Board of Directors Meeting
Wednesday, May 20, 2026

6:00 pm

In Person:
Board Room
Ava Community Energy
1999 Harrison St, Ste 2300
Oakland, CA 94612

Or from the following locations:

- Clipper Club – 5 Captain Dr. Emeryville, CA 94608
- 4917 Knowlson Terrace, Fremont, CA 94555
- City of Pleasanton – 200 Old Bernal, Pleasanton, CA 94566
- Stockton City Hall – 425 N El Dorado St., Stockton, CA 95202
- 1755 Harvest Landing Ln., Tracy, CA 95376

Via Zoom:
https://avaenergy-org.zoom.us/j/87023071843

Or join by phone:
Dial(for higher quality, dial a number based on your current location): US: +1 669 900 6833 or +1 346 248 7799 or +1 253 215 8782 or +1 929 205 6099 or +1 301 715 8592 or 888 475 4499 (Toll Free) or 877 853 5257 (Toll Free)
Webinar ID: 870 2307 1843

Meetings are accessible to people with disabilities. Individuals who need special assistance or a disability-related modification or accommodation to participate in this meeting, or who have a disability and wish to request an alternative format for the meeting materials, should contact the Clerk of the Board at least 2 working days before the meeting at (510) 906-0491 or cob@avaenergy.org.

If you have anything that you wish to be distributed to the Board of Directors, please email it to the clerk by 5:00 pm the day prior to the meeting.

1. **Welcome & Roll Call**

2. **Pledge of Allegiance**

3. **Public Comment**
   This item is reserved for persons wishing to address the Board on any Ava-related matters that are not otherwise on this meeting agenda. Public comments on matters listed on the agenda shall be heard at the time the matter is called. As with all public comment, members of the public who wish to address the Board are customarily limited to two minutes per speaker and must complete an electronic speaker slip. The Board Chair may increase or decrease the time allotted to each speaker.

CONSENT AGENDA

4. **Approval of Minutes from April 15, 2026**

5. **Contracts Entered Into (Informational Item)**

REGULAR AGENDA

Pursuant to Board direction, any agenda item not started by 9:00 p.m. will be continued to a future meeting unless the Board, by majority vote, elects to hear the item that evening. The Board may also determine an alternate disposition of the item at its discretion.

6. **CEO Report**

7. **CAC Report**

8. **Integrated Resource Planning (IRP) Process Overview (Informational Item)**
   Review the compliance IRP process and timing of submission, and a preview of initial analysis

9. **Fiscal Year 2026-2027 Draft Budget Review (Informational Item)**
   Review the estimated draft budget for the next fiscal year

10. **City of San Leandro's request for default service plan change (Informational Item)**
    Update the Board about the City of San Leandro's request to change their default service plan to Bright Choice

11. **Board Member and Staff Announcements including requests to place items on future Board of Directors Meeting Agendas**

12. **Adjourn**

    The next Ava Board of Directors meeting will be held on Wednesday, June 17, 2026 at 6pm.

Ava Community Energy

1999 Harrison Street, Suite 2300, Oakland, CA 94612

Board Meeting Access Instructions

If you need help finding or accessing the building, please call our Ava representative who is stationed in the building lobby: 510-393-0492.

Directions

Directions via BART

If you are taking BART: the 19th Street station is the closest stop to our office and is about a 5 minute walk away. Use the 20th St / Thomas L. Berkeley Way station exit.

Directions via Bike

Bike riders wanting to park their bike inside the parking garage can enter through the main building lobby. Bike parking is available on the parking garage first level right in front of the garage elevators.

Directions to Parking Garage via Car

The entrance to the building's attached garage is located on Harrison Street. If you're driving northbound on Harrison Street, as soon as you cross 19th St. the garage entrance is 3/4 down on your left-hand side. If you're heading east on Thomas L Berkeley Way/20th St. Continue East then make a right turn on Harrison Street, and the garage entrance is a quarter block up on your right-hand side.

When you arrive, enter via the gate labeled "Public Parkers". There are four floors of the parking garage, and you will need to take the elevator in the parking garage to the first floor. The parking attendant or an Ava representative will provide access into the building lobby.

The parking garage entry gate will be open until 8pm for CAC and BOD meetings. Attendees can exit the parking garage until 11pm.

Note that the garage's parking fee is $30 per use. Street parking is widely available near the building and free after 6pm.



Check-in at Security Desk

When you arrive at our building, please check in with the security desk in the lobby to get access to the elevators. If you have questions or need assistance, an Ava representative will be stationed and identifiable in the lobby. They can be reached at: 510-393-0492.

Draft Minutes (corrected)
Board of Directors Meeting
Wednesday, April 15, 2026

6:00 pm

In Person:
Board Room
Ava Community Energy
1999 Harrison St, Ste 2300
Oakland, CA 94612

Or from the following locations:

- Clipper Club - 5 Captain Dr. Emeryville, CA 94608
- 4917 Knowlson Terrace, Fremont, CA 94555
- 35653 Scarborough Dr Newark, CA 94560
- 1100 Webster St, 2nd Floor Conference Room, Oakland, CA 94607
- Larch Clover Community Center – 11157 West Larch Road, Tracy, CA 95376
- Stockton City Hall – 425 N El Dorado St., Stockton, CA 95202

Via Zoom:
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1. **(1:21) Welcome & Roll Call**

Present: Members: Marquez (Alameda County), Jordan (Albany), Tregub (Berkeley), Morada (Dublin), Kaur (Emeryville), Keng (Fremont), Roche (Hayward), Barrientos (Livermore), Del Catancio (Newark), Brown (Oakland), Nibert (Pleasanton), Fugazi (Stockton), Nygard (Tracy), Sakakihara (Union City), CAC Chair Souza (Community Advisory Committee) and Chair Andersen (Piedmont)

Not Present: Members: Diallo (Lathrop) and Rickman (San Joaquin County)

Alternate Member Jordan served as representative for the City of Albany (Lopez).
Alternate Member Nibert served as the representative for the City of Pleasanton (Balch).

2. **(2:48) Pledge of Allegiance**

3. **Public Comment**
This item is reserved for persons wishing to address the Board on any Ava-related matters that are not otherwise on this meeting agenda. Public comments on matters listed on the agenda shall be heard at the time the matter is called. As with all public comment, members of the public who wish to address the Board are customarily limited to two minutes per speaker and must complete an electronic speaker slip. The Board Chair may increase or decrease the time allotted to each speaker.

(4:09) Public Comment – Jessica Tovar provided historical context on the development of community choice energy in the East Bay. Tovar also spoke about community work to advance local clean energy investments—particularly for underserved communities.

(7:28) CONSENT AGENDA

4. **Approval of Minutes from March 18, 2026**

5. **Contracts Entered Into (Informational Item)**

6. **CAC Appointments** **R-2026-7**
Report overview of CAC application process and resolution approving all nominations

7. **FY 2025-2026 Q2 Treasurer's Report**
Update on Ava's for FY 2026 Q3 cash position

8. **2026 Legislative Program Administrative Update (Action Item)** **R-2026-8**
Administrative updates on legislative program for 2026

Member Fugazi requested a correction to the March 18, 2026 Board of Directors minutes to reflect that Alternate Member Blower represented Stockton, not Tracy.

A. **Member Tregub motioned to pull Consent Agenda Item 6 – CAC Appointments. Member Marquez seconded the motion, which was approved 12/4/0/0/2**

Yes: Members: Marquez, Jordan, Tregub, Kaur, Keng, Roche, Barrientos, Del Catancio, Brown, Nibert, Nygard and Sakakihara
No: Members: Morada, Fugazi, Vice-Chair Gonzalez and Chair Andersen
Abstain: none
Recuse: none
Not Present: Members: Diallo and Rickman

B. **Member Roche motioned to approve Consent Items 4, 5, 7 and 8, including the correction to the minutes. Member Tregub seconded the motion which was approved 16/0/0/0/2 (yes/no/abstain/recuse/not present):**
Yes: Members: Marquez, Jordan, Tregub, Morada, Kaur, Keng, Roche, Barrientos, Del Catancio, Brown, Nibert, Fugazi, Nygard, Sakakihara, Vice-Chair Gonzalez and Chair Andersen
No: none
Abstain: none
Recuse: none
Not Present: Member: Diallo and Rickman

C. **Consent Item 6 – CAC Appointments**

Howard Chang, CEO, presented on the CAC Appointments item and answered questions from the Board.

Public Comment:
(36:53) Jim Lutz
(39:21) Cynthia Landry
(41:33) Jessica Tovar
(43:51) Margie Lewis
(45:57) Ed Hernandez
(48:17) Colin Logan
(51:01) Alexa Zargoza

Multiple speakers expressed concern regarding the proposed CAC appointments, particularly the potential loss of institutional knowledge and continuity. Speakers, including former and current CAC participants, also raised concerns about the process and encouraged the Board to consider alternatives such as staggered terms, retention of experienced members, and more inclusive approaches to CAC membership.

Member Fugazi motioned to approve the staff's recommendation for Consent Item 6. Member Barrientos seconded the motion, which was approved 15/1/0/0/2 (yes/no/abstain/recuse/not present):

Yes: Members: Jordan, Tregub, Morada, Kaur, Keng, Roche, Barrientos, Del Catancio, Brown, Nibert, Fugazi, Nygard, Sakakihara, Vice Chair Gonzalez and Chair Andersen
No: Member Marquez
Abstain: none
Recuse: none
Not Present: Members: Diallo and Rickman

REGULAR AGENDA

9. **(1:17:51) CEO Report**
Howard Chang, CEO, presented the CEO Report and answered questions from the Board. A written version of the report is available in the April 15, 2026 agenda packet.

There were no public comments on this item.

10. **(1:20:45) CAC Report**
CAC Chair Souza presented the CAC Report and answered questions from the Board. A written version of the report is available in the April 15, 2026 agenda packet.

11. **(1:22:49) Procurement Policy Update (Action Item) R-2026-9**
Proposed additions to Ava's procurement policy and contract template to more closely align with Member practices (Berkeley & Oakland)

John Perkins, Legislative Director, presented the CEO Report and answered questions from the Board.

Public Comment:
(1:34:08) Jessica Tovar
(1:36:15) Jenna Rafia Yuan
(1:38:31) Margie Lewis
(1:40:00) Colin Logan

Multiple speakers expressed support for the policy and urged the Board to make it permanent, citing concerns about impacts of ICE-related activities on immigrant communities and alignment with agency values.

Member Tregub motioned to approve the staff recommendation. Member Jordan seconded the motion.

Member Tregub accepted friendly amendments to:
1. **Remove the last sentence in the Prohibition on Contracting section stating, "This Prohibition on Contracting expires on December 31, 2028"; and**

2. **Direct staff to return the policy to the Board for discussion and/or consideration between March and June 2029.**

Member Jordan accepted the friendly amendments.

Vice-Chair Gonzalez then offered a substitute motion to approve the staff recommendation, as amended to:

1. **In the Prohibition on Contracting section of the policy, replace the first sentence with the following: "Ava shall seek to not enter into a new contract or amend or extend an existing contract with any Provider of Data Brokerage or Extreme Vetting services to ICE for the purpose of immigration enforcement";**
2. **In the Prohibition on Contracting section of the policy, remove the last sentence stating, "This Prohibition on Contracting expires on December 31, 2028"; and**
3. **Direct staff to return the policy to the Board for discussion and/or consideration between March and June 2029.**

Member Jordan seconded the substitute motion, which was approved 16/0/0/0/2 (yes/no/abstain/recuse/not present).

Yes: Members: Marquez, Jordan, Tregub, Morada, Kaur, Keng, Roche, Barrientos, Del Catancio, Brown, Nibert, Fugazi, Nygard, Sakakihara, Vice-Chair Gonzalez and Chair Andersen.

No: none

Abstain: none

Recuse: none

Not Present: Members: Diallo and Rickman

12. (2:19:38) 2026 Legislative Positions (Action Item) R-2026-10

Consideration of 2026 proposed legislative positions

Sam Sadle, Principle Legislative Manager, presented the 2026 Legislative Positions and answered questions from the Board.

There was no public comment for this item.

Vice-Chair Gonzalez motioned to approve the staff's recommendation. Member Roche seconded the motion which was approved 15/0/0/0/3 (yes/no/abstain/recuse/not present):

Yes: Members: Marquez, Jordan, Tregub, Morada, Kaur, Keng, Roche, Barrientos, Del Catancio, Brown, Nibert, Fugazi, Nygard, Sakakihara, Vice-Chair Gonzalez and Chair Andersen.

No: none

Abstain: none

Recuse: none

Not Present: Members: Diallo, Rickman and Fugazi

Items 13–14 Not Reached

- Pursuant to the Board's Agenda Schedule Protocol adopted on January 21, 2026, agenda items not reached by 9:00 p.m. are continued unless the Board elects to hear them by majority vote.
- As the meeting reached 9:00 p.m. prior to consideration of Items 13 and 14, and no motion was made to hear the items that evening, both items were continued to a future meeting.

13. **Health-e Communities Pilot Update (Informational Item)**
Not heard

14. **Ava Impact Report (Informational Item)**
Not heard

15. **(3:06:53) Board Member and Staff Announcements including requests to place items on future Board of Directors Meeting Agendas**

- **Member Marquez** requested to consider the addition of a third At Large CAC seat and to stagger CAC appointments.
- **Chair Andersen** announced the opening of the City of Piedmont's public pool, the second all-electric municipal pool in Northern California.

16. **(3:08:11) Adjourn**
The meeting was adjourned at 9:09 p.m.

The next Ava Board of Directors meeting will be held on Wednesday, May 20, 2026 at 6pm.

Consent Item 5

To:	Ava Community Energy Authority
From:	Howard Chang, Chief Executive Officer
Subject:	**Contracts Entered Into**
Date:	May 20, 2026

RECOMMENDATION

Accept the CEO's report on contracts that Ava Community Energy has entered into, as required by the Administrative Procurement Policy, from April 10, 2026 through May 14, 2026.

Counterparty Name	Record Name	Record Type	Contract Purpose	Contract Value	Not To Exceed	Expiration Date	City	State	Ironclad Id
Abbott, Stringham & Lynch	March 2026 Purchase Rider	Purchase Rider	Provide 2025 data audit services to Ava	$13,000.00	$13,000.00	2026-10-31	Campbell	CA	IC-2688
Bike East Bay	April 2026 Purchase Rider	Purchase Rider	Sponsorship of Bike East Bay for 2026	$12,875.00		2027-04-24	Oakland	CA	IC-2741
COASTAL CLOUD, LLC	May 2026 Amendment to the Consulting Services Agreement	Consulting Services Agreement	Contract Purpose: Provide consulting services and subject matter experts for various Salesforce functionality.; Amendment Purpose: Extending the agreement by 40 hours to accommodate a change order driven by Ava needs	$9,000.00	$222,350.00	2026-12-31	Palm Coast	FL	IC-2789
DataEndure	Quote #DATQ25473	Vendor Purchase Template	Professional services only and is related to the new software licensing we just purchased for Okta	$10,000.00		2027-04-20	Santa Clara	CA	IC-2735

Counterparty Name	Record Name	Record Type	Contract Purpose	Contract Value	Not To Exceed	Expiration Date	City	State	Ironclad Id
GB Endeavors LLC	May 2026 Amendment to the Consulting Services Agreement	Consulting Services Agreement	Contract Purpose: Provide CEO executive coaching services; Amendment Purpose: Extend executive coaching agreement by one year.	$10,000.00	$35,000.00	2027-06-30	Oceanside	CA	IC-2838
Jonathan Tedesco	March 2026 Consulting Services Agreement	Consulting Services Agreement	CEO evaluation	$12,000.00	$12,000.00	2027-04-21	San Diego	CA	IC-2702
Moss Adams	Order Form	Vendor Purchase Template	LOOM software purchase (for creating recorded demos)	$960.00		2027-04-17	Seattle	WA	IC-2765
Oakland Venue Management Inc.	April 2026 Amendment to the Consulting Services Agreement	Consulting Services Agreement	Contract Purpose: Provide audio support for Board meetings.; Amendment Purpose: Renew contract	$68,000.00	$207,794.00	2027-06-30	Oakland	CA	IC-2771

Counterparty Name	Record Name	Record Type	Contract Purpose	Contract Value	Not To Exceed	Expiration Date	City	State	Ironclad Id
Twenty to Nine LLC d/b/a Delve	Terms of Service	Vendor Purchase Template	Short-term market research project (March - July 2026) using Delve.	$200.00		2027-02-27	New York	NY	IC-2732

CEO Report Item 6

TO: Ava Community Energy Board of Directors

FROM: Howard Chang, Chief Executive Officer

SUBJECT: **CEO Report (Informational Item)**

DATE: May 20, 2026

Recommendation
Accept Chief Executive Officer (CEO) report on update items below.

Executive Committee Meeting
An Executive Committee Meeting was held on Wednesday, May 6, 2026. Quorum was lost during the proceedings and the meeting was adjourned. The next regular Executive Committee will be held on June 3, 2026, at 3pm.

CalCCA Annual Conference
CalCCA held its annual conference May 12-14, 2026 in Sacramento, CA. This year marked the 10-year anniversary of CalCCA, which now represents 25 CCAs throughout California, collectively serving over 15,000,000 people. Ava sent a contingent of staff and board members to collaborate, learn, and share best practices. In addition to CCA staff, industry partners, state legislators, along with members of the CPUC, CEC, and CAISO, convened to celebrate this milestone and collaborate.

San Joaquin County Launch
On May 1, Ava began enrolling customers in unincorporated San Joaquin County. Customers will see this change reflected on the PG&E bill they receive beginning in June 2026. Ava is currently distributing the third of four required enrollment notices; customers will receive either an oversized postcard or an email, depending on the contact information available.

As of May 11, 2026, unincorporated San Joaquin County customers have a participation rate of 92%, meaning that 3,900 customers have opted to stay with PG&E for generation service.

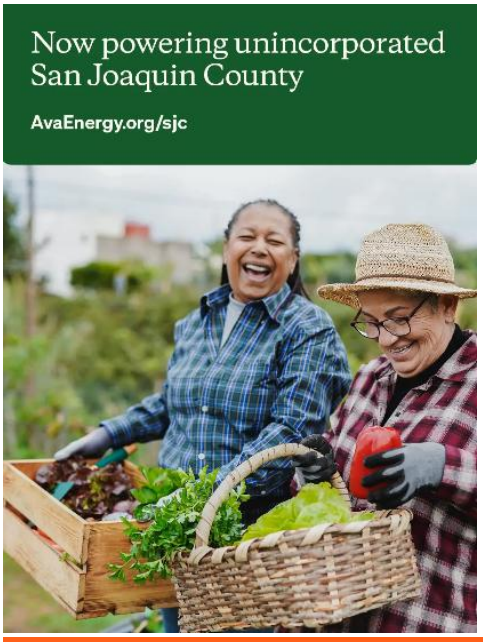
The first solar customer enrollments will begin in June for customers with a PG&E true-up month in May or June. Like non-solar customers, solar customers receive four required enrollment notices: two prior to their enrollment month, one during the enrollment month, and one following enrollment.

Ava enrolls solar customers on a rolling schedule designed to reduce potential bill impacts associated with an early solar true-up. Enrollment timing takes into account seasonal energy usage patterns and each customer's specific PG&E true-up month. Solar customer enrollments will continue throughout 2026, with the final group scheduled to enroll in April 2027.

Marketing & Outreach

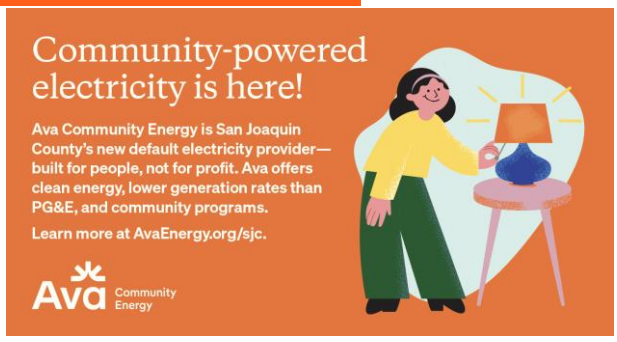
Ava continues outreach in San Joaquin County through participation in local events (see "Ava in the Community" below) including Municipal Advisory Committee meetings and tailored webinars in Spanish and English for agriculture and residential customers.

In May, Ava is running advertisements online featuring updated creative that reflects the official launch of service. Ads are appearing on Google, Meta, YouTube, and AudioGo platforms, as well as in print publications (Latino Times, San Joaquin Magazine, Tracy Press). Sample advertisements shown here:











Ava in DC

Community Choice Energy Alliance, the national trade association for CCAs (formerly known as LEAN Energy US), held its annual advocacy trip from April 20-24 in Washington, DC. Sam Sadle and Dominic Faria on Ava's Public Policy team were there representing Ava alongside a diverse group of CCA leaders from across the country. In total, 22 participants representing 14 CCAs—from California, Massachusetts, New Hampshire, New York, and Ohio—engaged in 28 total meetings with Congressional offices and Federal agencies and led networking events that strengthened connections among CCA advocates, national organizations, and Congressional staff. This included meetings with members of Ava's Congressional delegation and their staff (Reps. Lateefah Simon, Josh Harder, Ro Khanna, Adam Gray, and Mark DeSaulnier, and Sens. Alex Padilla and Adam Schiff), along with other members of the California Congressional delegation.

During these meetings and events, Ava and fellow CCA leaders educated policymakers on the CCA business model and how CCAs provide affordable, clean, and reliable power to millions of Americans all over the country. These included discussions on both challenges and opportunities, including the loss of federal clean energy tax credits, the importance of maintaining tax-exempt bond financing as a key tool for affordability, strengthening federal programs that support energy efficiency and reliability, and removing unnecessary burdens on clean energy development. Policymakers were particularly interested in solutions related to affordability, permitting reform, and emerging large load issues. Overall, this was a meaningful opportunity that helped Ava continue to establish itself as a player and leader in the federal policy space, as well as further relationships with decisionmakers in both parties.

Local Development Update

Given the high number of local development activities and varied status of design, implementation, and operations, we will aim to provide a summary update of all programs and services on a quarterly basis via the CEO report. The purpose is to keep the Board appraised of Local Development Programs and activities at a summary level. Action items and deep dives will continue to be brought forth on an as needed basis.

Program Name	Status	Description	Key Metrics	Key Upcoming Dates
Planning				
Customer Programs Roadmap	On Hold	Define Ava's customer programs roadmap for 2027-2032	N/A	Ava evaluating options to progress the Roadmap
Transportation Electrification				
Ava Charge	Operational	Developing EV fast charging sites on City lots and garages across Ava's service territory with a focus on locating near multi-family dwellings	Oakland City Center West garage with 31 chargers is now in operation	Ava negotiating with developers currently under contract to deliver the next Ava Charge projects
Ava SmartHome Charging	Operational	Program to shift home EV charging away from peak hours while helping customers lower their cost of home EV charging.	>2,700 EVs enrolled, Virtual Power Plant performance metrics are being met	Refining customer engagement and dispatch strategy to increase participation and optimize performance
Ava Bike Electric	Operational	Program to provide incentives for customers to purchase electric bikes, CARE customers receive higher incentives and 40% of allocated funds	over 19,000 applications received, 4,444 e-bikes purchased from 29 participating bike shops. 52% of rebate funding has been for CARE customers	Drawing on 4th Tuesday of each month.
Building Electrification				
Health-e Communities Pilot	Closed	Direct installation program to replace gas stoves with induction for CARE customers and complete indoor air quality monitoring to evaluate air quality impacts.	Installed 162 induction cooktops	Ava has closed the program and is documenting Program Learnings

Building Efficiency Accelerator	Operational	CPUC funded program to complete energy efficiency and building electrification projects on commercial and industrial customers, like LED lighting and heat pump water heaters	On target to reduce consumption by 12.8 GWh, 14 customers engaged in 100 unique projects	Program enrollment ends April 2026
SolarApp Heat Pump Water Heater (HPWH) permitting	Canceled	Contract with SolarApp to add heat pump water heaters to their online permitting application	SolarApp will deliver lessons learned from permitting departments, HPWH installers, and manufacturers on the value of expedited permitting	Contract cancelled do to Federal withdrawal of IRA funding and SolarApp needing to focus on core solar permitting business
Resilience				
Critical Municipal Facilities	In Development	Program to provide resilience on critical municipal sites. Eight projects across four cities will provide bill savings	Installing 258kW of PV and 1.34MWh of batteries generating 778,000 kWh of clean energy in year 1.	Five projects have recieved electrical sign-off. All seven NEM 2.0 projects are expected to be completed on time. Projects will become operational over the next quarter. Ava coordinating celebrations with City staff.
SmartHome Battery	Operational	Program to provide $11.25M in upfront and ongoing incentives for residential solar and storage projects	Manage 21MW of solar paired batteries for residential and low income customers.	SmartHome Battery Program launched in March. Initial projects being connected to Ava VPP
Community Resilience Hubs	Operational	Provide $5.75M in funding for Technical Assistance and incentives for the development of Community serving Resilience Hubs	Provide technical assistance for up to 50 Resilience Hubs sites and provide incentives for Resilience Hubs	Currently providing Technical Assistance to cohort of 14 sites that will be eligidle to apply for an incentive this summer. Additional sites can enroll in Technical Assistance.

Community Grants				
Community Grant Program	Operational	$8M budgeted for Community Grants to work with Community Based Organizations across four strategic focus areas	Award ~24 grants through 2033	Staff hosted Community Grants public workshop to solicit ideas for next round of community grants. Staff compiling results and will develop next round of grant RFPs for issuance in 2026 with community input
EV Charging	Operational	Provided grants to local non-profits to install up to twelve level 2 EV chargers at multiple places of worship	Two grants of $300k over 3 years to Green the Church and Interfaith Power and light to install community owned EV chargers	Green the Church has installed their first project at Glad Tidings Church in Hayward. Both grantees continue to work on identifying sites
Youth Training	Operational	Empowering young individuals through education and exposure to employment opportunities and hands-on training in clean energy technologies through	Two grants of $300k over 3 years to Rising Sun and AGAPE to train over 150 youth in electrification and clean energy trades	Students are beginning to matriculate into the job market. Rising Sun is developing an online jobs platform to help graduates find work in the trades.
Community Resilience Hubs	Operational	Emerald Cities Collaborative	Grant of $350k over 2 years, ECC has completed three community workshops with over 170 participants and 26 unique community based organizations	ECC planning additional Community engagement workshops in 2026 to educate groups about Resilience Hubs and get potential sites into Ava's Technical Assistance Program

Ava in the Community - May

To raise awareness of Ava's service, support our community, and connect customers to our offerings, Ava sponsors and staffs events throughout our service territory all year long. Additionally, we also deliver presentations to community groups. Below is a list of upcoming events we'll be attending between 5/20 and 6/30. Learn more at https://avaenergy.org/about-ava/meetings-events/events/

Date	Event	Type	Location

5/21/2026	French Camp CMAC	Presentation	French Camp Elementary
5/20/2026	Stockton State of the City	Sponsoring & Tabling	Adventist Health Arena
5/29/2026	Wind Farm Tour	Internal Tour	Scott Haggerty Wind Energy Center
5/29/2026	El Concilio Coalition Meeting	Sponsoring & Tabling	El Concilio California Community Center
5/31/2026	Ballers Sun Day #1	Sponsoring & Tabling	Raimondi Park
6/6/2026	San Leandro Cherry Festival	Sponsoring & Tabling	Downtown San Leandro
6/6/2026	East Bay Green Home Tour	Sponsoring & Tabling	Various homes in East Bay
6/12/2026	Stockton Ports game	Sponsoring & Tabling	Banner Islandball Park
6/13/2026	Fremont Pride Fair	Tabling	Fremont Main Library
6/14/2026	San Joaquin AgFest	Sponsoring & Tabling	San Joaquin County Fairgrounds
6/20/2026	Hayward Juneteenth	Sponsoring & Tabling	Hayward Heritage Plaza
6/20/2026	Stockton Juneteenth	Sponsoring	San Joaquin County Fairgrounds
6/27/2026	E Bike Test and Ride	Sponsoring & Tabling	Oakland Coliseum BART

Community Sponsorship Recipients

Three times a year, Ava awards sponsorships to community organizations across our service area. Funding areas include (but are not limited to) sports, art, music, and STEM. More information, eligibility criteria, and a link to apply for the next round of sponsorships can be found at https://avaenergy.org/community/grants-sponsorships/community-sponsorships/. The most recent sponsorship recipients are:

Recipient Org	City	Type	Sponsorship Amount
Women of the World Fund	Oakland	Social Services	$2,500
Oakland Ballet Company	Oakland	Arts and Culture	$2,500
The Leap Center	San Leandro	Environmental	$2,500
California Field School	Oakland	Bike	$2,500
Beloved Communities Network	Oakland	Food	$2,500
Stockton Art League	Stockton	Arts and Culture	$2,500
Roosevelt Green Hornets	San Leandro	Education	$2,500
Seneca Family of Agencies	San Leandro	Youth	$2,500
Partners For Change Tri-Valley	Livermore	Social Services	$2,500
Green Silicon Valley	Fremont	Education	$2,500

The Peace Haven Corporation	Hayward	Social Services	$2,500
Albany Climate Action Coalition	Albany	Environmental	$2,500
Trybe Inc.	Oakland	Arts and Culture	$2,500
Walk Oakland Bike Oakland	Oakland	Bike	$2,500
Down by the Bay Nursery	Hayward	Environmental	$2,500
East Bay Photo Collective	Oakland	Arts and Culture	$2,500
Serenity House	Oakland	Public Health	$2,500
Tri-City Ecology Center	Fremont	Environmental	$2,500

Staff Report Item 8

To:	Ava Community Energy Authority
From:	Marie Fontenot, SVP of Power Resources
Subject:	Updating the board on the status of Ava's 2024 Integrated Resource Plan compliance filing, due to the California Public Utilities Commission in August, 2026.
Date:	May 20, 2026

Summary/Recommendation

This staff report seeks to (1) provide an overview of deliverables Ava is required to submit no later than August 10, 2026 to comply with the California Public Utilities Commission (CPUC) Integrated Resource Plan (IRP) proceeding; and (2) discuss preliminary results of Ava's analysis and describe what additional information will be presented to the Board for approval prior to completion of the compliance filing. This item is informational and no action is required.

Financial Impact

N/A

Analysis and Context

All California Public Utilities Commission (CPUC) jurisdtictional load serving entities, including Ava, are required to comply with regulatory requirements. One of the CPUC's regulatory proceedings is the Integrated Resource Planning (IRP) Proceeding. The IRP has two distinct tracts: track 1, a bi-annual compliance analysis and filing; and track 2, procurement mandates and resource sufficiency demonstrations.

The 2026 bi-annual compliance analysis and filing must be submitted to the CPUC by August 10, 2026. Ava must perform a long-term resource planning analysis that looks out into the

2040s and evaluates what resources are the best fit for Ava's portfolio going into the future. The analysis will evaluate potential portfolio costs and how effectively the future, hypothetical portfolio will be able to reduce emissions.The analysis must comply with the CPUC's prescriptive assumptions and incorporate Ava own assumptions of resource availability as well as internal requirements, like achieving an carbon-free portfolio as measured on a net annual basis by 2030.

Regulation requires that Ava obtain Board approval of the compliance analysis prior to filing it with the CPUC. Based on the current filing due date of August 10, 2026, staff will present the compliance analysis and filing materials to the Board for approval in the July Board meeting.

In today's meeting, staff will present an overview of what will be filed in August as well as some preliminary analytical results to demonstrate the type of information that will be presented for the Board's approval prior to filing. The preliminary results are not an accurate numerical or value respresentation of what will be included for filing in August. Staff also attaches to this report copies of the previous IRP compliance filing materials, completed in 2022, to help the Board familiarize itself with the required format of the materials.

In addition to the CPUC-mandate analysis and compliance filing, Ava staff will perform additional analyses using modified assumptions. Staff will present the additional analyses to the Board in the future; these analyses will provide explanations of wht Ava's forecasted demand growth is, the costs of different possible resource portfolios, and the effectiveness of those resource portfolios in reducing Ava's contribution to grid emissions over time. These long-ter, planning analyses inform what resources Ava contracts wit over time but do not explicitly guarantee that Ava will contract with certain resource types or volumes from any resource type as the assumptions of resource cost and availability that are made when performing the analysis do not perfectly correlate to market conditions wen contracting occurs.

Attachments

A. Staff Presentation
B. 2022 IRP Narrative Document in required format
C. 2022 IRP Resource Data Template in required excel format
D. 2022 IRP Clean System Power Calculator in required excel format

Ava Community Energy



Integrated Resource Planning - 2026

Marie Fontenot | May 20, 2026

Agenda

- **Overview of IRP**
- **Timeline**
- **Submission**
- **Required Materials for Submission**
- **CPUC Required Inputs**
- **Description of Model Assumptions**
- **Discussion of Preliminary Results**

Overview of Integrated Resource Planning

- The California Public Utility Commission's (CPUC) Integrated Resource Planning (IRP) program is a long-term planning process to ensure enough generation capacity is built to:
  1. Reliability meet customer demand
  2. Meet greenhouse gas reduction targets
- CPUC staff use capacity expansion modeling to determine the optimal mix of resources needed to meet requirements 1 and 2
- To inform their modeling, the CPUC requires Load Serving Entities (LSEs) to submit our own IRP portfolios identifying least-cost, GHG-compliant resource mix to meet our customer demand
- Ava's IRP Portfolio submission is both a compliance requirement and an opportunity to express our procurement preferences

Timeline & Process

Date	Event
Oct 28, 2025	Scoping Memo establishing 2026 IRP Schedule
Jan 16, 2025	Filing requirements published via ALJ ruling
August 10, 2026	IRP filing deadline to CPUC
~Q3 & Q4 2026	CPUC staff aggregate LSE IRPs, prepare proposed PSP portfolio
~Q1 or Q2 2027	ALJ ruling seeking comments on proposed PSP
~Q2 or Q3 2027	Proposed decision addressing LSE IRPs and adopting PSP
~Q3 2027	Final decision addressing LSE IRPs and PSP

Submission of Ava's IRP

- Every two years, Ava is required to submit an IRP that meets CPUC-determined reliability and decarbonization metrics
- Specifically, Ava must submit:
  - Resource Data Template (RDT): Summary of current and planned procurement
  - Clean System Power (CSP) Calculator: Evaluation of portfolio emissions
  - Narrative Template: Description of portfolio and modeling process
- GenX modeling *informs*, but does not directly translate into, these deliverables

The Filing – Required Materials

Narrative Template

- Executive Summary
- Study Design
- Study Results
- Action Plan
- Lessons Learned
- Note: each section has required, defined subsections
- Ava's 2022 IRP Narrative Template: https://res.cloudinary.com/diactiwk7/image/upload/v1667342459/2022_IRP_EBCE_LSE_Plan_xj6yzo.pdf

Resource Data Template

- Excel workbook; many, many tabs
- Contract list w/ details
- Confirm contracts / resources are assumed to have "right' capacity factors based on when they come online & other details
- Summarize capacity value of resource
- Summarize types of resources in portfolio
- Ava's 2022 IRP RDT for 25 MMT portfolio: https://cdn.sanity.io/files/pc49kbjr/production/b06053ae09b11af066a291fa70d00d9653186e0b.xlsm

CSP Calculator

- Tool to estimate GHG & criteria pollutant emissions in portfolios
- Requirement to use this tool & method for emission accounting in IRP filing
- Only relevant to forecasting emissions, not calculating actual emissions
- Excel workbook; many, many tabs
- Ava's 2022 IRP CSP for 25 MMT portfolio: https://drive.google.com/file/d/1Dib2bFk5wLpibytxlLyxFxSjLM4Kr2qp/view?usp=share_link

Ava's 2018, 2020, 2022 IRPs can be found online at: https://avaenergy.org/about-ava/key-documents/integrated-resource-plan/

CPUC Requirements

Required Inputs

- Load forecast & GHG benchmark for each LSE
- CAISO zonal topology
- Resource regions align with CAISO study areas
- Rules on candidate resources; i.e. ***x*** much natural gas for whole system, ***x*** much geothermal, ***x*** much in-state wind, ***x*** much out-of-state wind, etc)
  - Includes rules for different resource capacity factors
  - Resource cost assumptions
  - Restrictions on how much of a resource type can be developed in different areas
  - Resource generation profiles
- Planning reserve margin and resource capacity factors (effective load carrying capability ELCC)
- 2024 dollar year

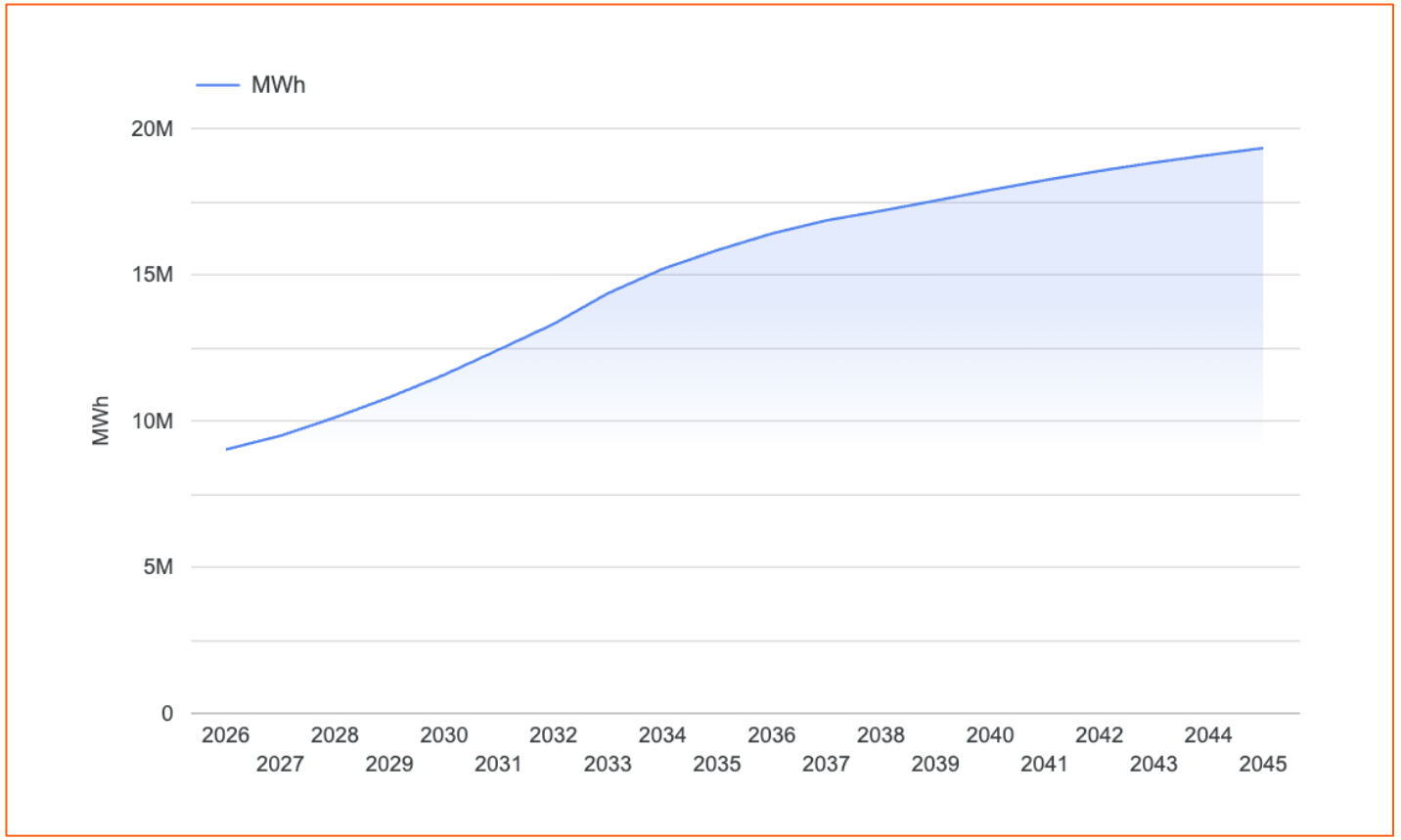
Preliminary Model Assumptions

Category	Constraint
Maximum Annual Build Capacity	500 MW
Maximum Market Purchase	1000 MWh
Maximum Market Sale	1000 MWh
Maximum out of state wind capacity	200 MW per year, 800 MW across all years
PCIA Hedge	Incorporated as market purchase
Minimum Annual Build Capacity	N/A

Preliminary Model Assumptions

Retail Demand: Applied historical load data shape to 2025 IERP Planning Forecasted Demand

Year	Retail Demand (MWh)
2026	8,990,567
2028	10,085,167
2030	11,544,908
2035	15,806,806
2040	17,863,484
2045	19,300,035



Current Model Assumptions

Peak Demand Forecast: CPUC input, Ava 2026 Filing Requirement Data

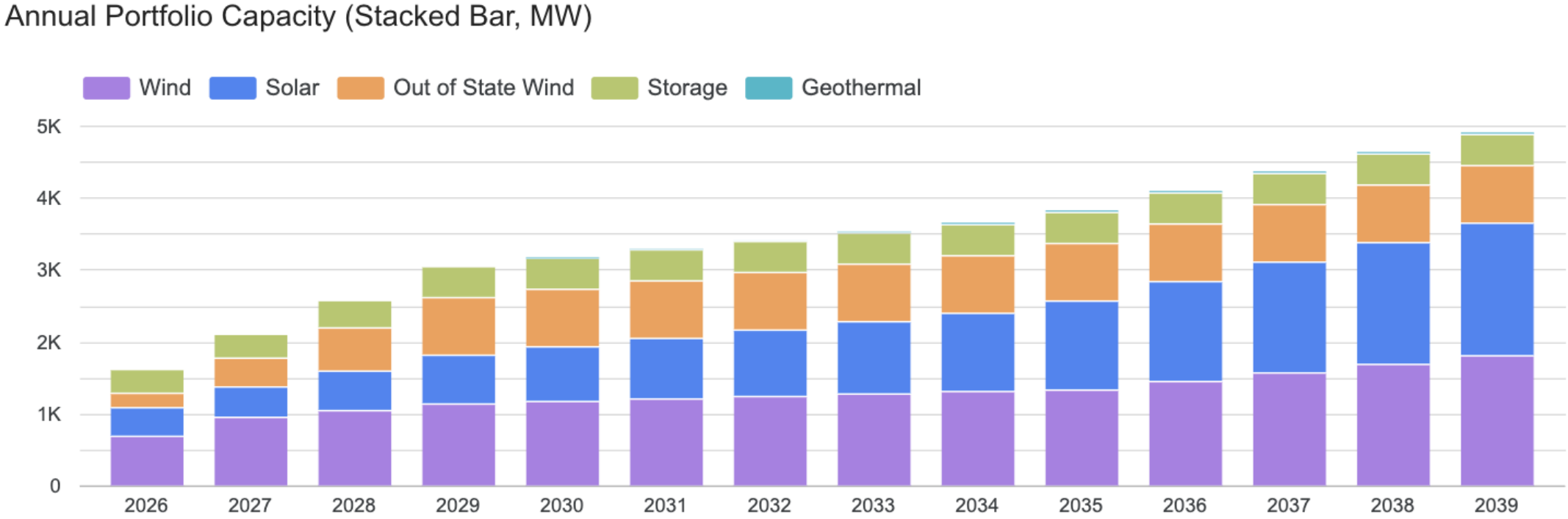
Year	Annual Peak Demand (MW)	PRM (%)	PRM Demand (MW)	Reliability Demand (MW)
2026	1954.5	18%	2306.3	2382
2028	2415.9	19%	2874.9	2463
2030	2497.6	21%	3022.1	2062
2035	3021.9	23%	3717.0	2419
2040	3260.3	23%	4010.1	2744
2045	3532.0	23%	4344.4	2944

Preliminary "Results"

- Graphs represent the *type* of images and analytical findings that will be shared when IRP modeling is complete.
- Values in these images are *not* representative of final results.
- "A model is only as good as its assumptions"
  - To-be finalized assumptions: annual capacity "build" limitations, resource-specific annual capacity limitations, any resource types to "force" offtake from

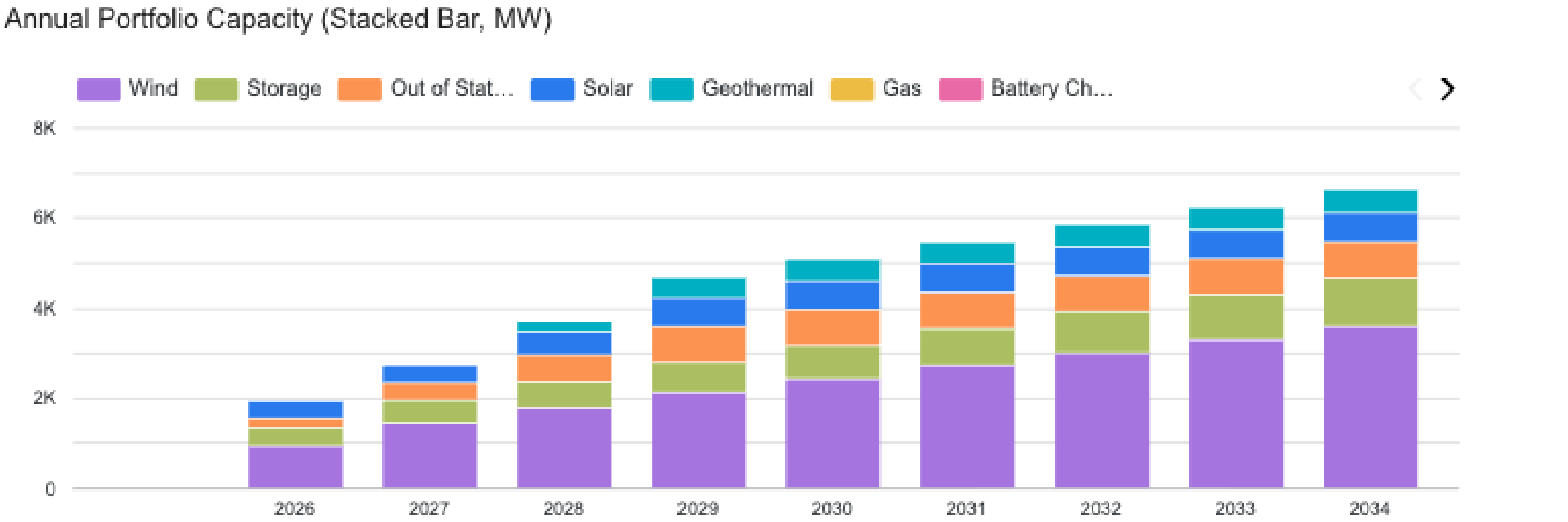
Total Capacity Results
(With 500 MW/year build constraint)

Annual Portfolio Capacity



Total Capacity Results (If no capacity constraint)

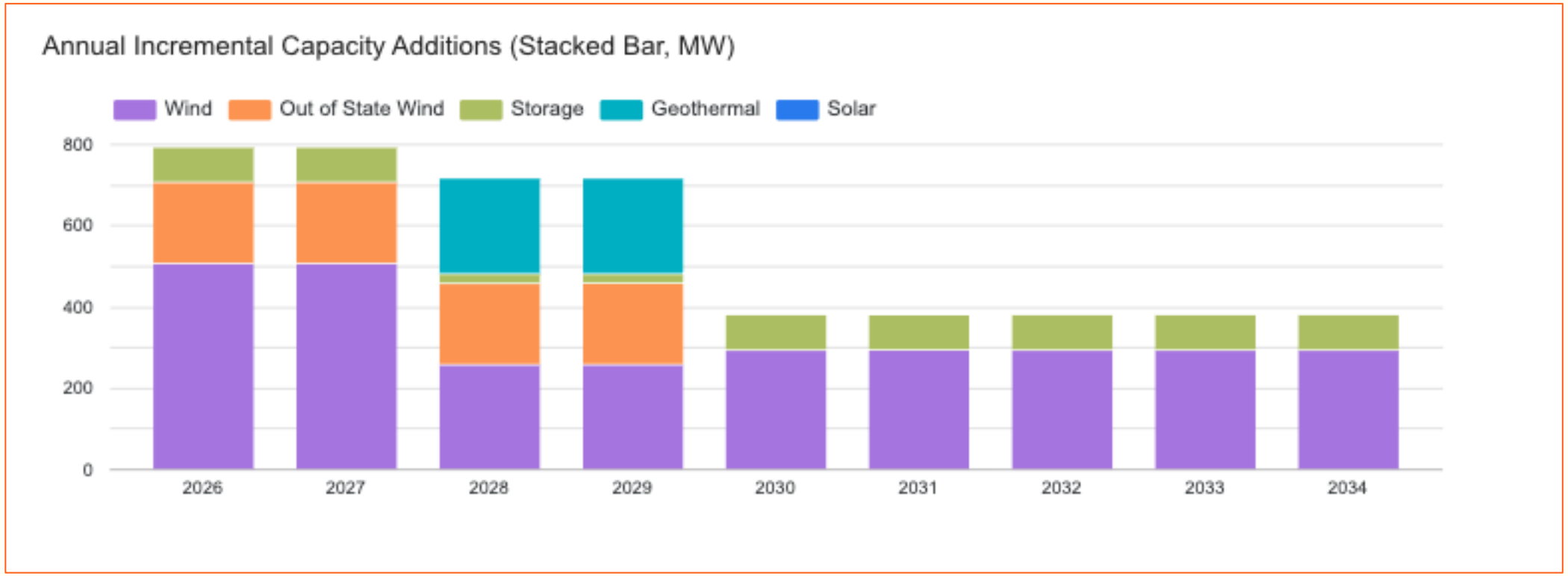
Annual Portfolio Capacity (If no capacity constraint on total new build)



Note: lack of new-build constraint results in significantly more geothermal added to portfolio

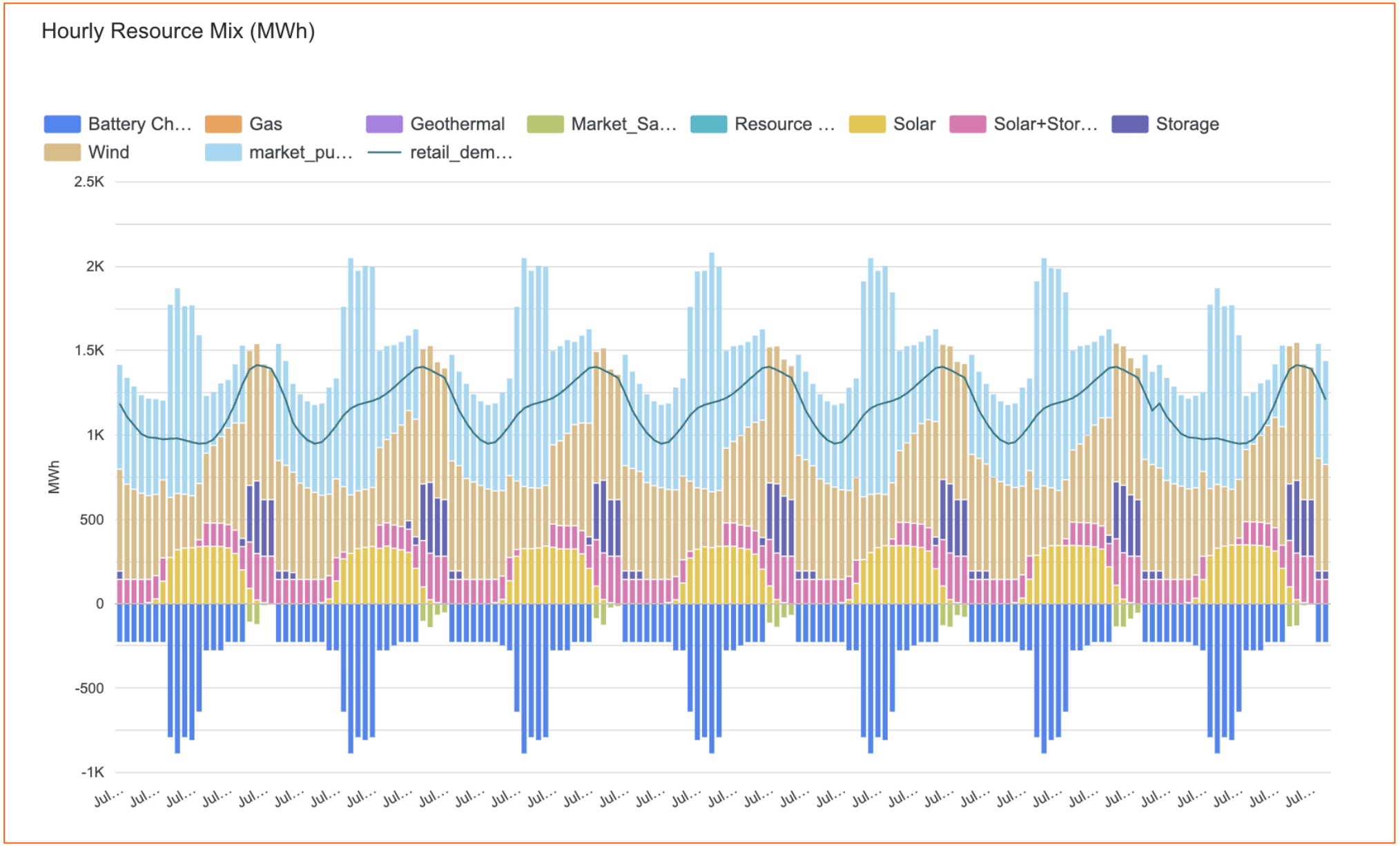
Incremental Capacity Results
(If no capacity build constraint)

Annual Incremental Capacity (New Build only, no build constraint)



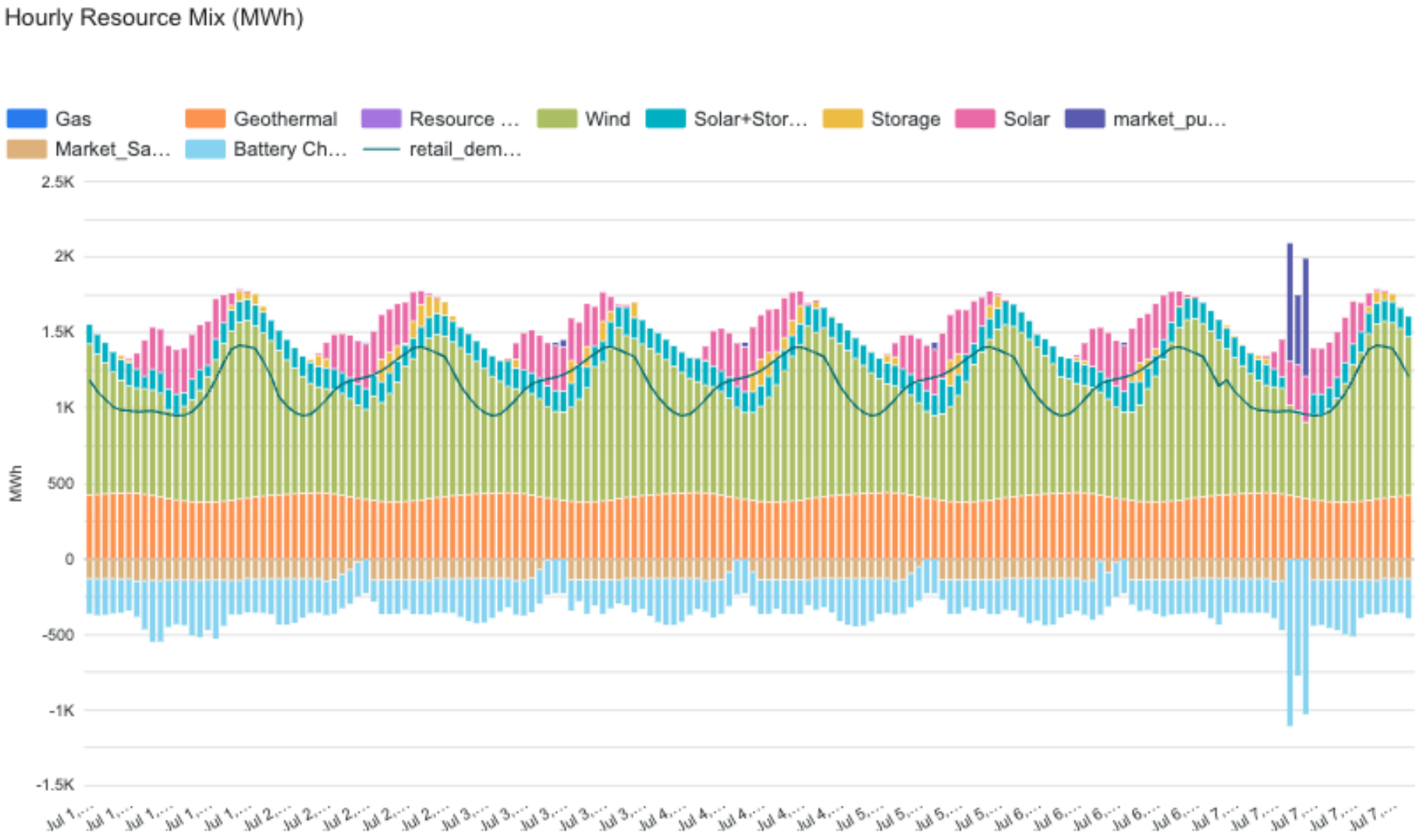
Note: lack of new-build constraint results in significantly more geothermal added to portfolio in early years

Hourly Resource Results



Hourly Resource Results

If no new build capacity constraint:



Additional Elements of Compliance Filing

- Estimated cost & revenues of portfolio
- Estimation of Ava's compliance portfolio emissions and portfolio contribution to state-wide emissions
- Estimation of annual generation from Ava's compliance portfolio and value/ability of portfolio to contribute to hedging
- Portfolio contribution to system reliability
- CAISO market exposure associated with the portfolio
- Ability of portfolio to meet RPS compliance obligations

Standard LSE Plan

East Bay Community Energy Authority

2022 Integrated Resource Plan

November 1, 2022

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I. Executive Summary

The East Bay Community Energy Authority (EBCE), a Community Choice Aggregator (CCA) and public Load Serving Entity (LSE) governed by elected officials from its 15 member communities,[1] is pleased to participate in the Integrated Resource Planning (IRP) process. EBCE is proud to serve one of the most dynamic and diverse communities in the State of California, with a clear mandate to spur the transition to a clean, greenhouse gas (GHG)-free energy economy while providing affordable energy to our customers.

This IRP narrative presents EBCE's Preferred Conforming Portfolio that meets all applicable reliability constraints and assigned GHG benchmarks for the 2022 IRP cycle. Together with the accompanying Resource Data Templates (RDTs) and Clean System Power (CSP) workbooks for both the 30MMT and 25MMT 2035 GHG scenarios, this narrative satisfies the IRP filing requirements defined by the California Public Utilities Commission (CPUC or Commission). On October 19, 2022, EBCE's Board of Directors (Board) approved the analysis and delegated final review of filing materials to EBCE's CEO.

For the 2021–2022 IRP cycle, EBCE partnered with First Principles Advisory to build a bespoke modeling framework that optimizes the goals of reliability, GHG-emission reductions, and affordability of different resources. Leveraging the benefits afforded by this modeling framework, EBCE identified an optimized least-cost portfolio that surpasses the emission reduction targets from the CPUC and meets the requirements for GHG-free procurement adopted by EBCE's Board. With no current plans to include new large hydro contracts or an allocation of nuclear power in its future portfolio, EBCE's entire supply of GHG-free energy in 2030 would be made up of qualifying renewable resources. As a result, EBCE exceeds the California State goal that LSEs serve at least 60% of retail sales with qualifying renewable sources by 2030. Additionally, at least 39% of the renewable generation in EBCE's Preferred Conforming Portfolio would be from resources with which EBCE had signed long-term contracts.

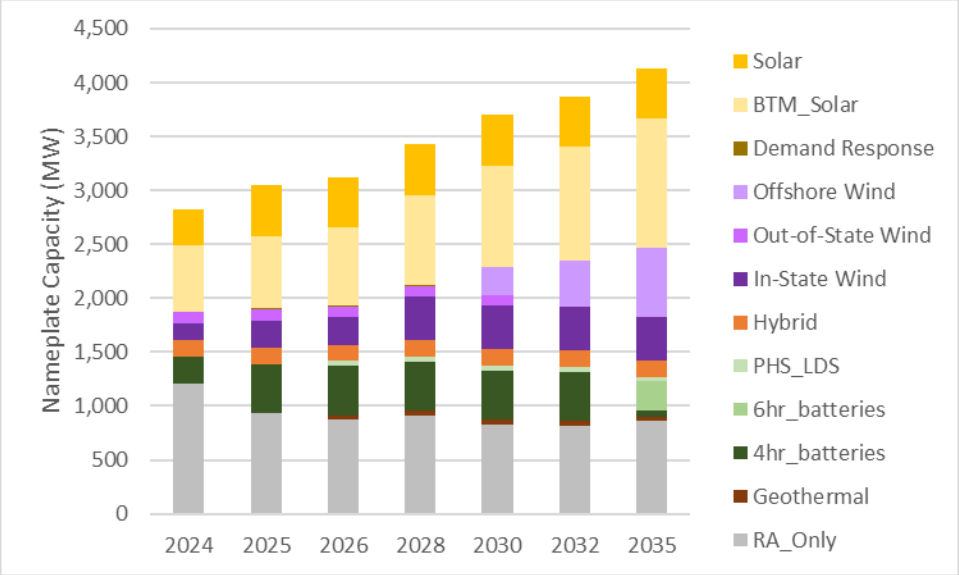
Actual procurement decisions may vary from EBCE's Preferred Conforming Portfolio due to prevailing market conditions, changes in direction from EBCE's Board, or CPUC action. Shortly after EBCE's completion of the modeling for this filing, the City of Stockton and EBCE's Board of Directors voted on and approved the City of Stockton's inclusion in EBCE's service territory starting in 2024. Required implementation filings to the CPUC have not been completed at this time, which means EBCE could not include Stockton's demand in the Preferred Conforming

[1] EBCE's current members are Alameda County and the Cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, Tracy, and Union City. The City of Stockton is scheduled to join EBCE in 2024.

Portfolio.[2] Nonetheless, EBCE staff view this IRP filing as an opportunity to communicate the overall direction of its procurement roadmap over the medium- and long-term horizons to EBCE's governing boards, customers, and regulatory agencies, while also recognizing a need for subsequent analysis that incorporates the additional electric demand from Stockton customers. EBCE encourages stakeholders to view the Preferred Conforming Portfolio as the organization's directional view on likely procurement decisions regarding resource types, amounts, locations, and timing of future portfolio additions.

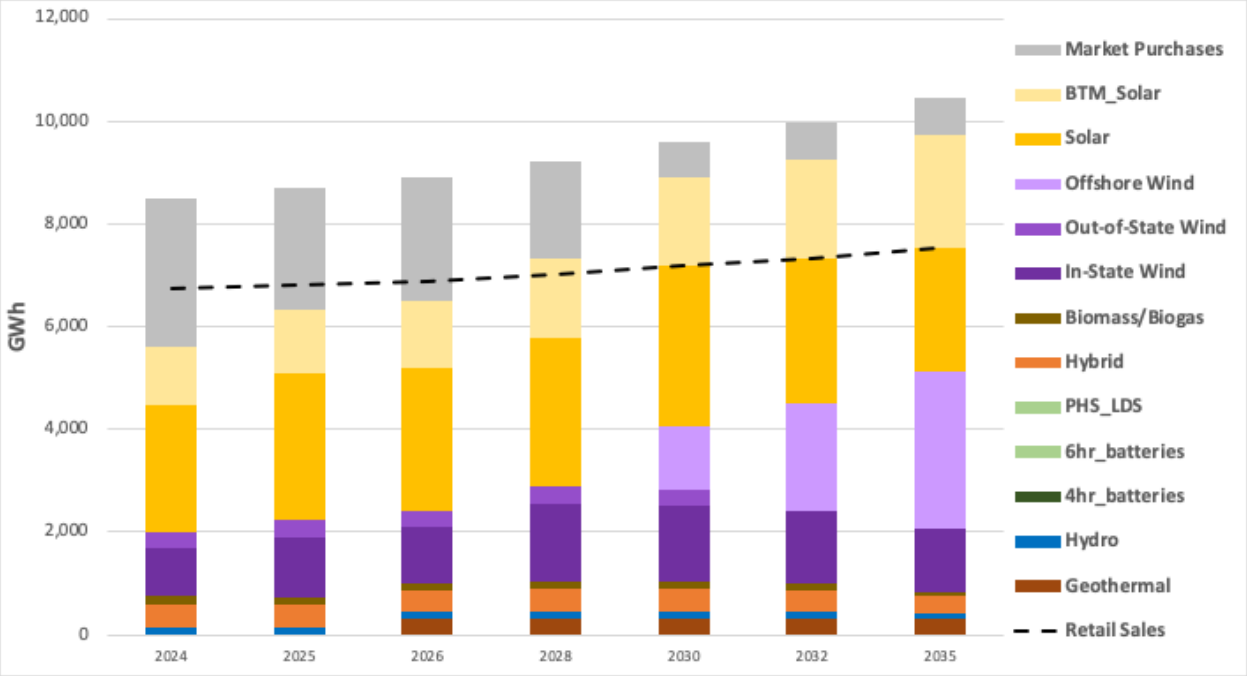
The total resource mix for EBCE's Preferred Conforming Portfolio is broken down by resource type in Figure 1 and Figure 2 below. These charts include EBCE's baseline resources, (i.e., resources already under contract), candidate resources (i.e., incremental resources added to the portfolio as part of this IRP exercise), environmental attributes (e.g., the Voluntary Allocation and Market Offer (VAMO)), and expected future market transactions (e.g., Resource Adequacy [RA]-Only contracts, fixed price Inter-Scheduling-Coordinator Trades (ISTs), and Day-Ahead Market purchases).

Figure 1 Nameplate Capacity of EBCE's Preferred Conforming Portfolio



[2] The CPUC determines the requirements for what constitute a "Conforming Portfolio" and specifies the retail sales forecast that each LSE must use for their filing to meet this definition. Nevertheless, EBCE appreciates that the Commission continues to allow LSEs to recommend modifications to the LSE-specific breakdown of the IEPR load forecast as part of the IRP cycle.

Figure 2 Annual Net Generation of EBCE's Preferred Conforming Portfolio[3]



To improve the applicability of the results from this IRP, EBCE staff supplemented the inputs and assumptions provided by the Commission with internal, proprietary forecasts on expected future market pricing conditions. The CPUC-provided values can be found in the 2022 Unified RA and IRP Modeling Datasets.[4] This dataset includes the 2021 California Energy Commission (CEC) Integrated Energy Policy Report (IEPR) load forecast, technology cost curves from NREL's 2021 Annual Technology Baseline (ATB), and the Effective Load Carrying Capacity (ELCC) values from the CPUC's latest loss-of-load-probability (LOLP) studies published in partnership with Energy and Environmental Economics, Inc. (E3), and Astrapé Consulting. EBCE staff relied on internal assumptions for the following: EBCE's actual procurement to date, expectations on future RA market pricing conditions and resource availability, and information germane to EBCE's local customer programs. All load-modifying resources, including BTM solar and storage, were modeled based on IEPR assumptions.

Once EBCE completed the modeling exercise to identify the optimal portfolio, staff transferred the results into the CPUC's RDT and CSP workbooks to verify that the portfolio conformed with all the applicable reliability and environmental requirements. As shown in the RDTs submitted

[3] Listed volumes include EBCE's VAMO allocations.

[4] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials/unified-ra-and-irp-modeling-datasets-2022

with this IRP Plan, EBCE's Preferred Conforming Portfolio satisfies its share of the system's Marginal Resource Needs in each year from 2024 – 2035 for both GHG scenarios. In addition, the calculated annual CO_2 emissions from the portfolio are 0.751 million metric tons (MMT) in 2030 and 0.614 MMT in 2035, which are less than EBCE's assigned GHG benchmarks of 0.772 MMT in 2030 and 0.623 MMT in 2035 for the 25 MMT GHG scenario.

II. Study Design

A. Objectives

Tracking the CPUC's IRP cycle, EBCE performs an IRP analysis exercise every two years to inform its mid-term and long-term procurement strategy. An integral part of EBCE's IRP analysis is to ensure that the planned resource mix can achieve the milestones assigned by EBCE's Board of Directors. Another key objective of this planning exercise is to identify a portfolio that satisfies CPUC requirements related to system reliability and GHG-reduction targets across the entire IRP planning horizon, which currently looks forward to 2035. The resulting portfolio not only is feasible to adopt and implement but may also assist EBCE in balancing the goals of reliability, decarbonization, and economics. Equally important, the IRP compliments the Commission's efforts to identify cost-effective resource choices that support system grid reliability and other statewide policy goals. The resource portfolio submitted for this IRP is the joint outcome of a series of fundamental modeling exercises as well as discussions with EBCE's Board, advisory committee, and other stakeholders.

The objectives for the analytical work described herein include:

- Satisfy the goals set forth by EBCE's Board;
- Satisfy the regulatory requirements of PU Code Section 454.52(a)(1);
- Satisfy all CPUC specifications for required conforming portfolios;
- Demonstrate how future portfolios achieve EBCE's 30 MMT and 25 MMT 2030 GHG Benchmarks;
- Demonstrate continuous progress towards meeting or exceeding the State's RPS targets;
- Show how EBCE's future portfolios will contribute to overall system reliability, particularly between the hours of 5 p.m. and 9 p.m.; and
- Provide insight into how State policy mandates and GHG emission reductions change EBCE customer costs over time.

B. Methodology

i. Modeling Tool(s)

For this IRP cycle, EBCE contracted with First Principles Advisory to design, build, and conduct the modeling analysis. To generate its Preferred Conforming Portfolios, EBCE and its consultant used a suite of modeling tools to account for all the critical modeling aspects related to planning: (1) capacity expansion modeling, (2) production cost modeling, and (3) local portfolio optimization. For capacity expansion modeling and local portfolio optimization, EBCE used Blue Marble Analytics' GridPath modeling software.[5] For production cost modeling of the California Independent System Operator (CAISO) system and broader WECC region, EBCE used Energy Exemplar's Plexos modeling program, an industry-leading fundamental modeling software.[6]

GridPath is an open-source fundamental modeling tool built and maintained by Blue Marble Analytics. The program can perform a variety of functions relevant to the IRP process, including regional capacity expansion modeling for CAISO and its surrounding balancing area (BA) regions. For this IRP exercise, GridPath was modified from its latest public release (version 14.1) to mimic the functionality available in RESOLVE. Specifically, two primary modifications were made: (1) an ELCC storage surface was added alongside the existing wind-solar ELCC surface; and (2) transmission deliverability constraints for peak primary, peak secondary, and off-peak time periods were also added to the linear problem (LP) formulation. In addition, GridPath was also modified to handle the CPUC-issued marginal ELCC values for each technology type across all years in the planning horizon. This last modification enabled EBCE to account for the annual reliability constraint in the RDT when generating its optimal portfolio.

For production cost modeling of the CAISO system and its surrounding BA neighbors, EBCE used Plexos. Working with First Principles Advisory, EBCE updated its Plexos' WECC zonal database with the Inputs and Assumptions for the 2022 IRP cycle and cross-referenced its database with the databases maintained by Energy Exemplar, the CEC and CAISO. The version of Plexos used for this modeling exercise was v9.0 R09.

ii. Modeling Approach

The modeling framework used to create EBCE's Preferred Conforming Portfolio is a multi-step process that begins with investment and operational decision modeling and concludes with local portfolio optimization. By individually addressing each of the key stages that constitute a robust

[5] See https://github.com/blue-marble/gridpath (latest available public codebase available at this website address).

[6] See https://www.energyexemplar.com/

IRP planning methodology, EBCE acquired greater clarity on potential future states of the grid and what the likely impacts would be to its portfolio. In addition, EBCE was able to conduct a detailed assessment of the trade-offs between its long-term goals and associated costs of such targets, and as a result, EBCE is better positioned to make timely, orderly, and cost-efficient procurement decisions for its customers.

Step 1 of the process begins with capacity expansion modeling (CEM) of the CAISO system in a manner similar to that taken by the CPUC's IRP instance of E3's RESOLVE model. Using the same inputs and spatiotemporal settings, GridPath was run by First Principles Advisory to conduct a benchmarking exercise with the CPUC's June 2022 Preferred System Plan (PSP). Although comparable results between the two models were attained, EBCE used the official results from RESOLVE to eliminate the introduction of modeling basis error downstream. Nevertheless, with GridPath successfully benchmarked to RESOLVE, EBCE is now capable of conducting additional capacity expansion modeling studies of the bulk electric system using alternative assumptions for future planning exercises.

Step 2 in the modeling sequence is to take the system buildout from Step 1 and port the selected candidate resources into a production cost model to assess system reliability, emissions, and regional forward pricing conditions in a more detailed manner. Similar to Step 1, EBCE assumed the same fuel and carbon price forecasts as listed in the official 2022 Inputs and Assumptions dataset. To map the candidate resources to the appropriate geographic region, First Principles Advisory leveraged the results of the CPUC's Resource-to-Busbar methodology defined for the 2021–2022 Transmission Planning Process (TPP)[7]. Once the setup of the Plexos model was complete, the model was run to ensure there was sufficient reliability across all hours and generated 8760 pricing for all the primary load zones in California. For this IRP cycle, EBCE only ran deterministic studies in Plexos and did not conduct any stochastic runs. EBCE will investigate the added utility in including stochastic runs to augment its reliability and pricing analysis for future IRP filings.

Once the Plexos modeling is finished, the analysis of the CAISO system is complete. The modeling framework then transitions into "local mode" for Step 3. In this step, Gridpath seeks to optimize EBCE's portfolio for the active planning horizon by identifying the candidate resources that, together with the existing baseline resources, will meet EBCE's reliability and environmental targets in a least cost manner. At this stage, financial markets for both energy and capacity are defined in Gridpath and the model implements a price-taking assumption on behalf of EBCE. The

[7] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2019-20-irp-events-and-materials/portfolios-and-modeling-assumptions-for-the-2021-2022-transmission-planning-process.

instantiation of these markets enables GridPath to assist EBCE in identifying the optimal tradeoff between bundled energy power purchase agreements (PPAs) and energy storage agreements (ESAs),[8] RA-only contracts, and market exposure to the CAISO's Day-Ahead (DA) market. In addition to these economic considerations, GridPath is also able to account for any Board-specific RPS and/or GHG goals that exceed state-mandated targets.

Figure 3 below conceptually outlines each step of the modeling framework.

Figure 3 Graphical Depiction of EBCE's IRP Modeling Methodology

Step	Stage: Region	Methodology Description
1	System CEM (GridPath)	Using the official I&A values, GridPath replicated the CPUC's June 2022 PSP generated in RESOLVE. **Note:** for this IRP cycle, EBCE did not evaluate alternative system-wide buildout scenarios and used the official published results for 30 MMT and 25 MMT base cases for the sake of consistency. For this IRP cycle, GridPath was primarily run to benchmark its results to RESOLVE. 
2	System PCM (Plexos)	Taking the official results from the June 2022 version of RESOLVE for the 30 MMT and 25 MMT cases, a zonal configuration of WECC—with an emphasis on the CAISO BA— is modeled for select calendar years from 2024-2035 to assess system adequacy, generate indicative forward pricing, and estimate systemwide GHG emissions. 
3	Local Portfolio Optimization (Gridpath)	Using the results from Step 2 along with the relevant CPUC-administered inputs for RA and GHG targets, GridPath identifies a portfolio with the optimal selection of candidate resources that will—along with the existing baseline resources— satisfy all the requirements LSEs must meet for a Conforming Portfolio as well as any additional LSE-specific constraints that exceed the requirements of the IRP proceeding. 

[8] Hereinafter all long-term agreements that include multiple products, whether in the form of an ESA, PPA or other form of contract, are referred to as "bundled PPAs" for ease of reference.

III. Study Results

A. Conforming and Alternative Portfolios

Pursuant to ALJ Ruling, an LSE is permitted to submit a single preferred portfolio where that LSE intends to go below its proportional share of both the 2030 30 MMT benchmark and the 2035 25 MMT benchmark.[9] EBCE intends to achieve a lower portfolio emissions level than its expected share of both the 30 MMT and 25 MMT 2035 benchmark. Therefore, EBCE elected to develop a single conforming portfolio for the 2022 IRP cycle. Table 1 lists the resources and corresponding nameplate capacities for the calendar years explicitly modeled in GridPath. For additional project related information, please refer to the RDT attachments.

Table 1 Nameplate Capacity (MW) of EBCE's Preferred Conforming Capacity by Project Type and Technology[10]

Project Type	Tech	Project	2024	2026	2030	2035
baseline	4hr_batteries	HenriettaStorage	10	10	10	10
baseline	4hr_batteries	Sanborn	47	47	47	0
baseline	4hr_batteries	Tumbleweed	50	50	50	50
baseline	BTM_Solar	BTM_Solar	618	719	940	1,196
baseline	Demand Response	OhmConnect	10	10	0	0
baseline	Demand Response	SUN01RA2031	1	1	1	0
baseline	Geothermal	FervoFECNevada1	0	40	40	40
baseline	Hybrid	DaggettSolarPower3	50	50	50	50
baseline	Hybrid	Scarlet	100	100	100	100
baseline	In-State Wind	SummitWind	56	56	56	56
baseline	Out-of-State Wind	Tecolote	100	100	100	0
baseline	RA_Only	Aggregate	1,205	873	832	858
baseline	Solar	EdwardsSolarII	100	100	100	100
baseline	Solar	RosamondCentral	112	112	112	112
baseline	Solar	TulareSolarCenter	56	56	56	56
candidate	4hr_batteries	Arizona_Li_Battery	57	117	117	0
candidate	4hr_batteries	Northern_California_Li_Battery	44	117	117	0
candidate	4hr_batteries	Riverside_Li_Battery	49	117	117	0
candidate	6hr_batteries	Generic_6hr_battery	0	0	0	268

[9] *ALJ Ruling Finalizing Load Forecasts and GHG Targets for the 2022 IRP LSE Plans,* issued June 15, 2022 at pp. 12, 15.

[10] Baseline "RA_Only" resources include EBCE's allocated share of Cost Allocation Mechanism (CAM) and Central Procurement Entity (CPE) related capacity.

candidate	8hr_batteries	Generic_8hr_battery	0	47	47	47
candidate	In-State Wind	Northern_California_Wind	100	200	349	349
candidate	Offshore Wind	Humboldt_Bay_Offshore_Wind	0	0	256	638
candidate	RA_Only	Aggregate	59	16	454	590
candidate	Solar	Arizona_Solar	55	205	205	205

Rather than assuming a proportional share of the June 2022 PSP, EBCE leveraged the capabilities of its modeling framework to identify a portfolio that was better suited to satisfy both state-mandated and EBCE-specific requirements. Table 2 lists the planned resources the organization would have selected had EBCE taken its proportional share of the PSP Portfolio.[11] To facilitate a comparative analysis, Table 3 summarizes EBCE's planned resources that GridPath selected for the Preferred Conforming Portfolio using a similar classification scheme.[12] Table 4 and Table 5 provide a similar comparison for the entire portfolio—including both baseline (i.e., existing) and candidate (i.e., planned) resources.

Table 2 EBCE's Pro-Rate Share of Planned Resources (MW) from 2022 PSP (25 MMT Scenario)

Technology	2024	2025	2026	2028	2030	2032	2035
DR	21	24	24	24	24	24	24
Solar	229	324	337	369	706	706	819
Geothermal	3	3	33	33	33	33	33
Biomass	2	3	3	4	4	4	4
In-State Wind	76	126	126	126	126	126	126
Out-of-State Wind	0	0	0	142	142	142	142
Offshore Wind	0	0	4	6	6	91	139
PHS / LDS	0	0	6	30	30	30	30
Li_Battery	298	349	349	357	429	473	584

[11] EBCE staff assumed 2.95% of total system load for this exercise.

[12] Table includes only bundled resources and excludes market-related transactions (e.g., RA-only or IST contracts). These volumes can be found in Table 5.

Table 3 Candidate (i.e., Planned) Resources (MW) Selected for EBCE's Preferred Conforming Portfolio

Technology	2024	2025	2026	2028	2030	2032	2035
DR	0	0	0	00	0	0	0
Solar	55	205	205	205	205	205	205
Geothermal	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0
In-State Wind	100	200	200	349	349	349	349
Out-of-State Wind	0	0	0	0	0	0	0
Offshore Wind	0	0	0	0	256	434	638
PHS / LDS	0	0	47	47	47	47	47
Li_Battery	150	350	350	350	350	350	268

Table 4 EBCE's Pro-Rate Share of Total Resources (MW) from 2022 PSP (25 MMT Scenario)

Technology	2024	2025	2026	2028	2030	2032	2035
RA	869	809	804	804	804	793	777
Hydro	293	293	293	293	293	293	293
DR	86	89	89	89	89	89	89
Solar	713	809	821	853	1,190	1,190	1,190
Geothermal	50	50	80	80	80	80	80
Biomass	26	27	27	28	28	28	28
In-State Wind	282	332	332	332	332	332	332
Out-of-State Wind	0	0	0	142	142	142	142
Offshore Wind	0	0	4	6	6	91	139
PHS / LDS	56	56	62	86	86	86	86
Li_Battery	357	408	408	416	487	531	642

Table 5 Nameplate Capacity (MW) of Total Resources Selected for EBCE's Preferred Conforming Portfolio

Technology	2024	2025	2026	2028	2030	2032	2035
RA	1,264	1,001	950	954	977	910	890
Hydro	0	0	0	0	0	0	0
DR	11	11	11	11	1	0	0
Solar	472	622	622	622	622	622	622
Geothermal	0	0	40	40	40	40	40
Biomass	0	0	0	0	0	0	0
In-State Wind	156	256	256	406	406	406	406
Out-of-State Wind	100	100	100	100	100	0	0
Offshore Wind	0	0	0	0	256	434	638
PHS / LDS	0	0	47	47	47	47	47
Li_Battery	300	500	500	500	500	500	371

As shown in Figure 4 and Figure 5 below, EBCE's Preferred Conforming Portfolio exhibits noteworthy differences when compared to its pro-rata share of the PSP. One of the principal distinctions between the two portfolios is the Preferred Conforming Portfolio's greater preference for wind energy over solar energy. While multiple assumptions in the GridPath model promote this resource type preference, the primary drivers are wind's resource profile during favorable LMP hours and greater per-unit reliability benefits thanks to the higher assigned ELCC factors from the CPUC. The other salient difference between the two portfolios is the selection between RA-only contracts and storage with tolling benefits. Similar to the wind-solar tradeoff, multiple assumptions affect the model's evaluation of RA-only and storage contracts for the portfolio. The primary ones, however, are the market price of RA, forecasted hourly energy prices, storage CAPX costs, and the required minimum contract length for both candidate resources.

Figure 4: Percent Allocation of EBCE's Portfolio Assuming Pro-Rate Share of 2022 PSP (25 MMT Scenario)

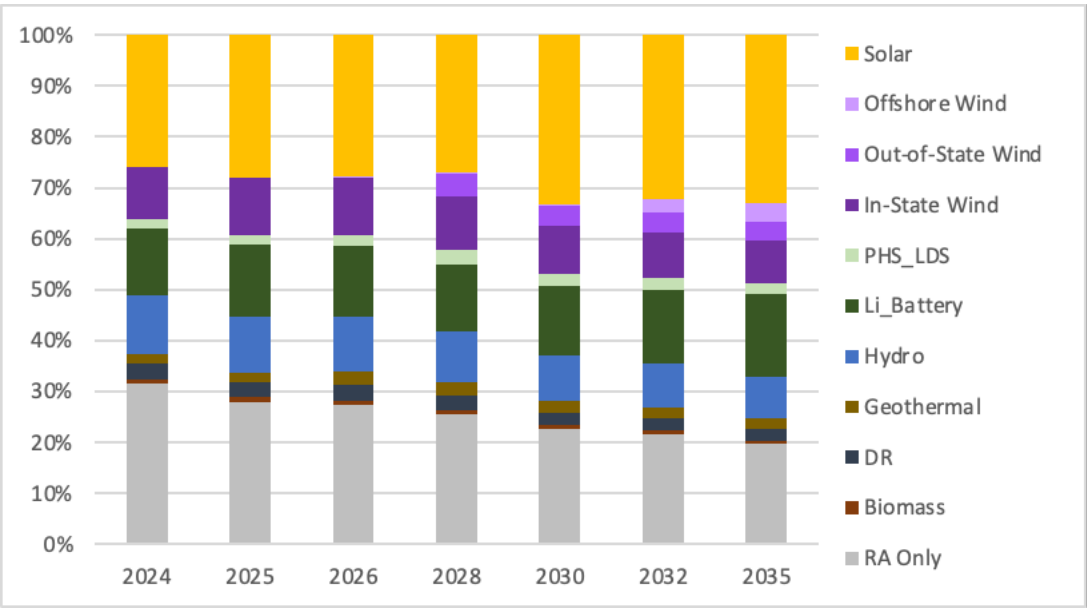
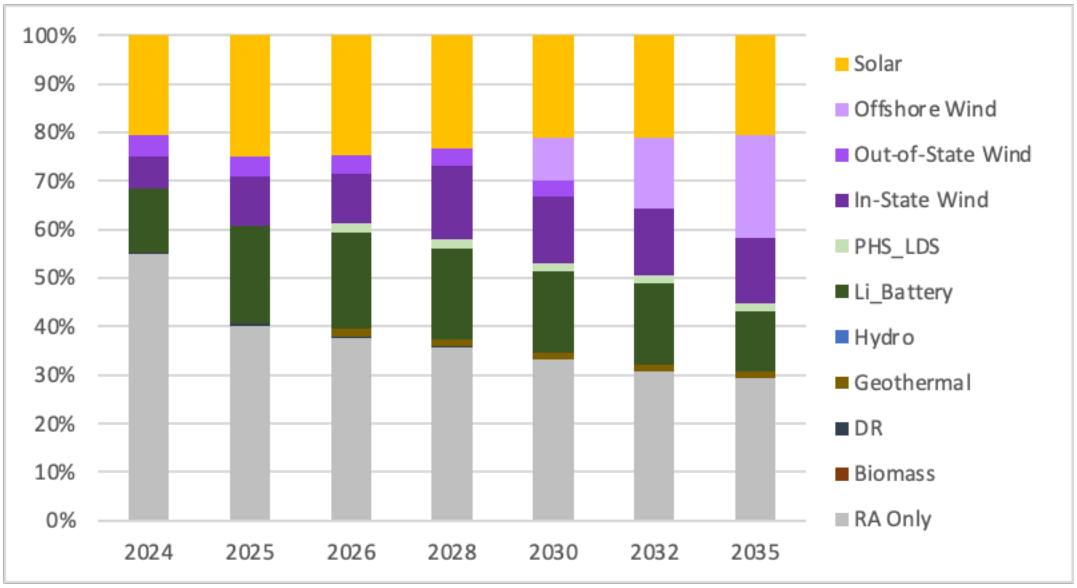


Figure 5: Percent Allocation of EBCE's Preferred Conforming Portfolio



iii. EBCE's existing and contracted resources

EBCE began executing long-term offtake agreements in 2019 and has released three RFOs since its inception. Presently, five of EBCE's long-term contracted assets are operational resources and numerous additional resources are scheduled to achieve commercial operation in the next few years. These resources are described below as physical, in development resources, consistent with the definitions provided in the Resource Data template. To date, EBCE has contracted with

nine RPS-eligible generating resources of varying types and in some cases with co-located energy storage, to reduce emissions and to cover our load. These contracts are not included in the CPUC's Baseline resource list and were added to the Resource Data Templates as physical resources in development for EBCE's 30 MMT and 25 MMT conforming portfolios to ensure completeness.[13]

- **Scott Haggerty Wind Energy Center**: The project is a 57.5 MW wind facility under contract with Greenbacker Energy; PPA executed on July 9, 2019. It is solely a wind facility and is located in Alameda County, making it the first in-county generating facility with energy off-take that EBCE contracted. The facility achieved Commercial Operation Date (COD) on July 20, 2021 and the term of the PPA is 20 years.
- **Golden Fields Solar**: The project is a 112 MW solar facility developed by Clearway Energy Group; PPA executed on July 26, 2019. It is solely a solar facility and is located in Kern County. The facility achieved COD on December 22, 2020 and the term of the PPA is 15 years.
- **Henrietta D Storage**: The project is a 10 MW, 4-hour duration energy storage (40 MWh) resource developed by Convergent Energy and Power; ESA executed on July 30, 2021. It is solely an energy storage facility and is located in Kings County. The facility achieved COD under its contract on January 1, 2022. The term of the PPA is 15 years.
- **Tecolote Wind**: This project is a wind facility developed by Pattern Energy; PPA executed on December 20, 2021. It is solely a wind facility and is located in Torrance and Guadalupe counties, New Mexico. The facility achieved COD on December 20, 2021 and the term of the PPA is 10 years.
- **Tulare Solare Center**: This project is a 55.8 MW solar facility under contract with Idemitsu Renewables; PPA executed June 10, 2019. It is solely a solar facility and is located in Tulare County. The facility achieved COD on April 30, 2022 and the term of the PPA is 15 years.
- **Scarlet I Solar Park**: This project is a 100 MW solar plus 30 MW 4-hour duration energy storage (120 MWh) resource developed by EDP Renewables North America; amended and restated PPA+ESA executed on March 21, 2022. It will be located in Fresno County. The expected COD is March, 2023 and the term of the PPA is 20 years.
- **Edwards Energy Center**: This project is a 100 MW solar facility developed by Terra-Gen; PPA executed on September 25, 2019. It is solely a solar facility and will be located in Kern County. The expected COD is December, 2022 and the term of the PPA is 15 years.
- **Sanborn Storage**: This project is a 47 MW 4-hour duration energy storage (188 MWh) resource developed by Terra-Gen; ESA executed on September 3, 2021. It is solely and energy storage facility and will be located in Kern County. The expected COD is December, 2022 and the term of the ESA is 12 years.
- **Daggett 3**: This project is a 50 MW solar and 12.5 MW 4-hour duration energy storage (50 MWh) resource developed by Clearway Energy; PPA+ESA executed on September 29,

[13] *See* Attachment 3a (Resource Data Template – 25 MMT) and Attachment 3b (Resource Data Template – 30 MMT).

2021. The facility will be located in San Bernadino County. The expected COD is July, 2023 and the term of the PPA+ESA is 15 years.

- **Oberon II**: This project is a 125 MW solar and 125 MW 4-hour duration energy storage (500 MWh) resource developed by Intersect Power with an executed PPA + RA Agreement on September 3, 2021. The facility will be located in Riverside County. The expected COD is January, 2024 and the term of the contract is 10 years.
- **Tumbleweed Energy Storage**: This project is a 500 MW 4-hour duration energy storage (200 MWh) resource developed by REV Renewables with an executed ESA on September 20, 2021. The facility will be located in Kern County. The expected COD is June, 2024 and the term of the contract is 15 years.
- **FEC Nevada 1**: This project is a40 MW geothermal facility developed by Fervo Energy; PPA executed on April 6, 2022.It is solely a geothermal facility and will be located in Churchill County, Nevada. The expected COD is June, 2026 and the term of the contract is 15 years.

Table 6 EBCE's current list of contracted long-term generation ("development resources")

Seller	Project Name	Technology	Nameplate MW	Storage MW	County	Expected COD	Term (Years)
Greenbacker Energy	Scott Haggerty Wind Energy Center	Wind	57.5	N/A	Alameda	7/20/2021	20
Clearway Energy Group	Golden Fields Solar	Solar	112	N/A	Kern	12/22/2021	15
Idemitsu Renewables	Tulare Solar Center	Solar	55.8	N/A	Tulare	4/30/2021	15
EDP Renewables North America	Scarlet I Solar Park	Solar + Storage	100	30MW/120MWh	Fresno	3/31/2022	20
Terra-Gen	Edwards Energy Center	Solar + Storage	100	TBD	Kern	12/31/2022	15
Clearway Energy Group	Daggett 3	Solar + Storage	50	12.5MW/50MWh	San Bernadino	7/30/2023	15
Intersect Power	Oberon II	Solar + Storage	125	31.25MW/125MWh	Riverside	1/1/2024	15
Pattern Energy	Tecolote Wind	Wind	100		Guadalupe & Torrance, NM	12/20/2021	10

Seller	Project Name	Technology	Nameplate MW	Storage MW	County	Expected COD	Term (Years)
Fervo Energy	FEC Nevada 1	Geothermal	40		Churchill, NV	5/01/2026	15
Convergent Energy and Power	Henrietta D	Storage		10MW/40MWh	Kings	01/01/2022	15
REV Renewables	Tumbleweed Energy Storage	Storage		50MW/200MWh	Kern	6/01/2024	15
Terra-Gen	Sanborn Storage	Storage		47MW/188MWh	Kern	12/28/2022	12

B. Preferred Conforming Portfolios

EBCE's Preferred Conforming Portfolio meets the CPUC's requirements of "conforming" and is consistent with the relevant statutory requirements of PU Code Section 454.52(a)(1). Below is a description of how EBCE's planned resource mix satisfies each of those requirements.

- The GHG reduction targets established by the State Air Resources Board for the electricity sector are set such that economywide GHG emissions reductions of 40 percent from 1990 levels by 2030 are achieved. By EBCE meeting its assigned GHG benchmarks for the 30MMT and 25 MMT scenario—as reflected in the accompanying CSP Calculators, this requirement is satisfied.
- Article 16 (commencing with Section 399.11) of Chapter 2.3 requires LSEs to meet at least 60 percent of retail sales with eligible renewable energy resources by December 31, 2030. Based on CSP accounting methodologies, EBCE's conforming portfolio is expected to meet 89% of retail sales with eligible RPS energy by 2030.
- Along with its current projections on future market pricing conditions, EBCE uses the costs assumptions provided by the CPUC. The organization's IRP modeling methodology applies these assumptions and identifies the least-cost portfolio that satisfies all defined reliability, GHG, and RPS constraints. As a result, EBCE's Preferred Conforming Portfolio fulfills its obligation to serve customers at just and reasonable rates and minimizes impacts on ratepayer's bills.
- By satisfying the reliability constraint defined in the RDT for both the 30MMT and 25MMT GHG scenario, EBCE believes it has demonstrated how its Preferred Conforming Portfolio meets the near-term and forecast long-term resource adequacy requirements of Section 380.

- Net of expected curtailments, EBCE's planned resource mix is scheduled to provide at least 65 percent of its RPS requirement for each compliance period from contracts of 10 years or more in duration. Please see the following table for supporting values.
- EBCE's planned resource mix is a diverse mix of resources that spans multiple technology types. In instances in which transmission upgrades are possible or likely (e.g., offshore wind) the organization will work with the appropriate stakeholders to assess commercial viability in a timely and costly manner.
- Enhance demand-side energy management.
- EBCE will continue to monitor the cost and availability of alternative supply-side and demand-side resources that can minimize air pollutant emissions, particularly in disadvantaged communities.

Table 7 Required RPS Portfolio Level and CSP Tool Modeled RPS Generation

	2024	2026	2030
Compliance Period	4	5	6
State RPS Requirement %	43.8	49.2	60.0
State RPS Requirement GWh	2,952	3,388	4,308
Delivered RPS (CSP)	4,370	5,253	6,415
State RPS Long-term Requirement (%)	65.0	65.0	65.0
State RPS Long-term Requirement (GWh)	1,919	2,203	2,800
Delivered LT RPS (CSP)	4,129	5,063	6,296

C. GHG Emissions Results

This section discusses the emissions results for EBCE's Preferred Conforming Portfolio as calculated by the Clean System Power (CSP) calculator.[14] Because EBCE is submitting a single portfolio that satisfies both GHG scenarios, the values listed below are from the 25 MMT version of the CSP.

While EBCE's portfolio meets the accepted definition of a 100% Renewable/CO2-Free Portfolio (eligible renewable or carbon-free resources as a share of *retail* sales, calculated on an annual basis), the modeling specifications developed by staff allowed the use of system power to shape

[14] The Clean System Power (CSP) tool is an excel-based workbook provided the CPUC that calculates emissions from CAISO system's dispatchable thermal generation and unspecified imports and allocates them to LSEs based on their planned IRP portfolios.

the renewable output and account for transmission and distribution losses. When the resulting Preferred Conforming Portfolio was input into the CSP, which takes an hourly view of emissions associated with a given portfolio, the system power portion of EBCE's portfolio is calculated as emitting 0.597 million metric tons (MMT) in 2030 and 0.518 MMT in 2035. Additionally, the CSP assigns each LSE a share of the system emissions from Combined Heat and Power (CHP) resources. Table 8 shows EBCE's CPUC-assigned GHG benchmarks for 2030 and 2035 at 0.772 MMT and 0.623 MMT, respectively. With reported emissions of 0.749 MMT in 2030 and 0.609 MMT in 2035, EBCE's Preferred Conforming Portfolio is compliant with the CPUC's targets in both years.

Table 8 CO_2 Emissions Summary of EBCE's Preferred Conforming Portfolio[15]

CO_2	*Unit*	2024	2026	2030	2035
Coal	*MMt/yr*	0.000	0.000	0.000	0.000
CHP	*MMt/yr*	0.163	0.162	0.159	0.098
Biogas[16]	*MMt/yr*	0.000	0.000	0.000	0.000
Biomass[16]	*MMt/yr*	0.000	0.000	0.000	0.000
System Power	*MMt/yr*	1.130	0.854	0.590	0.511
Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000
Total	***MMt/yr***	**1.293**	**1.015**	**0.749**	**0.609**
Average emissions intensity	*tCO_2/MWh*	0.192	0.147	0.104	0.081
Oversupply Emissions Credits	*MMt/yr*	0.15	0.17	0.10	0.22

- The only inputs specified by EBCE for the CSP workbook were the CPUC-issued retail sales and BTM solar forecasts and EBCE's supply portfolio information, which are copied over from the RDT. For this exercise, EBCE did not include any custom hourly load shapes or user-specified production profiles.
- Table 9 provides a summary of the amount of EBCE's portfolio that is provided by RPS and GHG-F resources according to the methodology used in the CSP. While GridPath modeling indicates that EBCE would achieve 100% of retail sales from GHG-free resources in 2030 and beyond, the CSP calculator expects curtailment beyond that shown in GridPath. This

[15] CHP emissions shown in Table 8 represent EBCE's pro rata share of behind-the-meter Combined Heat and Power (CHP) interconnected to the CAISO-controlled electric grid. CHP emissions are determined by the CSP calculator as a function of LSE load, unrelated to the 'actual' GHG-emission profile of any specific LSE's resource portfolio. EBCE is required to include this allocation in its CSP.

[16] As shown in the section below, EBCE is allocated particulate emissions associated with the VAMO allocation of Biomass / Biogas attributes. However, the CSP assigns no CO2 emissions for these resources.

modeled curtailment lowers the percentage of retail sales from GHG-free resources to 89% and 95% in 2030 and 2035, respectively. Please refer to the CSP calculator file for more information on the emission calculations used to generate the results shown in Table 8 and Table 9.

Table 9 CSP Summary of EBCE's Preferred Conforming Portfolio

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	6,740	6,887	7,180	7,540
RPS-Eligible Delivered Renewable	GWh	4,365	5,249	6,425	7,136
GHG free	GWh	4,365	5,249	6,428	7,147
RPS-Eligible Delivered Renewable Percentage	% of retail sales	65	76	89	95
GHG-free Percentage	% of retail sales	65	76	90	95

D. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

The following tables provide a breakdown of the air pollutant emissions (e.g., Particulate Matter (PM) 2.5, SO_2, and NO_X) associated with EBCE's Preferred Conforming Portfolio as calculated by the CSP. As previously mentioned, EBCE's primary source of air pollutants are the result of its reliance on system power, with some additional pollutants arising from EBCE's VAMO allocation[17]. To minimize the generation of local air pollutants and their corresponding impacts on disadvantaged communities, EBCE will continue to monitor the cost and availability of alternative candidate projects as well as the percentage of total supply for the portfolio made up by market purchases.

Table 10 Preferred Conforming Portfolio of PM 2.5 Emissions

PM2.5	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	9.16	9.09	8.95	5.50
Biogas	tonnes/yr	4.35	4.34	4.11	1.27
Biomass	tonnes/yr	36.95	35.04	26.08	19.87
System Power	tonnes/yr	28.85	21.28	16.58	13.88
Total	tonnes/yr	79.30	69.76	55.72	40.52
Average emissions intensity	kg/MWh	0.01	0.01	0.01	0.01

[17] Biogas and Biomass emissions appear in Local Air Pollutants Table 10, Table 11, and Table 12 as a result of EBCE accepting the VAMO allocation.

Table 11 Preferred Conforming Portfolio SO_2 Emissions

SO2	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	0.97	0.97	0.95	0.58
Biogas	tonnes/yr	3.17	3.15	3.06	0.95
Biomass	tonnes/yr	14.21	13.48	10.03	7.64
System Power	tonnes/yr	2.70	1.99	1.54	1.29
Total	tonnes/yr	21.05	19.59	15.58	10.47
Average emissions intensity	kg/MWh	0.00	0.00	0.00	0.00

Table 12 Preferred Conforming Portfolio NO_x Emissions

NOx	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	42.68	42.04	40.70	21.70
Biogas	tonnes/yr	14.25	14.18	13.76	4.29
Biomass	tonnes/yr	111.48	105.97	79.24	60.35
System Power	tonnes/yr	34.58	25.26	21.27	17.72
Total	tonnes/yr	203.00	187.45	154.97	104.06
Average emissions intensity	kg/MWh	0.03	0.03	0.02	0.01

ii. Focus on Disadvantaged Communities

There are 11 zip codes in EBCE's service area that are considered Disadvantaged Communities (DACs) according to the IRP definition that relies on CalEnviroScreen 4.0. These communities represent a total population of 137,029 ratepayers, or roughly 6% of EBCE's total number of customers. The identified zip codes are as follows:

1. 94601 – Oakland
2. 94621 – Oakland
3. 94603 – Oakland
4. 94607 – Oakland
5. 94606 – Oakland
6. 94577 – San Leandro
7. 94608 – Emeryville
8. 94609 – Oakland
9. 94578 – San Leandro
10. 95376 – Tracy
11. 94612 – Oakland

While CalEnviroScreen 4.0 is a useful tool to provide information on EBCE's customers living in areas of environmental and socioeconomic burdens, it is not the only resource. CalEnviroScreen 4.0 looks at the entire state and provides useful comparative information between significantly different regions across California. EBCE's service territory is significantly smaller. The variations in our territory do not resolve in a useful way while using the CalEnviroScreen 4.0 tool. To provide ourselves with more useful information applicable to our smaller portion of the State, EBCE collects its own data to provide a more complete picture of its communities. For example, EBCE is closely tracking disconnection and arrearage data based on zip code to inform program design that supports residents in need through its Connected Communities Program. EBCE is collaborating with UC Berkeley to conduct an evaluation of different programs supporting customer billing and debt-relief efforts. The purpose of the study is to measure program efficacy so EBCE can build robust programming under the Connected Communities Pilot. In addition to using arrearage data, EBCE integrates CARE- and FERA data in local programs, marketing campaigns, and policy efforts. There are roughly 120,000 CARE- and FERA-enrolled accounts in EBCE's service area, which makes up about 19% of total accounts served.

EBCE is committed to serving its DACs through numerous cross-organizational efforts, including in areas of procurement, local program development, increased customer engagement, and equitable policies. Of importance to EBCE is increasing the deployment of clean energy resources in areas typically overburdened by air pollution. EBCE's DAC Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT) programs advance access to renewables in DACs. The DAC-GT program allows EBCE to procure 5.72 MW of solar nameplate capacity and the CS-GT permits 1.56 MW of solar nameplate capacity. Currently, there are about 1,800 customers subscribed to the DAC-GT program. The CSGT program prioritizes community stakeholder engagement by collaborating and partnering with a community sponsor. This structure not only strengthens EBCE's relationships with its communities, but also encourages the development of just, clean energy economies. In addition to the DAC-GT and CSGT programs, EBCE has engaged in a variety of efforts to prioritize benefits to low-income residents and disadvantaged communities, including its Health-e Home program[18] in partnership with BlocPower and Revalue.io. This program provides low- to moderate-income homeowners with affordable financing options to gain access to the health and safety benefits of transitioning to clean energy and electric appliances. Energy efficient whole home upgrades can propel the clean energy just transition. EBCE's efforts to support increased EV adoption will reduce criteria air pollutants improving human health outcomes for all residents, especially those in the most vulnerable communities located along interstate corridors. These programs can be a model for intentional procurement

[18] *See infra*, AICP, p. 46; *see also infra*, DCFC Hub Network, p. 47.

of emission-free power to displace fossil-fueled generation and transportation fuel on behalf of our communities most at-risk of environmental injustices.

Equity is also a single thread guiding EBCE's transportation electrification initiatives. Since 2019, EBCE has analyzed transportation electrification gaps, needs, and opportunities in our service territory. Nearly half of the residents in our area are renters in multi-family properties that currently do not have access to at-home charging infrastructure. Significantly, home charging access is often complicated by the age of the properties where renters live. EBCE found that almost all the multi-family properties in our service territory are over 50 years old, meaning that many of these properties would require costly electrical upgrades above and beyond the cost of installing home charging equipment. Moreover, renters may not have the authority to make the upgrades needed to install home charging equipment because they do not own the property.

Recognizing these systematic challenges to EV adoption for nearly half the residents in our service area, EBCE is prioritizing deployment of reliable, convenient, and cost-effective public fast charging network. EBCE's EV fast charge network will establish equitable access for community-members who cannot charge at home to ensure that *all* residents in EBCE's service area, especially renters, can join in and benefit from the transition to clean energy transportation.[19]

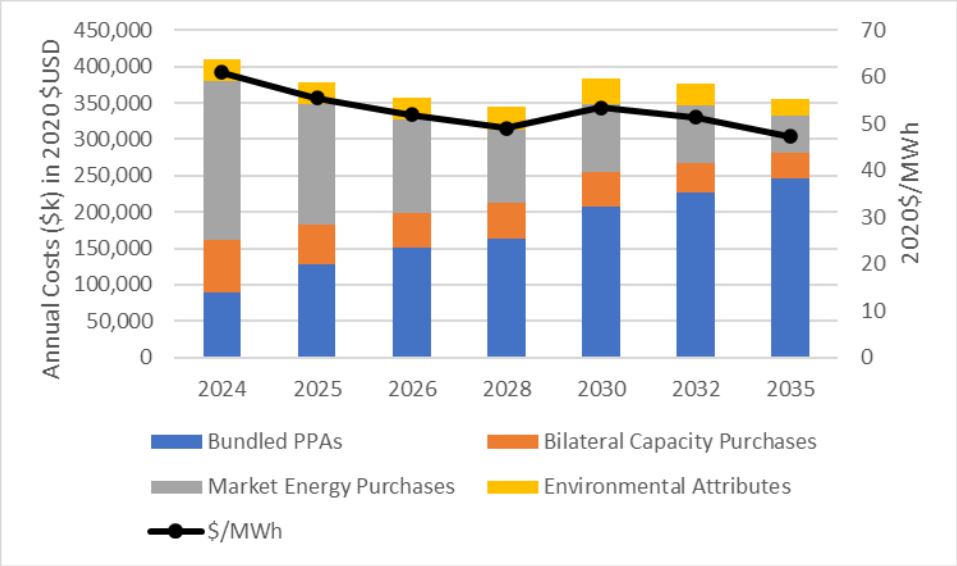
E. Cost and Rate Analysis

Recognizing that affordability is a key component of our long-term procurement strategy, EBCE incorporated timely technology costs assumptions and market conditions forecasts into its IRP process to ensure the optimal portfolio reflected EBCE's prevailing expectations on the future business landscape. EBCE's technology cost curves are sourced from NREL's 2021 Annual Technology Baseline (ATB). For electricity and capacity prices, EBCE used its internal, proprietary forward curves. Figure 6 below provides an estimate of the inflation-adjusted total net costs[20] of the Preferred Conforming Portfolio listed in real 2020 USD for select calendar years with a breakdown of the total by major cost category. Over the IRP planning horizon, the annual expense of the organization's optimal portfolio is expected to average $53/MWh (2020 USD). EBCE's reliance on the market for capacity and energy diminishes over time as bundled PPAs assume a larger role in the portfolio.

[19] *See infra* at 46.

[20] Total net costs equals expenditures to serve load in CAISO plus payments to counterparties EBCE has signed PPAs and other bilateral agreements with minus offsetting revenue from generation scheduled into the CAISO market.

Figure 6 Inflation-Adjusted Expenses (2020 $USD) of EBCE's Preferred Conforming Portfolio



Currently, EBCE offers its customers two different product choices: (1) Bright Choice, which offers a fixed percentage savings[21] relative to PG&E's generation rates for an electricity mix containing a larger percentage of renewables than the baseline PG&E product; and (2) Renewable 100, which offers a 100% renewable electricity mix at a small fixed per-kWh premium relative to PG&E's generation. Though EBCE is investigating a move toward cost-of-service-based pricing in the coming years, the timing of such a move will depend on our internal analytical capabilities, the rate at which we are able to build up the operating reserves necessary to ensure our long-term financial health, and the direction provided by EBCE's Board.

EBCE strives to maintain stable costs for our customers while collecting sufficient revenues by conducting extensive planning and risk-management to intelligently safeguard against the risks of extreme fluctuations in future energy prices.

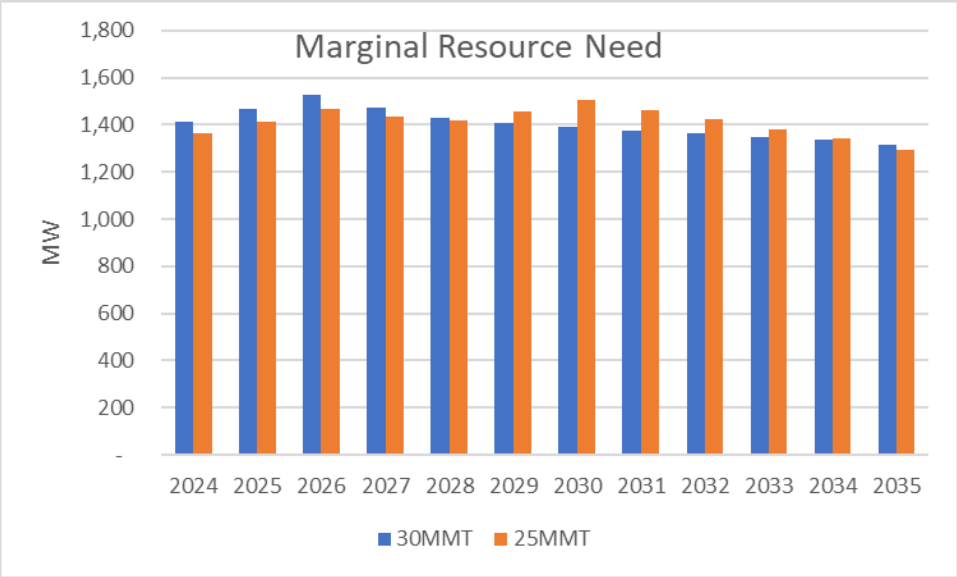
F. System Reliability Analysis

EBCE's Preferred Conforming Portfolio satisfies system reliability requirements for both the 30 MMT and 25MMT GHG scenarios and illustrates how EBCE contributes its commensurate share of system reliability to the grid. As a part of its IRP filing requirements, every CPUC-jurisdictional entity must demonstrate how it plans to meet its annual reliability requirements for every year in the IRP planning horizon. This reliability requirement is based on a Marginal Resource Need (MRN) to better account for the annual peak in net load shifting later into the evening due to the

[21] Over the course of EBCE's operating history, this discount has ranged from 1% to 3%.

increasing penetration of solar. As shown below in Figure 7, the MRN EBCE must meet is a function of the GHG scenario.

Figure 7 EBCE's Marginal Resource Need (MW) for the 30MMT and 25MMT GHG Scenarios



EBCE can satisfy its MRN requirement by either procuring bundled PPAs or RA-Only contracts; the amount of nameplate capacity that qualifies as firm is determined by the underlying physical resource backing the contract. In the 2022 IRP cycle, the CPUC updated its methodology when assigning firm capacity ratings to facilities by introducing dynamic marginal Effective Load Carrying Capacities (ELCCs) that are based on a "Perfect Capacity" construct. These ELCCs vary by year and reflect the ability of the resource type to provide reliable capacity during periods of high demand in net load. These ratings also account for the grid-level interactions of a given resource type with another, which is becoming increasingly more important as the grid sources more of its firm MWs from renewable and energy-limited resources. For additional information on these changes, please refer to the CPUC website.[22] A sample of ELCC assignments for certain resource types and select calendar years for both GHG scenarios are listed below.

[22] *See* CPUC presentation, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/20220719-fr-and-reliability-mag-slides.pdf.

Figure 8 Marginal ELCC Assignments (30MMT Scenario)

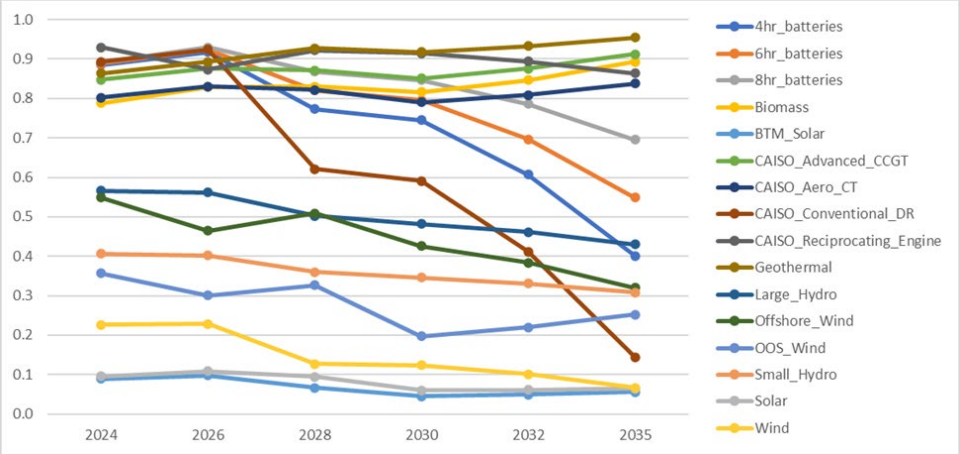
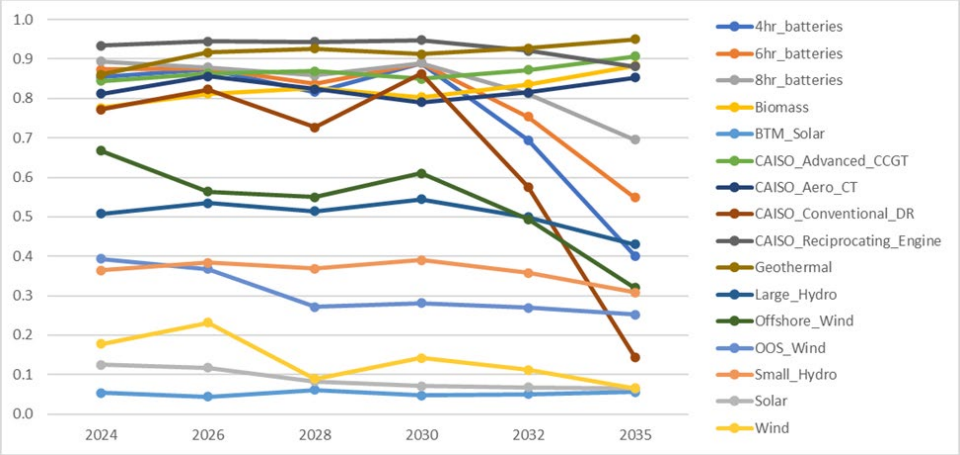


Figure 9 Marginal ELCC Assignments (25MMT Scenario)



Because the MRN requirements and ELCC assignments are both a function of the active GHG scenario, EBCE's portfolio is dependent, to a degree, on which GHG reduction target the state ultimately selects. To reduce this dependency, EBCE crafted a Preferred Conforming Portfolio that is compliant with both GHG scenarios by assuming the more conservative values for the MRNs and ELCCs in each calendar year. The corresponding MRN and ELCC values that resulted from this assumption and were used by EBCE during the modeling exercises are shown in Figure 10 and Figure 11.

Figure 10 EBCE's Effective Annual MRN Requirement

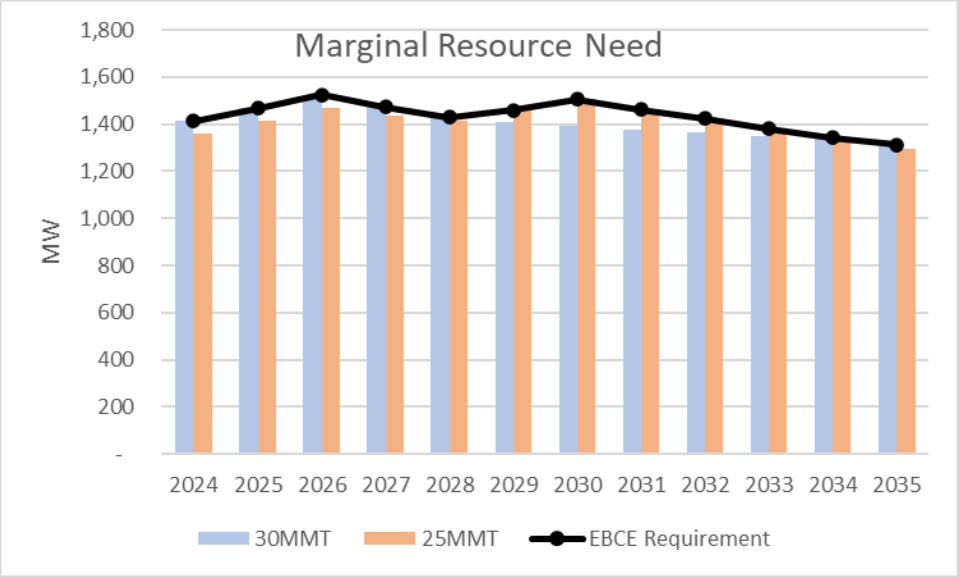
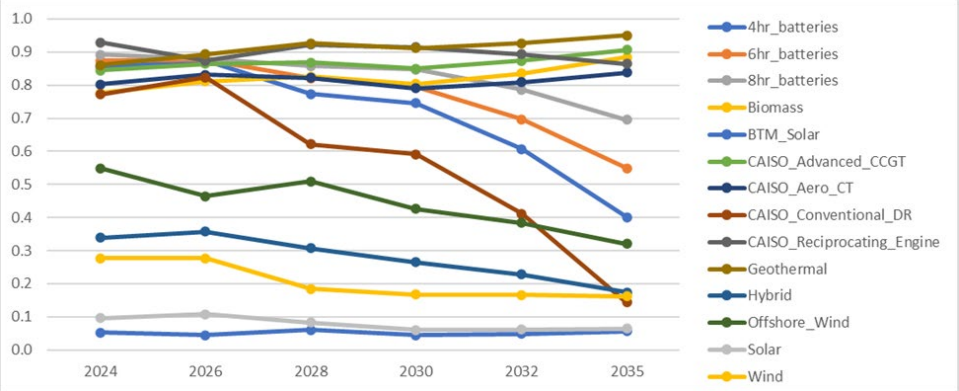


Figure 11 EBCE's Effective Marginal ELCC Assignments



The tables and charts below display the annual marginal reliability need EBCE must satisfy and the corresponding composition of its marginal ELCC supply by contract type for both the 30MMT and 25MMT scenarios. Although the same portfolio is shown for both GHG scenarios, the total supply of effective MWs shows slightly different amounts between the 30 MMT and 25MMT case due to the functional dependency of ELCCs on the active GHG scenario.[23] EBCE acknowledges that there is an increasing amount of project development risk in its portfolio, given that the percentage of its IRP portfolio of RA supply from projects that have not yet achieved commercial operation increases over time. Some of this risk can be managed through prudent procurement: for example, EBCE would seek to diversify its contracts across multiple developers, resource

[23] *See* narrative, *supra*, p. 27.

types, and expected CODs. EBCE will continue to monitor this risk factor and update the CPUC with any material updates related to project delays in a timely manner.

Figure 12 RDT Reliability Need and Effective Supply (30 MMT GHG Scenario)

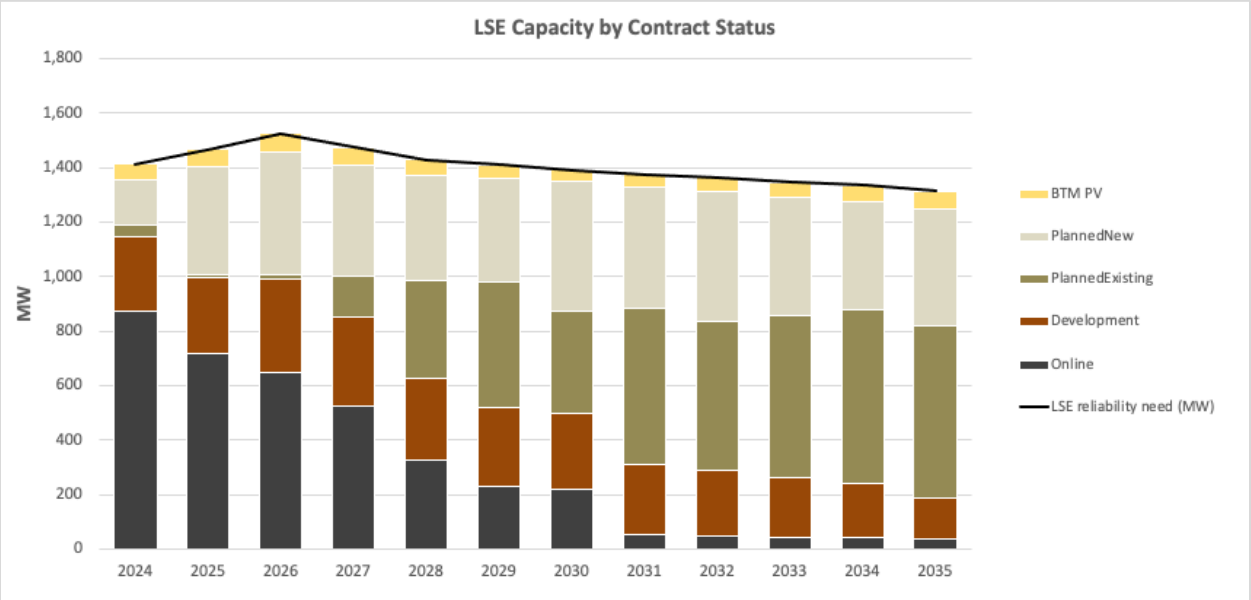


Table 13 Load and Resource Table by Contract Status (30 MMT GHG Scenario)

ELCC by contract status (effective MW)	2024	2026	2028	2030	2032	2034	2035
Online	876	649	325	219	48	40	37
Development	271	344	301	280	240	201	153
PlannedExisting	43	16	359	373	549	637	629
PlannedNew	168	448	390	479	476	396	428
BTM PV	55	71	55	42	52	62	67
LSE total supply (effective MW)	1,412	1,527	1,430	1,393	1,364	1,336	1,314
LSE reliability need (MW)	1,412	1,525	1,430	1,393	1,364	1,336	1,313
Net capacity position	0	2	0	0	0	0	0

Figure 13 RDT Reliability Need and Effective Supply (25 MMT GHG Scenario)

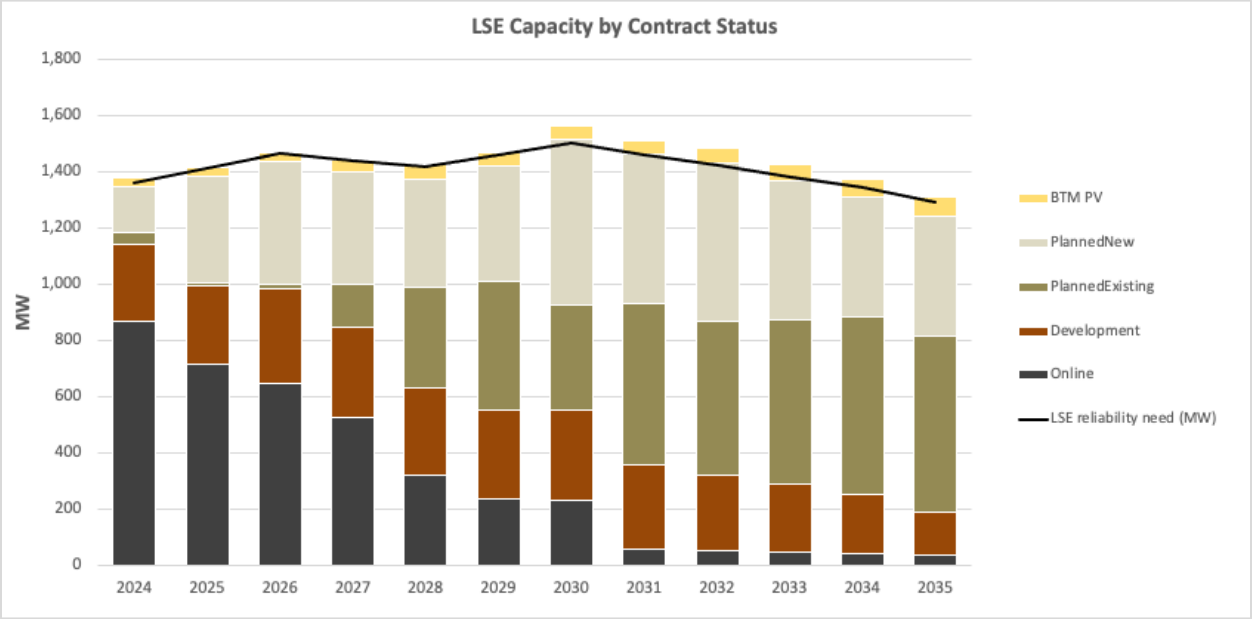


Table 14 Load and Resource Table by Contract Status (25 MMT GHG Scenario)

ELCC by contract status (effective MW)	2024	2026	2028	2030	2032	2034	2035
Online	871	648	323	229	54	42	37
Development	273	339	309	326	268	210	153
PlannedExisting	43	16	358	372	547	634	625
PlannedNew	159	433	384	590	562	424	428
BTM PV	33	32	50	44	53	62	67
LSE total supply (effective MW)	1,378	1,466	1,425	1,562	1,484	1,373	1,309
LSE reliability need (MW)	1,362	1,466	1,417	1,504	1,424	1,343	1,295
Net capacity position	16	0	8	57	60	29	14

G. High Electrification Planning

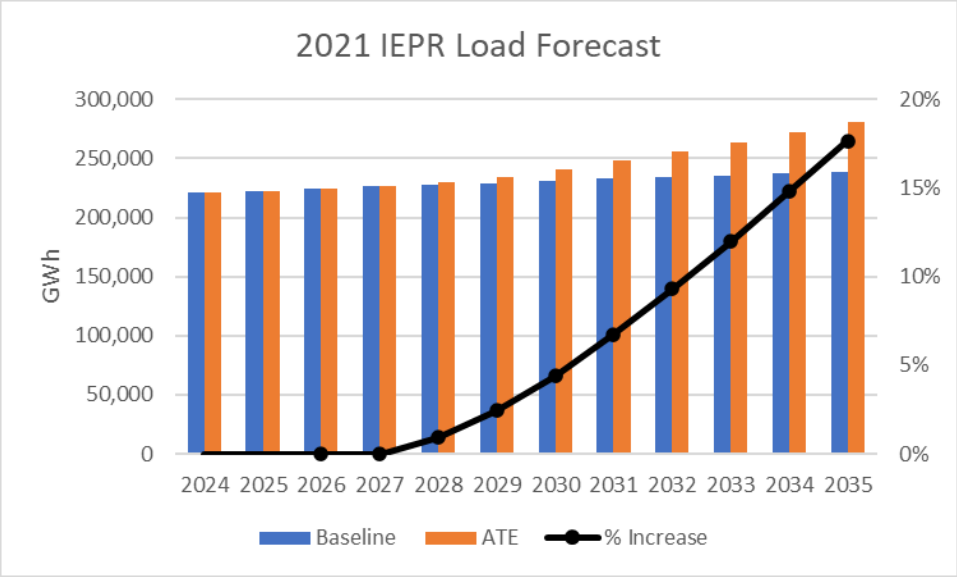
Guided by the direction in the June 15 Ruling,[24] EBCE analyzed the CECs Additional Transportation Electrification (ATE) scenario in its modeling framework to estimate the impacts from additional demand for electricity on its Preferred Conforming Portfolio. EBCE recognizes that over time this secular trend can have a material impact on EBCE's annual retail sales, peak demand, and aggregate load profile shape. To quantify the impacts of these changes on EBCE's procurement

[24] See *ALJ Ruling Finalizing Load Forecasts and GHG Targets for 2022 IRP LSE Plans*, issued June 15, 2022, p. 3.

strategy, EBCE leveraged its modeling framework to conduct a separate portfolio optimization exercise with revised inputs to reflect this high electrification scenario.

Figure 14 below illustrates the increase in CAISO demand relative to the Mid Baseline Scenario (AAEE Scenario 3; AAFS Scenario 3) from the 2021 IEPR. Starting in 2028, the ATE scenario reflects an increase in annual demand, primarily as the result of greater than expected EV charging demand relative to what is assumed in the baseline scenario. By 2035, cumulative effects of this incremental load are forecasted to result in an 18% increase in annual demand relative to the baseline IEPR scenario.

Figure 14 Percent Increase in CAISO Annual Load Assuming High Electrification



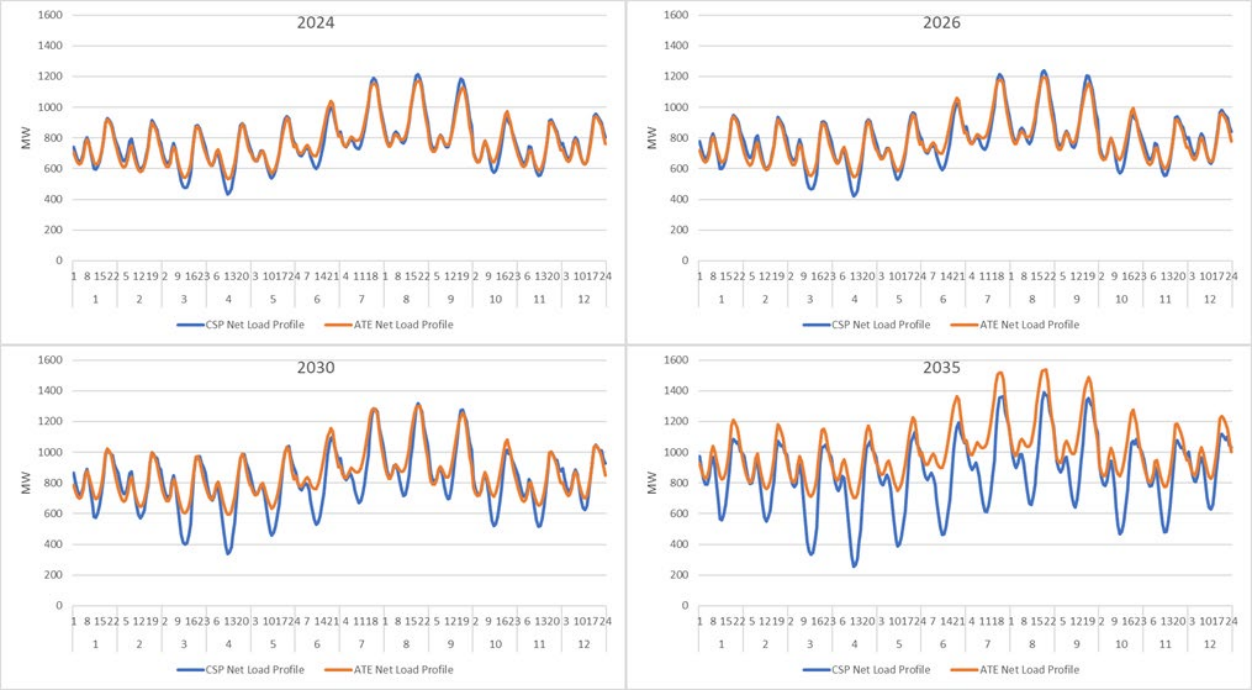
To map these systemwide impacts to its local service territory, EBCE applied the percent increase in CAISO load to its own 2022 IRP load forecast. Table 15 lists this information.

Table 15 EBCE Annual Demand for Baseline and Electrification Scenario

Service Area	LSE Name	YEAR	Baseline IRP Sales Forecast (GWH)	ATE IRP Sales Forecast (GWH)
PGE	East Bay Community Energy	2024	6,740	6,740
PGE	East Bay Community Energy	2025	6,816	6,816
PGE	East Bay Community Energy	2026	6,887	6,887
PGE	East Bay Community Energy	2027	6,955	6,955
PGE	East Bay Community Energy	2028	7,027	7,090
PGE	East Bay Community Energy	2029	7,101	7,271
PGE	East Bay Community Energy	2030	7,180	7,496
PGE	East Bay Community Energy	2031	7,259	7,746
PGE	East Bay Community Energy	2032	7,326	8,007
PGE	East Bay Community Energy	2033	7,394	8,281
PGE	East Bay Community Energy	2034	7,461	8,565
PGE	East Bay Community Energy	2035	7,540	8,867

In addition to modeling the increase in annual load, EBCE substituted the weather-normalized load profiles provided by the CSP calculator with the Managed Net Load profile defined in the IEPR's ATE scenario. Figure 15 shows the assumed EBCE load profile shapes for the High Electrification sensitivity case for select years. By 2030, the increase in load from daytime EV charging becomes significant and partially offsets BTM solar generation. In 2035, these effects become more pronounced. On balance, EBCE's load profile for the ATE scenario realizes a shallower trough in the middle of the day relative to the baseline load profile shape defined in the CSP.

Figure 15 EBCE Load Profile Shape for Preferred Conforming Portfolio and High Electrification Planning Portfolio



After updating the model with these changes, EBCE ran another study to identify a least-cost portfolio that satisfies the applicable reliability and environmental constraints. The results of that analysis are listed below.[25]

Table 16 Incremental Resources Selected for High Electrification Planning Scenario

Resource Type	MWs	Annual GWh	2035 GHG target	Transmission Zone	Substation / Bus	Alternative location	Note
Solar_2024	150	438	25MMT	SCE		PGE	
Solar_2025	150	438	25MMT	SCE		PGE	
Solar_2030	260	759	25MMT	SCE		PGE	
In-State Wind_2024	100	257	25MMT	PGE		SCE	
In-State Wind_2025	100	257	25MMT	PGE		SCE	
In-State Wind_2028	62.5	160	25MMT	PGE		SCE	

[25] EBCE's current modeling resolution is zonal, so the methodology does not capture busbar-specific issues such as expected congestion and/or deliverability availability. As a result, regional locations are listed for indicative purposes and are not final.

Resource Type	MWs	Annual GWh	2035 GHG target	Transmission Zone	Substation / Bus	Alternative location	Note
In-State Wind_2030	393	1,009	25MMT	PGE		SCE	
Offshore Wind_2032	268	1,290	25MMT	PGE		SCE	
Offshore Wind_2035	372	1,794	25MMT	PGE		SCE	
4hr storage_2024	88	n/a	25MMT	PGE		SCE	
4hr storage_2024	200	n/a	25MMT	PGE		SCE	
6hr storage_2035	295	n/a	25MMT	PGE		SCE	
8hr storage_206	47	n/a	25MMT	PGE		SCE	

H. Existing Resource Planning

EBCE, like most CCAs, has a preference for energy produced by non-GHG emitting resources. Given our Board-approved goal of achieving an emissions-free portfolio for EBCE's retail demand by 2030, EBCE has no plans to enter into long-term contracts with GHG-emitting resources. As such, existing in- and out-of-state hydro resources would generally be attractive to EBCE.[26] Staff actively monitors the market to identify opportunities to contract with existing hydro resources—either through short term transactions or through long-term contracts. EBCE has been successful in entering into short-term transactions with existing hydro resources to date and does not have any long-term hydro resources in its portfolio at this time. If such resources became available in the coming years, EBCE would evaluate those resources for portfolio fit and consider adding these resources to its portfolio. However, EBCE recognizes the demand for these resources and increasing uncertainty associated with their fuel supply as the western United States faces unprecedented droughts and other effects of climate change. Given the uncertainty of hydro resource availability, existing hydro resources are not assumed to contribute to EBCE's Preferred Conforming Portfolio. EBCE does not assume existing wind, solar, or battery storage resources in its portfolios but will evaluate existing resources for cost competitiveness in relation to generation profile in future procurements as these resources roll off their long-term contracts. EBCE assumes 0% of its portfolio will be served by contracted coal or nuclear resources, consistent with Board-approved organizational goals.

While EBCE will evaluate opportunities to contract with existing clean resources, there are currently no specific existing CAISO resources EBCE has plans to contract with in the future. Due

[26] *C.f. infra*, p. 36.

to the limited and uncertain availability, EBCE's approach to contracting with existing resources should be regarded as opportunistic and resulting from such resources submitting offers for long-term or short-term contracts to EBCE at a price and forecasted net present value that is competitive with new-build resources.

I. Hydro Generation Risk Management

EBCE's Preferred Conforming Portfolio does not include any expectations of long-term hydro asset contracts, whether with in-state or out-of-state hydro resources.[27] EBCE does hope to opportunistically enter into short-term transactions for carbon-free electricity, likely from out-of-state resources, to help EBCE achieve its goals of having an emission-free portfolio by 2030, but EBCE's ability to meet RPS and RA compliance obligations is unrelated to and unthreatened by its ability to procure *excess* carbon-free energy from hydro assets.

California and the Western North America are seeing increased levels of extreme heat duration and intensity. Concurrently, precipitation in the form of rain and snow are proving to be a less consistently reliable as 'fuel source' for hydro power across this same area. EBCE's potential exposure to the impact of drought and other climate-related hydro generation conditions lies in the impact prolonged drought has on the CAISO energy market and forward prices for electricity. Because EBCE procures a portion of its energy needs through short-term transactions, persistent drought will increase market forward prices and result in higher prices being offered for forward transactions than would be associated with average or above average hydro years. Any EBCE demand exposed to the CAISO day-ahead and real-time market will be subjected to greater price volatility in hours of exposure.

EBCE manages its exposure to high forward market prices by implementing its Board- and Risk Oversight Committee-approved Risk Management Regulations ("Risk Regs"). The Risk Regs mandate that EBCE transact following a dollar cost averaging approach such that EBCE procures specified amounts of electricity on a forward basis on a pre-determined schedule, thus minimizing exposure to short-term price fluctuations. In high level terms, EBCE manages the risk of CAISO price volatility in by incorporating the PCIA into hedging strategy and minimizing its open position in hours subject to high demand prices and likely high volatility.

[27] *See* Table 5, *supra*, p. 15.

J. Long-Duration Storage Planning

In February 2022, EBCE released a joint RFO with San Jose Clean Energy (SJCE); the RFO seeks opportunities to enter into long-term contract(s) with new, incremental resources to contribute to EBCE's obligation under D.21-06-035 ("MTR"). EBCE is currently engaged in negotiation with long duration storage resources that were offered in the RFO and expects to meet its MTR ordered obligation of 37 MW as a result of this effort. Notably, EBCE's Preferred Conforming Portfolio selects a total of 47 MW (i.e., 10 MW in excess of the MTR obligation).

EBCE recognizes that widespread plans for expansion of intermittent renewable resources creates needs for storage that goes beyond the 4-hour standard energy storage product that exists in today's market. EBCE's IRP analysis suggests that energy storage of sub-8-hour duration will be most favored in the near- to mid-term. This is driven by the assumed availability of different technologies and ability to develop sub-8-hour resource. Longer term, EBCE's IRP analysis suggests that longer-duration energy storage could play a larger role in supporting EBCE's as well as the State's resource needs. However, the availability of long-duration storage resources is not assured. Even with procurement mandates and other incentives, the technology may not become available due to other constraints including but not limited to transmission planning and the scarcity of deliverability. Load serving entities contracting with resources at this time lack certainty that barriers to deliverability will improve in near-mid-long term, meaning the transmission system may not be able to accommodate the amount of storage we anticipate may be necessary. Finally, it is also noteworthy that while the IRP analysis indicates portfolio value of 6-hour and some 8-hour duration storage, long-term forward curves common to the California market do not all assume the same value. At this time, it is difficult to justify investment in long duration storage based only on project economics as forward curves prefer 4-hour duration storage and storage dispatched in the CAISO market today continues to be incentivized to be used for the ancillary services market.

EBCE will meet its MTR long duration storage obligation in the near term. EBCE expects that it will release another all source RFO in early 2023 and will seek additional storage and generation resources to achieve commercial operation in the mid to late 2020s at that time. EBCE is also in a fortunate position that its largest contracted hybrid solar plus storage projects include a contractual right to extend duration on the existing storage capacity in future years by adding incremental lithium batteries at future installation costs. EBCE will continually evaluate the merit to calling on this contractual right versus contracting with new resources.

K. Clean Firm Power Planning

EBCE received multiple offers for geothermal resources that fit the Clean Firm Power requirements in its 2020 Renewable Energy and Storage RFO.[28] Though EBCE elected not to execute contracts with any of the geothermal resources offered in the RFO, when the CPUC released the MTR procurement order EBCE was able to initiate bilateral negotiations with one of the projects that had been previously offered. In April 2022, EBCE executed a contract with FEC Nevada 1 for a 40 MW geothermal facility which will be constructed in Churchill Country, Nevada. The facility is scheduled to achieve commercial operation in June 2026. This resource will contribute value firm renewable generation to EBCE's portfolio and serve as a baseload resource and hedge against price volatility. EBCE also looks forward to incorporating the high capacity factor RA into its RA position. EBCE must obtain import allocation rights (IAR) to ensure energy generated by the resource is fully deliverable into the CAISO and that the resource will provide RA value, thus there is some risk associated with the project. EBCE is working closely with the developer, Fervo Energy, to monitor CAISO transmission planning and evaluate probability that IAR will be available at the intended delivery point. If in EBCE and Fervo's estimation the ability to obtain IARs at the intended point is at risk, EBCE has some contractual ability to change the delivery point to a different CAISO branch group.

L. Out-of-State Wind Planning

Cost declines in solar resources from the early 2000s until approximately 2021 have largely resulted in lower costs for solar generation, on a levelized basis, as compared to wind. However, the diurnal production profile of solar means that wind resources can act as an important complementary resource in LSEs' portfolios, supplementing renewable production in overnight and winter hours and reducing the need for load shifting from battery or demand-side resources.

EBCE has one, energy-only (no RA) out-of-state wind resource in its portfolio and generating electricity at this time. While the out-of-state wind resource type was not selected within EBCE's IRP analysis, EBCE is aware of and following CAISO's Transmission Planning Process (TPP) solicitation of interest regarding Idaho-area out-of-state wind and in the CAISO's corollary to its TPP, the 20-year Transmission Outlook in which transmission projects that support access to out-of-state resources are evaluated. EBCE is interested in out-of-state wind resources should their project economics appear more favorable than the economic assumptions underpinning the IRP analysis and will provide updates on any long-term contracts EBCE enters into should that come to pass.

[28] https://ebce.org/2020-rfo/

M. Offshore Wind Planning

EBCE recognizes the significant interest in offshore wind (OSW) development in the California and Pacific Coast region. EBCE's portfolio analysis suggests that offshore wind (OSW) resources may be a valuable contribution to EBCE's portfolio in outer years of the forecast.[29] At this time, EBCE determined that, of the candidate OSW resources, North Coast OSW had greater value than Central Coast resources. However, the selection of *any* OSW resources in EBCE's portfolio is highly dependent on the availability of OSW resources (resource uncertainty is this case is driven by both construction risk and risks associated with the development of transmission to interconnect the OSW resources) within the time frame anticipated by mandated IRP modeling assumptions, as well as anticipated costs associated with OSW resources.

As is well known, OSW resources are not yet available, and their future availability is contingent on successful navigation of complex layers of Federal and State processes.[30] Given the uncertainty of the timeline and barriers to developing OSW off the coast of California, EBCE will continue to monitor the progress of OSW development and evaluate inclusion of these resources in our portfolio within the broader market context. If OSW development does not progress along the timeline necessary to incorporate these resources in its portfolio, EBCE will select other resources to achieve commensurate energy hedge, RA value, and renewable energy to meet its customers' needs. As described below,[31] EBCE expects to further explore the potential value of OSW resources.

N. Transmission Planning

Recognizing that transmission upgrades can constitute cost-effective investments in firm power, a key part of EBCE's IRP plan includes looking for opportunities to increase the deliverability of existing and new generation facilities. Based on the information available at this time, EBCE does not expect to incur any transmission-related restrictions on its procurement strategy for either baseline or planned resources.

Currently, there are no baseline resources with a "Development" status that require any transmission upgrades to achieve FCDS. As for planned resources, the only resource category in

[29] Table 5, *supra*, p. 15.

[30] *See, e.g.*, the October 6, 2022, CEC Workshop on Assembly Bill 525: Preparing a Strategic Plan for Offshore Wind Development. Workshop materials available under CEC Docket 17-Misc-01 and at https://www.energy.ca.gov/event/workshop/2022-10/workshop-assembly-bill-525-preparing-strategic-plan-offshore-wind.

[31] *See infra*, p. 44.

EBCE's portfolio that may require an upgrade to the existing transmission system is offshore wind. Starting in 2030, EBCE will look to procure significant amounts of procure offshore wind in either the Morro Bay or Humboldt Bay region, depending on costs, availability, and other considerations. As listed in the June 2022 PSP modeling results, RESOLVE flags the need to invest in transmission upgrade projects for additional deliverability of firm power in both these regions in 2032 and 2035.[32] EBCE assumes that either one or both of these deliverability projects will be built and that it will be able to secure a slice of these offshore projects at or near the current projected CAPX price for offshore wind in those future years. As for its plan to procure wind in the near-term horizon, EBCE conducts procurement RFOs to assess market conditions related to costs, location, and timing of new resources. It will emphasize the addition of wind to the portfolio, but the final amount, location, and timing will ultimately depend on the market pricing offered by project developers.

While, EBCE strives to execute contracts for long-term resources across a diverse geographic area to mitigate risks associated with congestion and limited deliverability in select load pockets, EBCE currently has no firm restrictions regarding the location of any of its planned candidate resources, as long as full capacity deliverability (FCDS) status is attainable.[33] The modeling framework used in this year's IRP has limited ability to account for transmission related constraints (e.g., congestion and interconnection capability) during the optimization stage. Moreover, the model assumes that any additional costs stemming from an Area Distribution Network Upgrade (ADNU) project are accounted for in the CapEx assumptions. EBCE recognizes these limitations and will evaluate opportunities to mitigate the impacts of these limitations in future modeling exercises. At this time EBCE has no stated objection to the CPUC or CAISO relocating their candidate projects, assuming similar availability and costs for any given replacement project.

IV. Action Plan

The biennial IRP study is a valuable planning tool and provides guidance that contributes to EBCE's procurement strategy. However, neither EBCE's IRP analysis nor the make-up of its Preferred Conforming Portfolio should be viewed as an explicit roadmap or firm commitment for future procurement. While EBCE values the lessons learned through the IRP analysis, EBCE will make procurement decisions and enter into contracts based on the resources available in the market and the cost and value proposition of those resources based on current and forward

[32] Currently, Morro Bay has up to 200 MW of unclaimed deliverability capacity, whereas Humboldt Bay has no existing spare deliverability capacity.

[33] A limited exception to EBCE's preference for geographically diverse resources is that EBCE does have a preference for projects sited in its own service territory for their contribution to local reliability, local air pollution reduction, and to minimize basis risk.

market projections at the time the resources in question are offered to EBCE. EBCE also notes that there remains significant uncertainty around the availability and timing of new resource types such as offshore wind. Significantly, since the COVID pandemic began in 2020, the world has experienced massive supply chain disruptions causing price increases and reducing the availability of core components needs for renewable and conventional power plants resulting in significant project delays. While EBCE hopes the supply chain landscape will return to a more normal state no load serving entity has the ability to correct this ongoing disruption and as a result we find ourselves on an ongoing period of great uncertainty related to resource availability and timeliness of construction.

A. Proposed Procurement Activities and Potential Barriers

The following sections describe EBCE's planned procurement activities flowing from the IRP portfolio analysis and Preferred Conforming Portfolio, as well as potential barriers to those actions.

i. Resources to meet D.19-11-016 procurement requirements

Table 17 EBCE Near Term IRP Procurement

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Golden Fields Solar	3/03/2021	2018 California Renewable Energy RFO	
Scott Haggerty Wind Energy Center	7/01/2021	2018 California Renewable Energy RFO	
Henrietta D Energy Storage	1/01/2022	2020 Renewable Energy and Storage RFO	
OhmConnect DR	1/01/2020	Bilateral negotiation	
CPA High Desert	4/01/2022	Bilateral negotiation	
SunRun OCEI	1/01/2022	Oakland Clean Energy Initiative RFO	
Tulare Solare	4/30/2022	2018 California Renewable Energy RFO	
Sanborn Storage	1/16/2023	2020 Renewable Energy and Storage RFO	Portion counted to D.21-06-035

EBCE is on track to fulfill its D.19-11-016 requirements through the long-term contracted resources listed in Table 17, above. This list of resources is consistent with the list EBCE has provided to the CPUC in the required IRP compliance filings.[34] There are no changes or updates to note at this time.

[34] *E.g.*, *see* EBCE's IRP Compliance Filing submitted August 1, 2022.

ii. Resources to meet D.21-06-035 procurement requirements, including:

Table 18 EBCE Mid-Term Reliability IRP Procurement

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Sanborn Storage	1/16/2023	2020 Renewable Energy and Storage RFO	Portion counted to D.19-11-016
Edwards Solar	4/30/2023		
Scarlet 1 Solar+Storage Park	3/31/2023	Amended & Restated PPA executed 3/21/2022	
Daggett 3 Solar+Storage	7/30/2023	2020 Renewable Energy and Storage RFO	
Oberon	1/1/2024	2020 Renewable Energy and Storage RFO	
Aramis	4/01/2024	Bilateral negotiation	
Tumbleweed Storage	6/01/2024	2020 Renewable Energy and Storage RFO	
FEC Nevada 1	5/01/2026	Bilateral negotiation	
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE has entered into multiple long-term contracts that will contribute to its D.21-06-035 requirements; executed agreements are listed inTable 18, above; however EBCE has not executed all agreements needed to fulfill its obligation. To ensure EBCE fulfills its obligation, EBCE partnered with SJCE and released a joint RFO in February of 2022. This procurement effort, titled the "EBCE/SJCE 2022 Long-Term Resource RFO" was explicitly designed to procure resources that will fulfill the D.21-06-035 procurement mandate. Negotiations are ongoing and EBCE plans to bring contracts to its Board for approval over the following months, with the first wave of contracts to be brought for approval in October, 2022, concurrent to the review of this IRP Plan filing.

In the unlikely event that EBCE does not execute sufficient contracts to meet its D.21-06-035 obligations through this RFO, EBCE will then engage in bilateral negotiations to close the remaining open position.

a. 1,000 MW of firm zero-emitting resource requirements

Table 19 EBCE Mid-Term Reliability IRP Procurement – Firm Zero-Emitting Resources

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
FEC Nevada 1		Bilateral negotiation	

In February of 2022, EBCE executed a long-term contract with Fervo Energy to meet its Firm Zero-Emitting Resource requirements under D.21-06-035. EBCE's 40 MW FEC Nevada 1 project is expected to achieve COD in June 2026. At this time the resource is on schedule to achieve that operational date however EBCE stays in close touch with the developer as this is a long-lead time resource and the project is pursuing financing through a loan program backed by the Department of Energy. If EBCE perceives any potential delay to the financing of the project, it will notify the CPUC and seek an extension to permit the resource coming online before 2028—but at this time there are no such delays that EBCE is aware of.

EBCE is also actively monitoring the CAISO TPP with the project developer, Fervo. The contract identifies a point of delivery to EBCE tied to a specific CAISO branch group and EBCE is evaluating opportunities to obtain IAR at that branch group so the resource would have sufficient deliverability to meet the RA requirements of D.21-06-035. Both EBCE and Fervo are willing to modify the point of delivery if necessary to ensure the resource meets its RA obligations.

b. 1,000 MW of long-duration storage resource requirements

Table 20 EBCE Mid-Term Reliability IRP Procurement - Long-Duration Energy Storage

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE shortlisted long-duration storage projects in its EBCE/SJCE 2022 Long-Term Resource RFO and is in active negotiations with these resources at the time of the IRP filing

c. 2,500 MW of zero-emissions generation, generation paired with storage, or demand response resource requirements

Table 21 Zero Emission, Co-located, and DR Procurement Activities

Resource Name	Expected or Actual COD	Procurement from which it was contracted	Notes
Scarlet 1 Solar+Storage Park	3/31/2023	Amended & Restated PPA executed 3/21/2022	
Daggett Solar+Storage	7/30/2023	2020 Renewable Energy and Storage RFO	
Other Resources Currently Under Negotiation		EBCE/SJCE 2022 Long-Term Resource RFO	

EBCE has fulfilled a portion of this requirement and is actively negotiating additional contracts to fulfill the obligation. EBCE will keep the CPUC updated on its progress through the twice-yearly IRP compliance filings and the ongoing informal summer reliability update filings. In the unlikely event that EBCE fails to execute contracts that fulfill this obligation as a result of its EBCE/SJCE 2022 Long-Term Resource RFO, then the organization will engage in bilateral negotiations to ensure it meets or exceeds this obligation.

d. All other procurement requirements

As previously mentioned, EBCE is actively negotiating contracts shortlisted in its EBCE/SJCE 2022 Long-Term Resource RFO and will seek approval to execute contracts from its Board of Directors beginning in October 2022 and likely on a monthly basis through the end of 2022 or early 2023.

EBCE is currently evaluating its next procurement effort and will decide between pursuing bilateral negotiations for targeted resources in early 2023 or releasing its next all source solicitation in Q1 2023. If EBCE pursues bilateral negotiations, they will be targeted to achieve compliance with D.21-06-035 procurement mandates. At this time, EBCE anticipates releasing an all-source solicitation in Q1 2023 or after completing procurement for D.21-06-035 with the goal of this next solicitation being to contract new resources to contribute energy, renewable energy and attributes, and RA to cover EBCE's increased demand as the City of Stockton joins EBCE's service territory in 2024.

iii. Offshore wind

EBCE's IRP analysis supports adding OSW resources to the portfolio beginning in 2030. Given the newness of the resource type in California and long-lead time to develop these assets, EBCE anticipates beginning preliminary evaluation of potential projects in the 2023–2024 timeframe and plans to release an OSW request for information (RFI) to begin its education on the costs and development process for these assets. The timing of actual procurement will be informed by lessons learned in the RFI.

iv. Out-of-state wind

Although the Preferred Conforming Portfolio does not explicitly select out-of-state wind for inclusion in EBCE's portfolio, EBCE is aware of development efforts underway in Idaho, Wyoming, and New Mexico that may prove to be of value to EBCE's portfolio if necessary transmission is developed to enable the interconnection of these assets to California load. EBCE is actively monitoring the CAISO TPP and will evaluate out-of-state wind resources offered to the organization through upcoming solicitations or bilateral outreach by project developers.

v. Other renewable energy not described above

None at this time.

vi. Other energy storage not described above

None at this time.

vii. Other demand response not described above

None at this time.

viii. Other energy efficiency not described above

EBCE has received CPUC approval to elect to administer Energy Efficiency programs for three years, (between 2023 and 2026). EBCE forecasts the current approved program to deliver approximately 30 GWh of energy savings over the Effective Useful Life (EUL). EBCE will be focused on providing additional incentives from EBCE funds to developers that can deliver energy savings and durable flexible load during evening peak hours. EBCE expects to continue investing in Energy Efficiency programs beyond 2026.

ix. Other distributed generation not described above

EBCE has developed the Resilient Home program[35] to deliver solar and storage to single and multi-family residential customers with the solar company Sunrun. Over 1,000 customers are currently enrolled in the program which is contracted to deliver 2MW/8MWh of energy during EBCE's 4 evening peak hours. EBCE will continue to develop programs to contract with battery storage resources in our territory to create flexible assets.

EBCE is currently negotiating with PPA providers to deliver solar + storage resources for municipal critical facilities in four Cities. These PPAs will provide 2–3 MW of solar generation and 2–6 MWh of BESS to increase resilience of City Services. EBCE will use these BESS systems to reduce peak load during evening hours. EBCE will issue a second RFO for an additional 5-7 Cities in Fall/Winter of 2023 for additional solar and storage projects. EBCE expects to aggregate these resources to reduce peak load during high-cost evening hours.

EBCE has over 40,000 existing NEM systems installed across our service area. Increasing battery installations on existing DG Solar systems and contracting those batteries to deliver energy during evening peak hours will be a priority for EBCE as we continue to develop mechanisms to build flexible renewable DERs.

[35] See https://ebce.org/resilient-home/.

x. Transportation electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

EBCE has multiple transportation electrification efforts underway. What follows is a high-level summary of several of these activities.

a. Alameda County Incentive Project (ACIP)

EBCE has partnered with the CEC's Electric Vehicle Incentive Project (CALeVIP)[36] to develop and co-fund the Alameda County Incentive Project (ACIP).[37] The ACIP is distributing $17.3 million to incentivize the deployment of publicly accessible, shared Level 2 and direct current fast chargers (DCFCs). The program launched December 1, 2021, with demand rapidly outstripping supply.

EBCE prioritized equity in designing the ACIP. A minimum of 50% of all funding is required to be invested in DAC/low income community (LIC) applications in Alameda County. This minimum investment is for both DCFC and Level 2 technology types. Because nearly half of the residents in EBCE's service territory are renters without access to EV charging where they live, EBCE worked with the CEC to require that 50% of the budget dedicated for fast charging infrastructure had to be for projects deployed in EBCE-defined multi-family "hotspots" or areas with a *dense concentration of multi-family housing units*.[38]

In developing this project, EBCE also looked at our service territory comprehensively and not solely through the lens of the State's CalEnviroScreen 4.0 and AB 1550 geographic boundaries.[39] EBCE found that the DAC/LIC boundaries often exclude many *affordable* multi-family properties which by definition serve low-income residents because residents must meet income eligibility requirements to qualify for this type of housing. This was an issue in designing the requirements for the ACIP as the CEC's CALeVIP pillar requirements for multi-family incentive "adders" only applied to properties in DAC/LIC boundaries. EBCE saw an equity gap in how the CEC's CALeVIP funding was reaching community members. Affordable housing providers statewide had been in a position of investing in an amenity that helps some of their low-income tenants realize the benefits of EVs but not others. Yet all of these properties serve *the same low-income eligible populations* as those within DAC geographic boundaries. EBCE wanted to ensure that *all* affordable multi-family property owners had equal access to ACIP incentive adders regardless of

[36] CEC's CALeVIP is funded by the CEC and provides incentives for EV charger installations throughout California, working to improve air quality, combat climate change, and reduce petroleum use.

[37] See https://calevip.org/incentive-project/alameda-county.

[38] See https://www.google.com/maps/d/u/0/viewer?mid=1IiJxkT5Rgg7wdcTRpOxplX6f0-tJjuEQ&ll=37.68066537992609%2C-121.9214665&z=10

[39] Boundaries determined in accordance with CalEnviroScreen 4.0 and AB 1550 requirements.

where they were located geographically. In turn, we mapped affordable multi-family properties throughout our service area and were able to show the CEC that its pillar requirements for incentive adders were not equitable and needed to be expanded. The CEC reviewed EBCE's data analysis, approved expanding the incentive adder eligibility, and made a systematic change to their pillar requirements statewide.

Throughout 2021, in anticipation of the program launch, EBCE also provided affordable multifamily property managers/developers with free technical assistance to help them prepare for the ACIP. EBCE's budget allowed for the assessment of up to 75 multifamily properties in our service territory. EBCE provided technical assistance in the form of site visits, site charging infrastructure reports, and a concierge service to help property managers apply for ACIP incentives.

b. DCFC Hubs

EBCE is investing in deployment of the densest regional network of public DCFC infrastructure to deliver charging throughout our service area. EBCE is prioritizing development of this network to ensure all EBCE customers are served and establish EBCE's Joint Power Authority member communities as leaders in affordable and accessible EV fast charging. EBCE's goal is to facilitate regional adoption of EVs in excess of the regional share of the California goal of 5 million zero-emission vehicles on the road by 2030. To support this goal, EBCE plans to build and operate as many as 50 public fast charging hubs, each with a minimum of 10 dual port DCFCs that have the capability of charging 20 EVs simultaneously. EBCE is focused on siting its hubs in areas with a dense population of renters.

EBCE's first such project is on the border of West Oakland and Downtown Oakland, in a municipal parking garage. The location is within the Bay Area Air Quality Management District AB617 boundary for West Oakland. EBCE anticipates that this DCFC hub will be the largest in Oakland and the second largest in Alameda County. More importantly, within two square miles of the DCFC hub are approximately 1,000 multi-family properties with over five units at each premises including over 100 in West Oakland specifically. This project will enable 60 minutes of free garage access for community members while charging, and all DCFCs will be powered by EBCE's Renewable 100 electricity product.

EBCE is working to develop additional projects throughout its service area including but not limited to the Cities of Berkeley, Hayward, Livermore, Pleasanton, and San Leandro.

c. Zero-Emission Medium- and Heavy-Duty Goods Movement Blueprint

As part of a 2-year, CEC-funded project, EBCE is developing a Zero-Emission Medium- and Heavy-Duty (MD/HD) Goods Movement Blueprint (Blueprint) to guide our comprehensive approach to MD/HD transportation electrification. The Blueprint focuses on five areas: (1) Vehicles, (2) Infrastructure, (3) Financing, (4) Workforce Development, and (5) Community Benefit and will serve as the regional plan on how to transition this ecosystem to zero-emission Class 3-6 and Class 7-8 vehicles by 2030 and 2045 respectively.

EBCE has also developed a technical assistance pilot program that is providing targeted MD/HD goods movement stakeholders with free fleet electrification assessments and a rebate application concierge service.

CALSTART is EBCE's technical consultant/partner for both the Blueprint as well as the technical assistance pilot program.

Blueprint Financing

To support Blueprint financing related actions and strategies, EBCE issued a Request for Offers solicitation that will provide $3M in MD/HD Goods Movement (vehicles and/or charging infrastructure) loans to eligible applicants. Project proposals were due October 17, 2022.[40] EBCE is providing the funds for these loans as part of EBCE's Local Development program approved by its Board of Directors. The funds are not associated with the CEC Blueprint grant funding.

Blueprint Workforce Development

Building upon internal analysis, as well as research from several partner organizations, EBCE will target charging infrastructure and other transportation electrification investments to support a paradigm shift in how goods move in and through our service territory. We know that a successful transition to zero emission vehicles will require enough service technicians who know how to maintain electric vehicles and install and service the associated charging infrastructure. This will require growing out the technical skills development of both medium- and heavy-duty vehicle service technicians and electric vehicle charging technicians, which ultimately means resourcing technical skills instruction to cover these new skill sets. Some of the challenges we have identified in expanding the workforce to support zero emission vehicles are lack of curriculum, whether in formal educational programs or through trade skills development, and lack of medium- and

[40] Current RFO available at https://res.cloudinary.com/diactiwk7/image/upload/v1664499492/REVISED_9.27.22_-_RFO_for_ZERO-EMISSION_MEDIUM_AND_HEAVY-DUTY_GOODS_MOVEMENT_PROJECT_LOANS_9.12_-_Copy_kfqviw.pdf (retrieved 10/11/2022). EBCE's prior solicitations can be accessed at https://ebce.org/solicitations-archive/.

heavy-duty zero emission vehicle training resources in the forms of training vehicles, facilities, certified instructors, and general funding to develop and sustain programming. We are working with educational institutions to understand and advocate for improvements to the educational pipeline starting at the high school and community college level to expand the awareness and capability of zero emission vehicle maintenance services in the East Bay. We are also looking at the role community-based organizations and organized labor can play in driving interest, engagement, and training opportunities to contribute to equipping the local workforce with relevant technical skills.

d. Commercial VGI Pilot Project

PG&E is partnering with EBCE on a Commercial Vehicle-to-Everything (V2X) pilot that targets the adoption of bidirectional charging among MD/HD fleets through customer incentives.

PG&E's pending V2X pilot will leverage EBCE's MD/HD goods movement scopes of work to engage applicable stakeholders with the goal of signing up 200+ bidirectional MD/HD zero-emission vehicles and charging stations. PG&E intends to demonstrate the value of V2X MD/HD technology and show how this technology can reduce the total cost of ownership once barriers are overcome. The pilot aims to prove out five value-streams: backup power; followed by customer bill management, system real-time energy, grid upgrade deferral and EV export for grid services (such as system resource adequacy, system capacity) in 2023. The pilot will also address barriers such as lack of real-world experience; incremental costs for charging infrastructure with V2X capabilities; lack of market signals for deployment; lack of information about costs; programs/rules that incentivize stationary storage but not EVs that export to the grid; lack of customer education and need for a system to aggregate pricing signals and communicate them to market actors. Throughout 2022, PG&E and EBCE have been coordinating on development of a pilot scope of work for our collaboration. The pilot has a targeted end date in 2024.

e. Municipal Fleet Electrification Technical Assistance Program

EBCE is providing free technical assistance to develop municipal fleet electrification plans to its Joint Power Authority member cities and counties. EBCE is also providing local government partners with a Charging-as-a-Service product so they can focus their annual budgeting efforts on vehicle procurement.

f. Brownfield Revitalization DCFC Project Development

EBCE is developing a service area wide inventory of brownfields and conducting in-depth feasibility assessments of specific sites for potential revitalization as DCFC hubs to serve two reuse cases: 1) Light-duty passenger vehicles and 2) MD/HD Goods Movement vehicles. This scope of work is funded by the United States Environmental Protection Agency (EPA). EBCE was

the first public or private sector entity in the United States to develop this concept and methodology for assessing brownfields for revitalization as fast charging hubs. In recognition of this work, in 2022 EBCE received the EPA's National Notable Achievement Award. The award reflects EBCE's outstanding performance in support of the EPA's most significant priorities and recognizes EBCE's accomplishment as one of the most noteworthy nationwide.

g. FreeWire Technologies CEC Grant

EBCE is a partner to FreeWire Technologies, Inc., on a CEC grant awarded in 2021. The project will specifically add the following advancements to FreeWire's Boost Charger: 1) Resilient EV charging even when grid power is unavailable; 2) Backup supply to power on-site loads as a microgrid; 3) On-site power demand management to reduce the overall energy costs for a Site Host; 4) Direct integration with on-site renewable sources, such as solar, to increase the efficiency of the solar plus storage system and reduce its total cost; 5) Bi-directional power flow to support charger-to-grid power flow, and 6) Utility integration to support demand response, grid load balancing and other grid services. EBCE provided match funding to the project and will own and test FreeWire's Boost Charger to understand how this functionality could be deployed at EBCE JPA member's municipal critical facilities in the future.

h. EBCE Smart Charge App

EBCE and leading energy software platform, Kaluza launched a pioneering VGI program to boost grid resilience, reduce energy costs and mitigate carbon emissions associated with electric vehicle (EV) charging using the EBCE Smart Charge app.[41]

The EBCE Smart Charge app, developed by Kaluza, will begin by servicing more than 1,000 electric vehicle drivers in EBCE's service area. As part of the initiative, Kaluza will enable drivers to easily 'set and forget' when they need their car ready via the mobile app and optimize vehicle charging to occur when electricity has a higher renewable energy content and is more cost effective. EBCE and Kaluza estimate that the service could enable the average EV driver to save over $550 a year and reduce their charging carbon emissions by 36%.

The EBCE Smart Charge app will leverage real-time price signals to enable cars to store energy during off-peak times creating 2-3GWh of flexible charging per year, thereby enabling EBCE to maximize its contracted wind and solar capacity and accelerate local system decarbonization.

[41] *See* https://ebce.org/news-and-events/ebce-and-kaluza-launch-charging-service-to-slash-bills-for-ev-drivers/.

xi. Building electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

EBCE has developed the Health-e Home program[42] to provide electrification and energy efficiency improvements to Low and Moderate income households in our service area. The Health-e Home program also supports health and safety improvements such as wiring upgrades and roofing repairs—all to help reduce indoor air pollution, increase resiliency during extreme weather events, and potentially increase home value. The Health-e Home program will retrofit 60 households by July 2023 and, if the model is successful, will scale up from there. The first installed projects will allow EBCE to create a baseline for the change in energy usage of these projects in order to forecast the impacts to load of future programs of this nature.

xii. Other

EBCE has worked with several of its member cities to develop and achieve Climate Action Plans, where cities transition their default energy service to EBCE's Renewable 100. EBCE's Renewable 100 service is sourced from California wind and solar facilities, including a new wind farm in Livermore. As EBCE's service area grows and more member cities adopt their own Climate Action Plans, EBCE will continue to maintain a portfolio that achieves 100 percent clean energy for customers in this service.

Recent legislative and other developments significantly alter the near-term procurement planning landscape. [List of changed circumstances: DCPP extension; DWR Strategic Reliability Reserve; EBCE expansion to incorporate residents of Stockton in 2024]

In light of the California state legislation seeking to extend operation of the Diablo Canyon Power Plant and pending further clarification of the implications of how this single large baseload resource may alter the relative costs and preferability of other resources, EBCE's Preferred Conforming Portfolio (as well as those of other LSEs') may not fully reflect EBCE's portfolio needs.

EBCE is monitoring developments regarding the California Department of Water Resources' (DWR) actions to establish a Strategic Reliability Reserve.[43] It is not yet clear how the development of the Strategic Reserve will affect other LSEs' ability to procure existing and planned resources. It seems likely that DWR's procurement activity may result in less availability of some existing resources to other LSEs to satisfy portfolio requirements.

[42] See https://ebce.org/health-e-home/.

[43] AB 205, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB205.

B. Disadvantaged Communities

EBCE demonstrates its commitment to deploying equitable policies and programs for its constituents in Alameda County and the City of Tracy. Equity is a through-line in EBCE's approach to some of the community-focused programs included below.

- Disadvantaged Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT)
- Healthy-e Homes program
- Resilient Home program
- Connected Communities pilot
- Covid-19 Grants for Community-Based Organizations
- Arrearage Management Plan (AMP) and California Arrearage Payment Program (CAPP)

The first four programs deploy robust marketing, education, and outreach strategies to meet our low-income, multi-family customers. EBCE integrates thorough data analytics to best meet the needs of our disadvantaged communities. EBCE intends to ensure that those who have been historically excluded in the clean energy movement, have access to these programs to propel a just, all-electric transition. For example, EBCE's Resilient Home program, partnered with Sunrun offers home solar and battery back-up systems at a pre-negotiated prices. Through this effort, EBCE's teams have targeted multi-family developments. As of August 2022, EBCE has installed systems covering 418 tenant units. EBCE intends to expand the program to include more multi-family dwellings to bridge the accessibility gap for multi-family tenants. In addition to targeting specific customer segments, EBCE provides in-language marketing material for multilingual customers or non-English readers.

Additionally, EBCE implements programs and payment plans aimed at removing economic barriers for ratepayers in our service area. EBCE currently participates in the CPUC- and state-funded programs: Arrearage Management Plan (AMP) and the California Arrearage Payment Plan (CAPP). The aim is to reduce utility debt accumulated during the Covid-19 pandemic. EBCE understands that there are compounding injustices such as economic inequities that prevent customers from paying their bills, causing greater stress and anxiety. AMP and CAPP are aimed to reduce those stressors. Furthermore, EBCE donated dollars to local relief efforts directly in our communities as a response to the Covid-19 pandemic. In the past years, EBCE contributed over $2 million to local organizations. Some of the awardees included small to large non-profits, food banks, and healthcare organizations. EBCE recognizes that both short-term and long-term funding are necessary to elevate energy equity issues in our service area.

Furthermore, EBCE's governance structure allows community input through the Community Advisory Committee (CAC), which consists of twelve members, plus five alternatives. Formed in

2016, EBCE's CAC advises the Board on all subjects related to our operations. The committee acts as a liaison between key stakeholders and our Board, holding public committee meetings on a regulator basis. Having diverse community members is important to EBCE, including geographic diversity.

C. Commission Direction of Actions

EBCE encourages the Commission to consider the following items.

First, the Commission should strive to reduce the volume of regulatory changes occurring simultaneously to allow the IRP process to serve as a meaningful guide for LSE and statewide resource procurement.

EBCE is concerned that the range of changes occurring in multiple regulatory programs render the results of EBCE's, and perhaps other LSEs', IRP analysis less useful. The changing regulatory and statutory landscape has been recognized by the Commission already.[44] For example, the Resource Adequacy program is undergoing a fundamental change in program design by moving towards a monthly 24-hour slice of day paradigm;[45] simultaneously, the Commission is considering making urgent changes to the framework of procurement orders that have been issued in the IRP program over the past 3 years while *also* establishing an ongoing IRP Procurement Program that would, potentially, replace the entire IRP procurement paradigm.[46]

EBCE is still determining how the RA program reforms will affect EBCE's portfolio needs. It has not been within the scope of EBCE's IRP analysis to anticipate or prejudge these impacts. Nevertheless, the RA program reform is a known area of uncertainty for EBCE's long-term resource planning.

The proposed changes in the IRP program[47] are potentially less well understood as they may affect EBCE's long-term portfolio planning. The proposed Near-Term Actions reflected in the September 8 Ruling may alter EBCE's near-term portfolio needs, by changing which resources may count towards EBCE's incremental Near Term and Mid-Term Reliability procurement

[44] See *ALJ Ruling Seeking Comments on Staff Paper on Procurement Program and Potential Near-Term Actions to Encourage Additional Procurement*, issued September 8, 2022 (hereafter, 9/8 ALJ Ruling) at p. 8 (noting changes to the RA program, Strategic Reliability Reserve, DCPP operation extension, and carbon neutrality requirements).

[45] D.22-06-050, issued June 23, 2022 (adopting 24-hour framework, workshop series, and timing to adopt with 2024 test year and 2025 implementation).

[46] 9/8 *ALJ Ruling* at p. 1.

[47] *Id.*

obligations. Coupled with this is the prospect of additional procurement directives before even the February 1, 2022, IRP Compliance Filing.[48] The IRP Procurement Program, as reflected in the Staff Paper, may further add complexity to EBCE's growing portfolio analysis efforts. EBCE simply has not been able to incorporate these potential changes into its IRP analysis. The amount of uncertainty that these changes inject into the LSE long-term resource planning is not helpful.

Second, the Commission should impose greater discipline on the timing and release of IRP filing requirements, inputs, and assumptions. As further described in the Lessons Learned section, the Commission continued to revise the materials used to develop the IRP LSE Plan filing until as late as September 29, 2022. While EBCE appreciates the Energy Division Staff's responsiveness and effort to provide useful guidance and materials in a timely manner, there needs to be a recognition that the IRP is a planning exercise that should inform and guide, but not necessarily dictate, LSE procurement over the planning horizon. Modifying the filing materials long after they were expected to be fixed is an issue that can and should be avoided.

Third, the IRP is an imprecise forecast of LSE portfolio needs using assumptions about the future state of resource costs, timely interconnection with available deliverability, and load forecasts. The conclusions of an LSE's IRP analysis provide more or less useful directional guidance about how their portfolio needs may change and what steps they may need to take in the future. In EBCE's case, several landscape changes have occurred since we started our IRP analysis. These include significant regulatory process changes underway in the RA and IRP proceedings; the extension of the Diablo Canyon Power Plant operation for several years; the development of California's Strategic Reliability Reserve by the Department of Water; and the addition of residents of the City of Stockton in 2024. With all these new uncertainties changes, EBCE anticipates that its portfolio needs in the future will differ from its Preferred Conforming Portfolio. The Commission should not expect nor insist that LSEs precisely follow the procurement plans reflected in their IRP portfolios.

V. Lessons Learned

As EBCE has matured, we are looking further ahead to determine the best resource portfolio that will achieve our organizational goals while contributing to system reliability and emission reduction goals for the State. To succeed, we need to manage our portfolio effectively, adding clean energy resources with the appropriate attributes to meet our portfolio needs over time.

[48] 9/8 ALJ Ruling at p. 8 ("the [9/8 ALJ] ruling is focused on . . . additional changes the Commission could make . . . prior to [the] next formal need assessment [i.e., IRP Compliance Filing in February, 2023] . . . and prior to the implementation of" an IRP Procurement Program).

Striving to achieve EBCE's Board-established a goal of providing 100% clean energy on a net-annual basis by 2030, EBCE purposefully sought to expand and improve the capability of our long-term portfolio planning both in preparation for the 2022 IRP LSE Plan submittal as well as to improve our own long-term portfolio management. We have adopted markedly different tools and methodologies we used for this year's IRP plan from previous cycles.[49] We did this to establish an enhanced baseline of long-term analytical capability that can be adapted and repeated more frequently that the current CPUC IRP cycle requires. EBCE's ultimate long-term portfolio strategy is to provide 24/7, coincident clean energy to our customers. EBCE's expanded long-term planning will be a critical tool in guiding our procurement strategy to manage portfolio needs over time.

As EBCE's long-term portfolio analysis continues to improve, we have identified several areas that warrant improvement.

A. Commission Should Recognize the Needs of Public Agency LSEs to Develop IRP Plans

EBCE notices that there appears to be an awareness gap between the CPUC's development of the IRP filing requirements and materials on the one hand, and EBCE's (like other public agencies) required internal governance process on the other. Namely, while the filing deadline to submit an IRP LSE Plan is established by the Commission (e.g., for this year it is November 1, 2022), EBCE must obtain filing authority from its Board well in advance of the CPUC's filing date. As a public agency, EBCE must comply with public meeting notice requirements such as the duty to publish Board meeting materials in advance of regularly scheduled meetings. While EBCE is governed by a Board comprised of elected officials from every municipality within our service territory, our Board is advised by a Community Advisory Committee in addition to EBCE Staff. EBCE must comply with public meeting notice requirements for our advisory committee as well. To ensure that our Community Advisory Committee *and* our Board have a meaningful opportunity to review and approve our IRP LSE plan, EBCE must complete its IRP analysis and plan development approximately one month prior to the CPUC's filing deadline. EBCE, like other public agencies participating in the IRP proceeding, therefore has less time to develop and prepare our IRP analysis than the Commission appears to perceive. EBCE asks that the Commission consider the process to which public agencies must adhere when setting IRP cycle milestones, fixing the closed system of planning parameters, and establishing IRP LSE Plan filing deadlines.

[49] *See supra* at p. 9.

Considering the IRP development timeline described above, much of which is dictated by EBCE's status as a public agency, EBCE was dismayed to see that the Commission continued to make revisions, however seemingly minor, to the filing requirements and materials as late as September 29, 2022.[50] EBCE's IRP analysis, like many other LSEs, is the culmination of several months' effort. While EBCE has made best efforts to accommodate these and other changes, it is not reasonable to expect such flexibility from all LSEs in every IRP cycle.

B. Transmission Congestion and Interconnection Deliverability Slow Incremental Resource Development

EBCE anticipates that the challenges of bringing incremental generating resources online will continue in light of congested transmission capacity across the CAISO system and scarce interconnection deliverability for new resources connecting to the grid. The Commission should consider what steps it may take to support efforts by CAISO and others to alleviate transmission congestion and deliverability scarcity for generation interconnection projects serving California load.

C. IRP-Directed Procurement Risks Displacing LSE Portfolio Management and Procurement Goals

EBCE is concerned that the CPUC's IRP process may have the effect of displacing EBCE's own portfolio management autonomy. Recognizing that the Commission is eager to encourage additional procurement beyond LSE need,[51] given EBCE's relatively small size within the broader LSE landscape, the Commission's procurement direction risks overwhelming EBCE's ability to procure resources that reflect our mission and guidance from our Board.

EBCE is cognizant of its place within the broader LSE landscape. EBCE fully appreciates our obligation to serve load with a resource portfolio that complies with EBCE Board guidance as well as State reliability and emission requirements. However, EBCE notes that the Commission's conclusions based on its analysis of individual LSE-submitted resource portfolios has often

[50] See the Commission's *Aggregated CAM Resources for LSEs Plan Development* workbook, published September 29, 2022, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/aggregated_cam_resources.xlsm; see also the updated Resource Data Template, Version 3, published September 23, 2022, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/rdtv3_092322.xlsm.

[51] *See* 9/8 ALJ Ruling at p. 8.

resulted in significant additional procurement requirements for EBCE, and other LSEs generally. EBCE has a responsibility to manage its resource portfolio in accordance with the direction set by EBCE's member city and municipal representatives. Yet EBCE's IRP analysis, and the resulting preferred conforming portfolio, are based on assumptions regarding EBCE's load change over time, availability of transmission capacity over the planning horizon, relative market energy prices, and costs associated with procurement of then-existing or new resources across the Western Interconnection. In other words, EBCE's IRP portfolio is highly dependent on these assumptions and projections. Whether a particular resource or technology best suits EBCE's future portfolio needs within the IRP planning context should guide but not constrain EBCE's portfolio management decision-making or strategy.

Where EBCE receives a directive from the Commission to procure capacity or energy from specific resource technologies, this 'forced portfolio adjustment' risks displacing other procurement EBCE might have undertaken. EBCE ultimately is striving to achieve a 24/7 coincident clean energy portfolio to meet its customers' load. Commission procurement direction constrains EBCE's procurement autonomy.

Glossary of Terms

Alternative Portfolio: *LSEs are permitted to submit "Alternative Portfolios" developed from scenarios using different assumptions from those used in the Preferred System Plan with updates. Any deviations from the "Conforming Portfolio" must be explained and justified.*

Approve (Plan)*: the CPUC's obligation to approve an LSE's integrated resource plan derives from Public Utilities Code Section 454.52(b)(2) and the procurement planning process described in Public Utilities Code Section 454.5, in addition to the CPUC obligation to ensure safe and reliable service at just and reasonable rates under Public Utilities Code Section 451.*

Balancing Authority Area (CAISO): *the collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.*

Baseline resources: *Those resources assumed to be fixed as a capacity expansion model input, as opposed to Candidate resources, which are selected by the model and are incremental to the Baseline. Baseline resources are existing (already online) or owned or contracted to come online within the planning horizon. Existing resources with announced retirements are excluded from the Baseline for the applicable years. Being "contracted" refers to a resource holding signed contract/s with an LSE/s for much of its energy and capacity, as applicable, for a significant portion of its useful life. The contracts refer to those approved by the CPUC and/or the LSE's governing board, as applicable. These criteria indicate the resource is relatively certain to come online. Baseline resources that are not online at the time of modeling may have a failure rate applied to their nameplate capacity to allow for the risk of them failing to come online.*

Candidate resource: *those resources, such as renewables, energy storage, natural gas generation, and demand response, available for selection in IRP capacity expansion modeling, incremental to the Baseline resources.*

Capacity Expansion Model: *a capacity expansion model is a computer model that simulates generation and transmission investment to meet forecast electric load over many years, usually with the objective of minimizing the total cost of owning and operating the electrical system. Capacity expansion models can also be configured to only allow solutions that meet specific requirements, such as providing a minimum amount of capacity to ensure the reliability of the system or maintaining greenhouse gas emissions below an established level.*

Certify (a Community Choice Aggregator Plan)*: Public Utilities Code 454.52(b)(3) requires the CPUC to certify the integrated resource plans of CCAs. "Certify" requires a formal act of the Commission to determine that the CCA's Plan complies with the requirements of the statute and the process established via Public Utilities Code 454.51(a). In addition, the Commission must review the CCA Plans to determine any potential impacts on public utility bundled customers under Public Utilities Code Sections 451 and 454, among others.*

Clean System Power (CSP) methodology*: the methodology used to estimate GHG and criteria pollutant emissions associated with an LSE's Portfolio based on how the LSE will expect to rely on system power on an hourly basis.*

Community Choice Aggregator*: a governmental entity formed by a city or county to procure electricity for its residents, businesses, and municipal facilities.*

Conforming Portfolio*: the LSE portfolio that conforms to IRP Planning Standards, the 2030 LSE-specific GHG Emissions Benchmark, use of the LSE's assigned load forecast, use of inputs and assumptions matching those used in developing the Reference System Portfolio, as well as other IRP requirements including the filing of a complete Narrative Template, a Resource Data Template and Clean System Power Calculator*.

Effective Load Carrying Capacity*: a percentage that expresses how well a resource is able avoid loss-of-load events (considering availability and use limitations). The percentage is relative to a reference resource, for example a resource that is always available with no use limitations. It is calculated via probabilistic reliability modeling, and yields a single percentage value for a given resource or grouping of resources.*

Effective Megawatts (MW): *perfect capacity equivalent MW, such as the MW calculated by applying an ELCC % multiplier to nameplate MW.*

Electric Service Provider*: an entity that offers electric service to a retail or end-use customer, but which does not fall within the definition of an electrical corporation under Public Utilities Code Section 218.*

Filing Entity*: an entity required by statute to file an integrated resource plan with CPUC.*

Future*: a set of assumptions about future conditions, such as load or gas prices.*

GHG Benchmark (or LSE-specific 2030 GHG Benchmark)*: the mass-based GHG emission planning targets calculated by staff for each LSE based on the methodology established by the California Air Resources Board and required for use in LSE Portfolio development in IRP.*

GHG Planning Price: *the systemwide marginal GHG abatement cost associated with achieving a specific electric sector 2030 GHG planning target.*

Integrated Resources Planning Standards (Planning Standards)*: the set of CPUC IRP rules, guidelines, formulas and metrics that LSEs must include in their LSE Plans.*

Integrated Resource Planning (IRP) process*: integrated resource planning process; the repeating cycle through which integrated resource plans are prepared, submitted, and reviewed by the CPUC*

Long term*: more than 5 years unless otherwise specified.*

Load Serving Entity*: an electrical corporation, electric service provider, community choice aggregator, or electric cooperative.*

Load Serving Entity (LSE) Plan*: an LSE's integrated resource plan; the full set of documents and information submitted by an LSE to the CPUC as part of the IRP process.*

Load Serving Entity (LSE) Portfolio*: a set of supply- and/or demand-side resources with certain attributes that together serve the LSE's assigned load over the IRP planning horizon.*

Loss of Load Expectation (LOLE): *a metric that quantifies the expected frequency of loss-of-load events per year. Loss-of-load is any instance where available generating capacity is insufficient to serve electric demand. If one or more instances of loss-of-load occurring within the same day regardless of duration*

are counted as one loss-of-load event, then the LOLE metric can be compared to a reference point such as the industry probabilistic reliability standard of "one expected day in 10 years," i.e. an LOLE of 0.1.

Maximum Import Capability: a California ISO metric that represents a quantity in MWs of imports determined by the CAISO to be simultaneously deliverable to the aggregate of load in the ISO's Balancing Authority (BAA) Area and thus eligible for use in the Resource Adequacy process. The California ISO assess a MIC MW value for each intertie into the ISO's BAA and allocated yearly to the LSEs. A LSE's RA import showings are limited to its share of the MIC at each intertie.

Net Qualifying Capacity (NQC): *Qualifying Capacity reduced, as applicable, based on: (1) testing and verification; (2) application of performance criteria; and (3) deliverability restrictions. The Net Qualifying Capacity determination shall be made by the California ISO pursuant to the provisions of this California ISO Tariff and the applicable Business Practice Manual.*

Non-modeled costs*: embedded fixed costs in today's energy system (e.g., existing distribution revenue requirement, existing transmission revenue requirement, and energy efficiency program cost).*

Nonstandard LSE Plan*: type of integrated resource plan that an LSE may be eligible to file if it serves load outside the CAISO balancing authority area.*

Optimization*: an exercise undertaken in the CPUC's Integrated Resource Planning (IRP) process using a capacity expansion model to identify a least-cost portfolio of electricity resources for meeting specific policy constraints, such as GHG reduction or RPS targets, while maintaining reliability given a set of assumptions about the future. Optimization in IRP considers resources assumed to be online over the planning horizon (baseline resources), some of which the model may choose not to retain, and additional resources (candidate resources) that the model is able to select to meet future grid needs.*

Planned resource: *any resource included in an LSE portfolio, whether already online or not, that is yet to be procured. Relating this to capacity expansion modeling terms, planned resources can be baseline resources (needing contract renewal, or currently owned/contracted by another LSE), candidate resources, or possibly resources that were not considered by the modeling, e.g., due to the passage of time between the modeling taking place and LSEs developing their plans. Planned resources can be specific (e.g., with a CAISO ID) or generic, with only the type, size and some geographic information identified.*

Qualifying capacity*: the maximum amount of Resource Adequacy Benefits a generating facility could provide before an assessment of its net qualifying capacity.*

Preferred Conforming Portfolio*: the conforming portfolio preferred by an LSE as the most suitable to its own needs; submitted to CPUC for review as one element of the LSE's overall IRP plan.*

Preferred System Plan: *the Commission's integrated resource plan composed of both the aggregation of LSE portfolios (i.e., Preferred System Portfolio) and the set of actions necessary to implement that portfolio (i.e., Preferred System Action Plan).*

Preferred System Portfolio: *the combined portfolios of individual LSEs within the CAISO, aggregated, reviewed and possibly modified by Commission staff as a proposal to the Commission, and adopted by the Commission as most responsive to statutory requirements per Pub. Util. Code 454.51; part of the Preferred System Plan.*

Short term*: 1 to 3 years (unless otherwise specified).*

***Staff**: CPUC Energy Division staff (unless otherwise specified).*

***Standard LSE Plan**: type of integrated resource plan that an LSE is required to file if it serves load within the CAISO balancing authority area (unless the LSE demonstrates exemption from the IRP process).*

***Transmission Planning Process (TPP)**: annual process conducted by the California Independent System Operator (CAISO) to identify potential transmission system limitations and areas that need reinforcements over a 10-year horizon.*

Appendix

The following figures and tables show the results tables from the CSP for the CPUC 30 MMT scenario.

Table 22 CO_2 Emissions Summary of EBCE's Preferred Conforming Portfolio - 30 MMT Scenario[52]

CO_2	*Unit*	2024	2026	2030	2035
Coal	*MMt/yr*	0.000	0.000	0.000	0.000
CHP	*MMt/yr*	0.167	0.167	0.167	0.100
Biogas[53]	*MMt/yr*	0.000	0.000	0.000	0.000
Biomass[53]	*MMt/yr*	0.000	0.000	0.000	0.000
System Power	*MMt/yr*	1.136	0.829	0.544	0.480
Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000
Total	***MMt/yr***	**1.303**	**0.997**	**0.710**	**0.580**
Average emissions intensity	*tCO_2/MWh*	0.193	0.145	0.099	0.077
Oversupply Emissions Credits	*MMt/yr*	0.14	0.18	0.20	0.27

Table 23 CSP Summary of EBCE's Preferred Conforming Portfolio – 30 MMT Scenario

Renewable and GHG-Free %	Unit	2024	2026	2030	2035
Retail Sales	GWh	6,740	6,887	7,180	7,540
RPS-Eligible Delivered Renewable	GWh	4,348	5,276	6,375	7,129
GHG free	GWh	4,348	5,276	6,375	7,131
RPS-Eligible Delivered Renewable Percentage	% of retail sales	65	77	89	95
GHG-free Percentage	% of retail sales	65	77	89	95

[52] CHP emissions shown in Table 22 represent EBCE's pro rata share of behind-the-meter Combined Heat and Power (CHP) interconnected to the CAISO-controlled electric grid. CHP emissions are determined by the CSP calculator as a function of LSE load, unrelated to the 'actual' GHG-emission profile of any specific LSE's resource portfolio. EBCE is required to include this allocation in its CSP.

[53] As shown in the tables below, EBCE is allocated particulate emissions associated with the VAMO allocation of Biomass / Biogas attributes. However, the CSP assigns no CO2 emissions for these resources.

Table 24 Preferred Conforming Portfolio of PM 2.5 Emissions – 30 MMT Scenario

PM2.5	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	9.17	9.17	9.14	5.61
Biogas	tonnes/yr	4.34	4.36	4.14	1.28
Biomass	tonnes/yr	36.96	35.06	26.12	19.84
System Power	tonnes/yr	29.51	24.51	16.71	17.74
Total	tonnes/yr	79.97	73.09	56.11	44.47
Average emissions intensity	kg/MWh	0.01	0.01	0.01	0.01

Table 25 Preferred Conforming Portfolio SO_2 Emissions – 30 MMT Scenario

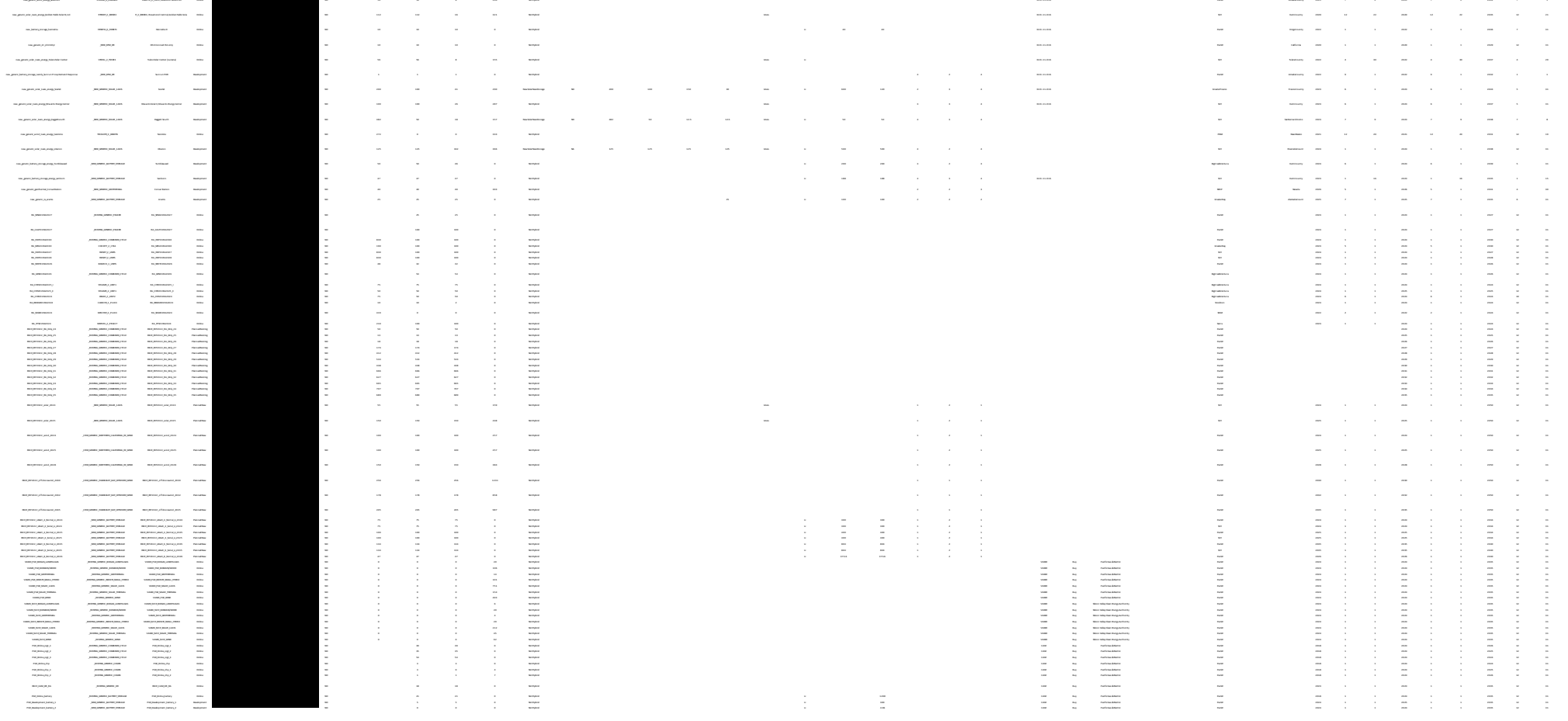
SO2	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	0.98	0.97	0.97	0.60
Biogas	tonnes/yr	3.17	3.16	3.06	0.95
Biomass	tonnes/yr	14.21	13.48	10.05	7.63
System Power	tonnes/yr	2.77	2.30	1.56	1.66
Total	tonnes/yr	21.13	19.92	15.64	10.84
Average emissions intensity	kg/MWh	0.00	0.00	0.00	0.00

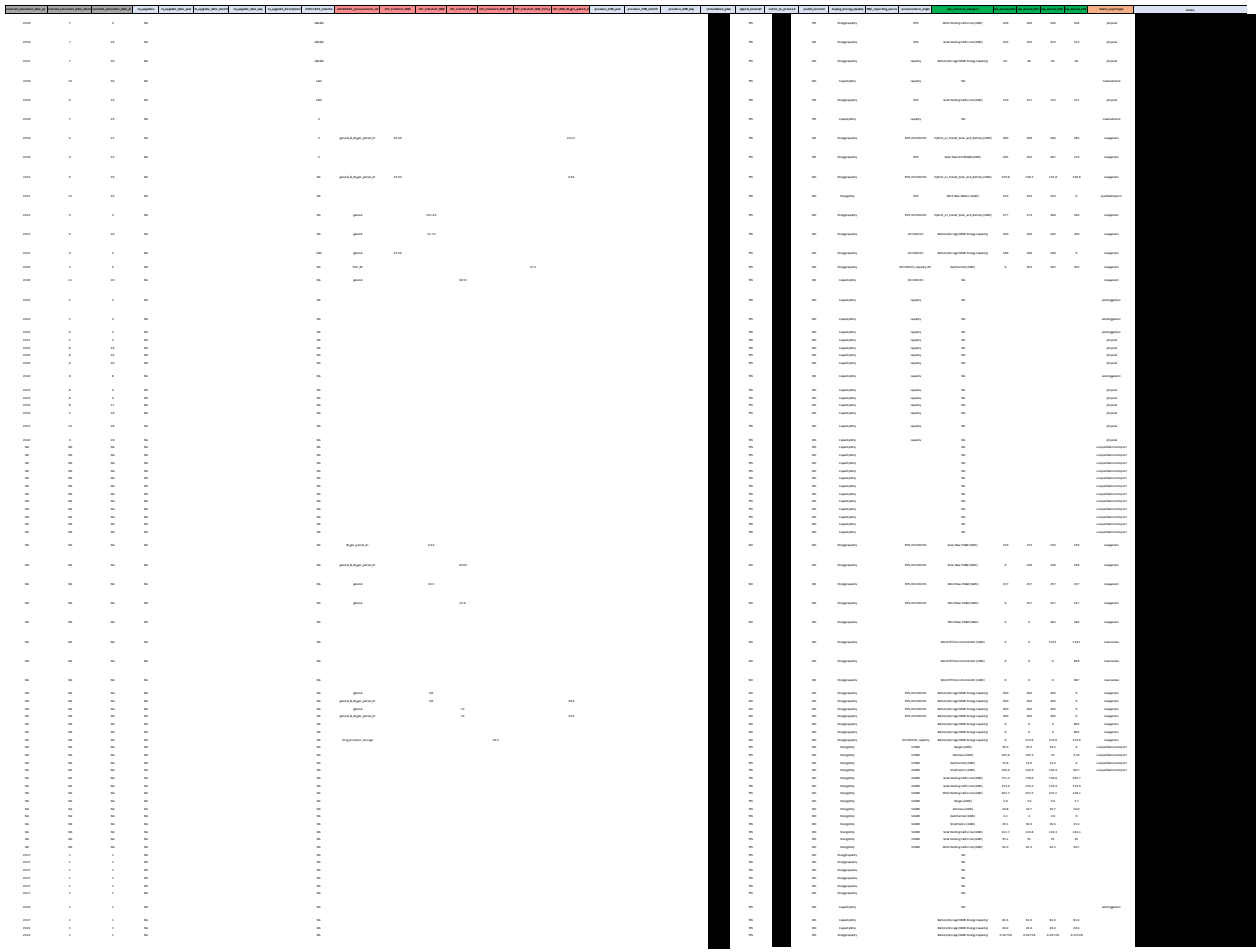
Table 26 Preferred Conforming Portfolio NO_x Emissions – 30 MMT Scenario

NOx	Unit	2024	2026	2030	2035
Coal	tonnes/yr	0.00	0.00	0.00	0.00
CHP	tonnes/yr	42.79	42.57	42.02	22.34
Biogas	tonnes/yr	14.26	14.23	13.75	4.29
Biomass	tonnes/yr	111.38	105.59	78.66	59.76
System Power	tonnes/yr	35.28	28.94	20.58	21.90
Total	tonnes/yr	203.70	191.33	155.02	108.29
Average emissions intensity	kg/MWh	0.03	0.03	0.02	0.01

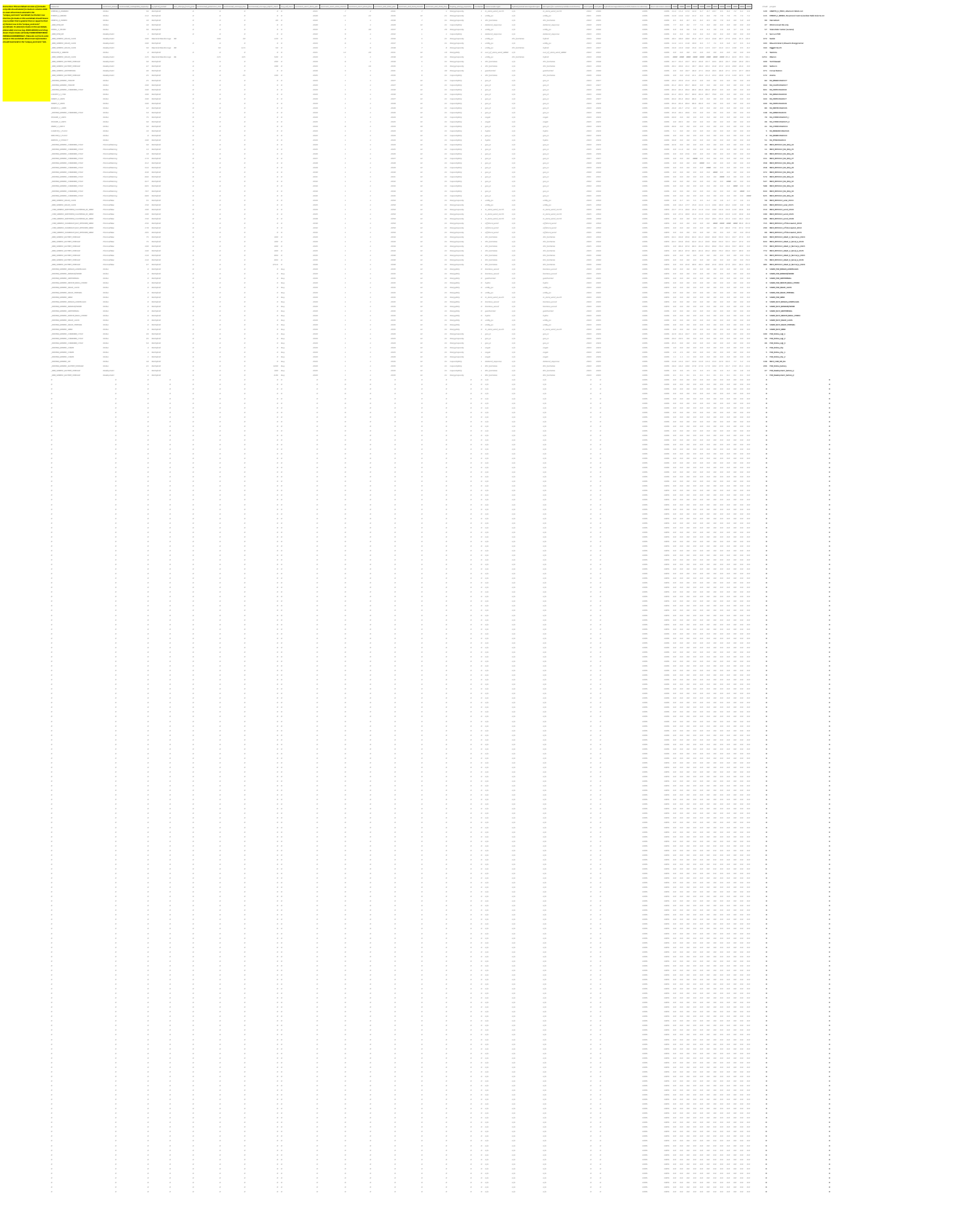
ReleaseVersion	ReleaseDate	ID	Note
RDTv3 beta	6/6/2022		
RDTv3 Release	6/15/2022		
RDTv3 Updated	6/20/2022		Minor updates in columns' names
RDTv3 Updated	7/15/2022		Reliability tabs updates & some minor updates to the resource tab
RDTv3 Updated	7/29/2022		1)"misc" tab: updated with all ELCC % values and added MRN/TRN ratios 2)“Reliability” tab: added formulas to pull MRN/TRN ratios from the “misc” worksheet; updated formatting for cells H23:J50 and L23:P50 (previously greyed out since results weren’t available for those years) 3)“Calcs” tab: updated formulas in columns S:T so that battery contracts with durations greater than or equal to 9 hours will get “8hr_batteries” ELCC%; updated formulas in columns S:T and added formulas in column Y so that battery contracts with durations less than 4 hours will get (“4hr_batteries” ELCC%) * (contract duration) / 4hr
RDTv3 Updated	8/23/2022		1)"resources" tab: updated to include several new resource IDs, remove duplicates, adjust how baseline hybrid/paired resources are characterized, and update some project-specific information 2) "btm_pv_forecast" tab: Added an additional LSE 3)“ReportSheet” tab: new macro generated error flag, *Rows with invalid buying_energy_capacity and csp_resource_category;* flags contracts with non-storage CSP resources is marked as CapacityOnly and is marked as CSP. 4)“ReportSheet” tab: summation now includes contracts that ara both "Buy" and "Owned"
RDTv3 Updated	9/23/2022		1) corrects made to macro 2) fixes the ELCC type issues for a few generic resources

Attachment Staff Report Item 8C





Attachment Staff Report Item 8C



resource	generator_name	MAXGEN	resolve_final_group	BAA_ID	supertype	elcc_type
7STDRD_1_SOLAR1	SHAFTER_SOLAR	20	caiso_solar	CISO	physical	utility_pv
ACACIA_6_SOLAR	WEST_ANTELOPE_SOLAR	20	caiso_solar	CISO	physical	utility_pv
ADELANTO_SOLAR	NAN	10	ldwp_solar	LADWP	physical	utility_pv
ADERA_1_SOLAR1	ADERA_SOLAR	20	caiso_solar	CISO	physical	utility_pv
ADLIN_1_UNITS	GEYSERS_AIDLIN_AGGREGATE	22	caiso_geothermal	CISO	physical	geothermal
ADMEST_6_SOLAR	ADAMS_EAST	19	caiso_solar	CISO	physical	utility_pv
ADOBEE_1_SOLAR	ADOBE_SOLAR	20	caiso_solar	CISO	physical	utility_pv
AGCANA_X_HOOVER	HOOVER_POWER_PLANT	40	caiso_hydro	WALC	specifiedimport	hydro
AGRICO_6_PL3N5	FRESNO_PEAKER	22.69	caiso_peaker1	CISO	physical	gas_ct
AGRICO_7_UNIT	FRESNO_COGEN	49.9	caiso_ccgt2	CISO	physical	gas_cc
AGUCAL_5_SOLAR1	AGUA_CALIENTE_SOLAR	290	caiso_solar	CISO	physical	utility_pv
AKINGS_6_AMESR1	AMERICAN_KINGS_SOLAR	123	caiso_solar	CISO	physical	utility_pv
ALAMIT_2_PL1X3	ALAMITOS_ENERGY_CENTER_UNIT_7	674.7	caiso_ccgt1	CISO	physical	gas_cc
ALAMIT_7_ES1	ALAMITOS_ENERGY_STORAGE	100.45	caiso_li_battery	CISO	physical	hr_batteries
ALAMIT_7_UNIT_3	ALAMITOS_GEN_STA._UNIT_3	326.76	caiso_st	CISO	physical	steam
ALAMIT_7_UNIT_4	ALAMITOS_GEN_STA._UNIT_4	334.43	caiso_st	CISO	physical	steam
ALAMIT_7_UNIT_5	ALAMITOS_GEN_STA._UNIT_5	480	caiso_st	CISO	physical	steam
ALAMO_6_UNIT	ALAMO_POWER_PLANT	17	caiso_hydro	CISO	physical	hydro
ALHMBR_1_ALHSLR	SG_ALHAMBRA	50	iid_solar	IID	specifiedimport	utility_pv
ALLGNY_6_HYDRO1	SALMON_CREEK_HYDROELECTRIC_PROJECT	0.52	caiso_small_hydro	CISO	physical	small_hydro
ALMASL_2_AL6BT6	MAVERICK6STORAGE	50	caiso_li_battery	CISO	physical	hr_batteries
ALMASL_2_GS1SR1	ALMASOL_GENERATING_STATION_1	125	caiso_solar	CISO	physical	utility_pv
ALMASL_2_GS4SR4	ALMASOL_GENERATING_STATION_4	100	caiso_solar	CISO	physical	utility_pv
ALMASL_2_GS6SR6	ALMASOL_GENERATING_STATION_6	100	caiso_solar	CISO	physical	utility_pv
ALMASL_2_GS7SR7	ALMASOL_GENERATING_STATION_7	132	caiso_solar	CISO	physical	utility_pv
ALMEGT_1_UNIT_1	ALAMEDA_GT_UNIT_1	25	caiso_peaker2	CISO	physical	gas_ct
ALMEGT_1_UNIT_2	ALAMEDA_GT_UNIT_2	25	caiso_peaker2	CISO	physical	gas_ct
ALPSLR_1_NTHSLR	ALPAUGH_NORTH,_LLC	20	caiso_solar	CISO	physical	utility_pv
ALPSLR_1_SPSSLR	ALPAUGH_50_LLC	50	caiso_solar	CISO	physical	utility_pv
ALT6DN_2_WIND7	PINYON_PINES_1	164.31	caiso_wind	CISO	physical	in_state_wind_south
ALT6DS_2_WIND9	PINYON_PINES_2	132	caiso_wind	CISO	physical	in_state_wind_south
ALTA3A_2_CPCE4	ALTA_WIND_4	102	caiso_wind	CISO	physical	in_state_wind_south
ALTA3A_2_CPCE5	ALTA_WIND_5	168	caiso_wind	CISO	physical	in_state_wind_south
ALTA3A_2_CPCE8	ALTA_WIND_8	150	caiso_wind	CISO	physical	in_state_wind_south
ALTA4A_2_CPCW1	ALTA_WIND_1	150	caiso_wind	CISO	physical	in_state_wind_south
ALTA4B_2_CPCW2	ALTA_WIND_2	150	caiso_wind	CISO	physical	in_state_wind_south
ALTA4B_2_CPCW3	ALTA_WIND_3	150	caiso_wind	CISO	physical	in_state_wind_south
ALTA4B_2_CPCW6	MUSTANG_HILLS	150	caiso_wind	CISO	physical	in_state_wind_south
ALTA6B_2_WIND11	ALTA_WIND_11	88.15	caiso_wind	CISO	physical	in_state_wind_south
ALTA6E_2_WIND10	ALTA_WIND_10	134.84	caiso_wind	CISO	physical	in_state_wind_south
ALTAGASSTORAGE	NAN	40	caiso_li_battery	CISO	physical	hr_batteries
ALTWD_1_QF	NAN	28.84	caiso_wind	CISO	physical	in_state_wind_south
ALTWD_2_AT3WD3	ALTECH_3	9.8	caiso_wind	CISO	physical	in_state_wind_south
ALTWD_2_COAWD1	COACHELLA_1	50.4	caiso_wind	CISO	physical	in_state_wind_south
ANAHM_2_CANYN1	CANYON_POWER_PLANT_UNIT_1	49.4	caiso_peaker1	CISO	physical	gas_ct
ANAHM_2_CANYN2	CANYON_POWER_PLANT_UNIT_2	49.4	caiso_peaker1	CISO	physical	gas_ct
ANAHM_2_CANYN3	CANYON_POWER_PLANT_UNIT_3	49.4	caiso_peaker1	CISO	physical	gas_ct
ANAHM_2_CANYN4	CANYON_POWER_PLANT_UNIT_4	49.4	caiso_peaker1	CISO	physical	gas_ct
ANAHM_7_CT	NAN	40.64	caiso_peaker1	CISO	physical	gas_ct
ANTLPE_2_QF	ANTELOPE QFS	4	caiso_wind	CISO	physical	in_state_wind_south
ANZA_6_SOLAR1	SEVILLE SOLAR ONE	20	iid_solar	IID	specifiedimport	utility_pv
APEX_CC	NAN	538.7	ldwp_ccgt	LADWP	physical	gas_cc
APLHIL_1_SFKHY1	SOUTH FORK POWERHOUSE	2.68	caiso_hydro	CISO	physical	hydro
APLHIL_1_SLABCK	SLAB CREEK HYDRO	1	caiso_small_hydro	CISO	physical	small_hydro
AQUAWS_2_AQWSR1	Aquamarine Westside	250	caiso_solar	CISO	physical	utility_pv
ARATINASOLAR	NAN	150	caiso_solar	CISO	physical	utility_pv
ARATINASTORAGE	NAN	50	caiso_li_battery	CISO	physical	hr_batteries
ARBWD_6_QF	WIND RESOURCE II	19.95	caiso_wind	CISO	physical	in_state_wind_south
ARCOGN_2_UNITS	WATSON COGENERATION	416.6	caiso_chp	CISO	physical	cogen
ARKANS_1_ARKSLR	SG ARKANSAS	50	iid_solar	IID	specifiedimport	utility_pv
ARLINT_5_SCEDYN	ARLINGTON VALLEY CC	565	SW_CCGT	AZPS	specifiedimport	gas_cc
ARLNTN_2_AR1SR1	Arlington	100	caiso_solar	CISO	physical	utility_pv
ARLNTN_2_ASUSR1	Arlington Solar 1	131	caiso_solar	CISO	physical	utility_pv
ARLVAL_5_SOLAR	ARLINGTON VALLEY SOLAR ENERGY II	127	caiso_solar	SRP	specifiedimport	utility_pv
ARVINN_6_ORION1	ORION 1 SOLAR	12	caiso_solar	CISO	physical	utility_pv
ARVINN_6_ORION2	ORION 2 SOLAR	8	caiso_solar	CISO	physical	utility_pv
ASTORA_2_SOLAR1	ASTORIA 1	100	caiso_solar	CISO	physical	utility_pv
ASTORA_2_SOLAR2	ASTORIA 2	75	caiso_solar	CISO	physical	utility_pv
ATHOS_5_AP1X2	INTERSECTSOLAR	250	caiso_solar	CISO	physical	utility_pv
ATHOS_5_AP2X2	Athos Power Plant 2	200	caiso_solar	CISO	physical	utility_pv
ATWEL2_1_SOLAR1	ATWELL WEST	20	caiso_solar	CISO	physical	utility_pv
ATWELL_1_SOLAR	ATWELL ISLAND PV SOLAR GENERATING FAC	20	caiso_solar	CISO	physical	utility_pv
AVENAL_6_AVPARK	AVENAL PARK SOLAR PROJECT	6	caiso_solar	CISO	physical	utility_pv
AVENAL_6_AVSLR1	AVENAL SOLAR 1	7.9	caiso_solar	CISO	physical	utility_pv
AVENAL_6_AVSLR2	AVENAL SOLAR 2	7.9	caiso_solar	CISO	physical	utility_pv
AVENAL_6_SANDDG	SAND DRAG SOLAR PROJECT	19	caiso_solar	CISO	physical	utility_pv
AVENAL_6_SUNCTY	SUN CITY SOLAR PROJECT	20	caiso_solar	CISO	physical	utility_pv
AVSOLR_2_SOLAR	AV SOLAR RANCH 1	241.5	caiso_solar	CISO	physical	utility_pv
AZALEASOLAR	NAN	60	caiso_solar	CISO	physical	utility_pv
AZALEASTORAGE	NAN	38	caiso_li_battery	CISO	physical	hr_batteries
BAHIA_2_LKHSR1	LAKE HERMAN SOLAR	5	caiso_solar	CISO	physical	utility_pv
BALCHS_7_UNIT 1	BALCH 1 PH UNIT 1	31	caiso_hydro	CISO	physical	hydro
BALCHS_7_UNIT 2	BALCH 2 PH UNIT 2	52.5	caiso_hydro	CISO	physical	hydro
BALCHS_7_UNIT 3	BALCH 2 PH UNIT 3	54.6	caiso_hydro	CISO	physical	hydro
BANGOR_6_HYDRO	VIRGINIA RANCH DAM POWERPLANT	1	caiso_small_hydro	CISO	physical	small_hydro
BANKPP_2_NSPIN	BANKPP_2_NSPIN	270	caiso_pumped_hydro	CISO	physical	pumped_storage
BARRE_2_QF	BARRE QFS	0.2	caiso_small_hydro	CISO	physical	small_hydro
BARRE_6_PEAKER	BARRE PEAKER	47	caiso_peaker1	CISO	physical	gas_ct
BASICE_2_UNITS	KING CITY COGEN	120	caiso_chp	CISO	physical	cogen
BCTSYS_5_PWXDYN	BCTSYS_5_PWXDYN	428	caiso_hydro	BPAT	specifiedimport	hydro
BDGRCK_1_UNITS	BADGER CREEK LIMITED	48.08	caiso_peaker1	CISO	physical	gas_ct
BEACON_SOLAR_B	NAN	125	ldwp_solar	LADWP	physical	utility_pv
BEARDS_7_UNIT 1	BEARDSLEY HYDRO	11.5	caiso_hydro	CISO	physical	hydro
BEARMT_1_UNIT	BEAR MOUNTAIN LIMITED	49.21	caiso_peaker2	CISO	physical	gas_ct
BEJNLS_5_BV2SCEDYN	BROADVIEW 2	167	caiso_wind	AZPS	specifiedimport	out_of_state_wind_AZNM
BEKWJS_5_BV1SCEDYN	BROADVIEW 1	130	caiso_wind	AZPS	specifiedimport	out_of_state_wind_AZNM
BELDEN_7_UNIT 1	BELDEN HYDRO	119	caiso_hydro	CISO	physical	hydro
BELLEVUESOLARINV1	NAN	1.6	caiso_solar	CISO	physical	utility_pv
BGSKYN_2_AS2SR1	ANTELOPE SOLAR 2	105	caiso_solar	CISO	physical	utility_pv
BGSKYN_2_ASPSR2	ANTELOPE SOLAR 2 SAN PABLO	100	caiso_solar	CISO	physical	utility_pv

BGSKYN_2_ASSR1B	Antelope Solar 1B	17	caiso_solar	CISO	physical	utility_pv
BGSKYN_2_ASSR3A	ANTELOPE SOLAR 3A	15	caiso_solar	CISO	physical	utility_pv
BGSKYN_2_ASSR3B	ANTELOPE SOLAR 3B	5	caiso_solar	CISO	physical	utility_pv
BGSKYN_2_BS3SR3	BIG SKY SOLAR 3	20	caiso_solar	CISO	physical	utility_pv
BIGBEAUSTORAGE	NAN	40	caiso_li_battery	CISO	physical	hr_batteries
BIGCRK_2_EXESWD	BIG CREEK HYDRO PROJECT PSP	820	caiso_hydro	CISO	physical	hydro
BIGCRK_7_DAM7	DAM 7 AT BIG CREEK (FISHWATER GEN)	0.3	caiso_hydro	CISO	physical	hydro
BIGCRK_7_MAMRES	MAMMOTH POOL RESERVOIR (FISHWATER	1.25	caiso_small_hydro	CISO	physical	small_hydro
BIGSKY_2_AS2BT1	Antelope Solar 2 LAB	127	caiso_li_battery	CISO	physical	hr_batteries
BIGSKY_2_ASLBT2	ANTELOPE SOLAR 2 LUNA	100	caiso_li_battery	CISO	physical	hr_batteries
BIGSKY_2_BSKSR6	BIG SKY SOLAR 6	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_BSKSR7	BIG SKY SOLAR 7	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_BSKSR8	BIG SKY SOLAR 8	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR1	ANTELOPE BIG SKY RANCH	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR2	BIG SKY SOLAR 4	40	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR3	BIG SKY SUMMER	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR4	WESTERN ANTELOPE BLUE SKY RANCH B	20	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR5	BIG SKY SOLAR 2	5	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR6	SOLVERDE 1	85	caiso_solar	CISO	physical	utility_pv
BIGSKY_2_SOLAR7	BIG SKY SOLAR 1	50	caiso_solar	CISO	physical	utility_pv
BIGSKY1	NAN	0.75	caiso_biomass	CISO	physical	biomass_wood
BIGSKY2	NAN	0.75	caiso_biomass	CISO	physical	biomass_wood
BIOMAS_1_UNIT 1	WOODLAND BIOMASS	25.5	caiso_biomass	CISO	physical	biomass_wood
BIOMASSONEGE1	NAN	14.4	caiso_biomass	CISO	physical	biomass_wood
BISHOP_1_ALAMO	BISHOP CREEK PLANT 2 AND 6	13.4	caiso_small_hydro	CISO	physical	small_hydro
BISHOP_1_UNITS	BISHOP CREEK PLANT 3 AND 4	15.8	caiso_small_hydro	CISO	physical	small_hydro
BKRFLD_2_SOLAR1	BAKERSFIELD 111	1.38	caiso_solar	CISO	physical	utility_pv
BLACK_7_UNIT 1	JAMES B. BLACK 1	85	caiso_hydro	CISO	physical	hydro
BLACK_7_UNIT 2	JAMES B. BLACK 2	84.1	caiso_hydro	CISO	physical	hydro
BLACK_WALNUT	NAN	15	caiso_li_battery	CISO	physical	hr_batteries
BLAST_1_WIND	MOUNTAIN VIEW IV WIND	49	caiso_wind	CISO	physical	in_state_wind_south
BLCKBT_2_STONEY	BLACK BUTTE HYDRO	6.2	caiso_small_hydro	CISO	physical	small_hydro
BLCKWL_6_SOLAR1	BLACKWELL SOLAR	12	caiso_solar	CISO	physical	utility_pv
BLKCRK_2_GMCBT1	GENESIS MCCOY BESS	230	caiso_li_battery	CISO	physical	hr_batteries
BLKCRK_2_SOLAR1	MCCOY STATION	250	caiso_solar	CISO	physical	utility_pv
BLKDIA_2_BDEBT1	BLACK DIAMOND ENERGY STORAGE	200	caiso_li_battery	CISO	physical	hr_batteries
BLM W_2_COSBT1	COSOSTORAGE	60	caiso_li_battery	CISO	physical	hr_batteries
BLM_2_UNITS	BLM EAST FACILITY	72	caiso_geothermal	CISO	physical	geothermal
BLUE_MOUNTAIN_ELECTRIC_COMPANY	NAN	3	caiso_biomass	CISO	physical	biomass_wood
BLULKE_6_BLUELK	NAN	12	caiso_biomass	CISO	physical	biomass_wood
BLYTHE_1_SOLAR1	BLYTHE SOLAR 1 PROJECT	21	caiso_solar	CISO	physical	utility_pv
BLYTHE_1_SOLAR2	BLYTHE GREEN 1	20	caiso_solar	CISO	physical	utility_pv
BLYTHESTORAGE1	NAN	63	caiso_li_battery	CISO	physical	hr_batteries
BNNIEN_7_ALTAPH	ALTA POWER HOUSE	1	caiso_small_hydro	CISO	physical	small_hydro
BOGUE_1_UNITA1	FEATHER RIVER ENERGY CENTER, UNIT #1	47.6	caiso_peaker1	CISO	physical	gas_ct
BORDER_6_UNITA1	CALPEAK POWER BORDER UNIT 1	51.25	caiso_peaker2	CISO	physical	gas_ct
BOWMN_6_HYDRO	NID HYDRO BOWMAN POWERHOUSE	3.6	caiso_small_hydro	CISO	physical	small_hydro
BRDGVL_7_BAKER	BAKER STATION HYDRO	1.49	caiso_small_hydro	CISO	physical	small_hydro
BRDSLD_2_HIWIND	HIGH WINDS ENERGY CENTER	162	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_MTZUM2	NEXTERA ENERGY MONTEZUMA WIND II	78.2	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_MTZUMA	FPL ENERGY MONTEZUMA WIND	36.8	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_SHILO1	SHILOH I WIND PROJECT	150	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_SHILO2	SHILOH WIND PROJECT 2	150	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_SHLO3A	SHILOH III WIND PROJECT, LLC	102.5	caiso_wind	CISO	physical	in_state_wind_north
BRDSLD_2_SHLO3B	SHILOH IV WIND PROJECT	100	caiso_wind	CISO	physical	in_state_wind_north
BREGGO_6_DEGRSL	DESERT GREEN SOLAR FARM	6.3	caiso_solar	CISO	physical	utility_pv
BREGGO_6_SOLAR	NRG BORREGO SOLAR ONE	26	caiso_solar	CISO	physical	utility_pv
BRODIE_2_WIND	CORAM BRODIE WIND PROJECT	102	caiso_wind	CISO	physical	in_state_wind_south
BUCKBL_2_PL1X3	BLYTHE ENERGY CENTER	493.63	caiso_ccgt2	CISO	physical	gas_cc
BUCKCK_2_HYDRO	LASSEN STATION HYDRO	0.99	caiso_small_hydro	CISO	physical	small_hydro
BUCKCK_7_OAKFLT	OAK FLAT	1.3	caiso_small_hydro	CISO	physical	small_hydro
BUCKCK_7_PL1X2	BUCKS CREEK AGGREGATE	57.25	caiso_hydro	CISO	physical	hydro
BUCKWD_1_NPALM1	NORTH PALM SPRINGS 1A	2.4	caiso_solar	CISO	physical	utility_pv
BUCKWD_1_QF	BUCKWIND RE-POWERING PROJECT	16.5	caiso_wind	CISO	physical	in_state_wind_south
BUCKWD_7_WINTCV	WINTEC ENERGY, LTD.	1.32	caiso_wind	CISO	physical	in_state_wind_south
BURNYF_2_UNIT 1	BURNEY FOREST POWER	29	caiso_biomass	CISO	physical	biomass_wood
BUTTVL_7_UNIT 1	BUTT VALLEY HYDRO	39.5	caiso_hydro	CISO	physical	hydro
CABALO_2_M2BSR1	MUSTANG 2 BARBARO SOLAR	50	caiso_solar	CISO	physical	utility_pv
CABALO_2_M2WSR2	MUSTANG 2 WHIRLAWAY SOLAR	100	caiso_solar	CISO	physical	utility_pv
CABZON_1_WINDA1	CABAZON WIND PROJECT	41	caiso_wind	CISO	physical	in_state_wind_south
CALFTN_2_CFSBT1	California Flats Storage	60	caiso_li_battery	CISO	physical	hr_batteries
CALFTN_2_SOLAR	CALIFORNIA FLATS NORTH	130	caiso_solar	CISO	physical	utility_pv
CALFTS_2_CFSSR1	CALIFORNIA FLATS SOLAR SOUTH	150	caiso_solar	CISO	physical	utility_pv
CALGEN_1_UNITS	COSO NAVY 1	80	caiso_geothermal	CISO	physical	geothermal
CALPIN_1_AGNEW	AGNEWS POWER PLANT	28.56	caiso_ccgt1	CISO	physical	gas_cc
CALPSS_6_SOLAR1	CALIPATRIA SOLAR FARM	19.9	iid_solar	IID	specifiedimport	utility_pv
CAMCHE_1_PL1X3	CAMANCHE UNITS 1, 2 & 3 AGGREGATE	9.99	caiso_hydro	CISO	physical	hydro
CAMDEN_6_RDDBM1	RUANN DAIRY DIGESTER BIOMAT	0.55	caiso_biomass	CISO	physical	biomass_wood
CAMERON	NAN	2.4	caiso_solar	CISO	physical	utility_pv
CAMLOT_2_SOLAR1	CAMELOT	45	caiso_solar	CISO	physical	utility_pv
CAMLOT_2_SOLAR2	COLUMBIA TWO	15	caiso_solar	CISO	physical	utility_pv
CAMPFW_7_FARWST	CAMP FAR WEST HYDRO	8	caiso_small_hydro	CISO	physical	small_hydro
CANTUA_1_SOLAR	CANTUA SOLAR STATION	20	caiso_solar	CISO	physical	utility_pv
CAPWD_1_QF	EDOM HILLS WIND FARM	19.55	caiso_wind	CISO	physical	in_state_wind_south
CARBOU_7_PL2X3	CARIBOU PH 1 UNIT 2 & 3 AGGREGATE	49	caiso_hydro	CISO	physical	hydro
CARBOU_7_PL4X5	CARIBOU PH 2 UNIT 4 & 5 AGGREGATE	120	caiso_hydro	CISO	physical	hydro
CARBOU_7_UNIT 1	CARIBOU PH 1 UNIT 1	24	caiso_hydro	CISO	physical	hydro
CARGILLB6BIO1	NAN	1.1	caiso_biomass	CISO	physical	biomass_wood
CARGILLB6BIO2	NAN	1.1	caiso_biomass	CISO	physical	biomass_wood
CARLS1_2_CARCT1	CARLSBAD 1	422	caiso_peaker1	CISO	physical	gas_ct
CARLS2_1_CARCT1	CARLSBAD 2	105.5	caiso_peaker1	CISO	physical	gas_ct
CARSON_ICE_CC	NAN	62.7	banc_ccgt	BANC	physical	gas_cc
CARSON_ICE_PEAKER	NAN	42	banc_peaker	BANC	physical	gas_ct
CASADB_1_CD4GT1	NAN	40	caiso_geothermal	CISO	physical	geothermal
CASCADESTORAGE	NAN	25	caiso_li_battery	CISO	physical	hr_batteries
CASTAIC_1	NAN	240	ldwp_pumped_hydro	LADWP	physical	pumped_storage
CASTAIC_2	NAN	250	ldwp_pumped_hydro	LADWP	physical	pumped_storage
CASTAIC_3	NAN	240	ldwp_pumped_hydro	LADWP	physical	pumped_storage
CASTAIC_4	NAN	240	ldwp_pumped_hydro	LADWP	physical	pumped_storage
CASTAIC_5	NAN	240	ldwp_pumped_hydro	LADWP	physical	pumped_storage
CASTAIC_6	NAN	250	ldwp_pumped_hydro	LADWP	physical	pumped_storage

CASTVL_2_FCELL	NAN	1.4	caiso_biomass	CISO	physical	biomass_wood
CATLNA_2_SOLAR	CATALINA SOLAR - PHASES 1 AND 2	110	caiso_solar	CISO	physical	utility_pv
CATLNA_2_SOLAR2	CATALINA SOLAR 2	18	caiso_solar	CISO	physical	utility_pv
CAVLSR_2_BSOLAR	CALIFORNIA VALLEY SOLAR RANCH-PHASE B	40	caiso_solar	CISO	physical	utility_pv
CAVLSR_2_RSOLAR	CALIFORNIA VALLEY SOLAR RANCH-PHASE A	210	caiso_solar	CISO	physical	utility_pv
CAYTNO_2_VASCO	VASCO ROAD	4.3	caiso_biomass	CISO	physical	biomass_wood
CDWR07_2_GEN	CDWR07_2_GEN	415.3	caiso_pumped_hydro	CISO	physical	pumped_storage
CEDRCK_6_UNIT	WATER WHEEL RANCH	0.98	caiso_small_hydro	CISO	physical	small_hydro
CEDUCR_2_SOLAR1	DUCOR SOLAR 1	20	caiso_solar	CISO	physical	utility_pv
CEDUCR_2_SOLAR2	DUCOR SOLAR 2	20	caiso_solar	CISO	physical	utility_pv
CEDUCR_2_SOLAR3	DUCOR SOLAR 3	15	caiso_solar	CISO	physical	utility_pv
CEDUCR_2_SOLAR4	DUCOR SOLAR 4	20	caiso_solar	CISO	physical	utility_pv
CENT40_1_C40SR1	CENTRAL 40	40	caiso_solar	CISO	physical	utility_pv
CENTER_2_RHONDO	MWD RIO HONDO HYDROELECTRIC RECOVEI	1.91	caiso_hydro	CISO	physical	hydro
CENTER_2_SOLAR1	PICO RIVERA	0.9	caiso_solar	CISO	physical	utility_pv
CENTER_2_TECNG1	TECHNICAST	0.99	caiso_chp	CISO	physical	cogen
CENTER_6_PEAKER	CENTER PEAKER	47.11	caiso_peaker1	CISO	physical	gas_ct
CENTRY_6_PL1X4	CENTURY GENERATING PLANT (AGGREGATE)	41.4	caiso_peaker1	CISO	physical	gas_ct
CHALANSOLAR	NAN	64.9	caiso_solar	CISO	physical	utility_pv
CHALANSTORAGE	NAN	25	caiso_li_battery	CISO	physical	hr_batteries
CHALK_1_UNIT	CHALK CLIFF LIMITED	48.67	caiso_peaker2	CISO	physical	gas_ct
CHARMN_2_PGONG1	PROCTER AND GAMBLE OXNARD I	19.87	caiso_chp	CISO	physical	cogen
CHEVCD_6_UNIT	CHEVRON USA (TAFT/CADET)	11.5	caiso_chp	CISO	physical	cogen
CHEVCO_6_UNIT 1	CHEVRON USA (COALINGA)	16.5	caiso_chp	CISO	physical	cogen
CHEVCO_6_UNIT 2	AERA ENERGY LLC. (COALINGA)	8.5	caiso_chp	CISO	physical	cogen
CHEVCY_1_UNIT	CHEVRON USA (CYMRIC)	24.3	caiso_chp	CISO	physical	cogen
CHEVMN_2_UNITS	CHEVRON U.S.A. UNITS 1 & 2 AGGREGATE	124.87	caiso_chp	CISO	physical	cogen
CHICPK_7_UNIT 1	CHICAGO PARK POWERHOUSE	42	caiso_hydro	CISO	physical	hydro
CHILLS_1_SYCENG	SYCAMORE ENERGY 1	1.5	caiso_biomass	CISO	physical	biomass_wood
CHILLS_7_UNITA1	SYCAMORE ENERGY 2	2.25	caiso_biomass	CISO	physical	biomass_wood
CHINO_2_APEBT1	POMONA ENERGY STORAGE	20	caiso_li_battery	CISO	physical	hr_batteries
CHINO_2_JURUPA	JURUPA	1.5	caiso_solar	CISO	physical	utility_pv
CHINO_2_QF	CHINO QFS	0.19	caiso_biomass	CISO	physical	biomass_wood
CHINO_2_SASOLR	SS SAN ANTONIO WEST LLC	1.5	caiso_solar	CISO	physical	utility_pv
CHINO_2_SOLAR	CHINO RT SOLAR 1	1	caiso_solar	CISO	physical	utility_pv
CHINO_2_SOLAR2	KONA SOLAR - TERRA FRANCESCA	1.49	caiso_solar	CISO	physical	utility_pv
CHINO_6_CIMGEN	CHINO CO-GENERATION	26	caiso_chp	CISO	physical	cogen
CHINO_6_SMPPAP	NAN	44	caiso_peaker2	CISO	physical	gas_ct
CHINO_7_MILIKN	MN MILLIKEN GENCO LLC	1.9	caiso_biomass	CISO	physical	biomass_wood
CHWCHL_1_BIOMAS	CHOW II BIOMASS TO ENERGY	10.8	caiso_biomass	CISO	physical	biomass_wood
CHWCHL_1_UNIT	CHOW 2 PEAKER PLANT	48.6	caiso_reciprocating_engine	CISO	physical	ice
CLINESCO_3_PVDYN	CLINES CORNERS	129.94	caiso_wind	PNM	specifiedimport	out_of_state_wind_AZNM
CLINESCO_3_WBDYN	CLINES CORNERS B	194.28	caiso_wind	PNM	specifiedimport	out_of_state_wind_AZNM
CLOVDL_1_SOLAR	CLOVERDALE SOLAR I	1.5	caiso_solar	CISO	physical	utility_pv
CLOVER_2_UNIT	CLOVER CREEK	0.99	caiso_small_hydro	CISO	physical	small_hydro
CLRKRD_6_LIMESD	LIME SADDLE HYDRO	2	caiso_small_hydro	CISO	physical	small_hydro
CLRMTK_1_QF	SMALL QF AGGREGATION - OAKLAND	1.25	caiso_chp	CISO	physical	cogen
CNTNLA_2_SOLAR1	CENTINELA SOLAR ENERGY I	125	caiso_solar	CISO	physical	utility_pv
CNTNLA_2_SOLAR2	CENTINELS SOLAR ENERGY 2	45.6	caiso_solar	CISO	physical	utility_pv
CNTRVL_6_UNIT	CENTERVILLE	6.4	caiso_small_hydro	CISO	physical	small_hydro
COACHELLA_1	NAN	20	iid_peaker	IID	physical	gas_ct
COACHELLA_2	NAN	20	iid_peaker	IID	physical	gas_ct
COACHELLA_3	NAN	20	iid_peaker	IID	physical	gas_ct
COACHELLA_4	NAN	20	iid_peaker	IID	physical	gas_ct
COACHELLA_BATTERY	NAN	31	IID_Li_Battery	IID	physical	hr_batteries
COACHELLAWIND	NAN	94.936	caiso_wind	CISO	physical	in_state_wind_south
COCOPP_2_CTG1	MARSH LANDING 1	204.2	caiso_peaker1	CISO	physical	gas_ct
COCOPP_2_CTG2	MARSH LANDING 2	202.7	caiso_peaker1	CISO	physical	gas_ct
COCOPP_2_CTG3	MARSH LANDING 3	208.96	caiso_peaker1	CISO	physical	gas_ct
COCOPP_2_CTG4	MARSH LANDING 4	204.29	caiso_peaker1	CISO	physical	gas_ct
COCOSB_6_SOLAR	OAKLEY SOLAR PROJECT	1.5	caiso_solar	CISO	physical	utility_pv
COGNAT_1_UNIT	STOCKTON BIOMAS	45	caiso_biomass	CISO	physical	biomass_wood
COLEMN_2_UNIT	COLEMAN	13	caiso_small_hydro	CISO	physical	small_hydro
COLGAT_7_UNIT 1	COLGATE POWERHOUSE UNIT 1	176.72	caiso_hydro	CISO	physical	hydro
COLGAT_7_UNIT 2	COLGATE POWERHOUSE UNIT 2	175.67	caiso_hydro	CISO	physical	hydro
COLGNS_2_CNSSR1	COLGREEN NORTH SHORE	74.8	iid_solar	IID	specifiedimport	utility_pv
COLPIN_6_COLLNS	COLLINS PINE	3.3	caiso_biomass	CISO	physical	biomass_wood
COLTON_6_AGUAM1	AGUA MANSA UNIT 1 (CITY OF COLTON)	43	caiso_peaker2	CISO	physical	gas_ct
COLUSA_2_PL1X3	COLUSA GENERATING STATION	641	caiso_ccgt1	CISO	physical	gas_cc
COLVIL_7_PL1X2	COLLIERVILLE HYDRO UNIT 1 & 2 AGGREGAT	246.86	caiso_hydro	CISO	physical	hydro
CONTRL_1_CASAD1	MAMMOTH G1	10	caiso_geothermal	CISO	physical	geothermal
CONTRL_1_CASAD2	MAMMOTH G2	10.5	caiso_geothermal	CISO	physical	geothermal
CONTRL_1_CASAD3	MAMMOTH G3	14	caiso_geothermal	CISO	physical	geothermal
CONTRL_1_LUNDY	LUNDY	3	caiso_small_hydro	CISO	physical	small_hydro
CONTRL_1_OXBOW	DIXIE VALLEY GEO	60	caiso_geothermal	CISO	physical	geothermal
CONTRL_1_POOLE	POOLE HYDRO PLANT 1	10.9	caiso_small_hydro	CISO	physical	small_hydro
CONTRL_1_QF	CONTROL QFS	2.9	caiso_geothermal	CISO	physical	geothermal
CONTRL_1_RUSHCK	RUSH CREEK	11.94	caiso_small_hydro	CISO	physical	small_hydro
COPMT2_2_SOLAR2	CMS2	155	caiso_solar	CISO	physical	utility_pv
COPMT4_2_SOLAR4	COPPER MOUNTAIN SOLAR 4	92	caiso_solar	CISO	physical	utility_pv
COPMTN_2_CM10	COPPER MOUNTAIN 10	10	caiso_solar	CISO	physical	utility_pv
COPMTN_2_SOLAR1	COPPER MOUNTAIN 48	48	caiso_solar	CISO	physical	utility_pv
COPPER_MOUNTAIN_3_01	COPPER_MOUNTAIN_3_01	26	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_02	COPPER_MOUNTAIN_3_02	27	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_03	COPPER_MOUNTAIN_3_03	26	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_04	COPPER_MOUNTAIN_3_04	28	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_05	COPPER_MOUNTAIN_3_05	25	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_06	COPPER_MOUNTAIN_3_06	26	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_07	COPPER_MOUNTAIN_3_07	27	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_08	COPPER_MOUNTAIN_3_08	26	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_09	COPPER_MOUNTAIN_3_09	24	ldwp_solar	LADWP	physical	utility_pv
COPPER_MOUNTAIN_3_10	COPPER_MOUNTAIN_3_10	20	ldwp_solar	LADWP	physical	utility_pv
CORCAN_1_SOLAR1	CID SOLAR	20	caiso_solar	CISO	physical	utility_pv
CORCAN_1_SOLAR2	CORCORAN CITY	11	caiso_solar	CISO	physical	utility_pv
CORDOVA_FIR_SOLAR	NAN	9.5	banc_solar	BANC	physical	utility_pv
CORONS_2_SOLAR	MASTER DEVELOPMENT CORONA	0.99	caiso_solar	CISO	physical	utility_pv
CORONS_6_CLRWTR	CLEARWATER POWER PLANT	28	caiso_ccgt2	CISO	physical	gas_cc
CORRAL_6_SJOAQN	AMERESCO SAN JOAQUIN	4.3	caiso_biomass	CISO	physical	biomass_wood
COSUMNES_CC	NAN	534.6	banc_ccgt	BANC	physical	gas_cc
COTTLE_2_FRNKNH	FRANKENHEIMER POWER PLANT	5.3	caiso_small_hydro	CISO	physical	small_hydro
COVERD_2_HCKHY1	HATCHET CREEK	6.89	caiso_hydro	CISO	physical	hydro

COVERD_2_MCKHY1	MONTGOMERY CREEK HYDRO	2.8	caiso_hydro	CISO	physical	hydro
COVERD_2_QFUNTS	COVE HYDROELECTRIC PROJECT	5.5	caiso_small_hydro	CISO	physical	small_hydro
COVERD_2_RCKHY1	ROARING CREEK	2	caiso_hydro	CISO	physical	hydro
COWCRK_2_UNIT	COW CREEK HYDRO	2	caiso_small_hydro	CISO	physical	small_hydro
CPSTNO_7_PRMADS	PRIMA DESCHECHA (CAPISTRANO)	6.1	caiso_biomass	CISO	physical	cogen
CPVERD_2_SOLAR	CAMPO VERDE SOLAR	139	caiso_solar	CISO	physical	utility_pv
CRELMN_6_RAMON1	RAMONA 1	2	caiso_solar	CISO	physical	utility_pv
CRELMN_6_RAMON2	RAMONA 2	5	caiso_solar	CISO	physical	utility_pv
CRELMN_6_RAMSR3	RAMONA SOLAR ENERGY	4.32	caiso_solar	CISO	physical	utility_pv
CRESSY_1_PARKER	PARKER POWERHOUSE	2.83	caiso_small_hydro	CISO	physical	small_hydro
CRESTA_7_PL1X2	CRESTA PH UNIT 1 & 2 AGGREGATE	70.4	caiso_hydro	CISO	physical	hydro
CRIMSN_2_CRMBT1	Crimson (CAISO), Sonoran West (LSEs)	200	caiso_li_battery	CISO	physical	hr_batteries
CRIMSN_2_CRMBT2	Crimson 2	150	caiso_li_battery	CISO	physical	hr_batteries
CRNEVL_6_CRNVA	CRANE VALLEY	0.9	caiso_small_hydro	CISO	physical	small_hydro
CRNEVL_6_SJQN 2	SAN JOAQUIN 2	3.2	caiso_hydro	CISO	physical	hydro
CRNEVL_6_SJQN 3	SAN JOAQUIN 3	4.2	caiso_hydro	CISO	physical	hydro
CROKET_7_UNIT	CROCKETT COGEN	240	caiso_chp	CISO	physical	cogen
CROWCREEKSOLAR	NAN	20	caiso_solar	CISO	physical	utility_pv
CROWCREEKSTORAGE	NAN	20	caiso_li_battery	CISO	physical	hr_batteries
CRSTWD_6_KUMYAY	KUMEYAAY WIND FARM	50	caiso_wind	CISO	physical	in_state_wind_south
CRWCKS_1_SOLAR1	CROW CREEK SOLAR 1	20	caiso_solar	CISO	physical	utility_pv
CSCCOG_1_UNIT 1	SANTA CLARA CO-GEN	7	caiso_peaker1	CISO	physical	cogen
CSCGNR_1_UNIT 1	GIANERA PEAKER UNIT 1	24.75	caiso_peaker2	CISO	physical	gas_ct
CSCGNR_1_UNIT 2	GIANERA PEAKER UNIT 2	24.75	caiso_peaker2	CISO	physical	gas_ct
CSLR4S_2_SOLAR	CSOLAR IV SOUTH	130	caiso_solar	CISO	physical	utility_pv
CSTOGA_6_LNDFIL	CLOVER FLAT LAND FILL GAS	0.85	caiso_biomass	CISO	physical	biomass_wood
CSTRVL_7_PL1X2	MARINA LAND FILL GAS	4.53	caiso_biomass	CISO	physical	biomass_wood
CSTRVL_7_QFUNTS	CASTROVILLE QF AGGREGATE	2	caiso_biomass	CISO	physical	cogen
CTNWDP_1_QF	SMALL QF AGGREGATION - BURNEY	0.5	caiso_small_hydro	CISO	physical	small_hydro
CUMBIA_1_SOLAR	COLUMBIA SOLAR ENERGY II	19	caiso_solar	CISO	physical	utility_pv
CUMMNG_6_SUNCT1	SUNSELECT 1	4	caiso_chp	CISO	physical	cogen
CURTIS_1_CANLCK	CANAL CREEK POWERHOUSE	0.9	caiso_small_hydro	CISO	physical	small_hydro
CURTIS_1_FARFLD	FAIRFIELD POWERHOUSE	0.9	caiso_small_hydro	CISO	physical	small_hydro
CUYAMS_6_CUYSR1	CUYAMA SOLAR	40	caiso_solar	CISO	physical	utility_pv
DAIRLD_1_CR1BM1	NAN	2	caiso_biogas	CISO	physical	biogas
DAIRLD_1_MD1SL1	MADERA 1	1.5	caiso_solar	CISO	physical	utility_pv
DAIRLD_1_MD2BM1	MADERA DIGESTER GENSET 2	0.8	caiso_biomass	CISO	physical	biomass_wood
DALYCT_1_FCELL	NAN	1.6	caiso_biomass	CISO	physical	biomass_wood
DAVID_TEVELDE_DAIRY_DIGESTER	NAN	1	caiso_biogas	CISO	physical	biogas
DAVIS_1_SOLAR1	GRASSLANDS 3	1	caiso_solar	CISO	physical	utility_pv
DAVIS_1_SOLAR2	GRASSLANDS 4	1	caiso_solar	CISO	physical	utility_pv
DAVIS_7_MNMETH	MM YOLO POWER LLC	4	caiso_biogas	CISO	physical	biogas
DEADCK_1_UNIT	DEADCK_1_UNIT	2	caiso_small_hydro	CISO	physical	small_hydro
DEERCR_6_UNIT 1	DEER CREEK	7	caiso_hydro	CISO	physical	hydro
DEL_RANCH_COMPANY	NAN	42	iid_geothermal	IID	physical	geothermal
DELAMO_2_SOLAR1	GOLDEN SPRINGS BUILDING H	1.5	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLAR2	GOLDEN SPRINGS BUILDING M	1.75	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLAR3	GOLDEN SPRINGS BUILDING G	1.25	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLAR4	GOLDEN SPRINGS BUILDING F	1.3	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLAR5	GOLDEN SPRINGS BUILDING L	1	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLAR6	FREEWAY SPRINGS	2	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLRC1	GOLDEN SPRINGS BUILDING C1	1.16	caiso_solar	CISO	physical	utility_pv
DELAMO_2_SOLRD	GOLDEN SOLAR BUILDING D	1.25	caiso_solar	CISO	physical	utility_pv
DELSUR_6_BSOLAR	CENTRAL ANTELOPE DRY RANCH B	3	caiso_solar	CISO	physical	utility_pv
DELSUR_6_CREST	NAN	10	caiso_solar	CISO	physical	utility_pv
DELSUR_6_DRYFRB	DRY FARM RANCH B	5	caiso_solar	CISO	physical	utility_pv
DELSUR_6_SOLAR1	SUMMER SOLAR NORTH	6.5	caiso_solar	CISO	physical	utility_pv
DELSUR_6_SOLAR4	RADIANCE SOLAR 4	1.5	caiso_solar	CISO	physical	utility_pv
DELSUR_6_SOLAR5	RADIANCE SOLAR 5	1.5	caiso_solar	CISO	physical	utility_pv
DELTA_2_PL1X4	DELTA ENERGY CENTER AGGREGATE	880	caiso_ccgt1	CISO	physical	gas_cc
DESERT_POWER_3	NAN	50	iid_geothermal	IID	physical	geothermal
DESERT_VIEW	NAN	50	caiso_biomass	IID	physical	biogas
DEVERS_1_QF	NAN	92.64	caiso_wind	CISO	physical	in_state_wind_south
DEVERS_1_SEPV05	SEPV 5	2	caiso_solar	CISO	physical	utility_pv
DEVERS_1_SOLAR	CASCADE SOLAR	18.5	caiso_solar	CISO	physical	utility_pv
DEVERS_1_SOLAR1	SEPV8	12	caiso_solar	CISO	physical	utility_pv
DEVERS_1_SOLAR2	SEPV9	9	caiso_solar	CISO	physical	utility_pv
DEVERS_2_CS2SR4	CALIENTE SOLAR 2	0.91	caiso_solar	CISO	physical	utility_pv
DEVERS_2_DHSPG2	DESERT HOT SPRINGS 2	1.4	caiso_solar	CISO	physical	utility_pv
DEXZEL_1_UNIT	WESTERN POWER AND STEAM COGENERATI	20	caiso_chp	CISO	physical	cogen
DIABLO_7_UNIT 1	DIABLO CANYON UNIT 1	1150	caiso_nuclear	CISO	physical	nuclear
DIABLO_7_UNIT 2	DIABLO CANYON UNIT 2	1150	caiso_nuclear	CISO	physical	nuclear
DIAMOND_H_DAIRY_POWER	NAN	2	caiso_biogas	CISO	physical	biogas
DINUBA_6_UNIT	NAN	12.00	caiso_biomass	CISO	physical	biomass_wood
DISCOV_1_CHEVRN	CHEVRON USA (EASTRIDGE)	48.8	caiso_chp	CISO	physical	cogen
DIVSON_6_NSQF	NAN	47.00	caiso_chp	CISO	physical	cogen
DIXNLD_1_LNDFL	ZERO WASTE ENERGY	1.6	caiso_biomass	CISO	physical	biomass_wood
DMDVLY_1_UNITS	DIAMOND VALLEY LAKE PUMP-GEN PLANT	21	caiso_hydro	CISO	physical	hydro
DONNLS_7_UNIT	DONNELLS HYDRO	72	caiso_hydro	CISO	physical	hydro
DOSMGO_2_NSPIN	DOSMGO_2_NSPIN	159	caiso_pumped_hydro	CISO	physical	pumped_storage
DOUBLC_1_UNITS	DOUBLE "C" LIMITED	52.23	caiso_peaker2	CISO	physical	gas_ct
DOUBLEADIGESTER1	NAN	1.5	caiso_biomass	CISO	physical	biomass_wood
DOUBLEADIGESTER2	NAN	1.5	caiso_biomass	CISO	physical	biomass_wood
DOUBLEADIGESTER3	NAN	1.5	caiso_biomass	CISO	physical	biomass_wood
DRACKR_2_D4SR4B	DRACKER SOLAR UNIT 4B	62.5	caiso_solar	CISO	physical	utility_pv
DRACKR_2_DS3SR3	DRACKER SOLAR UNIT 3	125	caiso_solar	CISO	physical	utility_pv
DRACKR_2_DS4SR4	DRACKER SOLAR UNIT 4	62.5	caiso_solar	CISO	physical	utility_pv
DRACKR_2_DSUBT1	DRACKER SOLAR UNIT 1 BESS	63	caiso_li_battery	CISO	physical	hr_batteries
DRACKR_2_DSUBT2	DRACKER SOLAR UNIT 2 BESS	115	caiso_li_battery	CISO	physical	hr_batteries
DRACKR_2_DSUBT3	DRACKER SOLAR UNIT 3 BESS	115	caiso_li_battery	CISO	physical	hr_batteries
DRACKR_2_DSUBT4	Dracker Solar Unit 4 BESS	47	caiso_li_battery	CISO	physical	hr_batteries
DRACKR_2_SOLAR1	DRACKER SOLAR UNIT 1	110	caiso_solar	CISO	physical	utility_pv
DRACKR_2_SOLAR2	DRACKER SOLAR UNIT 2	125	caiso_solar	CISO	physical	utility_pv
DRACKR_3_DSUBT3	NAN	115	caiso_li_battery	CISO	physical	hr_batteries
DREWS_6_PL1X4	DREWS GENERATING PLANT	41.4	caiso_peaker1	CISO	physical	gas_ct
DREWSR_2_BHSSR1	Blue Hornet Solar	100	caiso_solar	CISO	physical	utility_pv
DRUM_7_PL1X2	DRUM PH 1 UNITS 1 & 2 AGGREGATE	26	caiso_hydro	CISO	physical	hydro
DRUM_7_PL3X4	DRUM PH 1 UNITS 3 & 4 AGGREGATE	28.9	caiso_hydro	CISO	physical	hydro
DRUM_7_UNIT 5	DRUM PH 2 UNIT 5	50	caiso_hydro	CISO	physical	hydro
DSABLA_7_UNIT	DE SABLA HYDRO	18.5	caiso_small_hydro	CISO	physical	small_hydro
DSFLWR_2_WS2SR1	WILLOW SPRINGS 2	100	caiso_solar	CISO	physical	utility_pv

DSRTHV_2_DH1SR1	DESERT HARVEST	80	caiso_solar	CISO	physical	utility_pv
DSRTHV_2_DH2BT1	DESERT HARVEST BESS	35	caiso_li_battery	CISO	physical	hr_batteries
DSRTHV_2_DH2SR2	DESERT HARVEST 2	70	caiso_solar	CISO	physical	utility_pv
DSRTSL_2_SOLAR1	DESERT STATELINE	296.19	caiso_solar	CISO	physical	utility_pv
DSRTSN_2_DS2X2	Desert Sunlight PV II Storage	230	caiso_li_battery	CISO	physical	hr_batteries
DSRTSN_2_SOLAR1	DESERT SUNLIGHT 300	300	caiso_solar	CISO	physical	utility_pv
DSRTSN_2_SOLAR2	DESERT SUNLIGHT 250	250	caiso_solar	CISO	physical	utility_pv
DTCHWD_2_BT3WND	BROOKFIELD TEHACHAPI 3	4.5	caiso_wind	CISO	physical	in_state_wind_south
DTCHWD_2_BT4WND	BROOKFIELD TEHACHAPI 4	6.52	caiso_wind	CISO	physical	in_state_wind_south
DUANE_1_PL1X3	DONALD VON RAESFELD POWER PROJECT	147.8	caiso_ccgt2	CISO	physical	gas_cc
DURNMESA_3_WBDYN	DURAN MESA	105.08	caiso_wind	PNM	specifiedimport	out_of_state_wind_AZNM
DUTCH1_7_UNIT 1	DUTCH FLAT 1 PH	22	caiso_hydro	CISO	physical	hydro
DUTCH2_7_UNIT 1	DUTCH FLAT 2 PH	26	caiso_hydro	CISO	physical	hydro
DVLCYN_1_UNITS	DEVIL CANYON HYDRO UNITS 1-4 AGGREGA	235	caiso_hydro	CISO	physical	hydro
DYERSM_6_DSWWD1	DYER SUMMIT WIND REPOWER	44.8	caiso_wind	CISO	physical	in_state_wind_north
EARTH_ENERGY_1	NAN	11	iid_geothermal	IID	physical	geothermal
EASTWD_7_UNIT	EASTWOOD PUMP-GEN	200	caiso_pumped_hydro	CISO	physical	pumped_storage
EDMONS_2_NSPIN	EDMONS_2_NSPIN	775.8	caiso_pumped_hydro	CISO	physical	pumped_storage
EDWARD_2_E21SB1_LESR	EdSan 2 Edwards 1A	71	caiso_li_battery	CISO	physical	hr_batteries
EDWARD_2_E21SB1_SUN	EdSan 2 Edwards 1A	95	caiso_solar	CISO	physical	utility_pv
EDWARD_2_E23SB1	EdSan 2 Edwards 3	18	caiso_solar	CISO	physical	utility_pv
EDWARD_2_E23SB1_LESR	EdSan 2 Edwards 3	12	caiso_li_battery	CISO	physical	hr_batteries
EDWARD_2_ES2BT3	EdSan 2	85	caiso_solar	CISO	physical	utility_pv
EDWARD_2_ES2BT3_LESR	EdSan 2	66	caiso_li_battery	CISO	physical	hr_batteries
EEKTMN_6_SOLAR1	EE K SOLAR 1	20	caiso_solar	CISO	physical	utility_pv
EL_CENTRO_4	NAN	70	iid_ccgt	IID	physical	gas_cc
EL_CENTRO_CC2	NAN	108.8	iid_ccgt	IID	physical	gas_cc
EL_CENTRO_CC3	NAN	146.5	iid_ccgt	IID	physical	gas_cc
ELCABO_5_ECWSCEDYN	EL CABO WIND	298	caiso_wind	AZPS	specifiedimport	out_of_state_wind_AZNM
ELCAJN_6_DRGEN1	NAN	3	caiso_li_battery	CISO	physical	hr_batteries
ELCAJN_6_DRGEN2	NAN	1	caiso_li_battery	CISO	physical	hr_batteries
ELCAJN_6_EB1BT1	EASTERN BESS 1	7.5	caiso_li_battery	CISO	physical	hr_batteries
ELCAJN_6_LM6K	EL CAJON ENERGY CENTER	48.1	caiso_peaker2	CISO	physical	gas_ct
ELCAJN_6_UNITA1	CUYAMACA PEAK ENERGY PLANT	45.42	caiso_peaker1	CISO	physical	gas_ct
ELCAP_1_SOLAR	2097 HELTON	1.5	caiso_solar	CISO	physical	utility_pv
ELDORO_7_UNIT 1	EL DORADO UNIT 1	11	caiso_hydro	CISO	physical	hydro
ELDORO_7_UNIT 2	EL DORADO UNIT 2	11	caiso_hydro	CISO	physical	hydro
ELECTR_7_PL1X3	ELECTRA PH UNIT 1 & 2 AGGREGATE	93	caiso_hydro	CISO	physical	hydro
ELK_GROVE_1_SOLAR	NAN	50.9	banc_solar	BANC	physical	utility_pv
ELK_GROVE_2_SOLAR	NAN	37.9	banc_solar	BANC	physical	utility_pv
ELKCRK_6_STONYG	STONEY GORGE HYDRO AGGREGATE	4.9	caiso_small_hydro	CISO	physical	small_hydro
ELKHIL_2_PL1X3	ELK HILLS COMBINED CYCLE (AGGREGATE)	551.7	caiso_ccgt1	CISO	physical	gas_cc
ELKHRN_1_EESX3	ELKHORN ENERGY STORAGE	182.5	caiso_li_battery	CISO	physical	hr_batteries
ELLIS_2_QF	ELLIS QFS	12	caiso_peaker1	CISO	physical	gas_ct
ELNIDP_6_BIOMAS	EL NIDO BIOMASS TO ENERGY	10.5	caiso_biomass	CISO	physical	biomass_wood
ELSEGN_2_UN1011	EL SEGUNDO ENERGY CENTER 5/6	263	caiso_ccgt2	CISO	physical	gas_cc
ELSEGN_2_UN2021	EL SEGUNDO ENERGY CENTER 7/8	263.68	caiso_ccgt1	CISO	physical	gas_cc
ENELBELLASTORAGE	NAN	10	caiso_li_battery	CISO	physical	hr_batteries
ENERGETICS_PV	NAN	4.8	caiso_solar	CISO	physical	utility_pv
ENERSJ_2_WIND	ESJ WIND ENERGY	155.1	caiso_wind	CISO	physical	in_state_wind_south
ENERSJ_5_ESJWD2	ENERGIA_SIERRA_JUAREZ_2_US_LLC	105	caiso_wind	CISO	physical	in_state_wind_south
ENWIND_2_WIND1	CAMERON RIDGE	47.1	caiso_wind	CISO	physical	in_state_wind_south
ENWIND_2_WIND2	RIDGETOP I	38.24	caiso_wind	CISO	physical	in_state_wind_south
ESCNDO_6_EB1BT1	ESCONDIDO BESS 1	10	caiso_li_battery	CISO	physical	hr_batteries
ESCNDO_6_EB2BT2	ESCONDIDO BESS 2	10	caiso_li_battery	CISO	physical	hr_batteries
ESCNDO_6_EB3BT3	ESCONDIDO BESS 3	10	caiso_li_battery	CISO	physical	hr_batteries
ESCNDO_6_PL1X2	MMC ESCONDIDO AGGREGATE	48.71	caiso_peaker2	CISO	physical	gas_ct
ESCNDO_6_UNITB1	CALPEAK POWER ENTERPRISE UNIT 1	48.04	caiso_peaker2	CISO	physical	gas_ct
ESCO_6_GLMQF	GOAL LINE COGEN	49.9	caiso_chp	CISO	physical	cogen
ESNHWR_2_WC1BT1	Wildcat I BESS	3	caiso_li_battery	CISO	physical	hr_batteries
ESQUON_6_LNDFIL	NEAL ROAD LANDFILL GENERATING FACILITY	2.1	caiso_biomass	CISO	physical	biomass_wood
ESTWND_2_OPPWD1	Oasis Power Plant Eastwind	57.14	caiso_wind	CISO	physical	in_state_wind_south
ETIWND_2_CHMPNE	CHAMPAGNE	1	caiso_solar	CISO	physical	utility_pv
ETIWND_2_FONTNA	FONTANALYTLE CREEK POWERHOUSE P	2.56	caiso_small_hydro	CISO	physical	small_hydro
ETIWND_2_RTS010	SPVP010 FONTANA RT SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS015	SPVP015	3	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS017	SPVP017	3.5	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS018	SPVP018 FONTANA RT SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS023	SPVP023 FONTANA RT SOLAR	2.5	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS026	SPVP026	6	caiso_solar	CISO	physical	utility_pv
ETIWND_2_RTS027	SPVP027	2	caiso_solar	CISO	physical	utility_pv
ETIWND_2_SOLAR1	DEDEAUX ONTARIO	1	caiso_solar	CISO	physical	utility_pv
ETIWND_2_SOLAR2	ROCHESTER	1	caiso_solar	CISO	physical	utility_pv
ETIWND_2_SOLAR5	DULLES	2	caiso_solar	CISO	physical	utility_pv
ETIWND_2_UNIT1	ETIWND_2_UNIT1	33.6	caiso_chp	CISO	physical	cogen
ETIWND_6_GRPLND	GRAPELAND PEAKER	47.39	caiso_peaker1	CISO	physical	gas_ct
ETIWND_6_MWDETI	ETIWANDA RECOVERY HYDRO	24	caiso_small_hydro	CISO	physical	small_hydro
EXCHEC_7_UNIT 1	EXCHEQUER HYDRO	94.5	caiso_hydro	CISO	physical	hydro
EXCLSG_1_SOLAR	EXCELSIOR SOLAR	60	caiso_solar	CISO	physical	utility_pv
FAIRHV_6_UNIT	NAN	18.75	caiso_biomass	CISO	physical	biomass_wood
FALLBROOKSTORAGE	NAN	40	caiso_li_battery	CISO	physical	hr_batteries
FELLOW_7_QFUNTS	FELLOW QF AGGREGATE	6.2	caiso_chp	CISO	physical	cogen
FLOWD_2_RT2WD2	RIDGETOP 2	27.39	caiso_wind	CISO	physical	in_state_wind_south
FLOWD_2_WIND1	CAMERON RIDGE 2	11.9	caiso_wind	CISO	physical	in_state_wind_south
FLOWD2_2_FPLWND	DIABLO WINDS	18	caiso_wind	CISO	physical	in_state_wind_north
FMEADO_6_HELLHL	FMEADO_6_HELLHL	0.6	caiso_hydro	CISO	physical	hydro
FMEADO_7_UNIT	FRENCH MEADOWS HYDRO	16	caiso_small_hydro	CISO	physical	small_hydro
FORBST_7_UNIT 1	FORBESTOWN HYDRO	37.5	caiso_hydro	CISO	physical	hydro
FORKBU_6_UNIT	HYPOWER, INC. (FORKS OF BUTTE)	14.3	caiso_hydro	CISO	physical	hydro
FRESHW_1_SOLAR1	CORCORAN 3	20	caiso_solar	CISO	physical	utility_pv
FRESNOSOLAR	NAN	100	caiso_solar	CISO	physical	utility_pv
FRESNOSTORAGE	NAN	10	caiso_li_battery	CISO	physical	hr_batteries
FRIANT_6_UNITS	FRIANT DAM	25	caiso_small_hydro	CISO	physical	small_hydro
FRITO_1_LAY	FRITO-LAY	6	caiso_chp	CISO	physical	cogen
FRNTBW_6_SOLAR1	FRONTIER SOLAR	20	caiso_solar	CISO	physical	utility_pv
FROGTN_1_UTICAA	ANGELS POWERHOUSE	1.4	caiso_hydro	CISO	physical	hydro
FROGTN_1_UTICAM	MURPHYS POWERHOUSE	3.6	caiso_hydro	CISO	physical	hydro
FTSWRD_6_TRFORK	THREE FORKS WATER POWER PROJECT	1.63	caiso_small_hydro	CISO	physical	small_hydro
FTSWRD_7_QFUNTS	FTSWRD_7_QFUNTS	1.6	caiso_small_hydro	CISO	physical	small_hydro
FULTON_1_QF	SMALL QF AGGREGATION - ZENIA	1	caiso_small_hydro	CISO	physical	small_hydro
GALE_1_SR3SR3	SUNRAY 3	13.8	caiso_solar	CISO	physical	utility_pv

GANSO_1_WSTBM1	WESTSTAR DAIRY BIOGAS	1	caiso_biogas	CISO	physical	biogas
GARLND_2_GARBT1	GARLAND STORAGE	88	caiso_li_battery	CISO	physical	hr_batteries
GARLND_2_GASLR	GARLAND B	180	caiso_solar	CISO	physical	utility_pv
GARLND_2_GASLRA	GARLAND A	20	caiso_solar	CISO	physical	utility_pv
GARNET_1_SOLAR	NORTH PALM SPRINGS 4A	4	caiso_solar	CISO	physical	utility_pv
GARNET_1_SOLAR2	GARNET SOLAR POWER GENERATION STATI(	4	caiso_solar	CISO	physical	utility_pv
GARNET_1_UNITS	GARNET GREEN POWER PROJECT AGGREGAT	16.5	caiso_wind	CISO	physical	in_state_wind_south
GARNET_1_WIND	GARNET WIND ENERGY CENTER	6.5	caiso_wind	CISO	physical	in_state_wind_south
GARNET_1_WINDS	GARNET WINDS AGGREGATION	22.5	caiso_wind	CISO	physical	in_state_wind_south
GARNET_1_WT3WND	WAGNER WIND	6	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_COAWD2	COACHELLA 2	10.8	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_DIFWD1	NAN	7.88	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_HYDRO	WHITEWATER HYDRO	1	caiso_small_hydro	CISO	physical	small_hydro
GARNET_2_WIND1	PHOENIX	11.2	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_WIND2	KAREN AVENUE WIND FARM	11.7	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_WIND3	SAN GORGONIO EAST	12.6	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_WIND4	WINDUSTRIES	9.8	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_WIND5	EASTWIND	3	caiso_wind	CISO	physical	in_state_wind_south
GARNET_2_WPMWD6	WINTEC PALM	5.93	caiso_wind	CISO	physical	in_state_wind_south
GASKW1_2_GW1SR1	GASKELL WEST 1	20	caiso_solar	CISO	physical	utility_pv
GATES_2_SOLAR	GATES SOLAR STATION	20	caiso_solar	CISO	physical	utility_pv
GATES_2_WSOLAR	WEST GATES SOLAR STATION	10	caiso_solar	CISO	physical	utility_pv
GATEWY_2_GESBT1	GATEWAY ENERGY STROAGE	250	caiso_li_battery	CISO	physical	hr_batteries
GATWAY_2_PL1X3	GATEWAY GENERATING STATION	585	caiso_ccgt1	CISO	physical	gas_cc
GENESI_2_STG	GENESIS STATION	250	caiso_solar	CISO	physical	utility_pv
GEO_EAST_MESA_2_1	NAN	22	iid_geothermal	IID	physical	geothermal
GEO_EAST_MESA_3_1	NAN	22	iid_geothermal	IID	physical	geothermal
GEO_EAST_MESA_3_2	NAN	10	iid_geothermal	IID	physical	geothermal
GEYS11_7_UNIT11	GEYSERS UNIT 11 (HEALDSBURG)	86.8	caiso_geothermal	CISO	physical	geothermal
GEYS12_7_UNIT12	GEYSERS UNIT 12 (HEALDSBURG)	57	caiso_geothermal	CISO	physical	geothermal
GEYS13_7_UNIT13	GEYSERS UNIT 13 (HEALDSBURG)	73	caiso_geothermal	CISO	physical	geothermal
GEYS14_7_UNIT14	GEYSERS UNIT 14 (HEALDSBURG)	70	caiso_geothermal	CISO	physical	geothermal
GEYS16_7_UNIT16	GEYSERS UNIT 16 (HEALDSBURG)	63	caiso_geothermal	CISO	physical	geothermal
GEYS17_2_BOTRCK	NAN	10.01	caiso_geothermal	CISO	physical	geothermal
GEYS17_7_UNIT17	GEYSERS UNIT 17 (HEALDSBURG)	75.5	caiso_geothermal	CISO	physical	geothermal
GEYS18_7_UNIT18	GEYSERS UNIT 18 (HEALDSBURG)	72	caiso_geothermal	CISO	physical	geothermal
GEYS20_7_UNIT20	GEYSERS UNIT 20 (HEALDSBURG)	50	caiso_geothermal	CISO	physical	geothermal
GIFENS_6_BUGSL1	BURFORD GIFFEN	20	caiso_solar	CISO	physical	utility_pv
GIFFEN_6_SOLAR	GIFFEN SOLAR STATION	10	caiso_solar	CISO	physical	utility_pv
GIFFEN_6_SOLAR1	ASPIRATION SOLAR G	9	caiso_solar	CISO	physical	utility_pv
GILROY_1_UNIT	GILROY COGEN AGGREGATE	120	caiso_ccgt1	CISO	physical	gas_ct
GILRPP_1_PL1X2	GILROY ENERGY CENTER UNITS 1&2 AGGREG	95.2	caiso_peaker2	CISO	physical	gas_ct
GILRPP_1_PL3X4	GILROY ENERGY CENTER, UNIT #3	46.2	caiso_peaker2	CISO	physical	gas_ct
GLDFGR_6_SOLAR1	PORTAL RIDGE B	20	caiso_solar	CISO	physical	utility_pv
GLDFGR_6_SOLAR2	PORTAL RIDGE C	11.4	caiso_solar	CISO	physical	utility_pv
GLDTWN_6_COLUM3	COLUMBIA 3	10	caiso_solar	CISO	physical	utility_pv
GLDTWN_6_SOLAR	RIO GRANDE	5	caiso_solar	CISO	physical	utility_pv
GLNARM_2_UNIT 5	GLENARM TURBINE 5	65.81	caiso_peaker2	CISO	physical	gas_cc
GLNARM_7_UNIT 1	GLEN ARM UNIT 1	22.07	caiso_peaker2	CISO	physical	gas_ct
GLNARM_7_UNIT 2	GLEN ARM UNIT 2	22.3	caiso_peaker2	CISO	physical	gas_ct
GLNARM_7_UNIT 3	GLEN ARM UNIT 3	44.83	caiso_peaker1	CISO	physical	gas_ct
GLNARM_7_UNIT 4	GLEN ARM UNIT 4	42.42	caiso_peaker1	CISO	physical	gas_ct
GLOW_6_SOLAR	ANTELOPE POWER PLANT	20	caiso_solar	CISO	physical	utility_pv
GOLETA_2_QF	GOLETA QFS	0.25	caiso_small_hydro	CISO	physical	small_hydro
GOLETA_2_VALBT1	VALLECITO ENERGY STORAGE	10	caiso_li_battery	CISO	physical	hr_batteries
GOLETA_6_ELLWOD	ELLWOOD ENERGY SUPPORT FACILITY	54	caiso_peaker2	CISO	physical	gas_ct
GOLETA_6_EXGEN	EXXON COMPANY USA	48.2	caiso_chp	CISO	physical	cogen
GOLETA_6_GAVOTA	NAN	9.90	caiso_chp	CISO	physical	cogen
GOLETA_6_TAJIGS	NAN	2.84	caiso_biogas	CISO	physical	biogas
GOLETA_6_TR2BM2	Tajiguas Biogas Engines	1.99	caiso_biomass	CISO	physical	biogas
GONZLS_6_UNIT	JOHNSON CANYON LANDFILL	1.42	caiso_biomass	CISO	physical	biomass_wood
GOOSLK_1_SOLAR1	GOOSE LAKE	12	caiso_solar	CISO	physical	utility_pv
GRADYW_5_GDYWD1	GRADY WIND	200	caiso_wind	AZPS	specifiedimport	out_of_state_wind_AZNM
GRAYSON_3	NAN	18	ldwp_st	LADWP	physical	steam
GRAYSON_4	NAN	40	ldwp_st	LADWP	physical	steam
GRAYSON_5	NAN	40	ldwp_st	LADWP	physical	steam
GRAYSON_9	NAN	48	ldwp_peaker	LADWP	physical	gas_ct
GRAYSON_CC	NAN	102	ldwp_ccgt	LADWP	physical	gas_cc
GRIDLY_6_SOLAR	GRIDLEY MAIN TWO	2.5	caiso_solar	CISO	physical	utility_pv
GRIFFI_2_LSPDYN	GRIFFITH ENERGY	570	sw_ccgt	WALC	specifiedimport	gas_cc
GRIZLY_1_UNIT 1	GRIZZLY HYDRO	20	caiso_hydro	CISO	physical	hydro
GRNITE_6_ESCBT1	EnerSmart El Cajon	3	caiso_li_battery	CISO	physical	hr_batteries
GRNLF1_1_PL1X2	Greenleaf 1	60	caiso_peaker2	CISO	physical	gas_ct
GRNLF1_1_UNITS	NAN	49.20	caiso_peaker1	CISO	physical	gas_ct
GRNLF2_1_UNIT	GREENLEAF II COGEN	49.2	caiso_chp	CISO	physical	cogen
GRNVLY_7_SCLAND	SANTA CRUZ LANDFILL GENERATING PLANT	3.04	caiso_biomass	CISO	physical	biomass_wood
GRSCRK_6_BGCKWW	BIG CREEK WATER WORKS - CEDAR FLAT	5	caiso_small_hydro	CISO	physical	small_hydro
GRZZLY_1_BERKLY	BERKELEY COGENERATION	26.35	caiso_chp	CISO	physical	cogen
GUERNS_6_HD3BM3	HANFORD DIGESTER GENSET 3	1	caiso_biogas	CISO	physical	biogas
GUERNS_6_SOLAR	GUERNSEY SOLAR STATION	20	caiso_solar	CISO	physical	utility_pv
GUERNS_6_VH2BM1	HANFORD DIGESTER GENSET 2	1	caiso_biogas	CISO	physical	biogas
GWFPWR_1_UNITS	HANFORD PEAKER PLANT	98.46	caiso_peaker2	CISO	physical	gas_ct
GYS5X6_7_UNITS	GEYSERS UNITS 5 & 6 AGGREGATE	98.43	caiso_geothermal	CISO	physical	geothermal
GYS7X8_7_UNITS	GEYSERS UNITS 7 & 8 AGGREGATE	95.8	caiso_geothermal	CISO	physical	geothermal
GYSRVL_7_WSPRNG	WARM SPRINGS HYDRO	3.75	caiso_small_hydro	CISO	physical	small_hydro
HAASPH_7_PL1X2	HAAS PH UNIT 1 & 2 AGGREGATE	144	caiso_hydro	CISO	physical	hydro
HALSEY_6_UNIT	HALSEY HYDRO	13.5	caiso_small_hydro	CISO	physical	small_hydro
HARBGN_7_UNITS	HARBOR COGEN COMBINED CYCLE	109.01	caiso_ccgt2	CISO	physical	gas_cc
HARBOR_CC	NAN	231	ldwp_ccgt	LADWP	physical	gas_cc
HARBOR_UNIT_10	NAN	49	ldwp_peaker	LADWP	physical	gas_ct
HARBOR_UNIT_11	NAN	49	ldwp_peaker	LADWP	physical	gas_ct
HARBOR_UNIT_12	NAN	49	ldwp_peaker	LADWP	physical	gas_ct
HARBOR_UNIT_13	NAN	49	ldwp_peaker	LADWP	physical	gas_ct
HARBOR_UNIT_14	NAN	49	ldwp_peaker	LADWP	physical	gas_ct
HARDWK_6_STWBM1	STILL WATER RANCH DAIRY	1	caiso_biogas	CISO	physical	biogas
HAT_CREEK_BIOENERGY__LLC	NAN	2.88	caiso_biomass	CISO	physical	biomass_wood
HATCR1_7_UNIT	HAT CREEK #1	8.5	caiso_small_hydro	CISO	physical	small_hydro
HATCR2_7_UNIT	HAT CREEK #2	8.5	caiso_small_hydro	CISO	physical	small_hydro
HATLOS_6_BWDHY1	BIDWELL DITCH	2	caiso_hydro	CISO	physical	hydro
HATLOS_6_LSCRK	LOST CREEK 1 & 2 HYDRO CONVERSION	1.7	caiso_small_hydro	CISO	physical	small_hydro
HATRDG_2_WIND	HATCHET RIDGE WIND FARM	102	caiso_wind	CISO	physical	in_state_wind_north

HAYNES_1	NAN	222	ldwp_st	LADWP	physical	steam
HAYNES_11	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_12	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_13	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_14	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_15	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_16	NAN	96	ldwp_peaker	LADWP	physical	gas_ct
HAYNES_2	NAN	222	ldwp_st	LADWP	physical	steam
HAYNES_CC	NAN	590	ldwp_ccgt	LADWP	physical	gas_cc
HAYPRS_6_HAYHD1	HAYPRESS LOWER	5.8	caiso_small_hydro	CISO	physical	small_hydro
HAYPRS_6_HAYHD2	HAYPRESS MIDDLE	6.7	caiso_small_hydro	CISO	physical	small_hydro
HEBER_GEO_1	NAN	8.75	iid_geothermal	IID	physical	geothermal
HEBER_GEO_2	NAN	4.37	iid_geothermal	IID	physical	geothermal
HEBER_GEO_COMPLEX	NAN	52	iid_geothermal	IID	physical	geothermal
HEBER_II	NAN	16	iid_geothermal	IID	physical	geothermal
HEBER_SOLAR_PV	NAN	10	iid_solar	IID	physical	utility_pv
HEDGE_SOLAR	NAN	1.5	banc_solar	BANC	physical	utility_pv
HELMPG_7_UNIT 1	HELMS PUMP-GEN UNIT 1	407	caiso_pumped_hydro	CISO	physical	pumped_storage
HELMPG_7_UNIT 2	HELMS PUMP-GEN UNIT 2	407	caiso_pumped_hydro	CISO	physical	pumped_storage
HELMPG_7_UNIT 3	HELMS PUMP-GEN UNIT 3	404	caiso_pumped_hydro	CISO	physical	pumped_storage
HENRTA_6_HDEBT1	HENRIETTA D ENERGY STORAGE	10	caiso_li_battery	CISO	physical	hr_batteries
HENRTA_6_SOLAR1	LEMOORE 1	1.5	caiso_solar	CISO	physical	utility_pv
HENRTA_6_SOLAR2	WESTSIDE SOLAR POWER PV1	2	caiso_solar	CISO	physical	utility_pv
HENRTA_6_UNITA1	GWF HENRIETTA PEAKER PLANT UNIT 1	49.98	caiso_peaker2	CISO	physical	gas_ct
HENRTA_6_UNITA2	GWF HENRIETTA PEAKER PLANT UNIT 2	49.42	caiso_peaker2	CISO	physical	gas_ct
HENRTS_1_SOLAR	HENRIETTA SOLAR PROJECT	100	caiso_solar	CISO	physical	utility_pv
HERDLN_6_BYHSR1	Byron Highway Solar	5	caiso_solar	CISO	physical	utility_pv
HIDSRT_2_UNITS	HIGH DESERT POWER PROJECT AGGREGATE	830	caiso_ccgt1	CISO	physical	gas_cc
HIGGNS_1_COMBIE	COMBIE SOUTH	1.5	caiso_small_hydro	CISO	physical	small_hydro
HIGGNS_7_QFUNTS	HIGGNS_7_QFUNTS	0.5	caiso_hydro	CISO	physical	hydro
HIGHDS_2_H5SBT1	HIGH 5 SOLAR BESS	50	caiso_li_battery	CISO	physical	hr_batteries
HIGHDS_2_H5SSR1	HIGH 5 SOLAR	100	caiso_solar	CISO	physical	utility_pv
HILAND_7_YOLOWD	CLEAR LAKE UNIT 1	3.75	caiso_hydro	CISO	physical	hydro
HINSON_6_CARBGN	BP WILMINGTON CALCINER	30	caiso_chp	CISO	physical	cogen
HINSON_6_LBECH1	LONG BEACH UNIT 1	63	caiso_peaker2	CISO	physical	gas_ct
HINSON_6_LBECH2	LONG BEACH UNIT 2	63	caiso_peaker2	CISO	physical	gas_ct
HINSON_6_LBECH3	LONG BEACH UNIT 3	63	caiso_peaker2	CISO	physical	gas_ct
HINSON_6_LBECH4	LONG BEACH UNIT 4	63	caiso_peaker2	CISO	physical	gas_ct
HINSON_6_SERRGN	SOUTHEAST RESOURCE RECOVERY	34	caiso_chp	CISO	physical	cogen
HMLTBR_6_UNITS	HAMILTON BRANCH PH (AGGREGATE)	4.9	caiso_small_hydro	CISO	physical	small_hydro
HNTGBH_2_PL1X3	HUNTINGTON BEACH ENERGY	673.8	caiso_ccgt1	CISO	physical	gas_cc
HNTGBH_7_UNIT 2	HUNTINGTON BEACH GEN STA. UNIT 2	226.84	caiso_st	CISO	physical	steam
HOLGAT_1_BORAX	U.S. BORAX, UNIT 1	48.2	caiso_chp	CISO	physical	cogen
HOLSTR_1_SOLAR	SAN BENITO SMART PARK	1.5	caiso_solar	CISO	physical	utility_pv
HOLSTR_1_SOLAR2	HOLLISTER SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
HOOLEYDIGESTER1	NAN	0.2	caiso_biomass	CISO	physical	biomass_wood
HOOLEYDIGESTER2	NAN	0.2	caiso_biomass	CISO	physical	biomass_wood
HOOVER_2_MWDDYN	HOOVER	249	caiso_hydro	WALC	specifiedimport	hydro
HOOVER_2_VEADYN	HOOVER	16	caiso_hydro	WALC	specifiedimport	hydro
HUDSON_RANCH_I	NAN	64.8	iid_geothermal	IID	physical	geothermal
HUMBPP_1_UNITS3	HUMBOLDT BAY GENERATING STATION 3	65.08	caiso_reciprocating_engine	CISO	physical	ice
HUMBPP_6_UNITS	HUMBOLDT BAY GENERATING STATION 1	97.62	caiso_reciprocating_engine	CISO	physical	ice
HUMBSB_1_QF	SMALL QF AGGREGATION - TRINITY	1.25	caiso_hydro	CISO	physical	hydro
HUMMINGBIRDSTORAGE	NAN	75	caiso_li_battery	CISO	physical	hr_batteries
HURON_6_SOLAR	HURON SOLAR STATION	20	caiso_solar	CISO	physical	utility_pv
HYTTHM_2_UNITS	HYATT-THERMALITO PUMP-GEN (AGGREGAT	933.1	caiso_hydro	CISO	physical	hydro
IGNACO_1_QF	SMALL QF AGGREGATION - VALLEJO/DINSM	0.5	caiso_chp	CISO	physical	cogen
IMPERIAL_VALLEYIVSC2	NAN	20	iid_solar	IID	physical	utility_pv
INDIGO_1_UNIT 1	INDIGO PEAKER UNIT 1	45	caiso_peaker2	CISO	physical	gas_ct
INDIGO_1_UNIT 2	INDIGO PEAKER UNIT 2	45	caiso_peaker2	CISO	physical	gas_ct
INDIGO_1_UNIT 3	INDIGO PEAKER UNIT 3	45	caiso_peaker2	CISO	physical	gas_ct
INDVLY_1_UNITS	INDIAN VALLEY HYDRO	3.01	caiso_small_hydro	CISO	physical	small_hydro
INSKIP_2_UNIT	INSKIP HYDRO	8	caiso_hydro	CISO	physical	hydro
INTERMOUNTAIN_1	NAN	849.97	ldwp_coal	LADWP	physical	coal
INTERMOUNTAIN_2	NAN	849.97	ldwp_coal	LADWP	physical	coal
INTKEP_2_UNITS	CCSF HETCH_HETCHY HYDRO AGGREGATE	405	caiso_hydro	CISO	physical	hydro
INTMNT_3_ANAHEIM	INTERMOUNTAIN POWER PROJECT	236	ldwp_coal	LADWP	specifiedimport	coal
INTMNT_3_PASADENA	INTERMOUNTAIN POWER PROJECT	107	ldwp_coal	LADWP	specifiedimport	coal
INTMNT_3_RIVERSIDE	IPPDYN	136	ldwp_coal	LADWP	specifiedimport	coal
INTTRB_6_UNIT	INTERNATIONAL TURBINE RESEARCH	18.4	caiso_wind	CISO	physical	in_state_wind_north
IVANPA_1_UNIT1	IVANPAH 1	126	caiso_solar	CISO	physical	utility_pv
IVANPA_1_UNIT2	IVANPAH 2	133	caiso_solar	CISO	physical	utility_pv
IVANPA_1_UNIT3	IVANPAH 3	133	caiso_solar	CISO	physical	utility_pv
IVSLR2_2_SM2SR1	SILVER RIDGE MOUNT SIGNAL 2	150	caiso_solar	CISO	physical	utility_pv
IVSLRP_2_SOLAR1	SILVER RIDGE MOUNT SIGNAL	200	caiso_solar	CISO	physical	utility_pv
IVWEST_2_SOLAR1	IMPERIAL VALLEY WEST (Q # 608)	150	caiso_solar	CISO	physical	utility_pv
JACMSR_1_JACSR1	JACUMBA SOLAR FARM	20	caiso_solar	CISO	physical	utility_pv
JANCRK_6_RCABT1	Redwood Coast Airport Microgrid	1.75	caiso_li_battery	CISO	physical	hr_batteries
JAVASR_1_JAVSR1	NAN	13.5	caiso_solar	CISO	physical	utility_pv
JAWBNE_2_NSRWND	NORTH SKY RIVER WIND PROJECT	160	caiso_wind	CISO	physical	in_state_wind_south
JAWBNE_2_SRWND	NAN	77	caiso_wind	CISO	physical	in_state_wind_south
JAWBNE_2_SRWWD2	Sky River Wind Repower B	30.2	caiso_wind	CISO	physical	in_state_wind_south
JAYNE_6_WLSLR	WESTLANDS SOLAR FARM PV 1	18	caiso_solar	CISO	physical	utility_pv
JJ_ELMORE	NAN	42	iid_geothermal	IID	physical	geothermal
JOANEC_2_STABT1	SANTA ANA STORAGE 1	20	caiso_li_battery	CISO	physical	hr_batteries
JOANEC_2_STABT2	Santa Ana Storage 2	20.00	caiso_li_battery	CISO	physical	hr_batteries
JOHANN_2_JOSBT1	JOHANNA STORAGE 1	10	caiso_li_battery	CISO	physical	hr_batteries
JOHANN_2_JOSBT2	JOHANNA STORAGE 2	10	caiso_li_battery	CISO	physical	hr_batteries
JOHANN_2_OCEBT2	ORANGE COUNTY ENERGY STORAGE 2	9	caiso_li_battery	CISO	physical	hr_batteries
JOHANN_2_OCEBT3	ORANGE COUNTY ENERGY STORAGE 3	6	caiso_li_battery	CISO	physical	hr_batteries
K_ROAD_MOAPA	NAN	250	ldwp_solar	LADWP	physical	utility_pv
K_ROAD_MODESTO	NAN	26.32	banc_solar	BANC	physical	utility_pv
KANSAS_6_SOLAR	RE KANSAS SOUTH	20	caiso_solar	CISO	physical	utility_pv
KEARNY_6_NESBT1	KEARNY NORTH ENERGY STORAGE	10	caiso_li_battery	CISO	physical	hr_batteries
KEARNY_6_SESBT2	KEARNY SOUTH ENERGY STORAGE	10	caiso_li_battery	CISO	physical	hr_batteries
KEKAWK_6_UNIT	STS HYDROPOWER LTD. (KEKAWAKA)	5.5	caiso_small_hydro	CISO	physical	small_hydro
KELSO_2_UNITS	MARIPOSA ENERGY	198.03	caiso_peaker1	CISO	physical	gas_ct
KELYRG_6_UNIT	KELLY RIDGE HYDRO	11	caiso_small_hydro	CISO	physical	small_hydro
KERKH2_7_UNIT 1	KERKHOFF PH 2 UNIT #1	153.9	caiso_hydro	CISO	physical	hydro
KERMAN_6_SOLAR1	FRESNO SOLAR SOUTH	1.5	caiso_solar	CISO	physical	utility_pv
KERMAN_6_SOLAR2	FRESNO SOLAR WEST	1.5	caiso_solar	CISO	physical	utility_pv

KERNFT_1_UNITS	KERN FRONT LIMITED	52.4	caiso_chp	CISO	physical	cogen
KERNRG_1_UNITS	SOUTH BELRIDGE COGEN FACILITY	55.2	caiso_chp	CISO	physical	cogen
KERRGN_1_UNIT 1	KERN RIVER HYDRO UNITS 1-4 AGGREGATE	25.6	caiso_hydro	CISO	physical	hydro
KIEFER_LANDFILL_1_1	NAN	3.5	caiso_biomass	BANC	physical	biogas
KIEFER_LANDFILL_1_2	NAN	3.5	caiso_biomass	BANC	physical	biogas
KIEFER_LANDFILL_1_3	NAN	3.5	caiso_biomass	BANC	physical	biogas
KIEFER_LANDFILL_2_1	NAN	3.5	caiso_biomass	BANC	physical	biogas
KIEFER_LANDFILL_2_2	NAN	3.5	caiso_biomass	BANC	physical	biogas
KILARC_2_UNIT 1	KILARC HYDRO	1.5	caiso_small_hydro	CISO	physical	small_hydro
KINGCO_1_KINGBR	KINGSBURG COGEN	34.5	caiso_chp	CISO	physical	cogen
KINGRV_7_UNIT 1	KINGS RIVER HYDRO UNIT 1	51.2	caiso_hydro	CISO	physical	hydro
KIRKER_7_KELCYN	KELLER CANYON LANDFILL GEN FACILICITY	3.56	caiso_biomass	CISO	physical	biomass_wood
KNGBRD_2_SOLAR1	KINGBIRD SOLAR A	20	caiso_solar	CISO	physical	utility_pv
KNGBRD_2_SOLAR2	KINGBIRD SOLAR B	20	caiso_solar	CISO	physical	utility_pv
KNGBRG_1_KBSLR1	KINGSBURG1	1.5	caiso_solar	CISO	physical	utility_pv
KNGBRG_1_KBSLR2	KINGSBURG2	1.5	caiso_solar	CISO	physical	utility_pv
KNGCTY_6_UNITA1	KING CITY ENERGY CENTER, UNIT 1	44.6	caiso_peaker2	CISO	physical	gas_ct
KNTSTH_6_SOLAR	KENT SOUTH	20	caiso_solar	CISO	physical	utility_pv
KRAMER_1_KJ5SR5	NAN	30.00	caiso_solar	CISO	physical	utility_pv
KRAMER_1_SEGS37	NAN	72.06	caiso_solar	CISO	physical	utility_pv
KRAMER_1_SEGSR3	NAN	30.00	caiso_solar	CISO	physical	utility_pv
KRAMER_1_SEGSR4	NAN	30.88	caiso_solar	CISO	physical	utility_pv
KRAMER_2_SEGS 8	KRAMER JUNCTION 8	80	caiso_solar	CISO	physical	utility_pv
KRAMER_2_SEGS 9	KRAMER JUNCTION 9	80	caiso_solar	CISO	physical	utility_pv
KRAMER_2_SEGS89	NAN	80	caiso_solar	CISO	physical	utility_pv
KRNCNY_6_UNIT	KERN CANYON POWERHOUSE	10.6	caiso_small_hydro	CISO	physical	small_hydro
KYCORA_6_KMSBT1	KEARNY MESA STORAGE	1	caiso_li_battery	CISO	physical	hr_batteries
LACIEN_2_VENICE	MWD VENICE HYDROELECTRIC RECOVERY PL	9.95	caiso_hydro	CISO	physical	hydro
LAGBEL_6_QF	NAN	0.35	caiso_chp	CISO	physical	cogen
LAKE	NAN	51	ldwp_peaker	LADWP	physical	gas_ct
LAKESIDE_BIOGAS_LLC	NAN	3	caiso_biogas	CISO	physical	biogas
LAKHDG_6_UNIT 1	LAKE HODGES PUMPED STORAGE-UNIT1	20	caiso_pumped_hydro	CISO	physical	pumped_storage
LAKHDG_6_UNIT 2	LAKE HODGES PUMPED STORAGE-UNIT2	20	caiso_pumped_hydro	CISO	physical	pumped_storage
LAMONT_1_SOLAR1	REGULUS SOLAR	60	caiso_solar	CISO	physical	utility_pv
LAMONT_1_SOLAR2	REDWOOD SOLAR FARM 4	20	caiso_solar	CISO	physical	utility_pv
LAMONT_1_SOLAR3	WOODMERE SOLAR FARM	14.99	caiso_solar	CISO	physical	utility_pv
LAMONT_1_SOLAR4	HAYWORTH SOLAR FARM	26.66	caiso_solar	CISO	physical	utility_pv
LAMONT_1_SOLAR5	REDCREST SOLAR FARM	16.66	caiso_solar	CISO	physical	utility_pv
LAPAC_6_UNIT	LOUISIANA PACIFIC SAMOA	20	caiso_biomass	CISO	physical	biomass_wood
LAPLMA_2_UNIT 1	LA PALOMA GENERATING PLANT UNIT #1	267	caiso_ccgt1	CISO	physical	gas_cc
LAPLMA_2_UNIT 2	LA PALOMA GENERATING PLANT UNIT #2	266	caiso_ccgt1	CISO	physical	gas_cc
LAPLMA_2_UNIT 3	LA PALOMA GENERATING PLANT UNIT #3	266	caiso_ccgt1	CISO	physical	gas_cc
LAPLMA_2_UNIT 4	LA PALOMA GENERATING PLANT, UNIT #4	267	caiso_ccgt1	CISO	physical	gas_cc
LARKSP_6_UNIT 1	LARKSPUR PEAKER UNIT 1	46.1	caiso_peaker1	CISO	physical	gas_ct
LARKSP_6_UNIT 2	LARKSPUR PEAKER UNIT 2	47.98	caiso_peaker1	CISO	physical	gas_ct
LAROA2_2_UNITA1	LR2	322	caiso_ccgt2	CISO	physical	gas_cc
LASSEN_6_UNITS	HONEY LAKE POWER	30	caiso_biomass	CISO	physical	biomass_wood
LAWRNC_7_SUNYVL	CITY OF SUNNYVALE UNIT 1 AND 2	0.3	caiso_chp	CISO	physical	cogen
LEATHERS	NAN	42	iid_geothermal	IID	physical	geothermal
LEBECS_2_UNITS	PASTORIA ENERGY FACILITY	799.47	caiso_ccgt1	CISO	physical	gas_cc
LECEF_1_UNITS	LOS ESTEROS ENERGY FACILITY AGGREGATE	309.84	caiso_ccgt2	CISO	physical	gas_cc
LECONT_2_LESBT1	LeConte Energy Storage	125	caiso_li_battery	CISO	physical	hr_batteries
LEPRFD_1_KANSAS	KANSAS	20	caiso_solar	CISO	physical	utility_pv
LGHTHP_6_ICEGEN	CARSON COGENERATION	48	caiso_ccgt1	CISO	physical	gas_ct
LHILLS_6_SOLAR1	LOST HILLS SOLAR	20	caiso_solar	CISO	physical	utility_pv
LILIAC_6_SOLAR	MESA CREST	3	caiso_solar	CISO	physical	utility_pv
LITLRK_6_GBCSR1	GREEN BEANWORKS C	3	caiso_solar	CISO	physical	utility_pv
LITLRK_6_SEPV01	GESTAMP SOLAR 1	2	caiso_solar	CISO	physical	utility_pv
LITLRK_6_SOLAR1	LANCASTER LITTLE ROCK C	5	caiso_solar	CISO	physical	utility_pv
LITLRK_6_SOLAR2	PALMDALE 18	2	caiso_solar	CISO	physical	utility_pv
LITLRK_6_SOLAR3	ONE TEN PARTNERS	2	caiso_solar	CISO	physical	utility_pv
LITLRK_6_SOLAR4	LITTLE ROCK PHAM SOLAR	3	caiso_solar	CISO	physical	utility_pv
LIVEOK_6_SOLAR	HARRIS	1.25	caiso_solar	CISO	physical	utility_pv
LIVOAK_1_UNIT 1	LIVE OAK LIMITED	49.7	caiso_peaker2	CISO	physical	gas_ct
LLAGAS	NAN	20	caiso_li_battery	CISO	physical	hr_batteries
LMBEPK_2_UNITA1	LAMBIE ENERGY CENTER, UNIT #1	47.5	caiso_peaker2	CISO	physical	gas_ct
LMBEPK_2_UNITA2	CREED ENERGY CENTER, UNIT #1	47.6	caiso_peaker2	CISO	physical	gas_ct
LMBEPK_2_UNITA3	GOOSE HAVEN ENERGY CENTER, UNIT #1	47.4	caiso_peaker2	CISO	physical	gas_ct
LMEC_1_PL1X3	LOS MEDANOS ENERGY CENTER AGGREGATE	580	caiso_ccgt1	CISO	physical	gas_cc
LNCSTR_6_CREST	NAN	5.5	caiso_solar	CISO	physical	utility_pv
LNCSTR_6_SOLAR2	SEPV SIERRA NGR	2.75	caiso_solar	CISO	physical	utility_pv
LOCKFD_1_BEARCK	BEAR CREEK SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
LOCKFD_1_KSOLAR	KETTLEMAN SOLAR	1	caiso_solar	CISO	physical	utility_pv
LODI25_2_UNIT 1	LODI GAS TURBINE	25	caiso_peaker2	CISO	physical	gas_ct
LODIEC_2_PL1X2	LODI ENERGY CENTER	302.58	caiso_ccgt1	CISO	physical	gas_cc
LOTUS_6_LSFSR1	LOTUS SOLAR FARM	50	caiso_solar	CISO	physical	utility_pv
LOWGAP_1_SUPHR	MILL & SULPHUR CREEK HYDRO	0.99	caiso_small_hydro	CISO	physical	small_hydro
LOWGAP_7_QFUNTS	MATTHEWS DAM HYDRO	1.35	caiso_hydro	CISO	physical	hydro
LTBEAR_1_LB3SR3	LITTLE BEAR 3 SOLAR	20	caiso_solar	CISO	physical	utility_pv
LTBEAR_1_LB4SR4	LITTLE BEAR 4	50	caiso_solar	CISO	physical	utility_pv
LTBEAR_1_LB4SR5	LITTLE BEAR 4 SOLAR 5	50	caiso_solar	CISO	physical	utility_pv
LTBERA_1_LB1SR1	LITTLE BEAR SOLAR 1	40	caiso_solar	CISO	physical	utility_pv
MAGNLA_6_ANAHEIM	MAGNOLIA POWER PLANT ANAHEIM	109	ldwp_ccgt	LADWP	specifiedimport	gas_cc
MAGNLA_6_CERRITOS	MAGNOLIA POWER PLANT CERRITOS	12	ldwp_ccgt	LADWP	specifiedimport	gas_cc
MAGNLA_6_COLTON	MAGNOLIA POWER PROJECT	12	caiso_ccgt1	LADWP	specifiedimport	gas_cc
MAGNLA_6_PASADENA	MAGNOLIA POWER PLANT - PASADENA	18	caiso_ccgt1	LADWP	specifiedimport	gas_cc
MAGNOLIA_CC	MAGNOLIA	301	ldwp_ccgt	LADWP	physical	gas_cc
MAGUND_1_BKISR1	BAKERSFIELD INDUSTRIAL 1	1	caiso_solar	CISO	physical	utility_pv
MAGUND_1_BKSSR2	BAKERSFIELD SOLAR 1	5.25	caiso_solar	CISO	physical	utility_pv
MALAGA_1_PL1X2	MALAGA POWER AGGREGATE	96	caiso_peaker1	CISO	physical	gas_ct
MALCHQ_7_UNIT 1	MALACHA HYDRO L.P.	32.5	caiso_hydro	CISO	physical	hydro
MALIN_5_BPADYN	MALIN_5_BPADYN	250	CAISO_Imports	BPAT	specifiedimport	n/a
MALIN_5_GCPDDYN	GRANT COUNTY HYDRO FACILITIES	125	caiso_hydro	BPAT	specifiedimport	hydro
MALIN_5_HERMDYN	MALIN_5_HERMDYN	308	nw_ccgt	BPAT	specifiedimport	gas_cc
MALIN_5_IBERDR	IBERDROLA CENTROID SYTEM RESOURCE	100	caiso_wind	BPAT	specifiedimport	out_of_state_wind_WAOR
MALIN_5_INHRED	CSF COLUMBIA GORGE	50	caiso_wind	BPAT	specifiedimport	out_of_state_wind_WAOR
MALIN_5_INHRPG	BIGLOW CANYON	50	caiso_wind	BPAT	specifiedimport	out_of_state_wind_WAOR
MANTEC_1_ML1SR1	MANTECA LAND 1	1	caiso_solar	CISO	physical	utility_pv
MANZNA_2_WIND	MANZANA WIND	189	caiso_wind	CISO	physical	in_state_wind_south
MARCPW_6_SOLAR1	MARICOPA WEST SOLAR PV	20	caiso_solar	CISO	physical	utility_pv
MARTIN_1_SUNSET	SUNSET RESERVOIR - NORTH BASIN	4.5	caiso_solar	CISO	physical	utility_pv

MCARTH_6_FRIVRB	FALL RIVER MILLS PROJECT B	1.5	caiso_solar	CISO	physical	utility_pv
MCCALL_1_QF	FISH WATER	0.52	caiso_small_hydro	CISO	physical	small_hydro
MCCLELLAN_1	NAN	74	banc_peaker	BANC	physical	gas_ct
MCCLURE_1	NAN	62	banc_peaker	BANC	physical	gas_ct
MCCLURE_2	NAN	62	banc_peaker	BANC	physical	gas_ct
MCSWAN_6_UNITS	MC SWAIN HYDRO	10	caiso_hydro	CISO	physical	hydro
MDFKRL_2_PROJCT	MIDDLE FORK AND RALSTON PSP	210	caiso_hydro	CISO	physical	hydro
MELROSESTORAGE1	NAN	20	caiso_li_battery	CISO	physical	hr_batteries
MENBIO_6_RENEW1	CALRENEW - 1(A)	5	caiso_solar	CISO	physical	utility_pv
MENBIO_6_UNIT	NAN	25.00	caiso_biomass	CISO	physical	biomass_wood
MERCED_1_SOLAR1	MISSION SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
MERCED_1_SOLAR2	MERCED SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
MERCFL_6_UNIT	MERCED FALLS POWERHOUSE	3.5	caiso_small_hydro	CISO	physical	small_hydro
MESAP_1_QF	SMALL QF AGGREGATION - SAN LUIS OBISPC	1	caiso_chp	CISO	physical	cogen
MESAS_2_QF	NAN	2.90	caiso_chp	CISO	physical	cogen
MESQUITE_RECOVERY	NAN	27	caiso_biomass	IID	physical	biogas
METEC_2_PL1X3	METCALF ENERGY CENTER	593.16	caiso_ccgt1	CISO	physical	gas_cc
MIDSUN_1_PL1X2	North Midway Cogens 5A 5B	9.6	caiso_peaker2	CISO	physical	gas_ct
MIDWD_2_WIND1	NAN	7.81	caiso_wind	CISO	physical	in_state_wind_south
MIDWD_2_WIND2	CORAM ENERGY	3	caiso_wind	CISO	physical	in_state_wind_south
MIDWD_6_WNDLND	NAN	7.45	caiso_wind	CISO	physical	in_state_wind_south
MIDWD_7_CORAMB	CELLC 7.5 MW TEHACHAPI PROJECT	7.5	caiso_wind	CISO	physical	in_state_wind_south
MIDWY3_2_MDSSR1	MIDWAY SOUTH SOLAR FARM	20	iid_solar	IID	specifiedimport	utility_pv
MIDWYS_2_MIDSL1	MIDWAY SOLAR FARM	49.9	iid_solar	IID	specifiedimport	utility_pv
MILFORD_WIND_1_1	NAN	145	nw_wind	LADWP	physical	out_of_state_wind_WYID
MILFORD_WIND_1_2	NAN	58.5	nw_wind	LADWP	physical	out_of_state_wind_WYID
MILFORD_WIND_2	NAN	100	nw_wind	LADWP	physical	out_of_state_wind_WYID
MILFRD_7_PASADENA	MILFORD I	5	nw_wind	LADWP	specifiedimport	out_of_state_wind_WYID
MIRLOM_2_CORONA	MWD CORONA HYDROELECTRIC RECOVERY I	2.85	caiso_hydro	CISO	physical	hydro
MIRLOM_2_LNDFL	MILLIKEN LANDFILL SOLAR	3	caiso_solar	CISO	physical	utility_pv
MIRLOM_2_MLBBTA	MIRA LOMA BESS A	10	caiso_li_battery	CISO	physical	hr_batteries
MIRLOM_2_MLBBTB	MIRA LOMA BESS B	10	caiso_li_battery	CISO	physical	hr_batteries
MIRLOM_2_ONTARO	ONTARIO RT SOLAR	5.5	caiso_solar	CISO	physical	utility_pv
MIRLOM_2_RTS032	SPVP032	1.5	caiso_solar	CISO	physical	utility_pv
MIRLOM_2_RTS033	SPVP033	1	caiso_solar	CISO	physical	utility_pv
MIRLOM_2_TEMESC	MWD TEMESCAL HYDROELECTRIC RECOVER\	2.85	caiso_hydro	CISO	physical	hydro
MIRLOM_6_PEAKER	MIRA LOMA PEAKER	46	caiso_peaker1	CISO	physical	gas_ct
MIRLOM_7_MWDLKM	LAKE MATHEWS HYDROELECTRIC RECOVERY	5	caiso_hydro	CISO	physical	hydro
MISSIX_1_QF	SMALL QF AGGREGATION - SAB FRABCUSCI	1	caiso_chp	CISO	physical	cogen
MKTRCK_1_UNIT 1	MCKITTRICK LIMITED	47.49	caiso_peaker2	CISO	physical	gas_ct
MLPTAS_7_QFUNTS	MLPTAS_7_QFUNTS	1	caiso_chp	CISO	physical	cogen
MM_SD_MIRAMAR2	NAN	1.6	caiso_biomass	CISO	physical	biomass_wood
MNDALY_6_MCGRTH	MCGRATH BEACH PEAKER	47.2	caiso_peaker1	CISO	physical	gas_ct
MNDOTA_1_SOLAR1	NORTH STAR SOLAR 1	60	caiso_solar	CISO	physical	utility_pv
MNDOTA_1_SOLAR2	CITIZEN SOLAR B	5	caiso_solar	CISO	physical	utility_pv
MNOCAERSSTORAGE	NAN	10	caiso_li_battery	CISO	physical	hr_batteries
MOJAVE_1_SIPHON	MOJAVE SIPHON POWER PLANT	14.36	caiso_hydro	CISO	physical	hydro
MOJAVW_2_SOLAR	MOJAVE WEST	20	caiso_solar	CISO	physical	utility_pv
MONLTH_6_BATTRY	TEHACHAPI STORAGE PROJECT	7.99	caiso_li_battery	CISO	physical	hr_batteries
MONLTS_2_MONWD4	NAN	6.14	caiso_wind	CISO	physical	in_state_wind_south
MONLTS_2_MONWD5	NAN	4.04	caiso_wind	CISO	physical	in_state_wind_south
MONLTS_2_MONWD6	NAN	5.25	caiso_wind	CISO	physical	in_state_wind_south
MONLTS_2_MONWD7	NAN	6.16	caiso_wind	CISO	physical	in_state_wind_south
MONTPH_7_UNITS	MONTICELLO HYDRO AGGREGATE	12.5	caiso_small_hydro	CISO	physical	small_hydro
MOORPK_2_ACOBT1	ACORN I BESS	2	caiso_li_battery	CISO	physical	hr_batteries
MOORPK_2_CALABS	CALABASAS GAS-TO-ENERGY FACILITY	6.96	caiso_biomass	CISO	physical	biomass_wood
MOORPK_6_QF	MOORPARK QFS	0.8	caiso_small_hydro	CISO	physical	small_hydro
MORWD_6_QF	MORWIND	38.16	caiso_wind	CISO	physical	in_state_wind_south
MOSSLD_1_QF	SMALL QF AGGREGATION - SANTA CRUZ	1	caiso_chp	CISO	physical	cogen
MOSSLD_2_PSP1	MOSS LANDING POWER BLOCK 1	510	caiso_ccgt1	CISO	physical	gas_cc
MOSSLD_2_PSP2	MOSS LANDING POWER BLOCK 2	510	caiso_ccgt1	CISO	physical	gas_cc
MRCHNT_2_PL1X3	DESERT STAR ENERGY CENTER	494.58	caiso_ccgt1	CISO	physical	gas_cc
MRGT_6_MEF2	MIRAMAR ENERGY FACILITY II	44	caiso_peaker1	CISO	physical	gas_ct
MRGT_6_MMAREF	MIRAMAR ENERGY FACILITY	45	caiso_peaker1	CISO	physical	gas_ct
MRGT_6_TGEBT1	TOP GUN ENERGY STORAGE	30	caiso_li_battery	CISO	physical	hr_batteries
MRLSDS_6_SOLAR1	MORELOS SOLAR	15	caiso_solar	CISO	physical	utility_pv
MSHGTS_6_MMARLF	MIRAMAR LANDFILL	5	caiso_biomass	CISO	physical	biomass_wood
MSOLAR_2_SOLAR1	MESQUITE SOLAR 1	165	caiso_solar	CISO	physical	utility_pv
MSOLAR_2_SOLAR2	MESQUITE SOLAR 2	100.81	caiso_solar	CISO	physical	utility_pv
MSOLAR_2_SOLAR3	MESQUITE SOLAR 3, LLC	152	caiso_solar	CISO	physical	utility_pv
MSQUIT_5_SERDYN	MSQUIT_5_SERDYN	625	sw_ccgt	SRP	specifiedimport	gas_ct
MSSION_2_QF	SMALL QF AGGREGATION - SAN DIEGO	2	caiso_small_hydro	CISO	physical	small_hydro
MSTANG_2_MTGBT1	MUSTANG 1 BESS	75	caiso_li_battery	CISO	physical	hr_batteries
MSTANG_2_SOLAR	MUSTANG	30	caiso_solar	CISO	physical	utility_pv
MSTANG_2_SOLAR3	MUSTANG 3	40	caiso_solar	CISO	physical	utility_pv
MSTANG_2_SOLAR4	MUSTANG 4	30	caiso_solar	CISO	physical	utility_pv
MTHSE_G_38380_1	NAN	20	banc_solar	BANC	physical	utility_pv
MTNPOS_1_UNIT	MT.POSO COGENERATION CO.	46.64	caiso_biomass	CISO	physical	cogen
MTWIND_1_MVPWD1	Mountain View Power Project I Repower	66.6	caiso_wind	CISO	physical	in_state_wind_south
MTWIND_1_UNIT 1	MOUNTAIN VIEW POWER PROJECT I	44.4	caiso_wind	CISO	physical	in_state_wind_south
MTWIND_1_UNIT 2	MOUNTAIN VIEW POWER PROJECT II	22.2	caiso_wind	CISO	physical	in_state_wind_south
MTWIND_1_UNIT 3	MOUNTAIN VIEW POWER PROJECT III	22.44	caiso_wind	CISO	physical	in_state_wind_south
MURRAY_6_UNIT	GROSSMONT HOSPITAL	4.12	caiso_chp	CISO	physical	cogen
NAPA_RECYCLING_BIOMASS_PLANT	NAN	1	caiso_biomass	CISO	physical	biomass_wood
NAROW1_2_UNIT	NARROWS PH 1 UNIT	12	caiso_small_hydro	CISO	physical	small_hydro
NAROW2_2_UNIT	NARROWS POWERHOUSE UNIT 2	55	caiso_hydro	CISO	physical	hydro
NAVYII_2_UNITS	COSO POWER DEVELOPER (NAVY II) AGGREG	90	caiso_geothermal	CISO	physical	geothermal
NCPA_7_GP1UN1	NCPA GEO PLANT 1 UNIT 1	38.85	caiso_geothermal	CISO	physical	geothermal
NCPA_7_GP1UN2	NCPA GEO PLANT 1 UNIT 2	39.94	caiso_geothermal	CISO	physical	geothermal
NCPA_7_GP2UN3	NCPA GEO PLANT 2 UNIT 3	42.42	caiso_geothermal	CISO	physical	geothermal
NCPA_7_GP2UN4	NCPA GEO PLANT 2 UNIT 4	52.73	caiso_geothermal	CISO	physical	geothermal
NEENACH_SOLAR	NAN	3	ldwp_solar	LADWP	physical	utility_pv
NEENCH_6_SOLAR	ALPINE SOLAR	66	caiso_solar	CISO	physical	utility_pv
NEWARK_1_QF	NEWARK 1 QF	0.1	caiso_chp	CISO	physical	cogen
NGILAA_5_SDGDYN	NGILAA_5_SDGDYN	57	sw_ct	AZPS	specifiedimport	gas_ct
NHOGAN_6_UNITS	NEW HOGAN PH AGGREGATE	4	caiso_hydro	CISO	physical	hydro
NILAND_1	NAN	50	iid_peaker	IID	physical	gas_ct
NILAND_2	NAN	50	iid_peaker	IID	physical	gas_ct
NIMTG_6_NICOGN	NORTH ISLAND COGEN	4.05	caiso_chp	CISO	physical	cogen
NIMTG_6_NIQF	NAN	42.70	caiso_chp	CISO	physical	cogen
NORTH_BRAWLEY_01	NAN	16	iid_geothermal	IID	physical	geothermal

NORTH_BRAWLEY_02	NAN	16	iid_geothermal	IID	physical	geothermal
NORTH_BRAWLEY_03	NAN	16	iid_geothermal	IID	physical	geothermal
NORTH_BRAWLEY_04	NAN	16	iid_geothermal	IID	physical	geothermal
NORTH_BRAWLEY_05	NAN	16	iid_geothermal	IID	physical	geothermal
NORTH_BRAWLEY_06	NAN	16	iid_geothermal	IID	physical	geothermal
NORTH_FORK_COMMUNITY_POWER	NAN	2	caiso_biomass	CISO	physical	biomass_wood
NOVATO_6_LNDFL	REDWOOD RENEWABLE ENERGY	3.9	caiso_biogas	CISO	physical	biogas
NWCSTL_7_UNIT 1	NEWCASTLE HYDRO	12	caiso_hydro	CISO	physical	hydro
NZWIND_2_WDSTR5	WINDSTREAM 6111	6.31	caiso_wind	CISO	physical	in_state_wind_south
NZWIND_6_CALWND	WIND RESOURCE I	9	caiso_wind	CISO	physical	in_state_wind_south
NZWIND_6_WDSTR	WINDSTREAM 39	3.35	caiso_wind	CISO	physical	in_state_wind_south
NZWIND_6_WDSTR2	WINDSTREAM 6040	4.07	caiso_wind	CISO	physical	in_state_wind_south
NZWIND_6_WDSTR3	WINDSTREAM 6041	3.86	caiso_wind	CISO	physical	in_state_wind_south
NZWIND_6_WDSTR4	WINDSTREAM 6042	6.77	caiso_wind	CISO	physical	in_state_wind_south
OAK C_1_EBMUD	MWWTP PGS 1 - ENGINES	6.9	caiso_biogas	CISO	physical	biogas
OAK C_7_UNIT 1	OAKLAND STATION C GT UNIT 1	55	caiso_peaker2	CISO	physical	gas_ct
OAK C_7_UNIT 3	OAKLAND STATION C GT UNIT 3	55	caiso_peaker2	CISO	physical	gas_ct
OAK C_7_UNIT_2	OAKLAND STATION C GT UNIT 2	55	caiso_peaker2	CISO	physical	gas_ct
OAK L_1_GTG1	MWWTP PGS 2 - TURBINE	4.6	caiso_biomass	CISO	physical	biomass_wood
OAKWD_6_QF	OAK CREEK	27.87	caiso_wind	CISO	physical	in_state_wind_south
OAKWD_6_ZEPHWD	ZEPHYR PARK	3.5	caiso_wind	CISO	physical	in_state_wind_south
OASIS_6_CREST	NAN	13.5	caiso_solar	CISO	physical	utility_pv
OASIS_6_GBDSR4	GREEN BEANWORKS D	3	caiso_solar	CISO	physical	utility_pv
OASIS_6_LPPSR1	Lancaster Psomas PV	3	caiso_solar	CISO	physical	utility_pv
OASIS_6_SOLAR1	MORGAN LANCASTER I	1.5	caiso_solar	CISO	physical	utility_pv
OASIS_6_SOLAR2	OASIS SOLAR	20	caiso_solar	CISO	physical	utility_pv
OASIS_6_SOLAR3	SOCCER CENTER	3	caiso_solar	CISO	physical	utility_pv
OCI_SOLAR_LAKESIDE	NAN	2	caiso_solar	CISO	physical	utility_pv
OCTILO_5_WIND	OCOTILLO WIND ENERGY FACILITY	265	caiso_wind	CISO	physical	in_state_wind_south
OGROVE_6_PL1X2	ORANGE GROVE ENERGY CENTER	96	caiso_peaker2	CISO	physical	gas_ct
OILFLD_7_QFUNTS	NACIMIENTO HYDROELECTRIC PLANT	3.8	caiso_hydro	CISO	physical	hydro
OLDRIV_6_BIOGAS	BIDART OLD RIVER 1	2	caiso_biomass	CISO	physical	biomass_wood
OLDRIV_6_CESDBM	CES DAIRY BIOGAS	1	caiso_biogas	CISO	physical	biogas
OLDRIV_6_LKVBM1	LAKEVIEW DAIRY BIOGAS	1	caiso_biogas	CISO	physical	biogas
OLDRV1_6_SOLAR	OLD RIVER ONE	20	caiso_solar	CISO	physical	utility_pv
OLINDA_2_COYCRK	MWD COYOTE CREEK HYDROELECTRIC RECO	3.13	caiso_hydro	CISO	physical	hydro
OLINDA_2_LNDFL2	BREA POWER II	28.1	caiso_biomass	CISO	physical	biomass_wood
OLINDA_2_QF	OLINDA QFS	0.4	caiso_small_hydro	CISO	physical	small_hydro
OLINDA_7_BLKSND	BLACKSAND GENERATING FACILITY	8	caiso_biomass	CISO	physical	biomass_wood
OLINDA_7_LNDFIL	NAN	5.6	caiso_biomass	CISO	physical	biomass_wood
OLIVE_O1	NAN	44	ldwp_st	LADWP	physical	steam
OLIVE_O2	NAN	55	ldwp_st	LADWP	physical	steam
OLIVEP_1_SOLAR	WHITE RIVER SOLAR	20	caiso_solar	CISO	physical	utility_pv
OLIVEP_1_SOLAR2	WHITE RIVER WEST	19.75	caiso_solar	CISO	physical	utility_pv
OLSEN_2_UNIT	OLSEN POWER PARTNERS	5.8	caiso_small_hydro	CISO	physical	small_hydro
OMAR_2_UNIT 1	KERN RIVER COGENERATION CO. UNIT 1	78	caiso_peaker1	CISO	physical	gas_ct
OMAR_2_UNIT 2	KERN RIVER COGENERATION CO. UNIT 2	78.11	caiso_peaker1	CISO	physical	gas_ct
OMAR_2_UNIT 3	KERN RIVER COGENERATION CO. UNIT 3	81.41	caiso_peaker1	CISO	physical	gas_ct
OMAR_2_UNIT 4	KERN RIVER COGENERATION CO. UNIT 4	81.44	caiso_peaker1	CISO	physical	cogen
ONLLPP_6_UNITS	O'NEILL PUMP-GEN (AGGREGATE)	25.2	caiso_pumped_hydro	CISO	physical	pumped_storage
ORLND_6_HIGHLI	HIGH LINE CANAL HYDRO	0.5	caiso_hydro	CISO	physical	hydro
ORLND_6_SOLAR1	ENERPARC CALIFORNIA 2	1.5	caiso_solar	CISO	physical	utility_pv
ORMESA_1_E	NAN	12.9	iid_geothermal	IID	physical	geothermal
ORMESA_1_H	NAN	12.9	iid_geothermal	IID	physical	geothermal
ORMESA_I	NAN	33.5	iid_geothermal	IID	physical	geothermal
ORMESA_II_OEC21	NAN	15	iid_geothermal	IID	physical	geothermal
ORMESA_II_OEC22	NAN	15	iid_geothermal	IID	physical	geothermal
ORMOND_7_UNIT 1	ORMOND BEACH GEN STA. UNIT 1	741.27	caiso_st	CISO	physical	steam
ORMOND_7_UNIT 2	ORMOND BEACH GEN STA. UNIT 2	750	caiso_st	CISO	physical	steam
ORNI33__LLC	NAN	20	iid_solar	IID	physical	utility_pv
OROLOM_1_SOLAR1	ORO LOMA SOLAR 1	10	caiso_solar	CISO	physical	utility_pv
OROLOM_1_SOLAR2	ORO LOMA SOLAR 2	10	caiso_solar	CISO	physical	utility_pv
OROVIL_6_UNIT	OROVILLE COGENERATION, LP	7.5	caiso_chp	CISO	physical	cogen
ORTGA_6_ME1SL1	MERCED 1	3	caiso_solar	CISO	physical	utility_pv
OSO_6_NSPIN	OSO_6_NSPIN	70	caiso_pumped_hydro	CISO	physical	pumped_storage
OTAY_6_ECVBT1	EnerSmart Chula Vista 1	3	caiso_li_battery	CISO	physical	hr_batteries
OTAY_6_ECVBT2	Chula Vista 2	3	caiso_li_battery	CISO	physical	hr_batteries
OTAY_6_LNDFL5	NAN	1.5	caiso_biogas	CISO	physical	biogas
OTAY_6_LNDFL6	NAN	1.5	caiso_biogas	CISO	physical	biogas
OTAY_6_PL1X2	CHULA VISTA ENERGY CENTER, LLC	35.5	caiso_peaker2	CISO	physical	gas_ct
OTAY_6_UNITB1	NAN	3	caiso_biogas	CISO	physical	biogas
OTMESA_2_PL1X3	OTAY MESA ENERGY CENTER	603.68	caiso_ccgt1	CISO	physical	gas_cc
OXBOW_6_DRUM	OXBOW HYDRO	5.8	caiso_hydro	CISO	physical	hydro
OXMTN_6_LNDFIL	OX MOUNTAIN LANDFILL GENERATING PLAI	10.62	caiso_biomass	CISO	physical	biomass_wood
PACLUM_6_UNIT	HUMBOLDT REDWOOD	28.8	caiso_biomass	CISO	physical	biomass_wood
PADUA_2_ONTARO	ONTARIO/SIERRA HYDRO PSP	1.92	caiso_small_hydro	CISO	physical	small_hydro
PADUA_2_SOLAR1	KONA SOLAR - RANCHO DC #1	1.75	caiso_solar	CISO	physical	utility_pv
PADUA_6_MWDSDM	SAN DIMAS HYDROELECTRIC RECOVERY PLAI	9.9	caiso_hydro	CISO	physical	hydro
PADUA_6_QF	PADUA QFS	1.82	caiso_small_hydro	CISO	physical	small_hydro
PADUA_7_SDIMAS	SAN DIMAS WASH HYDRO	1.05	caiso_small_hydro	CISO	physical	small_hydro
PAIGES_6_SOLAR	PAIGE SOLAR	20	caiso_solar	CISO	physical	utility_pv
PALALT_7_COBUG	COOPERATIVELY OWNED BACK UP GENERAT	4.5	caiso_peaker2	CISO	physical	gas_ct
PALO_VERDE_3_LADWP	NAN	407	ldwp_nuclear	LADWP	physical	nuclear
PALOMR_2_PL1X3	PALOMAR ENERGY CENTER	575	caiso_ccgt1	CISO	physical	gas_cc
PANDOL_6_UNIT	NAN	49.00	caiso_biomass	CISO	physical	biomass_wood
PANSEA_1_PANARO	NAN	30	caiso_wind	CISO	physical	in_state_wind_south
PARDEB_6_UNITS	PARDEE POWER HOUSE	30	caiso_hydro	CISO	physical	hydro
PARQUEEOLICO	NAN	10	caiso_wind	CISO	physical	in_state_wind_south
PBLOSM_2_SOLAR	PEARBLOSSOM	9.5	caiso_solar	CISO	physical	utility_pv
PEABDY_2_LNDFIL	G2 ENERGY HAY ROAD POWER PLANT	1.6	caiso_biomass	CISO	physical	biomass_wood
PEABDY_2_LNDFL1	POTRERO HILLS ENERGY PRODUCERS	8	caiso_biomass	CISO	physical	biomass_wood
PEARBL_2_NSPIN	PEARBL_2_NSPIN	118	caiso_pumped_hydro	CISO	physical	pumped_storage
PEASE_1_TBEBT1	Tierra Buena Energy Storage	5	caiso_li_battery	CISO	physical	hr_batteries
PEORIA_1_SOLAR	SONORA 1	1.5	caiso_solar	CISO	physical	utility_pv
PGE_BAY_BIP_DO	NAN	90	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_CBP DA_NONRES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_CBP DA_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_PDP_NON_RES	NAN	4	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_SMARTAC_NON_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_SMARTAC_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_BAY_SMARTRATE_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response

PGE_VAL_BIP_DO	NAN	267	caiso_loadmod	CISO	physical	demand_response
PGE_VAL_CBP_DA	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_VAL_CBP_DA_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_VAL_SMARTAC_NON_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_VAL_SMARTAC_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
PGE_VAL_SMARTRATE_RES	NAN	2	caiso_loadmod	CISO	physical	demand_response
PHOENX_1_UNIT	PHOENIX PH	2	caiso_small_hydro	CISO	physical	small_hydro
PINE_TREE_SOLAR	NAN	8.5	ldwp_solar	LADWP	physical	utility_pv
PINE_TREE_WIND	NAN	120	ldwp_wind	LADWP	physical	out_of_state_wind_WYID
PINFLT_7_UNITS	PINE FLAT HYDRO AGGREGATE	198.51	caiso_hydro	CISO	physical	hydro
PIOPIC_2_CTG1	PIO PICO UNIT 1	111.3	caiso_peaker1	CISO	physical	gas_ct
PIOPIC_2_CTG2	PIO PICO UNIT 2	112.7	caiso_peaker1	CISO	physical	gas_ct
PIOPIC_2_CTG3	PIO PICO UNIT 3	112	caiso_peaker1	CISO	physical	gas_ct
PIT1_6_FRIVRA	FALL RIVER MILLS PROJECT A	1.5	caiso_solar	CISO	physical	utility_pv
PIT1_7_UNIT 1	PIT PH 1 UNIT 1	32	caiso_hydro	CISO	physical	hydro
PIT1_7_UNIT 2	PIT PH 1 UNIT 2	32	caiso_hydro	CISO	physical	hydro
PIT3_7_PL1X3	PIT PH 3 UNITS 1, 2 & 3 AGGREGATE	70.6	caiso_hydro	CISO	physical	hydro
PIT4_7_PL1X2	PIT PH 4 UNITS 1 & 2 AGGREGATE	95	caiso_hydro	CISO	physical	hydro
PIT5_7_PL1X2	PIT PH 5 UNITS 1 & 2 AGGREGATE	82	caiso_hydro	CISO	physical	hydro
PIT5_7_PL3X4	PIT PH 5 UNITS 3 & 4 AGGREGATE	82	caiso_hydro	CISO	physical	hydro
PIT5_7_QFUNTS	GRASSHOPPER FLAT HYDRO	1.1	caiso_hydro	CISO	physical	hydro
PIT6_7_UNIT 1	PIT PH 6 UNIT 1	39	caiso_hydro	CISO	physical	hydro
PIT6_7_UNIT 2	PIT PH 6 UNIT 2	40	caiso_hydro	CISO	physical	hydro
PIT7_7_UNIT 1	PIT PH 7 UNIT 1	55.7	caiso_hydro	CISO	physical	hydro
PIT7_7_UNIT 2	PIT PH 7 UNIT 2	54.6	caiso_hydro	CISO	physical	hydro
PIUTE_6_GNBSR1	GREEN BEANWORKS B	3	caiso_biomass	CISO	physical	utility_pv
PLACVL_1_CHILIB	CHILI BAR HYDRO	8.4	caiso_small_hydro	CISO	physical	small_hydro
PLACVL_1_RCKCRE	ROCK CREEK HYDRO	5	caiso_small_hydro	CISO	physical	small_hydro
PLAINV_6_BSOLAR	WESTERN ANTELOPE BLUE SKY RANCH A	20	caiso_solar	CISO	physical	utility_pv
PLAINV_6_DSOLAR	WESTERN ANTELOPE DRY RANCH	10	caiso_solar	CISO	physical	utility_pv
PLAINV_6_NLRSR1	NORTH LANCASTER RANCH	20	caiso_solar	CISO	physical	utility_pv
PLAINV_6_SOLAR3	SIERRA SOLAR GREENWORKS LLC	20	caiso_solar	CISO	physical	utility_pv
PLAINV_6_SOLARC	CENTRAL ANTELOPE DRY RANCH C	20	caiso_solar	CISO	physical	utility_pv
PLMSSR_6_HISIER	HIGH SIERRA COGENERATION AGGREGATE	6	caiso_chp	CISO	physical	cogen
PLSNTG_7_LNCLND	LINCOLN LANDFILL POWER PLANT	4.98	caiso_biomass	CISO	physical	biomass_wood
PMDLET_6_SOLAR1	SEPV PALMDALE EAST, LLC	10	caiso_solar	CISO	physical	utility_pv
PMPJCK_1_RB2SLR	RIO BRAVO SOLAR 2	20	caiso_solar	CISO	physical	utility_pv
PMPJCK_1_SOLAR1	PUMPJACK SOLAR I	20	caiso_solar	CISO	physical	utility_pv
PMPJCK_1_SOLAR2	RIO BRAVO SOLAR 1	20	caiso_solar	CISO	physical	utility_pv
PNCHEG_2_PL1X4	PANOCHE ENERGY CENTER (AGGREGATED)	401	caiso_peaker1	CISO	physical	gas_ct
PNCHPP_1_PL1X2	MIDWAY PEAKING AGGREGATE	119.91	caiso_peaker2	CISO	physical	gas_ct
PNCHVS_2_SOLAR	PANOCHE VALLEY SOLAR	140	caiso_solar	CISO	physical	utility_pv
PNOCHE_1_PL1X2	PANOCHE PEAKER	49.97	caiso_peaker2	CISO	physical	gas_ct
PNOCHE_1_UNITA1	CALPEAK POWER PANOCHE UNIT 1	52.01	caiso_peaker2	CISO	physical	gas_ct
POCATELLO_WASTE	NAN	0.46	caiso_biomass	CISO	physical	biomass_wood
POEPH_7_UNIT 1	POE HYDRO UNIT 1	69	caiso_hydro	CISO	physical	hydro
POEPH_7_UNIT 2	POE HYDRO UNIT 2	68.5	caiso_hydro	CISO	physical	hydro
POINTLOMA1	NAN	2.29	caiso_biomass	CISO	physical	biomass_wood
POINTLOMA2	NAN	2.29	caiso_biomass	CISO	physical	biomass_wood
POTTER_6_UNITS	POTTER VALLEY	10.1	caiso_small_hydro	CISO	physical	small_hydro
POTTER_7_VECINO	VECINO VINEYARDS LLC	1.25	caiso_hydro	CISO	physical	hydro
PRCTVY_1_MIGBT1	MIGUEL BESS	2	caiso_biomass	CISO	physical	hr_batteries
PRIMA_PLANT1	NAN	3	caiso_biomass	CISO	physical	biomass_wood
PRIMA_PLANT2	NAN	3	caiso_biomass	CISO	physical	biomass_wood
PRIMM_2_SOLAR1	SILVER STATE SOUTH	250	caiso_solar	CISO	physical	utility_pv
PROXIMASOLAR	NAN	50	caiso_solar	CISO	physical	utility_pv
PROXIMASTORAGE	NAN	5	caiso_li_battery	CISO	physical	hr_batteries
PSWEET_1_STCRUZ	SANTA CRUZ ENERGY LLC	1.6	caiso_biogas	CISO	physical	biogas
PSWEET_7_QFUNTS	PSWEET_7_QFUNTS	1	caiso_chp	CISO	physical	cogen
PTLOMA_6_NTCCGN	NAN	2.58	caiso_chp	CISO	physical	cogen
PTLOMA_6_NTCQF	NTC/MCRD COGENERATION	22.3	caiso_chp	CISO	physical	cogen
PUTHCR_1_PCNSB1	Putah Creek Solar Farm North	3	caiso_solar	CISO	physical	utility_pv
PUTHCR_1_SOLAR1	PUTAH CREEK SOLAR FARM	1.98	caiso_solar	CISO	physical	utility_pv
PVERDE_5_SCEDYN	PVERDE_5_SCEDYN	635	caiso_nuclear	SRP	specifiedimport	nuclear
PWEST_1_UNIT	PACIFIC WEST 1 WIND GENERATION	2.1	caiso_wind	CISO	physical	in_state_wind_south
QUARANTINASTORAGE	NAN	10	caiso_li_battery	CISO	physical	hr_batteries
RABBITBRUSHSTORAGE	NAN	20	caiso_li_battery	CISO	physical	hr_batteries
RACEWAYSOLAR	NAN	125	caiso_solar	CISO	physical	utility_pv
RACEWAYSTORAGE	NAN	80	caiso_li_battery	CISO	physical	hr_batteries
RAMON_2_SCEDYN	RAMON_2_SCEDYN	106.18	iid_geothermal	IID	specifiedimport	geothermal
RANCHO_2_SMUDSYSDYN	SMUD REGULATION MARKET	124	caiso_specified_imports	BANC	specifiedimport	n/a
RATSKE_2_NROSR1	NORTH ROSAMOND SOLAR	150	caiso_solar	CISO	physical	utility_pv
RATSKE_2_RBSSB1	Rabbitbrush Solar 1	60	caiso_solar	CISO	physical	utility_pv
RATSKE_2_RBSSB2	Rabbitbrush Solar 2	40	caiso_solar	CISO	physical	utility_pv
RCKCRK_7_UNIT 1	ROCK CREEK HYDRO UNIT 1	57	caiso_hydro	CISO	physical	hydro
RCKCRK_7_UNIT 2	ROCK CREEK HYDRO UNIT 2	56.9	caiso_hydro	CISO	physical	hydro
RDWAY_1_CREST	NAN	6.5	caiso_solar	CISO	physical	utility_pv
RE_BR1_26960_1	NAN	61.1	ldwp_solar	LADWP	physical	utility_pv
RE_GASKELL_WEST_3	NAN	20	caiso_solar	CISO	physical	utility_pv
RE_GASKELL_WEST_4	NAN	20	caiso_solar	CISO	physical	utility_pv
RE_GASKELL_WEST_5	NAN	20	caiso_solar	CISO	physical	utility_pv
RECTOR_2_CREST	NAN	14	caiso_solar	CISO	physical	utility_pv
RECTOR_2_IVANPV	IVANHOE TULARE PV	3.5	caiso_solar	CISO	physical	utility_pv
RECTOR_2_KAWEAH	KAWEAH PH 2 & 3 PSP AGGREGATE	6.55	caiso_small_hydro	CISO	physical	small_hydro
RECTOR_2_KAWH 1	KAWEAH PH 1 UNIT 1	2.25	caiso_hydro	CISO	physical	hydro
RECTOR_2_QF	KAWEAH UNIT 1	20.09	caiso_small_hydro	CISO	physical	small_hydro
RECTOR_2_TFDBM1	TWO FIETS DAIRY DIGESTER	0.8	caiso_biomass	CISO	physical	biomass_wood
RECTOR_7_TULARE	MM TULARE	1.5	caiso_biomass	CISO	physical	biomass_wood
REDBLF_6_UNIT	RED BLUFF PEAKER PLANT	44	caiso_reciprocating_engine	CISO	physical	ice
REDDING_POWER_1	NAN	17.03	banc_peaker	BANC	physical	gas_ct
REDDING_POWER_2	NAN	25.03	banc_peaker	BANC	physical	gas_ct
REDDING_POWER_3	NAN	25.03	banc_peaker	BANC	physical	gas_ct
REDDING_POWER_CC	NAN	121	banc_ccgt	BANC	physical	gas_cc
REDMAN_2_SOLAR	LANCASTER EAST AVENUE F	3.75	caiso_solar	CISO	physical	utility_pv
REDMAN_6_AVSSR1	ANTELOPE VALLEY SOLAR	3	caiso_solar	CISO	physical	utility_pv
REDOND_7_UNIT 5	REDONDO GEN STA. UNIT 5	178.87	caiso_st	CISO	physical	steam
REDOND_7_UNIT 6	REDONDO GEN STA. UNIT 6	175	caiso_st	CISO	physical	steam
REDOND_7_UNIT 8	REDONDO GEN STA. UNIT 8	480	caiso_st	CISO	physical	steam
REEDLY_6_SOLAR	TERZIAN	1.23	caiso_solar	CISO	physical	utility_pv
RENWD_1_QF	RENWIND RE-POWERING PROJECT	10	caiso_wind	CISO	physical	in_state_wind_south
REXFORDSOLAR	NAN	300	caiso_solar	CISO	physical	utility_pv

REXFORDSTORAGE	NAN	180	caiso_li_battery	CISO	physical	hr_batteries
RHONDO_6_PUENTE	NAN	4.00	caiso_biogas	CISO	physical	biogas
RICHMN_1_CHVSR2	CHEVRON 8.5	8.5	caiso_solar	CISO	physical	utility_pv
RICHMN_1_SOLAR	CHEVRON 2	2	caiso_solar	CISO	physical	utility_pv
RICHMN_7_BAYENV	BAY ENVIRONMENTAL (NOVE POWER)	2.5	caiso_biomass	CISO	physical	biomass_wood
RIOBRV_6_UNIT 1	RIO BRAVO HYDRO	14	caiso_hydro	CISO	physical	hydro
RIOOSO_1_QF	SMALL QF AGGREGATION - GRASS VALLEY	1.11	caiso_small_hydro	CISO	physical	small_hydro
RIPON_1	NAN	50	banc_peaker	BANC	physical	gas_ct
RIPON_2	NAN	50	banc_peaker	BANC	physical	gas_ct
RNDMTN_2_SLSPHY1	SILVER SPRINGS	0.6	caiso_hydro	CISO	physical	hydro
RNDSBG_1_HZASR1	HAZEL A	2.99	caiso_solar	CISO	physical	utility_pv
ROCKWOOD_1	NAN	25	iid_peaker	IID	physical	gas_ct
ROCKWOOD_2	NAN	25	iid_peaker	IID	physical	gas_ct
ROLLIN_6_UNIT	ROLLINS HYDRO	13.5	caiso_hydro	CISO	physical	hydro
ROSEVILLE_1	NAN	25.6	banc_peaker	BANC	physical	gas_ct
ROSEVILLE_2	NAN	25.6	banc_peaker	BANC	physical	gas_ct
ROSMDW_2_WIND1	PACIFIC WIND - PHASE 1	140	caiso_wind	CISO	physical	in_state_wind_south
ROSMND_6_SOLAR	LANCASTER B	3	caiso_solar	CISO	physical	utility_pv
RSMSLR_6_SOLAR1	ROSAMOND ONE	20	caiso_solar	CISO	physical	utility_pv
RSMSLR_6_SOLAR2	ROSAMOND TWO	20	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SC1SR3	ROSAMOND WEST SOLAR CLEAN	40	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SEBSR3	ROSAMOND WEST SOLAR EAST BAY 3	56	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SEBSR4	ROSAMOND WEST SOLAR EAST BAY 4	56	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SOLAR1	ROSAMOND WEST SOLAR 1	54	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SOLAR2	ROSAMOND WEST SOLAR 2	54	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SPASR4	ROSAMOND WEST SOLAR PALO ALTO	26	caiso_solar	CISO	physical	utility_pv
RTEDDY_2_SRXSR4	ROSAMOND WEST SOLAR ROSIE X	13.6	caiso_solar	CISO	physical	utility_pv
RTREE_2_WIND1	RISING TREE 1	79.2	caiso_wind	CISO	physical	in_state_wind_south
RTREE_2_WIND2	RISING TREE 2	19.8	caiso_wind	CISO	physical	in_state_wind_south
RTREE_2_WIND3	RISING TREE 3	99	caiso_wind	CISO	physical	in_state_wind_south
RUSCTY_2_UNITS	RUSSELL CITY ENERGY CENTER	615.18	caiso_ccgt2	CISO	physical	gas_cc
RVRVEW_1_UNITA1	RIVERVIEW ENERGY CENTER (GP ANTIOCH)	47.6	caiso_peaker2	CISO	physical	gas_ct
RVSIDE_2_RERCU3	RIVERSIDE ENERGY RES. CTR UNIT 3	49	caiso_peaker1	CISO	physical	gas_ct
RVSIDE_2_RERCU4	RIVERSIDE ENERGY RES. CTR UNIT 4	49	caiso_peaker1	CISO	physical	gas_ct
RVSIDE_6_RERCU1	RIVERSIDE ENERGY RES. CTR UNIT 1	48.35	caiso_peaker1	CISO	physical	gas_ct
RVSIDE_6_RERCU2	RIVERSIDE ENERGY RES. CTR UNIT 2	48.5	caiso_peaker2	CISO	physical	gas_ct
RVSIDE_6_SOLAR1	TEQUESQUITE LANDFILL SOLAR PROJECT	7.5	caiso_solar	CISO	physical	utility_pv
RVSIDE_6_SPRING	SPRINGS GENERATION PROJECT AGGREGATE	36	caiso_peaker1	CISO	physical	gas_ct
S_RITA_6_SOLAR1	SUN HARVEST SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
SALIRV_2_UNIT	SALINAS RIVER COGENERATION	39	caiso_chp	CISO	physical	cogen
SALTON_SEA_4	NAN	42	iid_geothermal	IID	physical	geothermal
SALTON_SEA_5	NAN	50	iid_geothermal	IID	physical	geothermal
SALTON_SEA_UNIT_2_G1	NAN	10	iid_geothermal	IID	physical	geothermal
SALTON_SEA_UNIT_2_G2	NAN	5	iid_geothermal	IID	physical	geothermal
SALTON_SEA_UNIT_2_G3	NAN	5	iid_geothermal	IID	physical	geothermal
SALTSP_7_UNITS	SALT SPRINGS HYDRO AGGREGATE	46	caiso_hydro	CISO	physical	hydro
SAMPSN_6_KELCO1	KELCO QUALIFYING FACILITY	25	caiso_chp	CISO	physical	cogen
SANBRN_2_EESSB2	EdSan 1 Edwards 0	166	caiso_solar	CISO	physical	utility_pv
SANBRN_2_ES1BT3	EdSan 1 Edwards 1	51	caiso_solar	CISO	physical	utility_pv
SANBRN_2_ES2SB3	EdSan 2 Sanborn 3	42	caiso_solar	CISO	physical	utility_pv
SANBRN_2_ESABT1	EDSAN 1A	100	caiso_li_battery	CISO	physical	hr_batteries
SANBRN_2_ESBBT1	EDSAN 1B	100	caiso_li_battery	CISO	physical	hr_batteries
SANBRN_2_SS2SB4	EdSan 2 Sanborn 4	36	caiso_solar	CISO	physical	utility_pv
SANDHILLCWIND	NAN	80	caiso_wind	CISO	physical	in_state_wind_south
SANDLT_2_SUNITS	MOJAVE SOLAR	275	caiso_solar	CISO	physical	utility_pv
SANDRINISOL	NAN	100	caiso_solar	CISO	physical	utility_pv
SANITR_6_UNITS	LACSD CARSON WATER POLLUTION AGGREG	8	caiso_biogas	CISO	physical	biogas
SANLOB_1_LNDFIL	COLD CANYON	1.5	caiso_biomass	CISO	physical	biomass_wood
SANLOB_1_OSFBM1	OLD SANTA FE ROAD	0.85	caiso_biomass	CISO	physical	biomass_wood
SANTA_BARBARA_COUNTY_PUBLIC_WORKS_DEPARTMENT	NAN	2.274	caiso_biogas	CISO	physical	biogas
SANTFG_7_UNITS	GEYSERS CALISTOGA AGGREGATE	72	caiso_geothermal	CISO	physical	geothermal
SANTGO_2_LNDFL1	BOWERMAN POWER	19.6	caiso_biogas	CISO	physical	biogas
SANTGO_2_MABBT1	MILLIKAN AVENUE BESS	2	caiso_li_battery	CISO	physical	hr_batteries
SANWD_1_QF	SAN GORGONIO FARMS WIND FARM	31	caiso_wind	CISO	physical	in_state_wind_south
SAUGUS_2_TOLAND	NAN	1.57	caiso_biogas	CISO	physical	biogas
SAUGUS_6_MWDFTH	FOOTHILL HYDROELECTRIC RECOVERY PLANT	9.1	caiso_hydro	CISO	physical	hydro
SAUGUS_6_PTCHGN	NAN	20.78	caiso_chp	CISO	physical	cogen
SAUGUS_6_QF	SAUGUS QFS	2.19	caiso_small_hydro	CISO	physical	small_hydro
SAUGUS_7_CHIQCN	CHIQUITA CANYON LANDFILL FAC	8	caiso_biomass	CISO	physical	biomass_wood
SAUGUS_7_LOPEZ	MM LOPEZ ENERGY	6.1	caiso_biomass	CISO	physical	biomass_wood
SBERDO_2_PSP3	MOUNTAINVIEW GEN STA. UNIT 3	555	caiso_ccgt1	CISO	physical	gas_cc
SBERDO_2_PSP4	MOUNTAINVIEW GEN STA. UNIT 4	555	caiso_ccgt1	CISO	physical	gas_cc
SBERDO_2_QF	NAN	10.6	caiso_chp	CISO	physical	cogen
SBERDO_2_REDLND	REDLANDS RT SOLAR	2	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS005	SPVP005 REDLANDS RT SOLAR	2.5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS007	SPVP007 REDLANDS RT SOLAR	2.5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS011	SPVP011	3.5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS013	SPVP013	3.5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS016	SPVP016 REDLANDS RT SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_RTS048	SPVP048	5	caiso_solar	CISO	physical	utility_pv
SBERDO_2_SNTANA	SANTA ANA PSP	6.95	caiso_small_hydro	CISO	physical	small_hydro
SBERDO_6_MILLCK	MILL CREEK PSP	3.93	caiso_small_hydro	CISO	physical	small_hydro
SCACOGEN2_CC	NAN	65.6	banc_ccgt	BANC	physical	gas_cc
SCACOGEN2GT	NAN	49	banc_peaker	BANC	physical	gas_ct
SCATTERGOOD_1	NAN	174	ldwp_st	LADWP	physical	steam
SCATTERGOOD_2	NAN	177	ldwp_st	LADWP	physical	steam
SCATTERGOOD_4	NAN	300	ldwp_peaker	LADWP	physical	gas_ct
SCATTERGOOD_5	NAN	100	ldwp_peaker	LADWP	physical	gas_ct
SCATTERGOOD_6	NAN	89	ldwp_peaker	LADWP	physical	gas_ct
SCATTERGOOD_7	NAN	89	ldwp_peaker	LADWP	physical	gas_ct
SCE_AP_I	NAN	19	caiso_loadmod	CISO	physical	demand_response
SCE_BIP_15	NAN	212	caiso_loadmod	CISO	physical	demand_response
SCE_BIP_30	NAN	606	caiso_loadmod	CISO	physical	demand_response
SCE_CBP_DA	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SCE_CBP_DO	NAN	1	caiso_loadmod	CISO	physical	demand_response
SCE_SDP_COMM	NAN	3	caiso_loadmod	CISO	physical	demand_response
SCE_SDP_RESD	NAN	1	caiso_loadmod	CISO	physical	demand_response
SCEHOV_2_HOOVER	SCEHOV_2_HOOVER	287.01	caiso_hydro	WALC	specifiedimport	hydro
SCHLTE_1_PL1X3	TRACY COMBINED CYCLE POWER PLANT	336.04	caiso_ccgt2	CISO	physical	gas_cc
SCHNDR_1_FIVPTS	FIVE POINTS SOLAR STATION	15	caiso_solar	CISO	physical	utility_pv
SCHNDR_1_OS2BM2	OPEN SKY DIGESTER GENSET 2	0.8	caiso_biogas	CISO	physical	biogas

SCHNDR_1_WSTSDE	WESTSIDE SOLAR STATION	15	caiso_solar	CISO	physical	utility_pv
SDGE_BIP	NAN	2	caiso_loadmod	CISO	physical	demand_response
SDGE_CBP_DA	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGE_CBP_DO	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGE_SUMM_SAV_RESD	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGE_SUMMER_SAVER_COM	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGEAC_SAVER_DA_COMM	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGEAC_SAVER_DA_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGEAC_SAVER_DO_COMM	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDGEAC_SAVER_DO_RES	NAN	0.1	caiso_loadmod	CISO	physical	demand_response
SDSU_GEN	NAN	7	iid_solar	IID	physical	utility_pv
SEARLS_7_ARGUS	ARGUS COGENERATION	19	caiso_chp	CISO	physical	cogen
SEAWST_6_LAPOS	SEA WEST ENERGY - SEAWEST	13	caiso_wind	CISO	physical	in_state_wind_south
SECOND_IMPERIAL01_12	NAN	33	iid_geothermal	IID	physical	geothermal
SEGS_1_SR2SL2	SUNRAY 2	20	caiso_solar	CISO	physical	utility_pv
SENTNL_2_CTG1	SENTINEL UNIT 1	107.68	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG2	SENTINEL UNIT 2	102.5	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG3	SENTINEL UNIT 3	105.69	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG4	SENTINEL UNIT 4	106.55	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG5	SENTINEL UNIT 5	107.52	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG6	SENTINEL UNIT 6	105	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG7	SENTINEL UNIT 7	106.73	caiso_peaker1	CISO	physical	gas_ct
SENTNL_2_CTG8	SENTINEL UNIT 8	106.85	caiso_peaker1	CISO	physical	gas_ct
SEPV_BOULEVARD_2	NAN	2.9	caiso_solar	CISO	physical	utility_pv
SEVILLE_2	NAN	32.5	iid_solar	IID	physical	utility_pv
SGREGY_6_SANGER	ALGONQUIN POWER SANGER 2	48.3	caiso_chp	CISO	physical	cogen
SHANDN_2_SBBBM1	SAN BERNARDINO BIOGAS	2.6	caiso_biomass	CISO	physical	biomass_wood
SHEEP_CREEK_ROAD_SOLAR_GENERATION_FACILITY_PROJECT	NAN	3	caiso_solar	CISO	physical	utility_pv
SHELRF_1_UNITS	SHELL OIL REFINERY AGGREGATE	100	caiso_peaker2	CISO	physical	gas_ct
SHUTLE_6_CREST	NAN	4	caiso_solar	CISO	physical	utility_pv
SIERRA_1_UNITS	HIGH SIERRA LIMITED	52.43	caiso_peaker2	CISO	physical	gas_ct
SIERRASTORAGE	NAN	10	caiso_li_battery	CISO	physical	hr_batteries
SIGHEB_6_MIRDYN	Heber South	17	iid_geothermal	IID	specifiedimport	geothermal
SISQUC_1_SMARIA	SANTA MARIA II LFG POWER PLANT	1.42	caiso_biomass	CISO	physical	biomass_wood
SKERN_6_SOLAR1	SOUTH KERN SOLAR PV PLANT	20	caiso_solar	CISO	physical	utility_pv
SKERN_6_SOLAR2	SKIC SOLAR	10	caiso_solar	CISO	physical	utility_pv
SLATE_2_SLASR1	SLATE	50.5	caiso_solar	CISO	physical	utility_pv
SLATE_2_SLASR2_SUN	Slate_2	46.50	caiso_solar	CISO	physical	utility_pv
SLATE_2_SLASR2_LESR	Slate_2	46.5	caiso_li_battery	CISO	physical	hr_batteries
SLATE_2_SLASR3_LESR	SLATE_3	34	caiso_li_battery	CISO	physical	hr_batteries
SLATE_2_SLASR3_SUN	SLATE_3	34	caiso_solar	CISO	physical	utility_pv
SLATE_2_SLASR4	SLATE_4	63	caiso_solar	CISO	physical	utility_pv
SLATE_2_SLASR5_LESR	Slate 5	10	caiso_li_battery	CISO	physical	hr_batteries
SLATE_2_SLASR5_SUN	Slate 5	16	caiso_solar	CISO	physical	utility_pv
SLRMS3_2_SRMSR1	SILVER RIDGE MOUNT SIGNAL 3	250	caiso_solar	CISO	physical	utility_pv
SLST13_2_SOLAR1	QUINTO SOLAR PV PROJECT	107.6	caiso_solar	CISO	physical	utility_pv
SLSTR1_2_SOLAR1	SOLAR STAR 1	310	caiso_solar	CISO	physical	utility_pv
SLSTR2_2_SOLAR2	SOLAR STAR 2	276	caiso_solar	CISO	physical	utility_pv
SLUISP_2_UNITS	SAN LUIS (GIANELLI) PUMP-GEN (AGGREGAT	374.43	caiso_pumped_hydro	CISO	physical	pumped_storage
SLYCRK_1_UNIT 1	SLY CREEK HYDRO	13	caiso_hydro	CISO	physical	hydro
SMPRIP_1_SMPSON	RIPON COGENERATION UNIT 1	46.05	caiso_peaker1	CISO	physical	cogen
SMRCOS_6_LNDFIL	SAN MARCOS ENERGY	1.5	caiso_biomass	CISO	physical	biomass_wood
SMUDGO_7_UNIT 1	SONOMA POWER PLANT	64.8	caiso_geothermal	CISO	physical	geothermal
SMYRNA_1_DL1SR1	DELANO LAND 1	1	caiso_solar	CISO	physical	utility_pv
SNCLRA_2_HOWLNG	HOUWELINGS NURSERIES OXNARD, INC	13	caiso_biomass	CISO	physical	biomass_wood
SNCLRA_2_SILBT1	SILVERSTRAND BESS	11	caiso_li_battery	CISO	physical	hr_batteries
SNCLRA_2_SPRHYD	SPRINGVILLE HYDROELECTRIC GENERATOR	1	caiso_small_hydro	CISO	physical	small_hydro
SNCLRA_2_UNIT	CHANNEL ISLANDS POWER	27.5	caiso_chp	CISO	physical	cogen
SNCLRA_2_UNIT1	NEW INDY OXNARD	27.8	caiso_chp	CISO	physical	cogen
SNCLRA_2_VESBT1	VENTURA ENERGY STORAGE	100	caiso_li_battery	CISO	physical	hr_batteries
SNCLRA_6_OXGEN	OXGEN	47.7	caiso_chp	CISO	physical	cogen
SNCLRA_6_PROCGN	PROCTER AND GAMBLE OXNARD 2	47.9	caiso_chp	CISO	physical	cogen
SNCLRA_6_QF	SANTA CLARA QFS	1.65	caiso_small_hydro	CISO	physical	small_hydro
SNDBAR_7_UNIT 1	SANDBAR	16.2	caiso_hydro	CISO	physical	hydro
SNMALF_6_UNITS	SONOMA COUNTY LANDFILL	5	caiso_biomass	CISO	physical	biomass_wood
SNORA_2_SNRSLR	SG SORRENTO	50	iid_solar	IID	specifiedimport	utility_pv
SOL_GEN	NAN	20	iid_solar	IID	physical	utility_pv
SONRISASOLAR	NAN	100	caiso_solar	CISO	physical	utility_pv
SONRISASTORAGE	NAN	30	caiso_li_battery	CISO	physical	hr_batteries
SOUTH_2_UNIT	SOUTH HYDRO	7.1	caiso_small_hydro	CISO	physical	small_hydro
SPA_COGEN_3_CC	NAN	157	banc_ccgt	BANC	physical	gas_cc
SPANSH_6_FBEHY1	FIVE BEARS HYDROELECTRIC	0.99	caiso_hydro	CISO	physical	hydro
SPAULD_6_UNIT 3	SPAULDING HYDRO PH 3 UNIT	6.5	caiso_hydro	CISO	physical	hydro
SPAULD_6_UNIT12	SPAULDING HYDRO PH 1 & 2 AGGREGATE	11.4	caiso_hydro	CISO	physical	hydro
SPBURN_2_UNIT 1	BURNEY BIOMASS	22	caiso_biomass	CISO	physical	biomass_wood
SPBURN_7_SNOWMT	BURNEY CREEK HYDRO	3	caiso_small_hydro	CISO	physical	small_hydro
SPI LI_2_UNIT 1	LINCOLN BIOMASS	17.2	caiso_biomass	CISO	physical	biomass_wood
SPIAND_1_ANDSN2	SPI ANDERSON 2	27.15	caiso_biomass	CISO	physical	biomass_wood
SPICER_1_UNITS	SPICER HYDRO UNITS 1-3 AGGREGATE	6	caiso_small_hydro	CISO	physical	small_hydro
SPIFBD_1_PL1X2	SIERRA PACIFIC IND. (SONORA)	7.5	caiso_biomass	CISO	physical	biomass_wood
SPOINT_2_MEADDYN	SPOINT_2_MEADDYN	325	SW_CCGT	WALC	specifiedimport	gas_cc
SPOINT_2_PARKERDYN	SOUTHPOINT ENERGY CENTER	200	SW_CCGT	WALC	specifiedimport	gas_cc
SPQUIN_6_SRPCQU	QUINCY BIOMASS	24	caiso_biomass	CISO	physical	biomass_wood
SPRGAP_1_UNIT 1	SPRING GAP HYDRO	7	caiso_hydro	CISO	physical	hydro
SPRGVL_2_CREST	NAN	14	caiso_solar	CISO	physical	utility_pv
SPRGVL_2_EXETPV	EXETER TULARE PV	3.5	caiso_solar	CISO	physical	utility_pv
SPRGVL_2_LINDPV	LINDSAY TULARE PV	4	caiso_solar	CISO	physical	utility_pv
SPRGVL_2_PORTPV	PORTERVILLE TULARE PV	3.5	caiso_solar	CISO	physical	utility_pv
SPRGVL_2_QF	SPRINGVILLE QFS	0.18	caiso_small_hydro	CISO	physical	cogen
SPRGVL_2_TULE	TULE RIVER HYDRO PLANT (PG&E)	6.4	caiso_small_hydro	CISO	physical	small_hydro
SPRGVL_2_TULESC	TULE RIVER HYDRO PLANT (SCE)	2.5	caiso_small_hydro	CISO	physical	small_hydro
SPRINGBOK_1	NAN	108	ldwp_solar	LADWP	physical	utility_pv
SPRINGBOK_2	NAN	165	ldwp_solar	LADWP	physical	utility_pv
SPRINGBOK_3	NAN	90	ldwp_solar	LADWP	physical	utility_pv
SRINTL_6_UNIT	SRI INTERNATIONAL	6.9	caiso_chp	CISO	physical	cogen
STANIS_7_UNIT 1	STANISLAUS HYDRO	91	caiso_hydro	CISO	physical	hydro
STANTN_2_STAGT1	STANTON 1	49.65	caiso_peaker1	CISO	physical	gas_ct
STANTN_2_STAGT2	STANTON 2	49.65	caiso_peaker1	CISO	physical	gas_ct
STAUFF_1_UNIT	NAN	4.6	caiso_chp	CISO	physical	cogen
STIGCT_2_LODI	LODI STIG UNIT	49.9	caiso_peaker2	CISO	physical	gas_ct
STNRES_1_UNIT	COVANTA STANISLAUS	19.9	caiso_biomass	CISO	physical	biomass_wood

STOILS_1_UNITS	CHEVRON RICHMOND REFINERY	56.2	caiso_chp	CISO	physical	cogen
STOREY_2_MDRCH2	MADERA CHOWCHILLA 2	0.56	caiso_small_hydro	CISO	physical	small_hydro
STOREY_2_MDRCH3	MADERA CHOWCHILLA 3	0.42	caiso_small_hydro	CISO	physical	small_hydro
STOREY_2_MDRCH4	MADERA CHOWCHILLA 4	0.92	caiso_small_hydro	CISO	physical	small_hydro
STOREY_7_MDRCHW	MADERA CANAL SITE 980	1.84	caiso_small_hydro	CISO	physical	small_hydro
STRAUSSWIND	NAN	99	caiso_wind	CISO	physical	in_state_wind_south
STROUD_6_SOLAR	STROUD SOLAR STATION	20	caiso_solar	CISO	physical	utility_pv
STROUD_6_WWHSR1	WINTER WHEAT SOLAR FARM	1.5	caiso_solar	CISO	physical	utility_pv
SUMWHT_6_SWSSR1	SUMMER WHEAT SOLAR FARM	18.5	caiso_solar	CISO	physical	utility_pv
SUN_EDISON_VICTORVILLE_SOLAR	NAN	10	caiso_solar	CISO	physical	utility_pv
SUNCAT_2_A1ABT1	Arlington Solar Unit 1A BESS	43	caiso_li_battery	CISO	physical	hr_batteries
SUNCAT_2_A1BBT1	Arlington Solar Unit 1B BESS	67	caiso_li_battery	CISO	physical	hr_batteries
SUNCAT_2_A2ABT2	Arlington Solar Unit 2A BESS	132	caiso_li_battery	CISO	physical	hr_batteries
SUNPEAK_IID	NAN	23	iid_solar	IID	physical	utility_pv
SUNRIS_2_PL1X3	SUNRISE POWER PROJECT AGGREGATE II	586.02	caiso_ccgt1	CISO	physical	gas_cc
SUNSET_2_UNITS	MIDWAY SUNSET COGENERATION PLANT	248	caiso_peaker1	CISO	physical	cogen
SUNSHN_2_LNDFL	SUNSHINE GAS PRODUCERS	20	caiso_biomass	CISO	physical	biomass_wood
SUNSLR_1_SSVSR1	SUNSHINE VALLEY SOLAR 1	100	caiso_solar	CISO	physical	utility_pv
SUNSPT_2_WNASR1	WINDHUB SOLAR A	20	caiso_solar	CISO	physical	utility_pv
SUNST2_5_SS2SR1	SUN STREAMS SOLAR 2	150	caiso_solar	CISO	physical	utility_pv
SUNSTR_5_SS1SCEDYN	SUNSTREAM SOLAR 1	150	SW_SOLAR	AZPS	specifiedimport	out_of_state_wind_AZNM
SUTTER_2_CISO	SUTTER POWER PLANT PSEUDO-CISO	275	caiso_ccgt1	BANC	specifiedimport	gas_cc
SUTTERENERGYCC_TOTAL	SUTTER POWER PLANT	250	banc_ccgt	BANC	physical	gas_cc
SWIFT_1_NAS	YERBA BUENA BATTERY	4.8	caiso_li_battery	CISO	physical	hr_batteries
SYCAMR_2_UNIT 1	SYCAMORE COGENERATION UNIT 1	86	caiso_chp	CISO	physical	cogen
SYCAMR_2_UNIT 2	SYCAMORE COGENERATION UNIT 2	78	caiso_peaker1	CISO	physical	gas_ct
SYCAMR_2_UNIT 3	SYCAMORE COGENERATION UNIT 3	78	caiso_chp	CISO	physical	cogen
SYCAMR_2_UNIT 4	SYCAMORE COGENERATION UNIT 4	78	caiso_peaker1	CISO	physical	gas_ct
TANHIL_6_SOLART	BERRY COGEN 18	17	caiso_chp	CISO	physical	cogen
TBLMTN_6_QF	SMALL QF AGGREGATION - PARADISE	1.7	caiso_small_hydro	CISO	physical	small_hydro
TECOLOTE_3_WBDYN	TECOLOTE WIND	271.68	caiso_wind	PNM	specifiedimport	out_of_state_wind_AZNM
TEHAPI_2_PW1WD1	POINT WIND 1	47.49	caiso_wind	CISO	physical	in_state_wind_south
TEHAPI_2_PW2WD2	POINT WIND 2	14.4	caiso_wind	CISO	physical	in_state_wind_south
TEHAPI_2_WIND1	WIND WALL MONOLITH 1	19.85	caiso_wind	CISO	physical	in_state_wind_south
TEHAPI_2_WIND2	WIND WALL MONOLITH 2	23.66	caiso_wind	CISO	physical	in_state_wind_south
TENGEN_2_PL1X2	BERRY COGEN 42	40.2	caiso_chp	CISO	physical	cogen
TERMEX_2_PL1X3	TDM	625	caiso_ccgt1	CISO	physical	gas_cc
TESLA_1_QF	SMALL QF AGGREGATION - STOCKTON	2	caiso_small_hydro	CISO	physical	small_hydro
THERMONO1_2	NAN	14	caiso_geothermal	CISO	physical	geothermal
THREE_MILE_CANYON	NAN	9.9	nw_wind	PACW	physical	out_of_state_wind_WAOR
TIDWTR_2_UNITS	MARTINEZ COGEN LIMITED PARTNERSHIP	114.8	caiso_chp	CISO	physical	cogen
TIERRA_DEL_SOL__SOLAR_FARM	NAN	45	iid_solar	IID	physical	utility_pv
TIFFNY_1_DILLON	TIFFNY_1_DILLON	45	caiso_wind	CISO	physical	in_state_wind_south
TIGRCK_7_UNITS	TIGER CREEK HYDRO AGGREGATE	62	caiso_hydro	CISO	physical	hydro
TITANS_2_TTSSR1	TITAN SOLAR 1 PSEUDO	70	caiso_solar	IID	specifiedimport	utility_pv
TKOPWR_6_HYDRO	BEAR CREEK HYDROELECTRIC PROJECT	2.83	caiso_small_hydro	CISO	physical	small_hydro
TMPLTN_2_SOLAR	VINTNER SOLAR	1.5	caiso_solar	CISO	physical	utility_pv
TOADTW_6_UNIT	TOAD TOWN	1.5	caiso_small_hydro	CISO	physical	small_hydro
TOPAZ_2_SOLAR	TOPAZ SOLAR FARMS	550	caiso_solar	CISO	physical	utility_pv
TORTLA_1_SOLAR	LONGBOAT SOLAR	20	caiso_solar	CISO	physical	utility_pv
TOWNSITE_2_MEADDYN_LESR	Townsite Solar BESS	90	caiso_li_battery	CISO	physical	hr_batteries
TOWNSITE_2_MEADDYN_SUN	Townsite Solar BESS	90	caiso_solar	CISO	physical	utility_pv
TRNQL8_2_AMASR1	TRANQUILLITY 8 AMARILLO	20	caiso_solar	CISO	physical	utility_pv
TRNQL8_2_AZUSR1	TRANQUILLITY 8 AZUL	20	caiso_solar	CISO	physical	utility_pv
TRNQL8_2_ROJSR1	TRANQUILLITY 8 ROJO	100	caiso_solar	CISO	physical	utility_pv
TRNQL8_2_VERSR1	TRANQUILLITY 8 VERDE	60	caiso_solar	CISO	physical	utility_pv
TRNQLT_2_RETBT1	NAN	72	caiso_li_battery	CISO	physical	hr_batteries
TRNQLT_2_SOLAR	TRANQUILLITY	200	caiso_solar	CISO	physical	utility_pv
TRNSWD_1_QF	FPL ENERGY C WIND	38.97	caiso_wind	CISO	physical	in_state_wind_south
TULARE_2_TULBM1	TULARE BIOMAT FUEL CELL	2.8	caiso_biomass	CISO	physical	biomass_wood
TULEWD_1_TULWD1	TULE WIND	130.5	caiso_wind	CISO	physical	in_state_wind_south
TULLCK_7_UNITS	TULLOCK HYDRO	25.9	caiso_hydro	CISO	physical	hydro
TUPMAN_1_BIOGAS	ABEC BIDART-STOCKALE #1	0.6	caiso_biomass	CISO	physical	biomass_wood
TVYVLY_6_KRSHY1	Kings River Syphon	1.3	caiso_hydro	CISO	physical	hydro
TWISSL_6_SOLAR	NICKEL 1 ("NLH1")	1.5	caiso_solar	CISO	physical	utility_pv
TWISSL_6_SOLAR1	CORONAL LOST HILLS	20	caiso_solar	CISO	physical	utility_pv
TX_ELK_6_SOLAR1	CASTOR	1.5	caiso_solar	CISO	physical	utility_pv
TX-ELK_6_ECKSR2	EAGLE CREEK	3	caiso_solar	CISO	physical	utility_pv
TXMCKT_6_UNIT	MCKITTRICK COGEN	11.2	caiso_chp	CISO	physical	cogen
UC_DAVIS_MC	NAN	27	banc_ccgt	BANC	physical	gas_cc
UKIAH_7_LAKEMN	UKIAH LAKE MENDOCINO HYDRO	3.5	caiso_small_hydro	CISO	physical	small_hydro
ULTPCH_1_UCSBT1	Ultrapower Chinese Station BESS	10	caiso_li_battery	CISO	physical	hr_batteries
ULTPCH_1_UNIT 1	PACIFIC ULTRAPOWER CHINESE STATION	18	caiso_biomass	CISO	physical	biomass_wood
ULTPFR_1_UNIT 1	RIO BRAVO FRESNO	24.3	caiso_biomass	CISO	physical	biomass_wood
ULTRCK_2_UNIT	RIO BRAVO ROCKLIN	24.4	caiso_biomass	CISO	physical	biomass_wood
UNCHEM_1_UNIT	CONTRA COSTA CARBON PLANT	19	caiso_chp	CISO	physical	cogen
UNOCAL_1_UNITS	TOSCO (RODEO PLANT)	49.85	caiso_chp	CISO	physical	cogen
UNVRSY_1_UNIT 1	BERRY COGEN 38 - UNIT 1	38	caiso_chp	CISO	physical	cogen
USWND2_1_WIND1	GOLDEN HILLS A	42.96	caiso_wind	CISO	physical	in_state_wind_north
USWND2_1_WIND2	GOLDEN HILLS B	42.96	caiso_wind	CISO	physical	in_state_wind_north
USWND2_1_WIND3	GOLDEN HILLS C	46	caiso_wind	CISO	physical	in_state_wind_north
USWND4_2_UNIT2	ALTAMONT LANDFILL GAS TO ENERGY	7.4	caiso_biogas	CISO	physical	biogas
USWNDR_2_LABWD1	LABRISA WIND PROJECT	9	caiso_wind	CISO	physical	in_state_wind_north
USWNDR_2_SMUD	SOLANO WIND FARM	102.18	caiso_wind	CISO	physical	in_state_wind_north
USWNDR_2_SMUD2	SOLANO WIND PROJECT PHASE 3	127.8	caiso_wind	CISO	physical	in_state_wind_north
USWNDR_2_UNITS	NAN	8	caiso_wind	CISO	physical	in_state_wind_south
USWPFK_6_FRICK	FRICK SUMMIT WIND REPOWER	10	caiso_wind	CISO	physical	in_state_wind_north
USWPJR_2_UNITS	VASCO WIND	78.2	caiso_wind	CISO	physical	in_state_wind_north
V2_GEN	NAN	3.1	iid_solar	IID	physical	utility_pv
V3_GEN	NAN	3.1	iid_solar	IID	physical	utility_pv
VACADX_1_NAS	VACA-DIXON BATTERY	0.7	caiso_li_battery	CISO	physical	hr_batteries
VACADX_1_SOLAR	VACA-DIXON SOLAR STATION	2.5	caiso_solar	CISO	physical	utility_pv
VACADX_1_UNITA1	CALPEAK POWER VACA DIXON UNIT 1	50.61	caiso_peaker2	CISO	physical	gas_ct
VALLEY_5_PERRIS	MWD PERRIS HYDROELECTRIC RECOVERY PL	7.94	caiso_small_hydro	CISO	physical	small_hydro
VALLEY_5_REDMTN	MWD RED MOUNTAIN HYDROELECTRIC REC	5.9	caiso_hydro	CISO	physical	hydro
VALLEY_5_RTS044	NAN	8	caiso_solar	CISO	physical	utility_pv
VALLEY_5_SOLAR1	KONA SOLAR - MERIDIAN #1	1.49	caiso_solar	CISO	physical	utility_pv
VALLEY_5_SOLAR2	AP NORTH LAKE SOLAR	20	caiso_solar	CISO	physical	utility_pv
VALLEY_CC	NAN	529	ldwp_ccgt	LADWP	physical	gas_cc
VALLEY_UNIT_5	NAN	47	ldwp_peaker	LADWP	physical	gas_ct
VALTNE_2_AVASR1	VALENTINE SOLAR	100	caiso_solar	CISO	physical	utility_pv

VALTNE_2_TBBBT1	NAN	128	caiso_solar	CISO	physical	utility_pv
VALTNE_2_TRSBT1	Tropico Solar	70	caiso_li_battery	CISO	physical	hr_batteries
VAN_DER_KOOI_DAIRY_DIGESTER	NAN	0.8	caiso_biogas	CISO	physical	biogas
VEAVST_1_SOLAR	COMMUNITY SOLAR	14.4	caiso_solar	CISO	physical	utility_pv
VEDDER_1_SEKERN	TEXACO EXPLORATION & PROD (SE KERN RI\	34.47	caiso_chp	CISO	physical	cogen
VEGA_6_SOLAR1	VEGA SOLAR	20	caiso_solar	CISO	physical	utility_pv
VENWD_1_WIND1	Windpark Unlimited 1	12.20	caiso_wind	CISO	physical	in_state_wind_south
VENWD_1_WIND2	Windpark Unlimited 2	16	caiso_wind	CISO	physical	in_state_wind_south
VENWD_1_WIND3	PAINTED HILLS	44.53	caiso_wind	CISO	physical	in_state_wind_south
VERNON_6_GONZL1	H. GONZALES UNIT #1	5.75	caiso_peaker1	CISO	physical	gas_ct
VERNON_6_GONZL2	H. GONZALES UNIT #2	5.75	caiso_peaker1	CISO	physical	gas_ct
VERNON_6_MALBRG	MALBURG GENERATING STATION	134	caiso_ccgt2	CISO	physical	gas_cc
VESTAL_2_KERN	KERN RIVER PH 3 UNITS 1 & 2 AGGREGATE	36.8	caiso_hydro	CISO	physical	hydro
VESTAL_2_RTS042	SPVP042 PORTERVILLE SOLAR	5	caiso_solar	CISO	physical	utility_pv
VESTAL_2_SOLAR1	NICOLIS	20	caiso_solar	CISO	physical	utility_pv
VESTAL_2_SOLAR2	TROPICO	14	caiso_solar	CISO	physical	utility_pv
VESTAL_2_TS5SR1	TULARE SOLAR 5	55.8	caiso_solar	CISO	physical	utility_pv
VESTAL_2_UNIT1	CALGREN-PIXLEY	5	caiso_chp	CISO	physical	cogen
VESTAL_2_WELLHD	WELLHEAD POWER DELANO	49	caiso_peaker1	CISO	physical	gas_ct
VESTAL_6_QF	ISABELLA HYDRO DAM 1	11.95	caiso_small_hydro	CISO	physical	small_hydro
VICTOR_1_CREST	NAN	24.49	caiso_solar	CISO	physical	utility_pv
VICTOR_1_EXSLRA	EXPRESSWAY SOLAR A	2	caiso_solar	CISO	physical	utility_pv
VICTOR_1_EXSLRB	EXPRESSWAY SOLAR B	2	caiso_solar	CISO	physical	utility_pv
VICTOR_1_LVSLR1	LONE VALLEY SOLAR PARK 1	10	caiso_solar	CISO	physical	utility_pv
VICTOR_1_LVSLR2	LONE VALLEY SOLAR PARK 2	20	caiso_solar	CISO	physical	utility_pv
VICTOR_1_SLRHES	SUNEDISON - HESPERIA	1.5	caiso_solar	CISO	physical	utility_pv
VICTOR_1_SOLAR1	VICTOR PHELAN SOLAR ONE	17.5	caiso_solar	CISO	physical	utility_pv
VICTOR_1_SOLAR2	ALAMO SOLAR	20	caiso_solar	CISO	physical	utility_pv
VICTOR_1_SOLAR3	ADELANTO SOLAR 2	7	caiso_solar	CISO	physical	utility_pv
VICTOR_1_SOLAR4	ADELANTO SOLAR	20	caiso_solar	CISO	physical	utility_pv
VICTOR_1_VDRYFA	VICTOR DRY FARM RANCH A	5	caiso_solar	CISO	physical	utility_pv
VICTOR_1_VDRYFB	VICTOR DRY FARM RANCH B	5	caiso_solar	CISO	physical	utility_pv
VILLPK_2_VALLYV	MWD VALLEY VIEW HYDROELECTRIC RECOVI	4.1	caiso_hydro	CISO	physical	hydro
VILLPK_6_MWDYOR	YORBA LINDA HYDROELECTRIC RECOVERY PL	5.1	caiso_hydro	CISO	physical	hydro
VINCNT_2_QF	NAN	207.00	caiso_wind	CISO	physical	in_state_wind_south
VINCNT_2_WESTWD	NAN	59	caiso_wind	CISO	physical	in_state_wind_south
VISTA_2_FCELL	CSUSB FUEL CELL	1.4	caiso_chp	CISO	physical	cogen
VISTA_2_RIALTO	RIALTO RT SOLAR	1	caiso_solar	CISO	physical	utility_pv
VISTA_2_RTS028	SPVP028	3.5	caiso_solar	CISO	physical	utility_pv
VISTA_6_QF	VISTA QFS	0.18	caiso_small_hydro	CISO	physical	small_hydro
VISTRA_5_DALBT1	DALLAS ENERGY STORAGE	100	caiso_li_battery	CISO	physical	hr_batteries
VISTRA_5_DALBT2	DALLAS ENERGY STORAGE 2	100	caiso_li_battery	CISO	physical	hr_batteries
VISTRA_5_DALBT3	DALLAS ENERGY STORAGE 3	100	caiso_li_battery	CISO	physical	hr_batteries
VISTRA_5_DALBT4	DALLAS ENERGY STORAGE 4	100	caiso_li_battery	CISO	physical	hr_batteries
VLCNTR_6_VCEBT1	Valley Center Energy Storage	54	caiso_li_battery	CISO	physical	hr_batteries
VLCNTR_6_VCEBT2	Valley Center Energy Storage B	50	caiso_li_battery	CISO	physical	hr_batteries
VLCNTR_6_VCSLR	COLE GRADE	2.33	caiso_solar	CISO	physical	utility_pv
VLCNTR_6_VCSLR1	VALLEY CENTER 1	2.5	caiso_solar	CISO	physical	utility_pv
VLCNTR_6_VCSLR2	VALLEY CENTER 2	5	caiso_solar	CISO	physical	utility_pv
VLYHOM_7_SSJID	WOODWARD POWER PLANT	3	caiso_small_hydro	CISO	physical	small_hydro
VOLTA_2_UNIT 1	VOLTA HYDRO UNIT 1	9.1	caiso_hydro	CISO	physical	hydro
VOLTA_2_UNIT 2	VOLTA HYDRO UNIT 2	1	caiso_hydro	CISO	physical	hydro
VOLTA_6_BAILCK	BAILEY CREEK RANCH	0.63	caiso_hydro	CISO	physical	hydro
VOLTA_6_DIGHYD	DIGGER CREEK RANCH HYDRO	0.6	caiso_small_hydro	CISO	physical	small_hydro
VOLTA_7_PONHY1	VOLTA_7_PONHY1	1.25	caiso_hydro	CISO	physical	hydro
VOLTA_7_QFUNTS	VOLTA_7_QFUNTS	0.15	caiso_small_hydro	CISO	physical	small_hydro
VOYAGR_2_VOAWD5	VOYAGER WIND OASIS ALTA	13.98	caiso_wind	CISO	physical	in_state_wind_south
VOYAGR_2_VOYWD1	VOYAGER 1	128.91	caiso_wind	CISO	physical	in_state_wind_south
VOYAGR_2_VOYWD2	VOYAGER WIND 2	126.35	caiso_wind	CISO	physical	in_state_wind_south
VOYAGR_2_VOYWD3	VOYAGER WIND 3	42.45	caiso_wind	CISO	physical	in_state_wind_south
VOYAGR_2_VOYWD4	VOYAGER WIND 4	21.01	caiso_wind	CISO	physical	in_state_wind_south
VSTAES_6_VESBT1	VISTA ENERGY STORAGE	40	caiso_li_battery	CISO	physical	hr_batteries
VULCAN_1	NAN	38	iid_geothermal	IID	physical	geothermal
VULCAN_2	NAN	10.74	iid_geothermal	IID	physical	geothermal
VULCAN_EXPANDER	NAN	10.5	iid_geothermal	IID	physical	geothermal
WADHAM_6_UNIT	WADHAM ENERGY LP	29.07	caiso_biomass	CISO	physical	biomass_wood
WALCRK_2_CTG1	WALNUT CREEK ENERGY PARK UNIT 1	96.43	caiso_peaker1	CISO	physical	gas_ct
WALCRK_2_CTG2	WALNUT CREEK ENERGY PARK UNIT 2	96.91	caiso_peaker1	CISO	physical	gas_ct
WALCRK_2_CTG3	WALNUT CREEK ENERGY PARK UNIT 3	96.65	caiso_peaker1	CISO	physical	gas_ct
WALCRK_2_CTG4	WALNUT CREEK ENERGY PARK UNIT 4	96.49	caiso_peaker1	CISO	physical	gas_ct
WALCRK_2_CTG5	WALNUT CREEK ENERGY PARK UNIT 5	96.65	caiso_peaker1	CISO	physical	gas_ct
WALNUT_2_SOLAR	INDUSTRY METROLINK PV 1	1.5	caiso_solar	CISO	physical	utility_pv
WALNUT_6_HILLGEN	PUENTE HILLS	47	caiso_biomass	CISO	physical	biomass_wood
WALNUT_7_WCOVCT	NAN	0.2	caiso_geothermal	CISO	physical	geothermal
WALNUT_7_WCOVST	MM WEST COVINA - ST UNIT	6.5	caiso_biomass	CISO	physical	biomass_wood
WARNE_2_UNIT	WARNE HYDRO AGGREGATE	76	caiso_hydro	CISO	physical	hydro
WAUKNA_1_SOLAR	CORCORAN SOLAR	20	caiso_solar	CISO	physical	utility_pv
WAUKNA_1_SOLAR2	CORCORAN 2	19.75	caiso_solar	CISO	physical	utility_pv
WDLEAF_7_UNIT 1	WOODLEAF HYDRO	60	caiso_hydro	CISO	physical	hydro
WEBER_6_FORWRD	FORWARD	4.2	caiso_biomass	CISO	physical	biomass_wood
WESTLANDSSOLAR	NAN	19.88	caiso_solar	CISO	physical	utility_pv
WESTPT_2_UNIT	WEST POINT HYDRO PLANT	14	caiso_small_hydro	CISO	physical	small_hydro
WFRESN_1_SOLAR	JOYA DEL SOL	1.5	caiso_solar	CISO	physical	utility_pv
WHEATL_6_LNDFIL	G2 ENERGY, OSTROM ROAD LLC	3.55	caiso_biomass	CISO	physical	biomass_wood
WHITEH_2_MEADDYN1	WHITE HILLS A	50	caiso_wind	WALC	specifiedimport	out_of_state_wind_AZNM
WHITEH_2_MEADDYN2	WHITE HILLS B	300	caiso_wind	WALC	specifiedimport	out_of_state_wind_AZNM
WHITNY_6_SOLAR	WHITNEY POINT SOLAR	20	caiso_solar	CISO	physical	utility_pv
WHTWTR_1_WINDA1	WHITEWATER HILL WIND PROJECT	61.5	caiso_wind	CISO	physical	in_state_wind_south
WILLMS_6_ARBBM1	Abel Road Bioenergy	3	caiso_biomass	CISO	physical	biogas
WILSONASOLAR	NAN	14	caiso_solar	CISO	physical	utility_pv
WISE_1_UNIT 1	WISE HYDRO UNIT 1	14.5	caiso_hydro	CISO	physical	hydro
WISE_1_UNIT 2	WISE HYDRO UNIT 2	3.2	caiso_hydro	CISO	physical	hydro
WISHON_6_UNITS	WISHON/SAN JOAQUIN #1-A AGGREGATE	18.4	caiso_small_hydro	CISO	physical	small_hydro
WISTER_2_WISSR1	Wister Solar	20	caiso_solar	CISO	physical	utility_pv
WISTRA_2_WRSSR1	WISTARIA RANCH SOLAR	100	caiso_solar	CISO	physical	utility_pv
WLDWD_1_SOLAR1	WILDWOOD SOLAR I	20	caiso_solar	CISO	physical	utility_pv
WLDWD_1_SOLAR2	WILDWOOD SOLAR 2	15	caiso_solar	CISO	physical	utility_pv
WNDMAS_2_UNIT 1	BUENA VISTA ENERGY, LLC	38	caiso_wind	CISO	physical	in_state_wind_north
WNDSTR_2_WIND	WINDSTAR	120	caiso_wind	CISO	physical	in_state_wind_south
WOLFSK_1_UNITA1	WOLFSKILL ENERGY CENTER	46.9	caiso_peaker2	CISO	physical	gas_ct
WOODLAND_1	NAN	49	banc_peaker	BANC	physical	gas_ct

WOODLAND_3A	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_3B	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_3C	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_3D	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_3E	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_3F	NAN	8.2	banc_reciprocating_engine	BANC	physical	ice
WOODLAND_CC	NAN	84.2	banc_ccgt	BANC	physical	gas_cc
WOODWR_1_HYDRO	QUINTEN LUALLEN	7.3	caiso_hydro	CISO	physical	hydro
WRGHTP_7_AMENGY	SMALL QF AGGREGATION - LOS BANOS	2.5	caiso_hydro	CISO	physical	hydro
WRGTSR_2_WSFSR1	WRIGHT SOLAR FREEMAN	200	caiso_solar	CISO	physical	utility_pv
WRIGHTFREEMANSTORAGE	NAN	80	caiso_li_battery	CISO	physical	hr_batteries
WSENGY_1_UNIT 1	WHEELABRATOR SHASTA	50	caiso_biomass	CISO	physical	biomass_wood
WSNR_2_CVPDYN	CENTRAL VALLEY 1	10	caiso_hydro	BANC	specifiedimport	hydro
WSNR_2_TESLADYN	CENTRAL VALLEY TESLA	10	caiso_hydro	BANC	specifiedimport	hydro
WSNR_5_TRCYDYN	CENTRAL VALLEY TRACY	10	caiso_hydro	BANC	specifiedimport	hydro
WSTWND_2_M89WD1_LESR	Mojave 89	70.60	caiso_li_battery	CISO	physical	hr_batteries
WSTWND_2_M89WD1_WIND	Mojave 89	82.65	caiso_wind	CISO	physical	in_state_wind_south
WSTWND_2_M90BT1	MOJAVE 90 BESS 1A	15.71	caiso_li_battery	CISO	physical	hr_batteries
WSTWND_2_M90WD2	MOJAVE 90	48.85	caiso_wind	CISO	physical	in_state_wind_south
WSTWND_2_SBSBT1	Sagebrush Solar 2	80	caiso_li_battery	CISO	physical	hr_batteries
YUBACT_1_SUNSWT	YUBA CITY COGEN	49.97	caiso_chp	CISO	physical	cogen
YUBACT_6_UNITA1	YUBA CITY ENERGY CENTER (CALPINE)	47.6	caiso_peaker2	CISO	physical	gas_ct
YUCCA_GT21	NAN	22	iid_peaker	IID	physical	gas_ct
YUCCA_ST1	NAN	75	iid_st	IID	physical	steam
ZOND_6_UNIT	ZOND WINDSYSTEMS INC.	17.1	caiso_wind	CISO	physical	in_state_wind_north
_BRANCH_GENERIC_AMARGO_ITC	AMARGOSA230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_BLYTHE_ITC	BLYTHE161		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_CASCADE_ITC	CRAG		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_CFE_ITC	CFETIJ & CFEROA		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_COTPISO_ITC	TRCYCOTPISO		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_CTW230_ITC	CTW230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_ELDORADO_ITC	WILLOWBEACH		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_GONDIPPDC_ITC	GONIPP		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_IID-SCE_ITC	MIR2		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_IID-SDGE_ITC	IVLY2		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_IPPDCADLN_ITC	IPP & IPPUTAH		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_LAUGHLIN_ITC	MOHAVE500		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_LLNL_ITC	LLL115		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MALIN500_ISL	MALIN500		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MARBLE_ITC	MARBLE60		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MCCLMKTPC_ITC	MCCULLOUG500		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MCCULLGH_ITC	ELDORADO500		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MEADMKTPC_ITC	MEAD5MSCHD		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MEADTMEAD_ITC	MEAD2MSCHD		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MEAD_ITC	MEAD230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MERCHANT_ITC	ELDORADO230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MERCURY_ITC	MERCURY138		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MKTPCADLN_ITC	MARKETPLACE		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_MONAIPPDC_ITC	MDWP		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_NEWMELONP_ITC	NML230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_NOB_ITC	NOB		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_NORTHGILA500_ITC	NORTHGILA500		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_NWEST230_ITC	NWEST		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_OAKDALE_ITC	OAKDALE		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_PALOVRDE_ITC	PVWEST		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_PARKER_ITC	PARKER230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_RDM230_ITC	RDM230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_RNCHLAKE_ITC	LAKE & RANCHOSECO		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_SILVERPK_ITC	SILVERPEAK55		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_STANDIFORD_ITC	STANDIFORD		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_SUMMIT_ITC	SUMMIT120		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_SYLMAR-AC_ITC	SYLMAR		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_TRACY230_ITC	TESLA230		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_TRACY500_ITC	TRCYPGAE & TRCYCOTP		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_TRCYTEA_ITC	TRCYTEA		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_VICTVL_ITC	LUGO		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_WESTLYLBNS_ITC	WESTLYQNTO		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_WESTLYTSLA_ITC	WESTLYTSLA		nan	NAN	unspecifiedimport	n/a
_BRANCH_GENERIC_WSTWGMEAD_ITC	WESTWING500		nan	NAN	unspecifiedimport	n/a
_CREZ_GENERIC_ARIZONA_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_ARIZONA_WIND	NAN		caiso_wind	NAN	newresolve	out_of_state_wind_AZNM
_CREZ_GENERIC_BAJA_CALIFORNIA_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_BAJA_CALIFORNIA_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_CAPE_MENDOCINO_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_CARRIZO_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_CARRIZO_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_CENTRAL_VALLEY_NORTH_LOS_BANOS_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_CENTRAL_VALLEY_NORTH_LOS_BANOS_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_DEL_NORTE_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_DIABLO_CANYON_EXT_TX_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_DIABLO_CANYON_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_DISTRIBUTED_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_DISTRIBUTED_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_GREATER_IMPERIAL_GEOTHERMAL	NAN		caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_GREATER_IMPERIAL_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_GREATER_IMPERIAL_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_GREATER_KRAMER_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_GREATER_KRAMER_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_HUMBOLDT_BAY_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_HUMBOLDT_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_IDAHO_WIND	NAN		caiso_wind	NAN	newresolve	out_of_state_wind_WYID
_CREZ_GENERIC_INSTATE_BIOMASS	NAN		caiso_biomass	NAN	newresolve	biomass_wood
_CREZ_GENERIC_INYOKERN_NORTH_KRAMER_GEOTHERMAL	NAN		caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_INYOKERN_NORTH_KRAMER_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_KERN_GREATER_CARRIZO_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_KERN_GREATER_CARRIZO_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_KRAMER_INYOKERN_EX_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_KRAMER_INYOKERN_EX_WIND	NAN		caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_MORRO_BAY_OFFSHORE_WIND	NAN		caiso_wind	NAN	newresolve	offshore_wind
_CREZ_GENERIC_MOUNTAIN_PASS_EL_DORADO_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_NEW_MEXICO_SOLAR	NAN		caiso_solar	NAN	newresolve	utility_pv

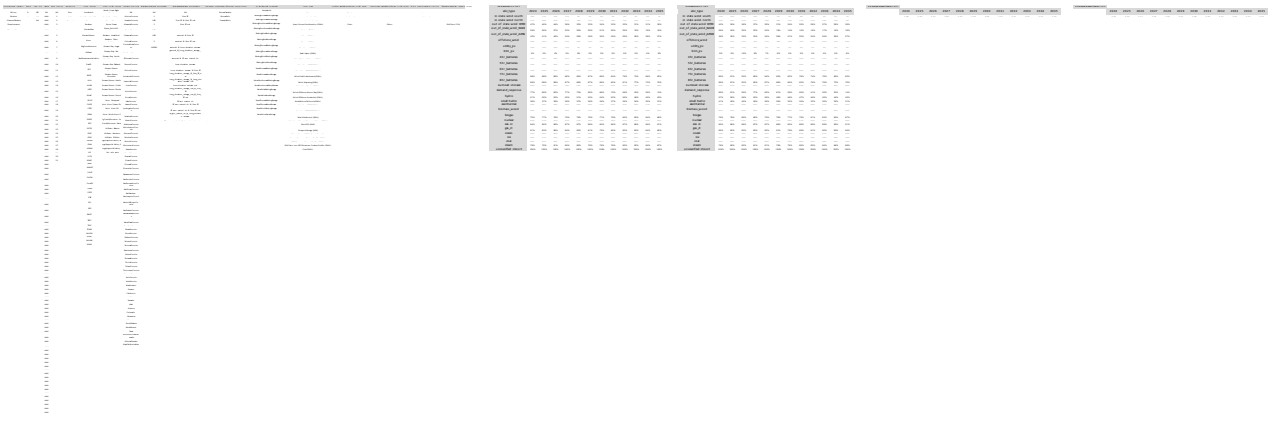
_CREZ_GENERIC_NEW_MEXICO_WIND	NAN	caiso_wind	NAN	newresolve	out_of_state_wind_AZNM
_CREZ_GENERIC_NORTHERN_CALIFORNIA_EX_GEOTHERMAL	NAN	caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_NORTHERN_CALIFORNIA_EX_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_NORTHERN_CALIFORNIA_EX_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_NORTH_VICTOR_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_NW_BIOMASS	NAN	caiso_biomass	NAN	newresolve	biomass_wood
_CREZ_GENERIC_NW_EXT_TX_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_NW_SMALL_HYDRO	NAN	caiso_small_hydro	NAN	newresolve	small_hydro
_CREZ_GENERIC_PACIFIC_NORTHWEST_GEOTHERMAL	NAN	caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_PACIFIC_NORTHWEST_WIND	NAN	caiso_wind	NAN	newresolve	out_of_state_wind_WAOR
_CREZ_GENERIC_RIVERSIDE_PALM_SPRINGS_GEOTHERMAL	NAN	caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_RIVERSIDE_PALM_SPRINGS_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SACRAMENTO_RIVER_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SACRAMENTO_RIVER_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_SCADSNV_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SCADSNV_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_SOLANO_GEOTHERMAL	NAN	caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_SOLANO_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SOLANO_SUBZONE_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SOLANO_SUBZONE_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_SOLANO_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_SOUTHERN_CALIFORNIA_DESERT_EX_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SOUTHERN_CALIFORNIA_DESERT_EX_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_SOUTHERN_CA_DESERT_SOUTHERN_NV_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SOUTHERN_CA_DESERT_SOUTHERN_NV_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_SOUTHERN_NEVADA_GEOTHERMAL	NAN	caiso_geothermal	NAN	newresolve	geothermal
_CREZ_GENERIC_SOUTHERN_NEVADA_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_SOUTHERN_NEVADA_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_SW_BIOMASS	NAN	caiso_biomass	NAN	newresolve	biomass_wood
_CREZ_GENERIC_SW_EXT_TX_WIND	NAN	caiso_wind	NAN	newresolve	out_of_state_wind_AZNM
_CREZ_GENERIC_TEHACHAPI_EX_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_TEHACHAPI_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_TEHACHAPI_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_south
_CREZ_GENERIC_UTAH_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_UTAH_WIND	NAN	caiso_wind	NAN	newresolve	out_of_state_wind_AZNM
_CREZ_GENERIC_WESTLANDS_EX_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_WESTLANDS_EX_WIND	NAN	caiso_wind	NAN	newresolve	in_state_wind_north
_CREZ_GENERIC_WESTLANDS_SOLAR	NAN	caiso_solar	NAN	newresolve	utility_pv
_CREZ_GENERIC_WYOMING_WIND	NAN	caiso_wind	NAN	newresolve	out_of_state_wind_WYID
_CREZ_UNBUNDLEDREC_ARIZONA_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_ARIZONA_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_BAJA_CALIFORNIA_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_BAJA_CALIFORNIA_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_CAPE_MENDOCINO_OFFSHORE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_CARRIZO_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_CARRIZO_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_CENTRAL_VALLEY_NORTH_LOS_BANOS_	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_CENTRAL_VALLEY_NORTH_LOS_BANOS_	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_DEL_NORTE_OFFSHORE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_DIABLO_CANYON_EXT_TX_OFFSHORE_W	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_DIABLO_CANYON_OFFSHORE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_DISTRIBUTED_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_DISTRIBUTED_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_GREATER_IMPERIAL_GEOTHERMAL	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_GREATER_IMPERIAL_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_GREATER_IMPERIAL_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_GREATER_KRAMER_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_GREATER_KRAMER_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_HUMBOLDT_BAY_OFFSHORE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_HUMBOLDT_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_IDAHO_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_INSTATE_BIOMASS	NAN	caiso_biomass	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_INYOKERN_NORTH_KRAMER_GEOTHERM	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_INYOKERN_NORTH_KRAMER_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_KERN_GREATER_CARRIZO_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_KERN_GREATER_CARRIZO_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_KRAMER_INYOKERN_EX_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_KRAMER_INYOKERN_EX_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_MORRO_BAY_OFFSHORE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_MOUNTAIN_PASS_EL_DORADO_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NEW_MEXICO_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NEW_MEXICO_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NORTHERN_CALIFORNIA_EX_GEOTHERM	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NORTHERN_CALIFORNIA_EX_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NORTHERN_CALIFORNIA_EX_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NORTH_VICTOR_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NW_BIOMASS	NAN	caiso_biomass	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NW_EXT_TX_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_NW_SMALL_HYDRO	NAN	caiso_small_hydro	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_PACIFIC_NORTHWEST_GEOTHERMAL	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_PACIFIC_NORTHWEST_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_RIVERSIDE_PALM_SPRINGS_GEOTHERM/	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_RIVERSIDE_PALM_SPRINGS_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SACRAMENTO_RIVER_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SACRAMENTO_RIVER_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SCADSNV_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SCADSNV_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOLANO_GEOTHERMAL	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOLANO_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOLANO_SUBZONE_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOLANO_SUBZONE_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOLANO_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_CALIFORNIA_DESERT_EX_SO	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_CALIFORNIA_DESERT_EX_W	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_CA_DESERT_SOUTHERN_NV	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_CA_DESERT_SOUTHERN_NV	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_NEVADA_GEOTHERMAL	NAN	caiso_geothermal	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_NEVADA_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SOUTHERN_NEVADA_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SW_BIOMASS	NAN	caiso_biomass	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_SW_EXT_TX_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a

_CREZ_UNBUNDLEDREC_TEHACHAPI_EX_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_TEHACHAPI_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_TEHACHAPI_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_UTAH_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_UTAH_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_WESTLANDS_EX_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_WESTLANDS_EX_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_WESTLANDS_SOLAR	NAN	caiso_solar	NAN	unbundledrec	n/a
_CREZ_UNBUNDLEDREC_WYOMING_WIND	NAN	caiso_wind	NAN	unbundledrec	n/a
_EXISTING_GENERIC_BATTERY_STORAGE	NAN	caiso_battery	NAN	existinggeneric	hr_batteries
_EXISTING_GENERIC_BIOGAS_LANDFILLGAS	NAN	caiso_biomass	NAN	existinggeneric	biomass_wood
_EXISTING_GENERIC_BIOMASS/WOOD	NAN	caiso_biomass	NAN	existinggeneric	biomass_wood
_EXISTING_GENERIC_COAL	NAN	caiso_coal	NAN	existinggeneric	coal
_EXISTING_GENERIC_COGEN	NAN	caiso_chp	NAN	existinggeneric	cogen
_EXISTING_GENERIC_COMBINED_CYCLE	NAN	caiso_ccgt1	NAN	existinggeneric	gas_cc
_EXISTING_GENERIC_DR	NAN	caiso_dr	NAN	existinggeneric	demand_response
_EXISTING_GENERIC_GEOTHERMAL	NAN	caiso_geothermal	NAN	existinggeneric	geothermal
_EXISTING_GENERIC_ICE	NAN	caiso_reciprocating_engine	NAN	existinggeneric	ice
_EXISTING_GENERIC_INSTATE_LARGE_HYDRO	NAN	caiso_hydro	NAN	existinggeneric	hydro
_EXISTING_GENERIC_INSTATE_SMALL_HYDRO	NAN	caiso_hydro	NAN	existinggeneric	hydro
_EXISTING_GENERIC_NUCLEAR	NAN	caiso_nuclear	NAN	existinggeneric	nuclear
_EXISTING_GENERIC_NW_HYDRO	NAN	caiso_hydro	NAN	existinggeneric	hydro
_EXISTING_GENERIC_PEAKER	NAN	caiso_peaker1	NAN	existinggeneric	gas_ct
_EXISTING_GENERIC_PUMPED_STORAGE_HYDRO	NAN	caiso_pumped_hydro	NAN	existinggeneric	pumped_storage
_EXISTING_GENERIC_SOLAR_1AXIS	NAN	caiso_solar	NAN	existinggeneric	utility_pv
_EXISTING_GENERIC_SOLAR_2AXIS	NAN	caiso_solar	NAN	existinggeneric	utility_pv
_EXISTING_GENERIC_SOLAR_FIXED	NAN	caiso_solar	NAN	existinggeneric	utility_pv
_EXISTING_GENERIC_SOLAR_THERMAL	NAN	caiso_solar	NAN	existinggeneric	utility_pv
_EXISTING_GENERIC_STEAM	NAN	caiso_steam	NAN	existinggeneric	steam
_EXISTING_GENERIC_UNKNOWN	NAN	caiso_unknown	NAN	existinggeneric	n/a
_EXISTING_GENERIC_WIND	NAN	caiso_wind	NAN	existinggeneric	in_state_wind_south
_NEW_BTM_DR	NAN	caiso_loadmod	NAN	newloadmod	demand_response
_NEW_BTM_EE	NAN	caiso_loadmod	NAN	newloadmod	demand_response
_NEW_BTM_RESOURCE	NAN	caiso_loadmod	NAN	newloadmod	demand_response
_NEW_DG	NAN	caiso_loadmod	NAN	newloadmod	btm_pv
_NEW_EV	NAN	caiso_loadmod	NAN	newloadmod	demand_response
_NEW_GENERIC_BATTERY_STORAGE	NAN	caiso_battery	NAN	newgeneric	hr_batteries
_NEW_GENERIC_BIOGAS_LANDFILLGAS	NAN	caiso_biomass	NAN	newgeneric	biomass_wood
_NEW_GENERIC_BIOMASS/WOOD	NAN	caiso_biomass	NAN	newgeneric	biomass_wood
_NEW_GENERIC_COAL	NAN	caiso_coal	NAN	newgeneric	coal
_NEW_GENERIC_COGEN	NAN	caiso_chp	NAN	newgeneric	cogen
_NEW_GENERIC_COMBINED_CYCLE	NAN	caiso_ccgt1	NAN	newgeneric	gas_cc
_NEW_GENERIC_DR	NAN	caiso_dr	NAN	newgeneric	demand_response
_NEW_GENERIC_GEOTHERMAL	NAN	caiso_geothermal	NAN	newgeneric	geothermal
_NEW_GENERIC_ICE	NAN	caiso_reciprocating_engine	NAN	newgeneric	ice
_NEW_GENERIC_INSTATE_LARGE_HYDRO	NAN	caiso_hydro	NAN	newgeneric	hydro
_NEW_GENERIC_INSTATE_SMALL_HYDRO	NAN	caiso_hydro	NAN	newgeneric	hydro
_NEW_GENERIC_NUCLEAR	NAN	caiso_nuclear	NAN	newgeneric	nuclear
_NEW_GENERIC_NW_HYDRO	NAN	caiso_hydro	NAN	newgeneric	hydro
_NEW_GENERIC_PEAKER	NAN	caiso_peaker1	NAN	newgeneric	gas_ct
_NEW_GENERIC_PUMPED_STORAGE_HYDRO	NAN	caiso_pumped_hydro	NAN	newgeneric	pumped_storage
_NEW_GENERIC_SOLAR_1AXIS	NAN	caiso_solar	NAN	newgeneric	utility_pv
_NEW_GENERIC_SOLAR_2AXIS	NAN	caiso_solar	NAN	newgeneric	utility_pv
_NEW_GENERIC_SOLAR_FIXED	NAN	caiso_solar	NAN	newgeneric	utility_pv
_NEW_GENERIC_SOLAR_THERMAL	NAN	caiso_solar	NAN	newgeneric	utility_pv
_NEW_GENERIC_STEAM	NAN	caiso_steam	NAN	newgeneric	steam
_NEW_GENERIC_UNKNOWN	NAN	caiso_unknown	NAN	newgeneric	n/a
_NEW_GENERIC_WIND	NAN	caiso_wind	NAN	newgeneric	in_state_wind_south
_NEW_TOU	NAN	caiso_loadmod	NAN	newloadmod	demand_response
_SUPPLIERS_CHOICE	NAN	suppliers_choice	NAN	supplierschoice	n/a
_UNSPECIFIED_NON_IMPORT	NAN	unspecified_non_import	NAN	unspecifiednonimport	n/a

lse	NAME	lse_type
3PR	3 Phases Renewables	ESP
APN	American PowerNet Management	ESP
AVCE	Apple Valley Choice Energy	CCA
CEI	Just Energy Solutions	ESP
CES	Commercial Energy of Montana	ESP
CNE	Constellation New Energy	ESP
COBP	City of Baldwin Park	CCA
COSB	City of Solana Beach	CCA
CPA	Calpine Power America	ESP
CPASC	Clean Power Alliance of Southern California	CCA
CPSF	CleanPowerSF	CCA
DCE	Desert Community Energy	CCA
DEB	Direct Energy Business	ESP
EBCE	East Bay Community Energy	CCA
EIPS	EDF Industrial Power Services	ESP
HANFORD	City of Hanford	CCA
KCCP	King City Community Power	CCA
LCE	Lancaster Choice Energy	CCA
LPH	Liberty Power Holdings	ESP
CCCE	Monterey Bay Community Power Authority	CCA
MCE	Marin Clean Energy	CCA
NES	Calpine Energy Solutions	ESP
PALMDALE	City of Palmdale	CCA
PCEA	Peninsula Clean Energy Authority	CCA
PGE	Pacific Gas & Electric	IOU
PIONEER	Pioneer Community Energy	CCA
POMONA	City of Pomona	CCA
PPG	Pilot Power Group	ESP
PRIME	Pico Rivera Innovative Municipal Energy	CCA
RCEA	Redwood Coast Energy Authority	CCA
RMEA	Rancho Mirage Energy Authority	CCA
SCE	Southern California Edison	IOU
SDGE	San Diego Gas & Electric	IOU
SENA	Shell Energy North America	ESP
SJCE	San Jose Clean Energy	CCA
SJP	San Jacinto Power	CCA
SOMA	Sonoma Clean Power Authority	CCA
SVCE	Silicon Valley Clean Energy Authority	CCA
TNG	Tiger Natural Gas	ESP
UC	University of California	ESP
VCEA	Valley Clean Energy Alliance	CCA
WCE	Western Community Energy	CCA
PCORP	PacifiCorp	POU
BVES	Bear Valley Electric Service	IOU
LIB	Liberty Utilities	IOU
BCE	Butte Choice Energy	CCA
CEA	Clean Energy Alliance	CCA
COM	City of Commerce	CCA
SDCP	San Diego Community Power	CCA
SBCE	Santa Barbara Clean Energy	CCA
AGERA	Agera Energy, LLC	ESP
GEXA	Gexa Energy California, LLC	ESP
LPD	Liberty Power Delaware, LLC	ESP
PALMCO	Palmco Power CA	ESP
PRAX	Praxair Plainfield, Inc.	ESP
TENA	Tenaska Power Services Co.	ESP
YEP	Yep Energy	ESP
ANZA	Anza Electric Cooperative	COOP

PLUMAS	Plumas Sierra Rural Electric Cooperative	COOP
SURPRISE	Surprise Valley Electrification Corporation	POU
VEA	Valley Electric Association	COOP
ANHM	Anaheim	CAISOPOU
AZCO	Arizona Electric Power Cooperative	POU
AZUA	Azusa	CAISOPOU
BAN1	Banning	CAISOPOU
BWPM	Burbank	POU
CCSF	City and County San Francisco	CAISOPOU
CLTN	Colton	CAISOPOU
COR1	Corona	CAISOPOU
CRCL	Cerritos	CAISOPOU
GLEN	Glendale	POU
IIDE	Imperial Irrigation District	POU
INDU	Industry	CAISOPOU
KIRK	Kirkwood	POU
LADWP	LADWP	POU
LASS	Lassen	CAISOPOU
MEID	Merced	POU
MID	Modesto Irrigation District	POU
MVAL	Moreno Valley	CAISOPOU
NCPA	Northern California Power Agency	CAISOPOU
NEED	Needles	POU
PASA	Pasadena	CAISOPOU
PITT	Pittsburg	CAISOPOU
PSTN	Stockton	CAISOPOU
PWRPA	Power Water Resources Pooling Authority	CAISOPOU
RCMU	Rancho Cucamonga	CAISOPOU
RDG1	Redding	POU
RSVL	Roseville	POU
RVSD	Riverside	CAISOPOU
SCOV	Shelter Cove	CAISOPOU
SLAK	Shasta Lake	POU
SMUD	SMUD	POU
SNCL	Silicon Valley Power	CAISOPOU
TIDM	Turlock Irrigation District	POU
TRIN	Trinity	CAISOPOU
TRUC	Truckee	POU
VERN	Vernon	CAISOPOU
VMUS	Victorville	CAISOPOU
WEPA	Eastside Power Authority	CAISOPOU
_OTHER	Multiple non-IOU LSEs	
_OTHER	Multiple LSEs	
_OTHER	Multiple IOUs	
_OTHER	non-LSE supplier	_OTHER

Attachment Staff Report Item 8C



				Capacity (MW)											
Service A	Type	LSE CPU(	LSE Name	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
PGE	IOU	PGE	Pacific Gas	2,484	2,671	2,859	3,056	3,257	3,469	3,667	3,883	4,090	4,313	4,526	4,734
PGE	ESP		Pacific Gas	1,044	1,116	1,189	1,264	1,342	1,418	1,491	1,560	1,629	1,692	1,752	1,807
PGE	CCA	3CE	Central Coa	421	452	484	518	553	588	623	657	690	722	753	783
PGE	CCA	CPSF	CleanPower	272	293	315	337	361	384	408	432	455	477	499	522
PGE	CCA	EBCE	East Bay Co	618	668	719	771	828	883	940	994	1,047	1,098	1,147	1,196
PGE	CCA	KCCP	King City Co	3	3	4	4	4	4	5	5	5	5	6	6
PGE	CCA	MCE	Marin Clean	528	564	601	640	683	725	779	819	863	897	933	967
PGE	CCA	PCEA	Peninsula Cl	317	339	365	394	426	456	487	518	550	579	609	639
PGE	CCA	PIONEER	Pioneer Cor	175	188	201	215	230	245	260	275	289	304	318	331
PGE	CCA	RCEA	Redwood Co	62	66	71	76	80	85	90	94	98	102	106	109
PGE	CCA	SJCE	San José Cl	350	377	404	432	462	492	523	553	583	613	642	670
PGE	CCA	SVCEA	Silicon Valle	337	363	388	415	444	473	502	531	559	587	614	641
PGE	CCA	SOMA	Sonoma Cle	204	220	235	252	269	287	305	322	339	357	373	390
PGE	CCA	VCEA	Valley Clean	66	71	77	83	90	96	103	109	116	122	128	134
SCE	IOU	SCE	Southern Ca	3,046	3,286	3,536	3,798	4,068	4,348	4,639	4,941	5,249	5,564	5,883	6,204
SCE	ESP		Southern Ca	259	278	297	316	337	358	379	401	425	448	471	495
SCE	CCA	AVCE	Apple Valley	30	33	35	38	40	43	46	49	52	55	58	61
SCE	CCA	COBP	Baldwin Par	-	-	-	-	-	-	-	-	-	-	-	-
SCE	CCA	3CE	Central Coa	32	35	37	39	41	44	46	48	51	54	57	61
SCE	CCA	CPASC	Clean Powe	451	486	523	562	602	644	687	732	777	824	871	918
SCE	CCA	DCE	Desert Com	40	43	47	50	53	57	61	64	68	73	77	82
SCE	CCA	PALMDALE	Energy for P	36	39	42	45	48	52	55	59	62	66	70	74
SCE	CCA	LCE	Lancaster C	73	79	85	92	98	105	112	119	127	134	142	150
SCE	CCA	OCPA	Orange Cou	232	250	269	290	311	333	356	379	404	428	453	479
SCE	CCA	PRIME	Pico Rivera	9	10	10	11	12	13	14	14	15	16	17	18
SCE	CCA	POMONA	Pomona Ch	7	8	8	9	10	10	11	12	13	13	14	15
SCE	CCA	RMEA	Rancho Mira	44	48	51	55	59	63	67	72	76	80	85	89
SCE	CCA	SJP	San Jacinto	23	25	27	29	31	33	36	38	40	42	45	47
SCE	CCA	SBCE	Santa Barba	20	22	23	25	27	29	31	33	35	37	39	41
SCE	CCA	WCE	Western Co	-	-	-	-	-	-	-	-	-	-	-	-
SDGE	IOU	SDGE	San Diego C	438	468	500	533	565	599	633	667	701	736	769	802
SDGE	ESP		San Diego C	474	507	540	574	608	642	675	707	740	772	803	834
SDGE	CCA	CEA	Clean Energ	179	192	206	220	235	249	264	279	293	308	322	337
SDGE	CCA	OCPA	Orange Cou	20	22	23	25	27	28	30	32	33	35	37	38
SDGE	CCA	SDCP	San Diego C	955	1,026	1,099	1,175	1,251	1,328	1,407	1,486	1,564	1,641	1,718	1,795
BEAR	SMJ	BEAR	Bear Valley	7	7	8	8	9	10	10	11	12	13	13	14

LSE Input

25 MMT

Reliability Need

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
CAISO gross peak (MW)	53,530	54,113	54,769	55,494	56,125	56,797	57,454	58,178	58,827	59,511	60,161	60,803
PRM (%)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
CAISO total reliability need (TRN) (MW)	61,024	61,689	62,437	63,263	63,983	64,749	65,498	66,323	67,063	67,843	68,584	69,315
MRN/TRN ratio	0.77	0.79	0.80	0.78	0.75	0.76	0.77	0.74	0.71	0.68	0.65	0.63
CAISO marginal reliability need (MRN) (MW)	47,112	48,652	50,193	49,099	48,005	49,369	50,732	49,261	47,790	46,318	44,847	43,376
LSE managed peak share (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
LSE MRN (MW)	1,362	1,414	1,466	1,438	1,417	1,459	1,504	1,462	1,424	1,381	1,343	1,295

BTM PV

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Capacity (MW)	616	668	719	771	828	883	940	994	1,047	1,098	1,147	1,196

ELCC (%)

Resource Type	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
in_state_wind_south	12%	14%	15%	11%	6%	8%	9%	8%	7%	6%	5%	4%
in_state_wind_north	24%	27%	31%	21%	12%	15%	19%	17%	15%	13%	11%	9%
out_of_state_wind_WYID	47%	45%	44%	38%	32%	33%	34%	33%	32%	31%	31%	30%
out_of_state_wind_WAOR	29%	28%	27%	23%	20%	20%	21%	20%	20%	19%	19%	18%
out_of_state_wind_AZNM	42%	41%	40%	34%	29%	30%	30%	30%	29%	28%	28%	27%
offshore_wind	67%	62%	56%	56%	55%	58%	61%	55%	49%	44%	38%	32%
utility_pv	12%	12%	12%	10%	8%	8%	7%	7%	7%	7%	7%	6%
btm_pv	5%	5%	4%	5%	6%	5%	5%	5%	5%	5%	5%	6%
4hr_batteries	85%	86%	87%	85%	82%	85%	89%	79%	69%	60%	50%	40%
5hr_batteries	86%	87%	88%	85%	83%	86%	89%	81%	72%	64%	56%	47%
6hr_batteries	87%	88%	88%	86%	84%	86%	89%	82%	75%	69%	62%	55%
7hr_batteries	88%	88%	88%	86%	85%	87%	89%	84%	78%	73%	68%	62%
8hr_batteries	89%	89%	88%	87%	86%	87%	89%	85%	81%	77%	73%	70%
pumped_storage	90%	89%	88%	87%	86%	87%	89%	86%	83%	80%	76%	73%
demand_response	77%	80%	82%	77%	73%	80%	86%	72%	58%	43%	29%	14%
hydro	51%	52%	53%	52%	51%	53%	54%	52%	50%	48%	45%	43%
small_hydro	36%	37%	38%	38%	37%	38%	39%	37%	36%	34%	32%	31%
geothermal	86%	89%	92%	92%	93%	92%	91%	92%	93%	93%	94%	95%
biomass_wood	78%	79%	81%	82%	83%	81%	80%	82%	84%	85%	87%	88%
biogas	75%	77%	78%	79%	79%	78%	77%	78%	80%	82%	84%	86%
nuclear	93%	94%	94%	94%	94%	93%	93%	93%	94%	95%	95%	96%
gas_cc	84%	85%	86%	87%	87%	86%	85%	86%	87%	88%	90%	91%
gas_ct	81%	83%	86%	84%	82%	81%	79%	80%	82%	83%	84%	85%
cogen	93%	93%	93%	93%	94%	93%	92%	93%	93%	93%	93%	93%
ice	93%	94%	94%	94%	94%	95%	95%	93%	92%	91%	89%	88%
coal	69%	71%	73%	72%	72%	69%	66%	69%	72%	75%	78%	81%
steam	78%	79%	81%	80%	80%	78%	76%	78%	80%	82%	84%	87%
unspecified_import	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

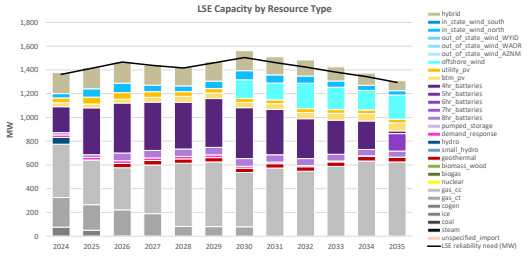
Contract ELCC (effective MW)

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
hybrid	Online	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	Online	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Online	13	15	17	12	7	9	11	10	8	7	6	5
out_of_state_wind_WYID	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Online	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Online	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Online	21	20	20	17	14	13	12	12	11	11	11	11
btm_pv	Online	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Online	9	9	9	8	8	9	9	8	7	6	5	4
5hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Online	18	18	18	18	18	18	18	17	17	16	15	14
pumped_storage	Online	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Online	22	22	23	22	20	22	15	13	10	8	5	3
hydro	Online	56	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Online	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Online	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Online	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Online	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Online	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Online	406	365	339	260	174	86	85	-	-	-	-	-
gas_ct	Online	249	214	220	189	82	81	79	-	-	-	-	-
cogen	Online	77	50	1	-	-	-	-	-	-	-	-	-
ice	Online	-	-	-	-	-	-	-	-	-	-	-	-
coal	Online	-	-	-	-	-	-	-	-	-	-	-	-
steam	Online	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Online	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Development	177	178	179	169	159	164	168	152	135	118	102	85
in_state_wind_south	Development	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Development	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Development	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Development	12	12	12	10	8	8	7	7	7	7	7	6
btm_pv	Development	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Development	83	84	107	103	100	104	109	97	85	73	61	20
5hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Development	0	5	5	5	4	5	5	4	4	4	4	4
pumped_storage	Development	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Development	0	0	0	0	0	0	0	0	-	-	-	-
hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Development	-	-	37	37	37	37	36	37	37	37	38	38
biomass_wood	Development	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Development	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Development	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Development	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Development	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Development	-	-	-	-	-	-	-	-	-	-	-	-
ice	Development	-	-	-	-	-	-	-	-	-	-	-	-
coal	Development	-	-	-	-	-	-	-	-	-	-	-	-
steam	Development	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Development	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Review	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Review	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
5hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Review	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Review	-	-	-	-	-	-	-	-	-	-	-	-
hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Review	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Review	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Review	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Review	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Review	-	-	-	-	-	-	-	-	-	-	-	-
ice	Review	-	-	-	-	-	-	-	-	-	-	-	-
coal	Review	-	-	-	-	-	-	-	-	-	-	-	-
steam	Review	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Review	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
5hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biogas	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedExisting	43	11	16	151	358	458	372	574	547	588	634	625
gas_ct	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	PlannedNew	24	55	62	43	42	54	66	59	52	45	38	31
out_of_state_wind_WYID	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	PlannedNew	-	-	-	-	-	-	156	141	215	189	164	204
utility_pv	PlannedNew	7	25	24	21	17	16	14	14	14	14	13	13
btm_pv	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedNew	128	302	306	296	286	299	312	277	243	209	175	-
5hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	147
7hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedNew	-	-	41	41	40	41	42	40	38	36	34	33
pumped_storage	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-

small_hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
biogas	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
LSE total supply (effective MW)		**1,345**	**1,386**	**1,435**	**1,400**	**1,374**	**1,421**	**1,517**	**1,462**	**1,430**	**1,368**	**1,310**	**1,242**

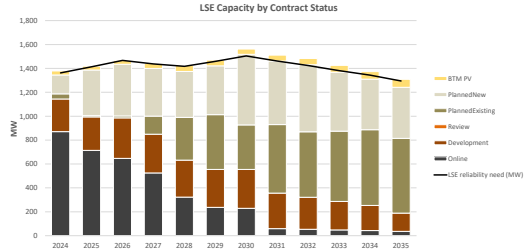
Load and Resource Table by Resource Type

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
LSE reliability need (MW)	**1,362**	**1,414**	**1,466**	**1,438**	**1,417**	**1,459**	**1,504**	**1,462**	**1,424**	**1,381**	**1,343**	**1,295**
ELCC by resource type (effective MW)												
hybrid	177	178	179	169	159	164	168	152	135	118	102	85
in_state_wind_south	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	37	70	79	55	48	63	77	69	60	52	44	36
out_of_state_wind_WYID	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	-	-	-	-	-	-	156	141	215	189	164	204
utility_pv	40	57	56	47	39	36	33	33	32	32	31	30
btm_pv	33	32	32	41	50	48	44	49	53	58	62	67
4hr_batteries	219	395	421	407	393	411	429	382	335	288	240	24
5hr_batteries	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	-	-	-	-	-	-	-	-	-	-	-	147
7hr_batteries	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	18	23	64	63	62	63	64	62	59	56	53	50
pumped_storage	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	22	23	23	22	21	23	16	13	10	8	5	3
hydro	56	-	-	-	-	-	-	-	-	-	-	-
small_hydro	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	-	-	37	37	37	37	36	37	37	37	38	38
biomass_wood	-	-	-	-	-	-	-	-	-	-	-	-
biogas	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	449	376	355	411	532	544	457	574	547	588	634	625
gas_ct	249	214	220	189	82	81	79	-	-	-	-	-
cogen	77	50	1	-	-	-	-	-	-	-	-	-
ice	-	-	-	-	-	-	-	-	-	-	-	-
coal	-	-	-	-	-	-	-	-	-	-	-	-
steam	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	-	-	-	-	-	-	-	-	-	-	-	-
LSE total supply (effective MW)	**1,378**	**1,419**	**1,466**	**1,441**	**1,425**	**1,469**	**1,562**	**1,511**	**1,484**	**1,425**	**1,373**	**1,309**
Net capacity position (+ve = excess, -ve = shortfall) (effective MW)	**16**	**5**	**0**	**3**	**8**	**10**	**57**	**49**	**60**	**45**	**29**	**14**



Load and Resource Table by Contract Status

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
LSE reliability need (MW)	**1,362**	**1,414**	**1,466**	**1,438**	**1,417**	**1,459**	**1,504**	**1,462**	**1,424**	**1,381**	**1,343**	**1,295**
ELCC by contract status (effective MW)												
Online	871	714	648	526	323	237	229	59	54	48	42	37
Development	273	279	339	324	309	317	326	297	268	239	210	153
Review	-	-	-	-	-	-	-	-	-	-	-	-
PlannedExisting	43	11	16	151	358	458	372	574	547	588	634	625
PlannedNew	159	382	433	400	384	409	590	532	562	493	424	428
BTM PV	33	32	32	41	50	48	44	49	53	58	62	67
LSE total supply (effective MW)	**1,378**	**1,419**	**1,466**	**1,441**	**1,425**	**1,469**	**1,562**	**1,511**	**1,484**	**1,425**	**1,373**	**1,309**
Net capacity position (+ve = excess, -ve = shortfall) (effective MW)	**16**	**5**	**0**	**3**	**8**	**10**	**57**	**49**	**60**	**45**	**29**	**14**



Resource	2024	2026	2030	2035	Units	*Type*
Large Hydro	-	-	-	-	GWh	GHG-Free
Imported Hydro	-	-	-	-	GWh	GHG-Free
Asset Controlling Supplier	-	-	-	-	GWh	GHG-Free (Partial)
Nuclear	-	-	-	-	GWh	GHG-Free
Biogas	26	26	25	8	GWh	RPS Eligible
Biomass	125	125	99	75	GWh	RPS Eligible
Geothermal	18	321	320	303	GWh	RPS Eligible
Small Hydro	130	135	135	112	GWh	RPS Eligible
Wind Resources						
Wind Existing California	671	621	583	369	GWh	RPS Eligible
Wind New PG&E	257	514	898	898	GWh	RPS Eligible
Wind New SCE SDG&E	-	-	-	-	GWh	RPS Eligible
Wind Pacific Northwest	-	-	-	-	GWh	RPS Eligible
Wind Wyoming	-	-	-	-	GWh	RPS Eligible
Wind New Mexico	334	334	334	-	GWh	RPS Eligible
Wind Offshore Morro Bay	-	-	-	-	GWh	RPS Eligible
Wind Offshore Humboldt	-	-	1,231	3,076	GWh	RPS Eligible
Solar Resources						
Solar Existing California	1,647	1,678	1,642	1,392	GWh	RPS Eligible
Solar New PG&E	159	597	597	597	GWh	RPS Eligible
Solar New SCE SDG&E	295	293	287	279	GWh	RPS Eligible
Solar Distributed	-	-	-	-	GWh	RPS Eligible
Hybrid						
Hybrid_or_Paired_Solar_and_Battery	826	820	809	794	GWh	RPS Eligible
Storage & DR						
Shed DR	-	-	-	-	MW	GHG-Free
Pumped Storage	-	-	-	-	MW	n/a
Battery Storage	1,110	2,304	2,304	2,324	MWh Energy Capacity	n/a
User-Specified Profies						
Storage Resource Custom Profile	-	-	-	-	MW	n/a
RPS Resource Custom Profile	-	-	-	-	GWh	RPS Eligible
GHG-free non-RPS Resource	-	-	-	-	GWh	GHG-Free
Coal						
Coal	-	-	-	-	GWh	n/a

Duplicated Contract IDs:	Entry with non-positive values:	Invalid resource error rows:	Rows missing required project viability associated data:	Rows missing required hybrid associated data:	Supertype Contract Status Error or Null Rows:	Transaction counterparty error rows:	Rows missing CSP GWh:	Rows with invalid buying energy capacity and csp resource category:	Rows missing MTR NQC:	Warning-total capacity is equal to or greater than generator plus storage MWs for rows:
BLANK ID DETECTED	total nameplate capacity row 238	42	238	39	42	193	87	51	56	39
	total nameplate capacity row 239	56	239	40	56	194	88	101		40
	csp annual 2024 row 56	57		41	57	196	89	322		41
	cso annual 2024 row 57	60		42	60	197	90			42
	csp annual 2024 row 58	64		43	64	198	91			43
	csp annual 2024 row 59	65		52	65	199	92			56
	cso annual 2024 row 60	66		53	66	200	93			57
	csp annual 2024 row 61	67		54	67	201	94			64
	csp annual 2024 row 62	68		55	68	202	307			65
	csp annual 2024 row 63	69		56	69					66
	csp annual 2024 row 64	70		57	70					67
	csp annual 2024 row 65	71			71					68
	csp annual 2024 row 66	72			72					69
	csp annual 2024 row 67	73			73					70
	csp annual 2024 row 68	75			75					71
	csp annual 2024 row 69	80			80					72
	csp annual 2024 row 70	121			121					88
	csp annual 2024 row 71	177			177					91
	csp annual 2024 row 72	263			240					92
	csp annual 2024 row 73	308			241					109
	csp annual 2024 row 126				263					111
	csp annual 2024 row 127				308					180
	csp annual 2024 row 128									228
	csp annual 2024 row 129									308
	csp annual 2024 row 130									310
	csp annual 2024 row 131									311
	csp annual 2024 row 132									312
	csp annual 2024 row 140									
	csp annual 2024 row 141									
	csp annual 2024 row 142									
	csp annual 2024 row 143									
	csp annual 2024 row 144									
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	csp annual 2024 row 146									
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	csp annual 2024 row 175									
	csp annual 2024 row 176									
	csp annual 2024 row 177									
	csp annual 2024 row 178									
	csp annual 2024 row 179									
	csp annual 2024 row 180									
	csp annual 2024 row 242									
	csp annual 2024 row 243									
	csp annual 2026 row 56									
	csp annual 2026 row 57									
	csp annual 2026 row 58									
	csp annual 2026 row 59									
	csp annual 2026 row 60									
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	csp annual 2026 row 73									
	csp annual 2026 row 126									
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	csp annual 2026 row 130									
	csp annual 2026 row 131									
	csp annual 2026 row 132									
	csp annual 2026 row 140									
	csp annual 2026 row 141									
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	csp annual 2026 row 147									
	csp annual 2026 row 148									
	csp annual 2026 row 175									
	csp annual 2026 row 176									
	csp annual 2026 row 177									
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Tab Color Scheme

	Gray tab describes data sources; further description available in accompanying documentation
	Light Orange tabs are where the user inputs values
	Blue tabs contain LSE-specific data or ovrided by the CPUC that the user should either input into the "Managed Retail Sales Forecast" or "BTM PV Forecast" rows on the Demand Inputs tab. or use as a point of comparison when assessing CO2 emissions in the Results tab
	Yellow tabs are read-only tabs that contain inputs and calculations
	Green tab contains results

Cell Color Scheme

	Yellow cells are inputs that can be changed by the user. Users should only input data into the Supply Inputs and Demand Inputs tabs, unless they represent an ESP in which case they should also input data into the ESP GHG Benchmarks tab
	Orange cells contain drop-down menus that allow the user to input custom values
	Blue cells are input data that should NOT be changed by the user
	Grey cells are intermediate calculations that should NOT be changed by the user
	Green cells are final outputs

Notes:

Input values in yellow cells on the Supply Inputs and Demand Inputs tabs are placeholders that represent the entire CAISO system. Users should replace ***all*** *inputs with values specific to their resources and demand.*
The years 2024, 2026, 2030, and 2035 are simulated within this tool. Any intermediate years should be interpolated outside of this tool.
Hourly renewable, demand, and dispatch profiles are based on 2009 weather conditions and are in standard time throughout the year. If possible, users should synchronize custom shapes with 2009 weather.
The SERVM model demand profiles for all future years with the convention that the first day of the year is a Monday.
All emissions factors and total emissions values are in ***metric*** *tonnes (as opposed to imperial system units)*

Data Sources

1. Hourly Profiles: Solar and Wind
Variable renewable profiles are gathered from the SERVM model maintained by the CPUC Energy Division's Energy Resource Modeling group

2. Demand Modifier Shapes
Baseline demand, energy efficiency, electric vehicle, building electrification, behind the meter photovoltaic, and behind the meter storage profiles are based on SERVM hourly profiles for the year 2009
The default Commercial and Industrial (C&I) demand shape is from the CEC's California Commercial End-Use Survey (https://www.energy.ca.gov/data-reports/surveys/california-commercial-end-use-survey).

3. Emissions Factors: CO2, SO2, NOx, PM2.5
System Power emissions factors on the Emissions Profiles tab are based on SERVM hourly weighted-average emissions from CAISO dispatchable gas resources and unspecified imports. The resource portfolio simulated in SERVM is the 2021 Preferred System Plan Portfolio as updated by IRP staff with more recent inputs ("2021 PSP Portfolio with updates")
Criteria pollutant emissions factor data was compiled from a combination of CAISO dispatch data, scientific literature, and EPA and CARB criteria pollutant data.
The Asset Controlline Supplier CO2 emissions factor is consistent with recent ACS emissions factors reported by CARB https://ww2.arb.ca.gov/mrr-acs

4. Resource Dispatch
The following dispatch profiles are based on SERVM model dispatch: Combined Heat and Power (CHP), Coal, Large Hydro, Nuclear, Geothermal, Biomass, Biogas, and Hybrid or Paired Solar and Battery
The small hydro dispatch profile is based on historical CAISO data
The Shed Demand Response (DR) dispatch profile is created by setting a target capacity factor based on average Shed DR dispatch over 22 years of SERVM simulations, and then allocating dispatch in each CSP year to the hours with the most dispatchable gas generation in SERVM. A 0.8 hourly capacity factor is set based on observed 2020 Shed DR dispatch (http://www.caiso.com/Documents/ReportonDemandResponseIssuesandPerformance-Feb252021.pdf)

5. Battery Storage and Pumped Storage Dispatch
The storage charge/discharge tables on the Resource Profiles tab are based on SERVM modeled charge/discharge patterns of 4-hour batteries and pumped hydro storage resources

6. Hydro Specified Imports Dispatch
The hydro dispatch tables on the Hydro Specified Imports Profile tab are based on dispatch patterns of the NW Hydro for CAISO resource in the 2021 PSP Portfolio with updates RESOLVE model runs

7. LSE Demand Forecasts. BTM PV Forecasts. and GHG Benchmarks
Assigned to LSEs per Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plan Filings. June 15. 2022. Available here:
https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=485625915

8. IEPR CAISO Load Modifiers
CEC 2021 IEPR CAISO Peak and Energy Forecasts: CED 2021 Mid Baseline / AAEE Scenario 3 / AAFS Scenario 3

9. Commercial and Industrial fraction of baseline consumption
CEC 2021 IEPR CED Forecast: Form 1.1 for PG&E. SCE. SDG&E for the Mid Demand Case. Available here:
https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-IEPR-03

25 MMT in 2035

Supply Inputs: Values should be pasted directly from the Resource Data Template using Excel's "Paste Values" option

Resource	2024	2026	2030	2035	Units	RPS or GHG-Free
Large Hydro	-	-	-	-	GWh	GHG-Free
Imported Hydro	-	-	-	-	GWh	GHG-Free
Asset Controlling Supplier	-	-	-	-	GWh	GHG-Free (Partial)
Nuclear	-	-	-	-	GWh	GHG-Free
Biogas	26	26	25	8	GWh	RPS
Biomass	125	125	99	75	GWh	RPS
Geothermal	18	321	320	303	GWh	RPS
Small Hydro	130	135	135	112	GWh	RPS
Wind Resources						
Wind Baseline California	671	621	583	369	GWh	RPS
Wind New PG&E	257	514	898	898	GWh	RPS
Wind New SCE SDG&E	-	-	-	-	GWh	RPS
Wind Pacific Northwest	-	-	-	-	GWh	RPS
Wind Wyoming	-	-	-	-	GWh	RPS
Wind New Mexico	334	334	334	-	GWh	RPS
Wind Offshore Morro Bay	-	-	-	-	GWh	RPS
Wind Offshore Humboldt	-	-	1,231	1,076	GWh	RPS
Solar Resources						
Solar Baseline California	1,647	1,678	1,642	1,392	GWh	RPS
Solar New PG&E	159	597	597	597	GWh	RPS
Solar New SCE SDG&E	295	293	287	279	GWh	RPS
Solar Distributed	-	-	-	-	GWh	RPS
Hybrid/Paired						
Hybrid or Paired Solar and Battery	826	820	809	794	GWh	RPS
Storage & OR						
Shed DR	-	-	-	-	MW	GHG-Free
Pumped Storage	-	-	-	-	MW	n/a
Battery Storage	1,110	2,304	2,304	2,324	MWh Energy Capacity	n/a
User-Specified Profiles						
Storage Resource Custom Profile	-	-	-	-	MW	n/a
RPS Resource Custom Profile	-	-	-	-	GWh	RPS
GHG-free non-RPS Resource Custom Profile	-	-	-	-	GWh	GHG-Free
Coal						
Coal	-	-	-	-	GWh	n/a
Calculated Share of IFM CHP - do not edit						
IFM CHP	367	364	358	220	GWh	n/a

INFORMATION ONLY - Calculated capacity, energy, and capacity factor values for all supply resources

Calculated Capacity (MW)

2024	2026	2030	2035
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
4	4	5	2
21	21	19	16
2	40	41	39
44	46	45	38
250	231	217	137
119	239	417	417
-	-	-	-
-	-	-	-
-	-	-	-
81	81	81	-
-	-	-	-
-	-	255	638
622	634	620	526
56	209	209	209
99	98	96	94
-	-	-	-
286	284	279	272
-	-	-	-
-	-	-	-
277	576	576	581
-	-	-	-
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
-	-	-	-
75	76	77	47

Calculated Energy Production Potential (GWh, pre-curtailment)

2024	2026	2030	2035
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
26	26	25	8
125	125	99	75
18	321	320	303
130	135	135	112
671	621	583	369
257	514	898	898
-	-	-	-
-	-	-	-
-	-	-	-
334	334	334	-
-	-	-	-
-	-	1,231	1,076
1,647	1,678	1,642	1,392
159	597	597	597
295	293	287	279
-	-	-	-
826	820	809	794
-	-	-	-
-	-	-	-
(61)	(130)	(179)	(168)
n/a	n/a	n/a	n/a
-	-	-	-
367	364	358	220

Capacity Factors (%)

2024	2026	2030	2035
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
44%	44%	44%	44%
44%	44%	44%	44%
88%	98%	90%	98%
69%	66%	58%	56%
70%	68%	58%	55%
92%	91%	89%	89%
34%	34%	34%	34%
31%	31%	31%	31%
25%	25%	25%	25%
31%	31%	31%	31%
24%	24%	24%	24%
51%	51%	51%	51%
47%	47%	47%	47%
46%	46%	46%	46%
55%	55%	55%	55%
30%	30%	30%	30%
33%	33%	33%	33%
34%	34%	34%	34%
20%	20%	20%	20%
33%	33%	33%	33%
0.04%	0.04%	0.03%	0.05%
-7%	-7%	-7%	-7%
-3%	-3%	-4%	-3%
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
24%	0%	0%	0%
55%	55%	53%	54%

Constants - Do Not Edit

8760	Hours per year
1000	GW -> MW
4	Battery duration of SERVM battery profile (hours)
100	Curtailment threshold (MW)
0.02	Asset Controlling Supplier Emissions Factor (tCO2/MWh)
0.428	Unspecified Import Emissions Factor (tCO2/MWh)
0.953	Fraction of Asset Controlling Supplier Imports to count as GHG-free

Checks	2024	2026	2030	2035
No negative supply inputs	TRUE	TRUE	TRUE	TRUE
Storage Resource Custom Profile does not produce power on a net basis	TRUE	TRUE	TRUE	TRUE
Storage Resource Custom Profile has values between -1 and 1	TRUE	TRUE	TRUE	TRUE
Sum of hourly RPS Resource Custom Profile equals annual input	TRUE	TRUE	TRUE	TRUE
Sum of hourly GHG-free non-RPS Resource Custom Profile equals annual input	TRUE	TRUE	TRUE	TRUE

Custom Hourly Profiles

Users wishing to add multiple custom resources of the same type should add together the hourly production values outside of this tool and input the final 8760 shape below.
Power production or storage dispatch entered in this section is incremental to any of the standard resource types entered in the resource table above - entering the same resources in both sections would result in double counting.

	Storage Resource Custom Profile				RPS Resource Custom Profile				GHG-free non-RPS Resource Custom Profile			
Units	Profile should be normalized to MW of nameplate storage capacity in the "Storage Resource Custom Profile" row above. Values should range between -1 (charging at max) to 1 (discharging at max).				Profile should be in units of MW in each hour (=MWh) The sum of power production in each year must match the annual value in the "User-Specified Profiles" section.				Profile should be in units of MW in each hour (=MWh) The sum of power production in each year must match the annual value in the "User-Specified Profiles" section.			
Total	-	-	-	-	-	-	-	-	-	-	-	-
Max	-	-	-	-	-	-	-	-	-	-	-	-
Min	-	-	-	-	-	-	-	-	-	-	-	-

Month	Day	Hour	2024	2026	2030	2035	2024	2026	2030	2035	2024	2026	2030	2035
1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
1	1	3	-	-	-	-	-	-	-	-	-	-	-	-
1	1	4	-	-	-	-	-	-	-	-	-	-	-	-
1	1	5	-	-	-	-	-	-	-	-	-	-	-	-
1	1	6	-	-	-	-	-	-	-	-	-	-	-	-
1	1	7	-	-	-	-	-	-	-	-	-	-	-	-
1	1	8	-	-	-	-	-	-	-	-	-	-	-	-
1	1	9	-	-	-	-	-	-	-	-	-	-	-	-
1	1	10	-	-	-	-	-	-	-	-	-	-	-	-
1	1	11	-	-	-	-	-	-	-	-	-	-	-	-
1	1	12	-	-	-	-	-	-	-	-	-	-	-	-
1	1	13	-	-	-	-	-	-	-	-	-	-	-	-
1	1	14	-	-	-	-	-	-	-	-	-	-	-	-
1	1	15	-	-	-	-	-	-	-	-	-	-	-	-
1	1	16	-	-	-	-	-	-	-	-	-	-	-	-
1	1	17	-	-	-	-	-	-	-	-	-	-	-	-
1	1	18	-	-	-	-	-	-	-	-	-	-	-	-
1	1	19	-	-	-	-	-	-	-	-	-	-	-	-
1	1	20	-	-	-	-	-	-	-	-	-	-	-	-
1	1	21	-	-	-	-	-	-	-	-	-	-	-	-
1	1	22	-	-	-	-	-	-	-	-	-	-	-	-
1	1	23	-	-	-	-	-	-	-	-	-	-	-	-
1	1	24	-	-	-	-	-	-	-	-	-	-	-	-
1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
1	2	4	-	-	-	-	-	-	-	-	-	-	-	-
1	2	5	-	-	-	-	-	-	-	-	-	-	-	-
1	2	6	-	-	-	-	-	-	-	-	-	-	-	-
1	2	7	-	-	-	-	-	-	-	-	-	-	-	-
1	2	8	-	-	-	-	-	-	-	-	-	-	-	-
1	2	9	-	-	-	-	-	-	-	-	-	-	-	-
1	2	10	-	-	-	-	-	-	-	-	-	-	-	-
1	2	11	-	-	-	-	-	-	-	-	-	-	-	-
1	2	12	-	-	-	-	-	-	-	-	-	-	-	-
1	2	13	-	-	-	-	-	-	-	-	-	-	-	-
1	2	14	-	-	-	-	-	-	-	-	-	-	-	-
1	2	15	-	-	-	-	-	-	-	-	-	-	-	-
1	2	16	-	-	-	-	-	-	-	-	-	-	-	-
1	2	17	-	-	-	-	-	-	-	-	-	-	-	-
1	2	18	-	-	-	-	-	-	-	-	-	-	-	-
1	2	19	-	-	-	-	-	-	-	-	-	-	-	-
1	2	20	-	-	-	-	-	-	-	-	-	-	-	-
1	2	21	-	-	-	-	-	-	-	-	-	-	-	-
1	2	22	-	-	-	-	-	-	-	-	-	-	-	-
1	2	23	-	-	-	-	-	-	-	-	-	-	-	-
1	2	24	-	-	-	-	-	-	-	-	-	-	-	-
1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
1	3	4	-	-	-	-	-	-	-	-	-	-	-	-
1	3	5	-	-	-	-	-	-	-	-	-	-	-	-
1	3	6	-	-	-	-	-	-	-	-	-	-	-	-
1	3	7	-	-	-	-	-	-	-	-	-	-	-	-
1	3	8	-	-	-	-	-	-	-	-	-	-	-	-
1	3	9	-	-	-	-	-	-	-	-	-	-	-	-
1	3	10	-	-	-	-	-	-	-	-	-	-	-	-
1	3	11	-	-	-	-	-	-	-	-	-	-	-	-
1	3	12	-	-	-	-	-	-	-	-	-	-	-	-
1	3	13	-	-	-	-	-	-	-	-	-	-	-	-
1	3	14	-	-	-	-	-	-	-	-	-	-	-	-
1	3	15	-	-	-	-	-	-	-	-	-	-	-	-
1	3	16	-	-	-	-	-	-	-	-	-	-	-	-
1	3	17	-	-	-	-	-	-	-	-	-	-	-	-
1	3	18	-	-	-	-	-	-	-	-	-	-	-	-
1	3	19	-	-	-	-	-	-	-	-	-	-	-	-
1	3	20	-	-	-	-	-	-	-	-	-	-	-	-
1	3	21	-	-	-	-	-	-	-	-	-	-	-	-
1	3	22	-	-	-	-	-	-	-	-	-	-	-	-
1	3	23	-	-	-	-	-	-	-	-	-	-	-	-
1	3	24	-	-	-	-	-	-	-	-	-	-	-	-
1	4	1	-	-	-	-	-	-	-	-	-	-	-	-
1	4	2	-	-	-	-	-	-	-	-	-	-	-	-
1	4	3	-	-	-	-	-	-	-	-	-	-	-	-
1	4	4	-	-	-	-	-	-	-	-	-	-	-	-
1	4	5	-	-	-	-	-	-	-	-	-	-	-	-
1	4	6	-	-	-	-	-	-	-	-	-	-	-	-
1	4	7	-	-	-	-	-	-	-	-	-	-	-	-
1	4	8	-	-	-	-	-	-	-	-	-	-	-	-
1	4	9	-	-	-	-	-	-	-	-	-	-	-	-
1	4	10	-	-	-	-	-	-	-	-	-	-	-	-
1	4	11	-	-	-	-	-	-	-	-	-	-	-	-
1	4	12	-	-	-	-	-	-	-	-	-	-	-	-
1	4	13	-	-	-	-	-	-	-	-	-	-	-	-
1	4	14	-	-	-	-	-	-	-	-	-	-	-	-
1	4	15	-	-	-	-	-	-	-	-	-	-	-	-
1	4	16	-	-	-	-	-	-	-	-	-	-	-	-
1	4	17	-	-	-	-	-	-	-	-	-	-	-	-
1	4	18	-	-	-	-	-	-	-	-	-	-	-	-
1	4	19	-	-	-	-	-	-	-	-	-	-	-	-
1	4	20	-	-	-	-	-	-	-	-	-	-	-	-
1	4	21	-	-	-	-	-	-	-	-	-	-	-	-
1	4	22	-	-	-	-	-	-	-	-	-	-	-	-
1	4	23	-	-	-	-	-	-	-	-	-	-	-	-
1	4	24	-	-	-	-	-	-	-	-	-	-	-	-
1	5	1	-	-	-	-	-	-	-	-	-	-	-	-
1	5	2	-	-	-	-	-	-	-	-	-	-	-	-
1	5	3	-	-	-	-	-	-	-	-	-	-	-	-
1	5	4	-	-	-	-	-	-	-	-	-	-	-	-
1	5	5	-	-	-	-	-	-	-	-	-	-	-	-
1	5	6	-	-	-	-	-	-	-	-	-	-	-	-
1	5	7	-	-	-	-	-	-	-	-	-	-	-	-
1	5	8	-	-	-	-	-	-	-	-	-	-	-	-
1	5	9	-	-	-	-	-	-	-	-	-	-	-	-
1	5	10	-	-	-	-	-	-	-	-	-	-	-	-
1	5	11	-	-	-	-	-	-	-	-	-	-	-	-
1	5	12	-	-	-	-	-	-	-	-	-	-	-	-
1	5	13	-	-	-	-	-	-	-	-	-	-	-	-
1	5	14	-	-	-	-	-	-	-	-	-	-	-	-
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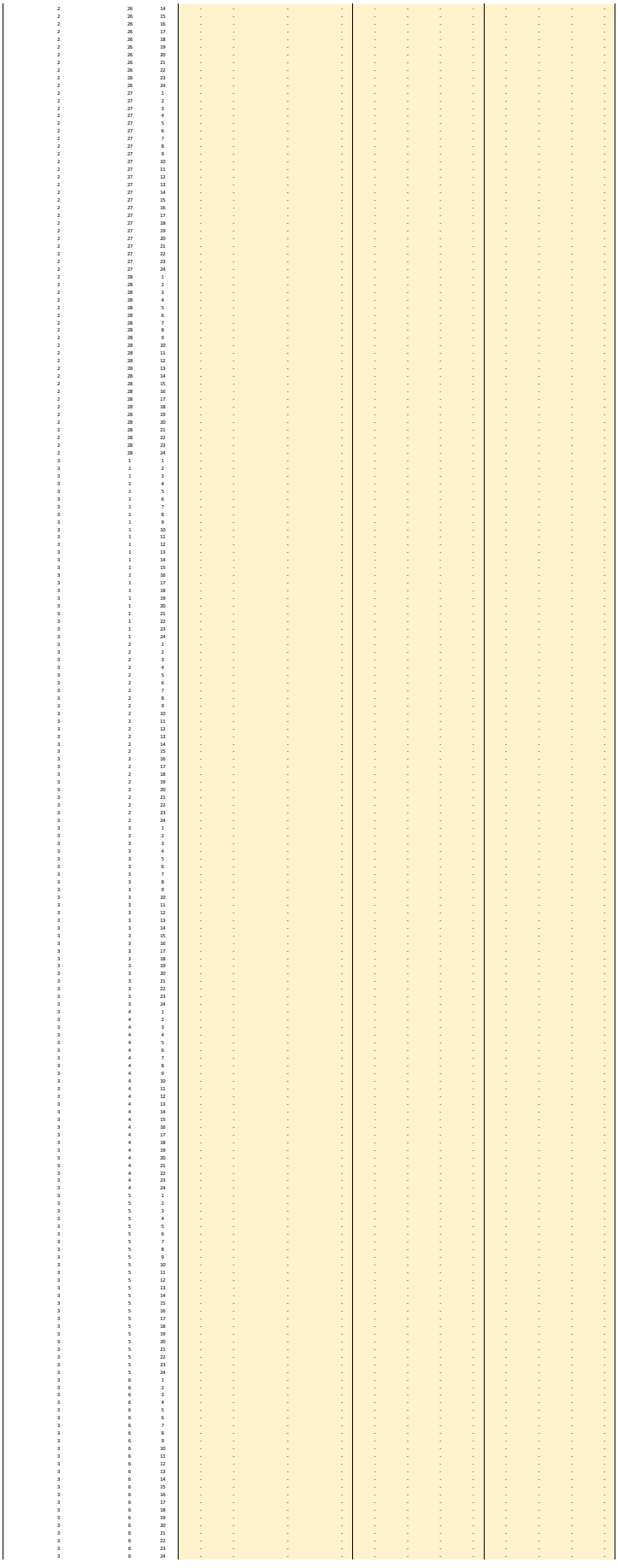
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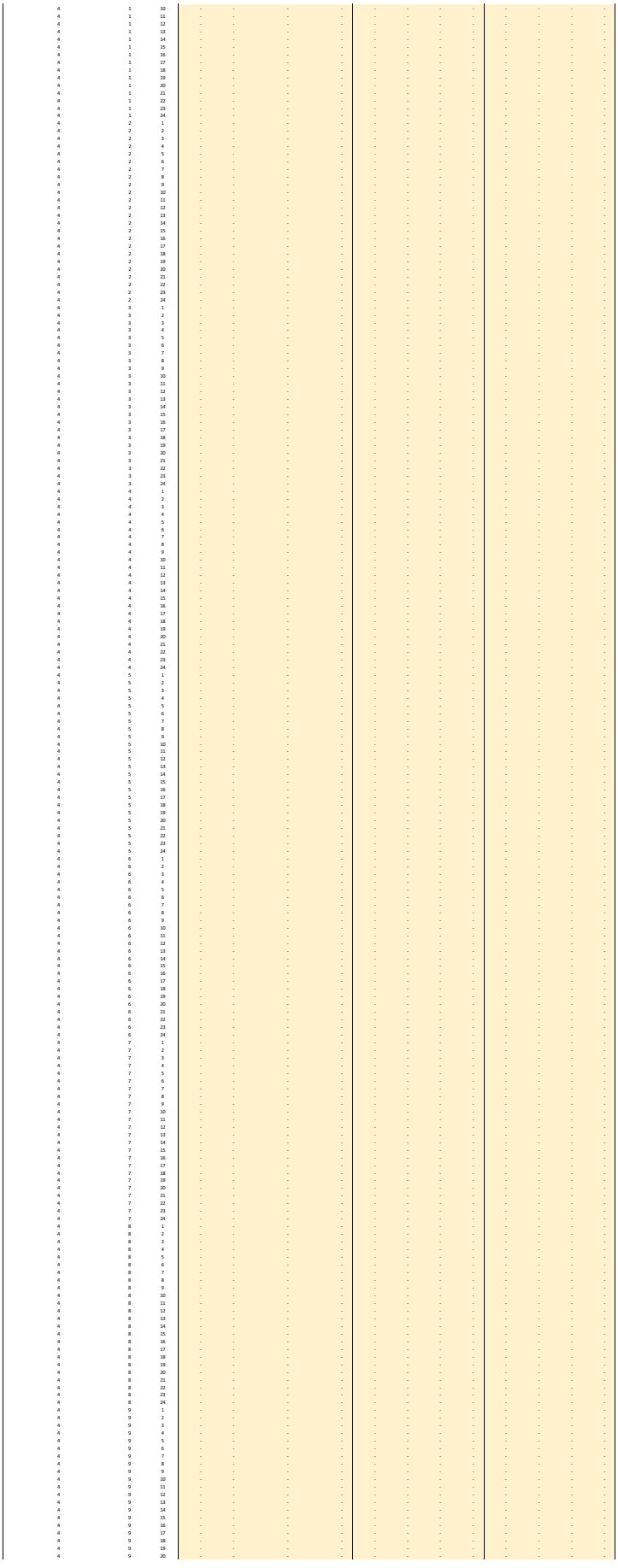
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Total	-	-	-	-

25 MMT in 2035

Demand Inputs

	Units	2024	2026	2030	2035	Notes
Managed Retail Sales Forecast (assigned to LSE)	GWh	6,740	6,887	7,180	7,540	Must be entered regardless of demand modifiers selected. Includes impact of BTM PV, Energy Efficiency, etc.
Behind-The-Meter Photovoltaics (BTM PV) Forecast (assigned to LSE)	GWh	1,055	1,223	1,595	2,022	Measured at customer, not grossed up for T&D losses
Retail Sales without BTM PV reduction	GWh	7,794	8,111	8,775	9,562	Used to allocate demand modifiers
Behind-The-Meter Photovoltaics (BTM PV) grossed up for T&D losses	GWh	1,138	1,320	1,721	2,181	At generator bus-bar
Calculated share of CAISO system demand (% of Retail Sales)	%	3%	3%	3%	3%	Do not edit

Commercial & Industrial Fraction of Baseline Demand	Use Custom?	Units	2024	2026	2030	2035	Notes
Default C&I Percentage of Total	No	%	49%	49%	49%	50%	Default, do not change. Does not include demand from Light Duty EVs.
Custom C&I Percentage of Total (OPTIONAL)		%					Will be used instead of default if "Use Custom?" = Yes

Calculated Demand, based on sales-weighted share of total from IEPR		Units	2024	2026	2030	2035	Notes
Baseline net energy for load		GWh	8,206	8,477	9,038	9,601	Grossed up for T&D losses; demand met by BTM CHP excluded
Electric Vehicle Load		GWh	286	413	663	1,040	Grossed up for T&D losses
Building Electrification		GWh	32	60	122	207	Grossed up for T&D losses
Energy Efficiency		GWh	(112)	(197)	(356)	(533)	Grossed up for T&D losses
Behind-The-Meter Photovoltaics (BTM PV)		GWh	(1,138)	(1,320)	(1,721)	(2,181)	Grossed up for T&D losses
Behind-The-Meter Storage Losses (BTM Storage)		GWh	2	4	7	10	Grossed up for T&D losses
Behind-The-Meter Storage Capacity (BTM Storage)		Nameplate MW	37	52	83	126	For information only
Custom Demand Inputs (OPTIONAL; overwrites sales-weighted IEPR values from Calculated Demand section)	Use Custom?	Units	2024	2026	2030	2035	Notes
Baseline net energy for load	No	GWh					To overwrite, set "Use Custom" to "Yes" and input forecast. For use in Alternative Plans only.
Electric Vehicle Load	No	GWh					Custom demand values should be grossed up for T&D losses.
Building Electrification	No	GWh					User-specified demand profiles should be input in the "Custom Profiles" tab.
Energy Efficiency	No	GWh					Energy efficiency and BTM PV subtract from demand and therefore should be entered as negative values.
Behind-The-Meter Photovoltaics (BTM PV)	No	GWh					
Behind-The-Meter Storage Capacity (BTM Storage)	No	Nameplate MW					Custom BTM storage should be entered in terms of Nameplate MW
Behind-The-Meter Storage Losses (BTM Storage)		GWh					
Active Demand Inputs	Source	Units	2024	2026	2030	2035	Notes
Baseline net energy for load	IEPR	GWh	8,206	8,477	9,038	9,601	Grossed up for T&D losses; demand met by BTM CHP excluded
Non-commercial/industrial portion of baseline (included in baseline total)	IEPR	GWh	4,221	4,345	4,588	4,774	Grossed up for T&D losses; demand met by BTM CHP excluded
Commercial/industrial portion of baseline (included in baseline total)	IEPR	GWh	3,984	4,131	4,451	4,827	Grossed up for T&D losses; demand met by BTM CHP excluded
Electric Vehicle Load	IEPR	GWh	286	413	663	1,040	Grossed up for T&D losses
Building Electrification	IEPR	GWh	32	60	122	207	Grossed up for T&D losses
Energy Efficiency	IEPR	GWh	(112)	(197)	(356)	(533)	Grossed up for T&D losses
Behind-The-Meter Photovoltaics (BTM PV)	IEPR	GWh	(1,138)	(1,320)	(1,721)	(2,181)	Grossed up for T&D losses
Behind-The-Meter Storage Losses (BTM Storage)	IEPR	GWh	2	4	7	10	Grossed up for T&D losses

Calculated demand at utility-scale generator bus-bar	GWh	7,276	7,436	7,753	8,144	Total of "Active Demand Inputs"

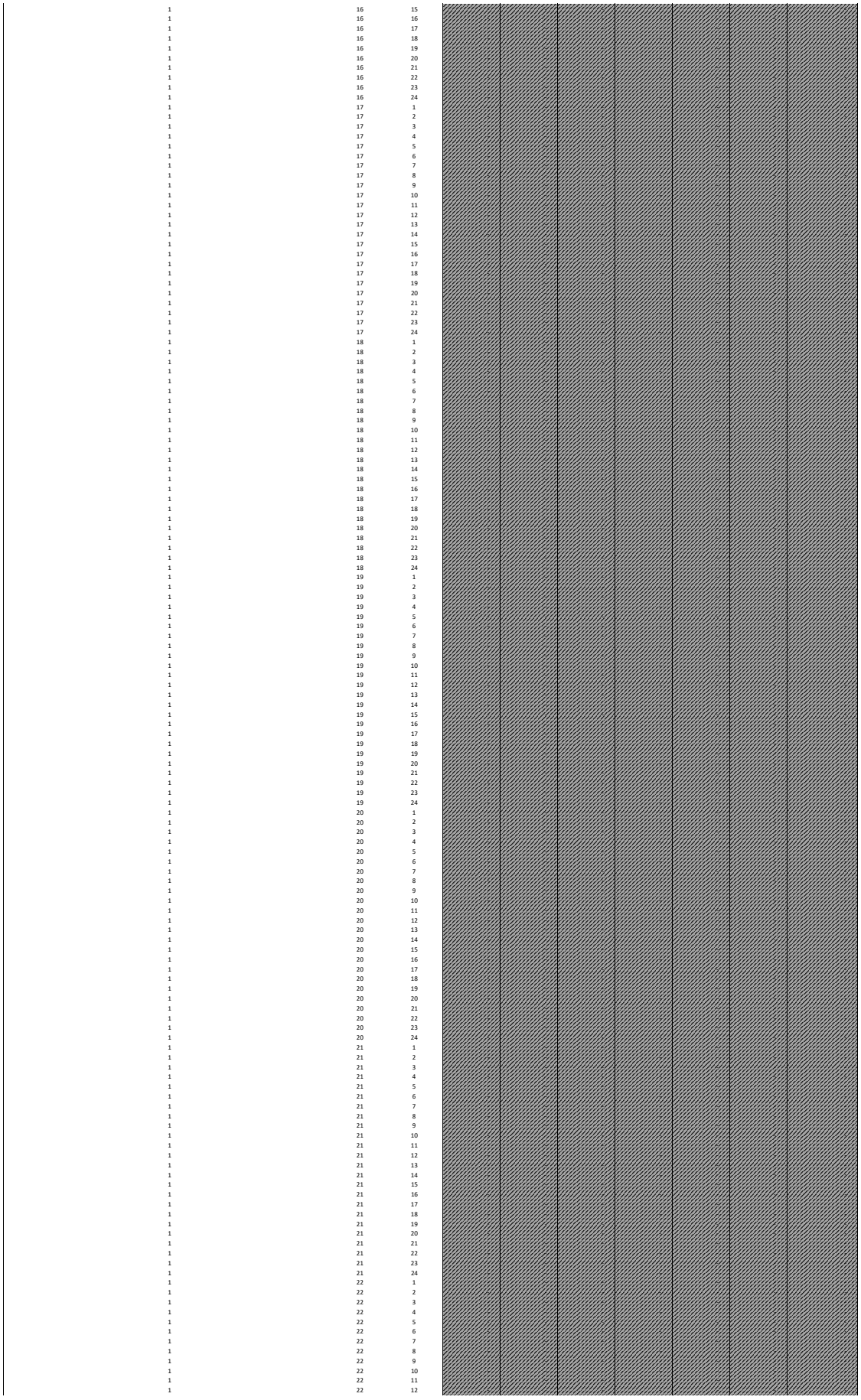
IFM CHP Calculation		2024	2026	2030	2035	
CASIO-wide In front of the meter (IFM) Combined Heat and Power (CHP) generation	GWh	11,129	10,980	10,660	6,470	Input data - do not change. Values are from SERVM disparch
LSE share of IFM CHP	GWh	367	364	358	220	Calculation - do not change

Checks	2024	2026	2030	2035
Correct sign (positive/negative) on demand inputs	TRUE	TRUE	TRUE	TRUE
If custom C&I percentage is used, positive percentage is used	TRUE	TRUE	TRUE	TRUE

Custom Demand Shapes (OPTIONAL; overwrites default demand shapes)			Custom Hourly Demand Profiles							
		Use Custom Shape?	No	No	No	No	No	No	No	
		Notes:	Set "Use Custom Shape" toggle to "Yes" to override default shape with custom shape below. Shape should be normalized - the sum of the hourly values over the entire year should equal 1 with the exception of BTM Storage. For all profiles except BTM Storage, normalize by dividing every hour of the original non-normalized shape (in MW) by the annual total (in MWh/yr). BTM Storage should be entered in units of MW per MW of installed nameplate capacity.							
		Check: Sums to 1 if custom shape is defined?	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	BTM Storage Check: Between -1 and 1
Total			-	-	-	-	-	-	-	
Month	Day	Hour	Baseline: Non C&I	Baseline: C&I	Electric Vehicle Load	Building Electrification	Energy Efficiency	Behind-The-Meter Photovoltaics (BTM PV)	Behind-The-Meter Storage (BTM Storage)	
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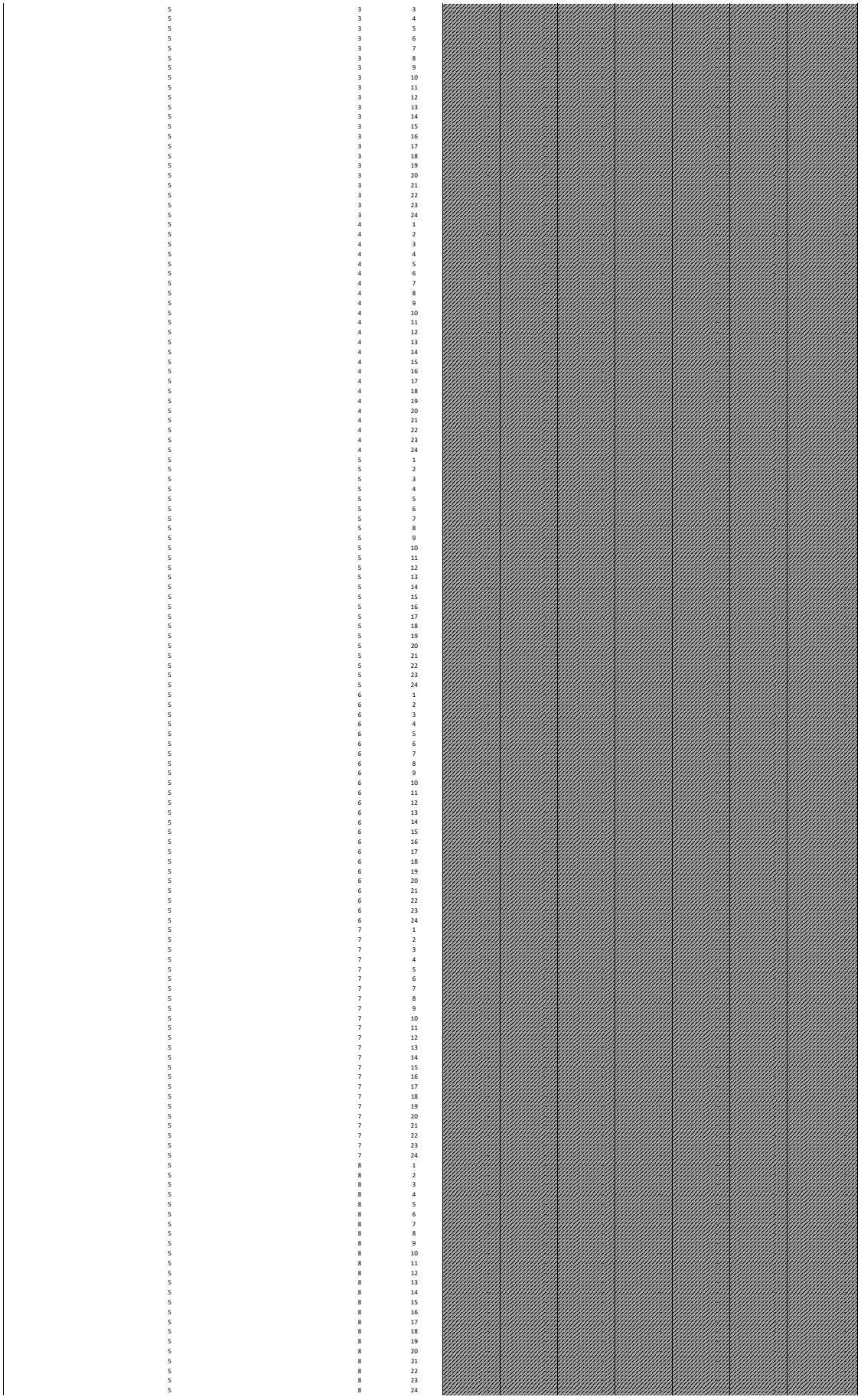
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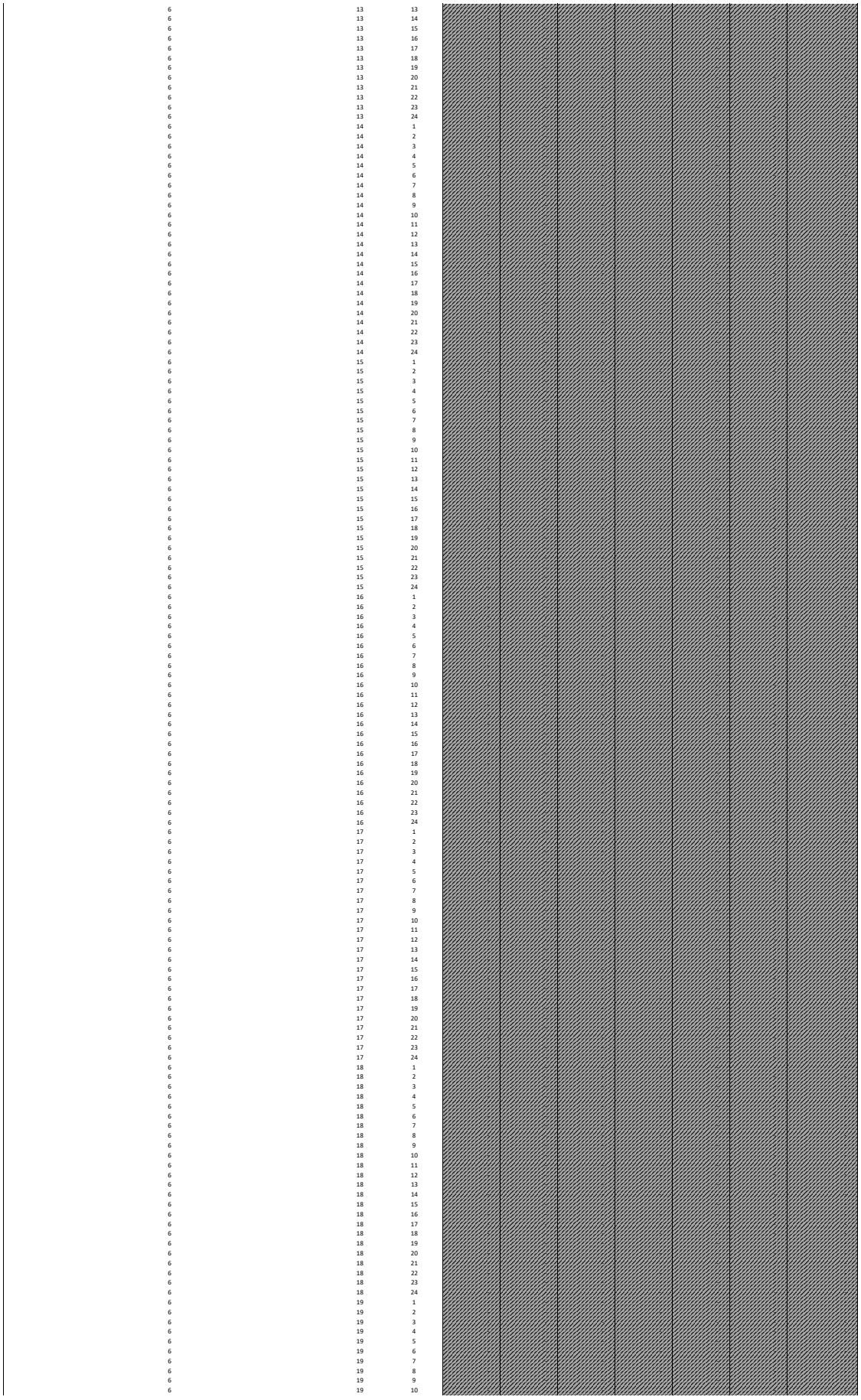
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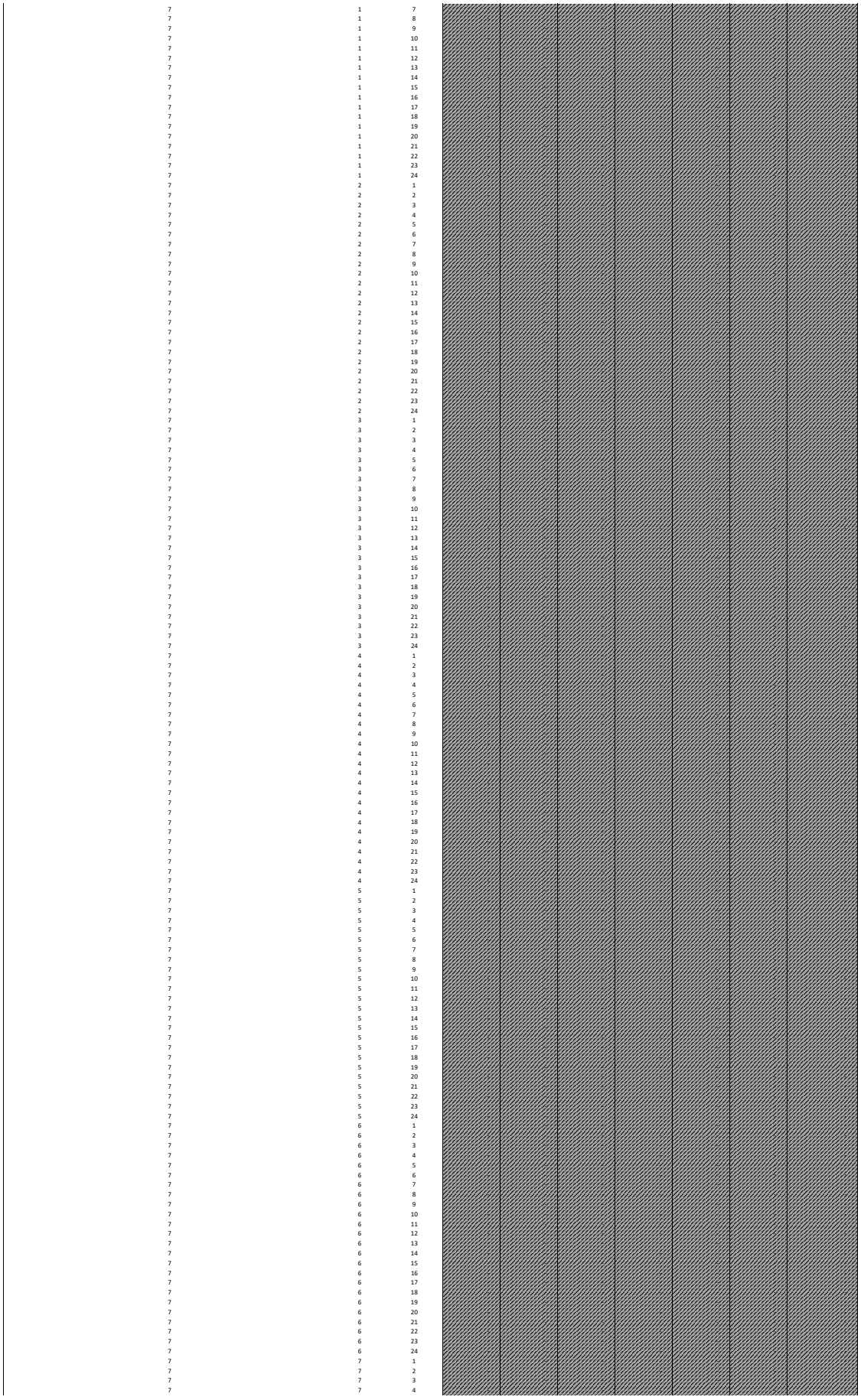
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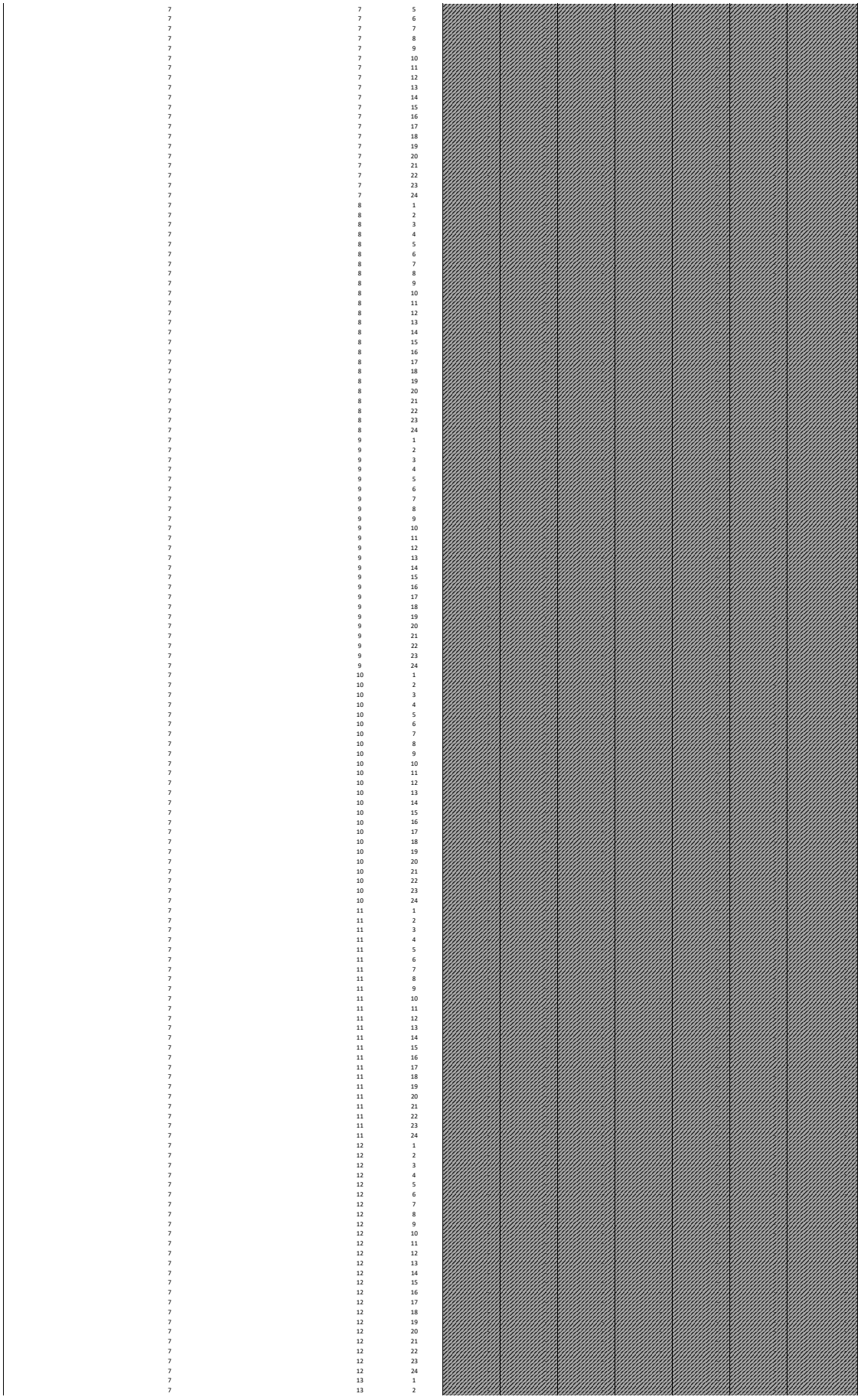
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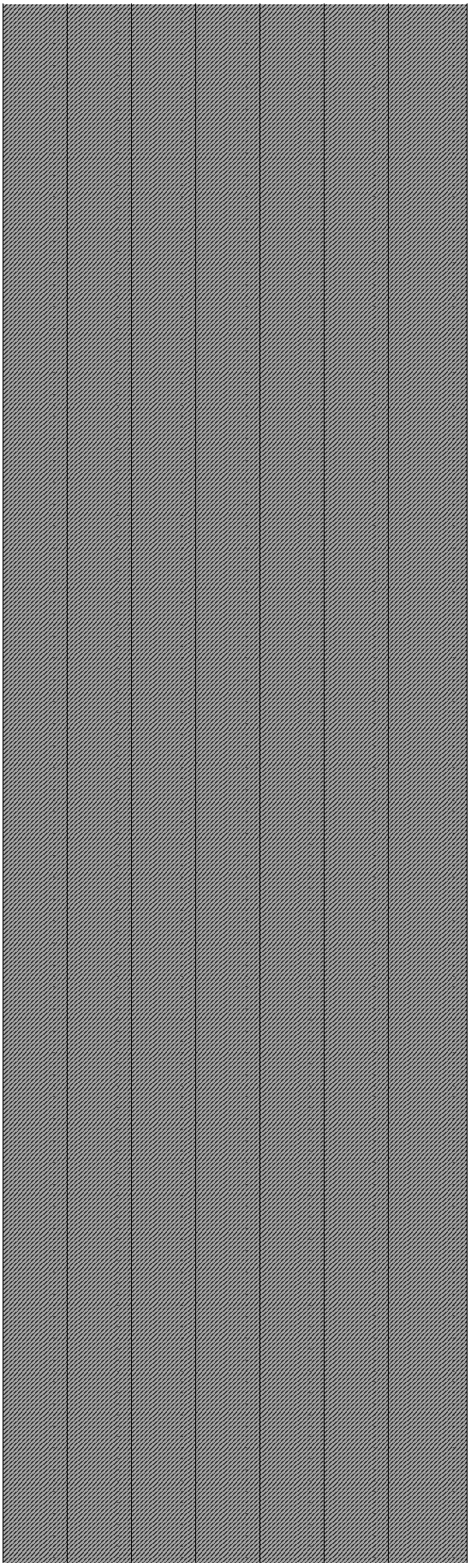
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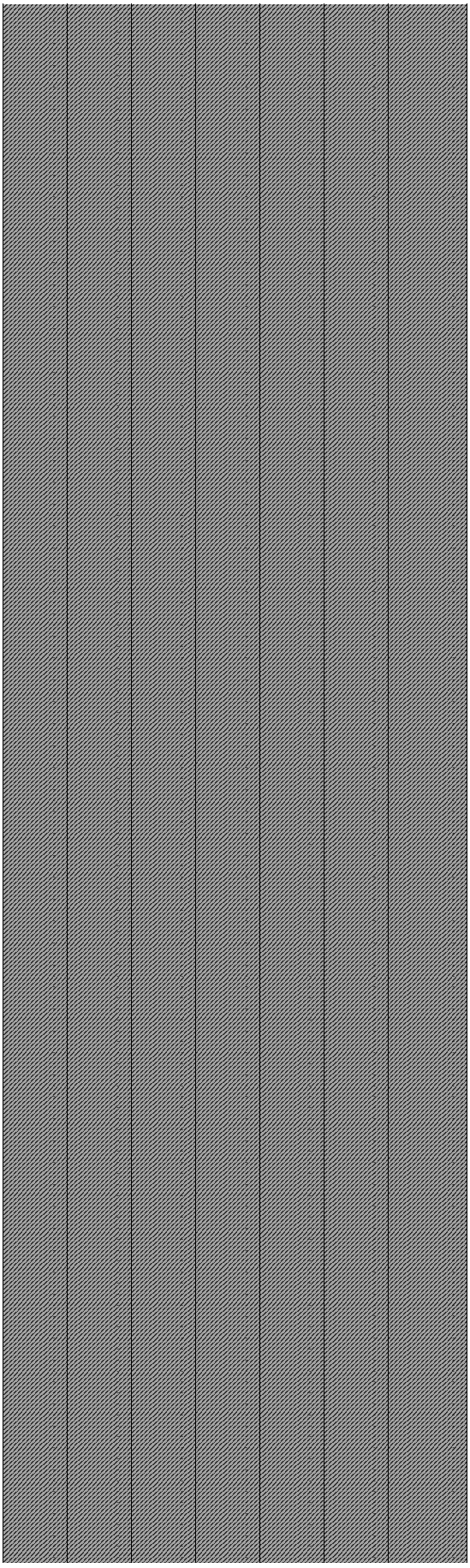
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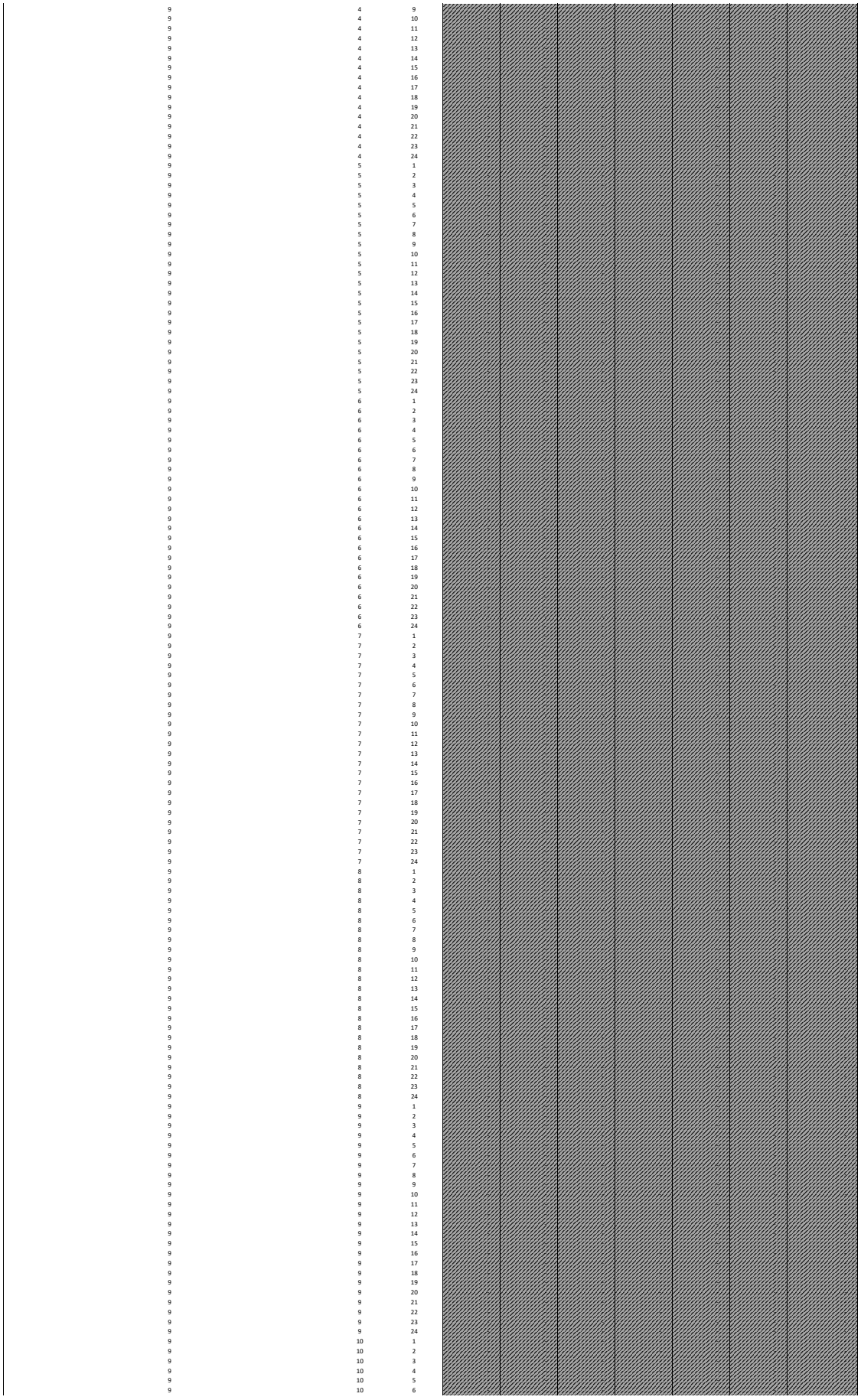
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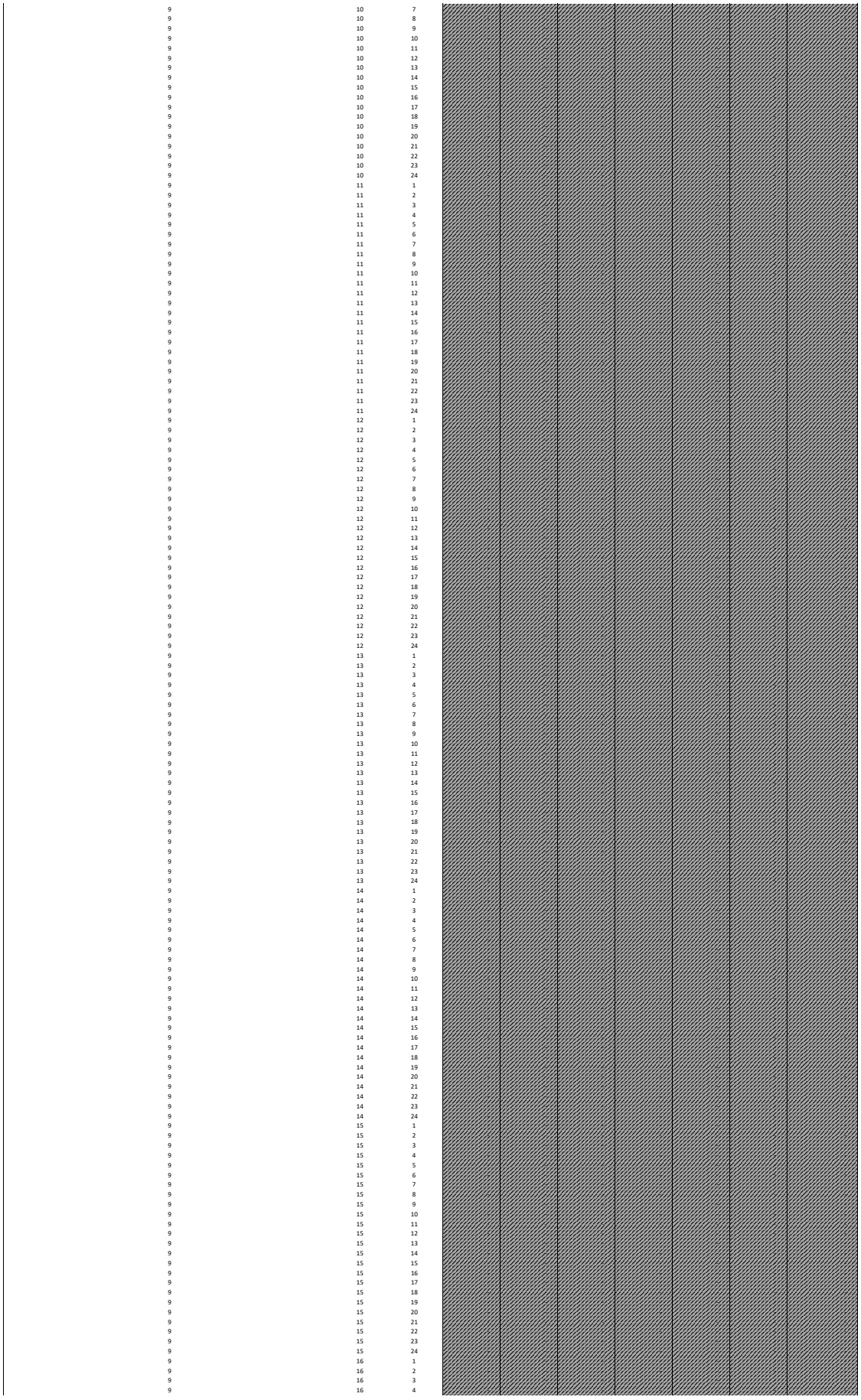


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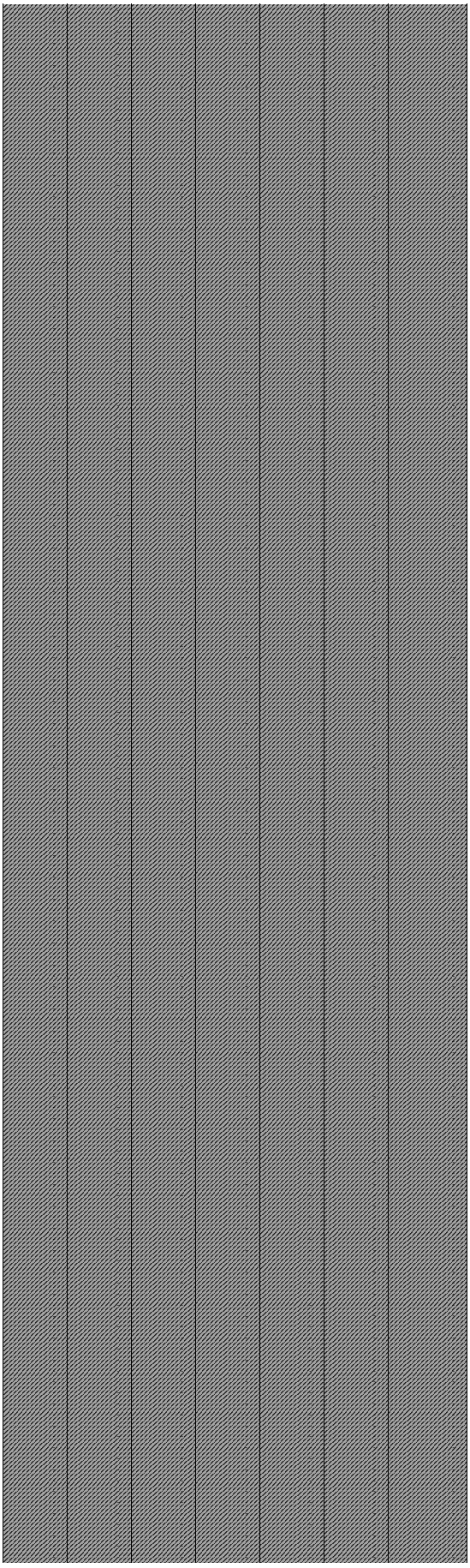
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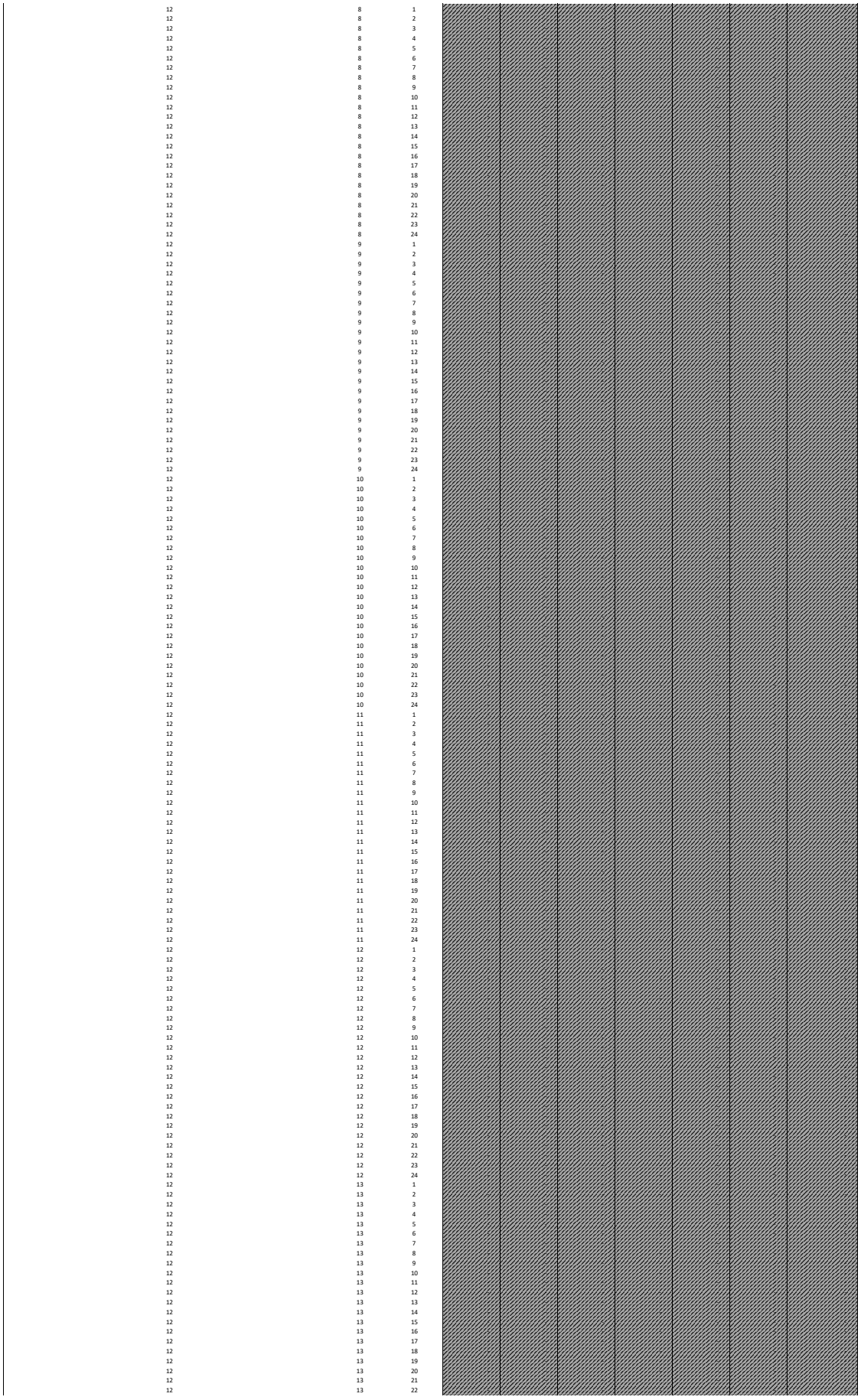
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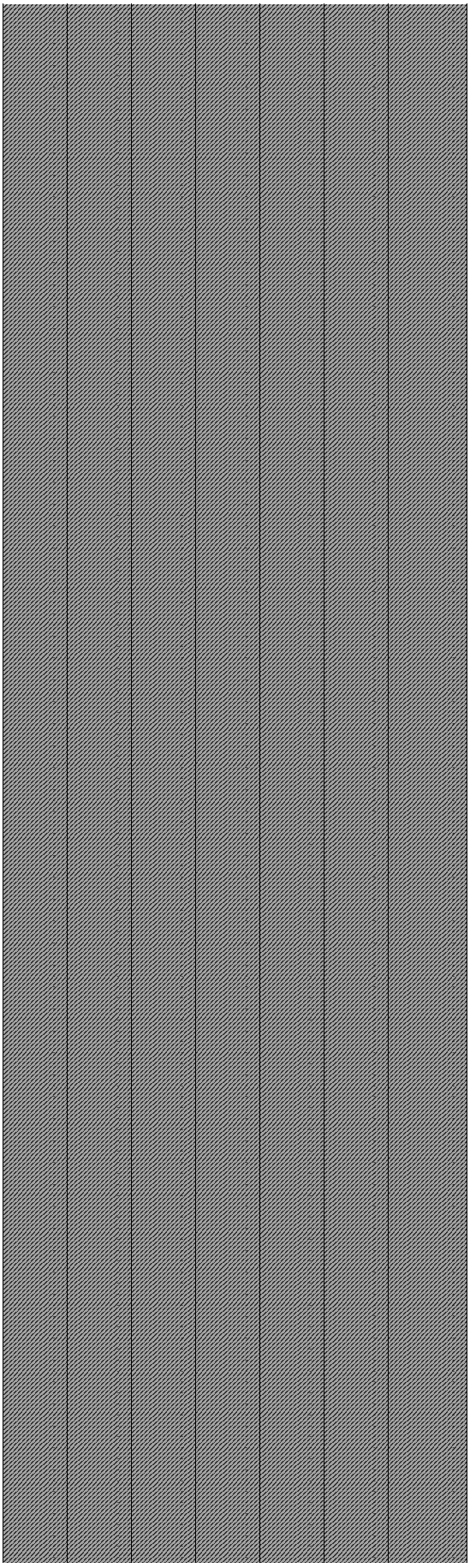
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25 MMT in 2035

LSEs within Utility Territory	2030 GHG Emissions Benchmark (MMT)	2035 GHG Emissions Benchmark (MMT)	2030 DA Load (GWh)	2035 DA Load (GWh)	ESP 2030 load within each IOU territory (GWh)	ESP 2035 load within each IOU territory (GWh)	ESP 2030 benchmark for each IOU territory (MMT)	ESP 2035 benchmark for each IOU territory (MMT)
Pacific Gas and Electric Company (Direct Access)	1.2250	0.9412	11,393	11,393			0.000	0.000
Southern California Edison Company (Direct Access)	1.2280	0.9695	13,421	13,421			0.000	0.000
San Diego Gas and Electric Company (Direct Access)	0.5049	0.4013	3,940	3,940			0.000	0.000
TOTAL			**28,754**	**28,754**	**0**	**0**	**0.000**	**0.000**

Each ESP is required to calculate its own confidential GHG Emissions Benchmark based on its 2030 and 2035 load share within the host IOU's territory. For any ESP that serves load in more than one IOU service territory, that ESP should add up the separate GHG Emissions Benchmarks calculated based on its share of direct access load for each IOU service territory to result in a single benchmark.When filling out Columns F and G -- "ESP 2030 load within each IOU territory" and "ESP 2035 load within each IOU territory" -- each ESP should utilize the confidential load forecast communicated to it by Energy Division staff.

25 MMT in 2035

Emissions Summary

Emissions Total	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
CO_2	*MMt/yr*	1.29	1.02	0.75	0.61	*Includes both in-CAISO and import emissions*
PM2.5	*tonnes/yr*	79	70	56	41	*Only In-CAISO emissions*
SO_2	*tonnes/yr*	21	20	16	10	*Only In-CAISO emissions*
NOx	*tonnes/yr*	203	187	155	104	*Only In-CAISO emissions*

Emissions by resource type

CO_2	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Coal	*MMt/yr*	0.000	0.000	0.000	0.000	*Included in GHG emissions total*
CHP	*MMt/yr*	0.163	0.162	0.159	0.098	
Biogas	*MMt/yr*	0.000	0.000	0.000	0.000	
Biomass	*MMt/yr*	0.000	0.000	0.000	0.000	
System Power	*MMt/yr*	1.130	0.854	0.590	0.511	*Includes emissions from in-CAISO dispatchable gas and unspecified imports*
Asset Controlling Supplier	*MMt/yr*	0.000	0.000	0.000	0.000	
Total	***MMt/yr***	**1.293**	**1.015**	**0.749**	**0.609**	*Includes both in-CAISO and import emissions*
Average emissions intensity	*tCO2/MWh*	0.192	0.147	0.104	0.081	*Emissions per MWh of sales*
Oversupply Emissions Credits	*MMt/yr*	0.15	0.17	0.10	0.22	*When hourly supply exceeds hourly load and system power is on the margin, LSE recieves credit at the system power emissions rate. Impact included in Total.*

PM2.5	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Coal	*tonnes/yr*	-	-	-	-	*Information only, not included in total*
CHP	*tonnes/yr*	9	9	9	5	
Biogas	*tonnes/yr*	4	4	4	1	
Biomass	*tonnes/yr*	37	35	26	20	
System Power	*tonnes/yr*	29	21	17	14	*In-CAISO emissions only - unspecified import emissions excluded*
Total	***tonnes/yr***	**79**	**70**	**56**	**41**	*Only In-CAISO emissions*
Average emissions intensity	*kg/MWh*	0.0118	0.0101	0.0078	0.0054	*Emissions per MWh of sales*

SO_2	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Coal	*tonnes/yr*	-	-	-	-	*Information only, not included in total*
CHP	*tonnes/yr*	1	1	1	1	
Biogas	*tonnes/yr*	3	3	3	1	
Biomass	*tonnes/yr*	14	13	10	8	
System Power	*tonnes/yr*	3	2	2	1	*In-CAISO emissions only - unspecified import emissions excluded*
Total	***tonnes/yr***	**21**	**20**	**16**	**10**	*Only In-CAISO emissions*
Average emissions intensity	*kg/MWh*	0.0031	0.0028	0.0022	0.0014	*Emissions per MWh of sales*

NOx	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Coal	*tonnes/yr*	-	-	-	-	*Information only, not included in total*
CHP	*tonnes/yr*	43	42	41	22	
Biogas	*tonnes/yr*	14	14	14	4	
Biomass	*tonnes/yr*	111	106	79	60	
System Power	*tonnes/yr*	35	25	21	18	*In-CAISO emissions only - unspecified import emissions excluded*
Total	***tonnes/yr***	**203**	**187**	**155**	**104**	*Only In-CAISO emissions*
Average emissions intensity	*kg/MWh*	0.0301	0.0272	0.0216	0.0138	*Emissions per MWh of sales*

Supply and Demand Balance

Demand Summary	***Unit***	**2024**	**2026**	**2030**	**2035**	
Managed Retail Sales Forecast (assigned to LSE)	*GWh*	6,740	6,887	7,180	7,540	*Sales forecast (before T&D losses increase demand at generator bus-bar)*
Baseline Demand, non-C&I	*GWh*	4,221	4,345	4,588	4,774	
Baseline Demand, C&I	*GWh*	3,984	4,131	4,451	4,827	
Electric Vehicle Load	*GWh*	286	413	663	1,040	
Building Electrification	*GWh*	32	60	122	207	*Summary of active inputs from Demand Inputs tab*
Energy Efficiency	*GWh*	(112)	(197)	(356)	(533)	
BTM PV	*GWh*	(1,138)	(1,320)	(1,721)	(2,181)	
Demand (at generator bus-bar)	*GWh*	7,276	7,436	7,753	8,144	

Supply Summary	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Large Hydro	*GWh*	-	-	-	-	
Imported Hydro	*GWh*	-	-	-	-	
Asset Controlling Supplier	*GWh*	-	-	-	-	
Nuclear	*GWh*	-	-	-	-	
Biogas	*GWh*	26	26	25	8	
Biomass	*GWh*	125	125	99	75	
Geothermal	*GWh*	18	321	320	303	
Small Hydro	*GWh*	130	135	135	112	
Wind CAISO	*GWh*	928	1,135	1,481	1,267	
Wind Out Of State	*GWh*	334	334	334	-	*Wind and solar values represent production potential (pre-curtailment).*
Wind Offshore	*GWh*	-	-	1,231	3,076	*Curtailment is calculated at the portfolio level (as opposed to the resource level), and is included as a line item below*
Solar Utility Scale	*GWh*	2,101	2,568	2,526	2,268	
Solar Distributed	*GWh*	-	-	-	-	*Distributed solar generation that is in front of the meter*
Hybrid or Paired Solar and Battery	*GWh*	826	820	809	794	
Shed DR	*GWh*	-	-	-	-	
Pumped Storage	*GWh*	-	-	-	-	*Negative because storage losses represent net negative energy production*
Battery Storage	*GWh*	(61)	(130)	(179)	(168)	*Negative because storage losses represent net negative energy production*
Storage Resource Custom Profile	*GWh*	-	-	-	-	*Negative because storage losses represent net negative energy production*
RPS Resource Custom Profile	*GWh*	-	-	-	-	
GHG-free non-RPS Resource Custom Profile	*GWh*	-	-	-	-	
Coal	*GWh*	-	-	-	-	
IPM CHP	*GWh*	367	364	358	220	

Supply Demand Balance Summary	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
LSE Supply, before curtailment and exports	*GWh*	*4,793*	*5,698*	*7,139*	*7,955*	*Represents LSE's net power production, before curtailment and exports reduce the power available to dispace CAISO dispatchable gas/unspecified imports*
Net Purchases, before curtailment and exports	*GWh*	*2,483*	*1,738*	*614*	*189*	*The net system power that the LSE would consume (positive = consume from system, negative = supply to system) if dispatchable gas/unspecified imports were on the margin at the system level in all hours. For information only - not directly used to calculate LSE emissions.*
Curtailment	GWh	(123)	(214)	(535)	(766)	*Power that, if supplied to the system, would not displace CAISO dispatchable gas and/or unspecified import emissions and would instead be curtailed*
Exports	GWh	(53)	(71)	(228)	(249)	*Power that, if supplied to the system, would not displace CAISO dispatchable gas and/or unspecified import emissions and would instead be exported*
Zero Emissions Power From System	GWh	0	-	3	11	*Power supplied to meet LSE demand that does not incur emissions. Oversupply conditions at the system level result in surplus zero emissions power in some hours.*
Net System Power (incurs emissions)	***GWh***	**2,659**	**2,024**	**1,374**	**1,193**	*Power supplied by the system (or sent back to the system from if negative) in hours when CAISO dispatchable gas and/or unspecified imports are on the margin. The net system power produced or consumed is multiplied by the system power emissions rate in each hour.*
Check: Supply equals demand		TRUE	TRUE	TRUE	TRUE	

Renewable and GHG-Free %	***Unit***	**2024**	**2026**	**2030**	**2035**	***Notes***
Retail Sales	GWh	6,740	6,887	7,180	7,540	
RPS-Eligible Delivered Renewable	GWh	4,365	5,249	6,425	7,136	Represents delivered renewable energy. Not directly comparable to production from an LSE's RPS-eligible resources.
GHG free	GWh	4,365	5,249	6,428	7,147	A small fraction of Asset Controlling Supplier imports are not counted as GHG-free
RPS-Eligible Delivered Renewable Percentage	*% of retail sales*	65%	76%	89%	95%	Represents delivered renewable energy. Not directly comparable to production from an LSE's RPS-eligible resources.
GHG-free Percentage	*% of retail sales*	65%	76%	90%	95%	

Individual LSE Energy Load Forecast Assignments for Use in 2022 LSE IRPs

Assigned per June 15, 2022 ALJ Ruling - https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=485625915

Service Area	LSE CPUC ID	LSE Name	YEAR	TYPE	Final IRP Sales Forecast (GWH)
PGE		Pacific Gas and Electric (Direct Access)	2023	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2024	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2025	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2026	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2027	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2028	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2029	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2030	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2031	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2032	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2033	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2034	ESP	11,393.00
PGE		Pacific Gas and Electric (Direct Access)	2035	ESP	11,393.00
SCE		Southern California Edison (Direct Access)	2023	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2024	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2025	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2026	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2027	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2028	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2029	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2030	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2031	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2032	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2033	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2034	ESP	13,420.85
SCE		Southern California Edison (Direct Access)	2035	ESP	13,420.85
SDGE		San Diego Gas and Electric (Direct Access)	2023	ESP	3,940.00

SDGE		San Diego Gas and Electric (Direct Access)	2024	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2025	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2026	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2027	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2028	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2029	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2030	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2031	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2032	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2033	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2034	ESP	3,940.00
SDGE		San Diego Gas and Electric (Direct Access)	2035	ESP	3,940.00
PGE	PGE	Pacific Gas and Electric (Bundled)	2023	IOU	26,903.26
PGE	PGE	Pacific Gas and Electric (Bundled)	2024	IOU	27,098.07
PGE	PGE	Pacific Gas and Electric (Bundled)	2025	IOU	27,256.63
PGE	PGE	Pacific Gas and Electric (Bundled)	2026	IOU	27,398.95
PGE	PGE	Pacific Gas and Electric (Bundled)	2027	IOU	27,549.43
PGE	PGE	Pacific Gas and Electric (Bundled)	2028	IOU	27,650.24
PGE	PGE	Pacific Gas and Electric (Bundled)	2029	IOU	27,879.43
PGE	PGE	Pacific Gas and Electric (Bundled)	2030	IOU	28,019.56
PGE	PGE	Pacific Gas and Electric (Bundled)	2031	IOU	28,355.70
PGE	PGE	Pacific Gas and Electric (Bundled)	2032	IOU	28,612.64
PGE	PGE	Pacific Gas and Electric (Bundled)	2033	IOU	29,044.21
PGE	PGE	Pacific Gas and Electric (Bundled)	2034	IOU	29,434.18
PGE	PGE	Pacific Gas and Electric (Bundled)	2035	IOU	29,851.64
SCE	SCE	Southern California Edison (Bundled)	2023	IOU	51,695.20
SCE	SCE	Southern California Edison (Bundled)	2024	IOU	51,866.12
SCE	SCE	Southern California Edison (Bundled)	2025	IOU	52,196.12
SCE	SCE	Southern California Edison (Bundled)	2026	IOU	52,501.95
SCE	SCE	Southern California Edison (Bundled)	2027	IOU	52,943.78
SCE	SCE	Southern California Edison (Bundled)	2028	IOU	53,251.42
SCE	SCE	Southern California Edison (Bundled)	2029	IOU	53,601.83
SCE	SCE	Southern California Edison (Bundled)	2030	IOU	53,909.21
SCE	SCE	Southern California Edison (Bundled)	2031	IOU	54,293.31
SCE	SCE	Southern California Edison (Bundled)	2032	IOU	54,525.33
SCE	SCE	Southern California Edison (Bundled)	2033	IOU	54,791.53

SCE	SCE	Southern California Edison (Bundled)	2034	IOU	55,033.06
SCE	SCE	Southern California Edison (Bundled)	2035	IOU	55,275.88
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2023	IOU	4,421.70
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2024	IOU	3,637.80
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2025	IOU	3,638.92
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2026	IOU	3,645.46
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2027	IOU	3,656.22
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2028	IOU	3,663.55
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2029	IOU	3,677.82
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2030	IOU	3,694.02
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2031	IOU	3,716.29
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2032	IOU	3,734.01
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2033	IOU	3,755.70
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2034	IOU	3,772.75
SDGE	SDGE	San Diego Gas and Electric (Bundled)	2035	IOU	3,787.41
PGE	3CE	Central Coast Community Energy	2023	CCA	4,557.05
PGE	3CE	Central Coast Community Energy	2024	CCA	4,594.72
PGE	3CE	Central Coast Community Energy	2025	CCA	4,617.45
PGE	3CE	Central Coast Community Energy	2026	CCA	4,640.88
PGE	3CE	Central Coast Community Energy	2027	CCA	4,672.05
PGE	3CE	Central Coast Community Energy	2028	CCA	4,697.30
PGE	3CE	Central Coast Community Energy	2029	CCA	4,729.19
PGE	3CE	Central Coast Community Energy	2030	CCA	4,760.56
PGE	3CE	Central Coast Community Energy	2031	CCA	4,799.79
PGE	3CE	Central Coast Community Energy	2032	CCA	4,829.14
PGE	3CE	Central Coast Community Energy	2033	CCA	4,864.25
PGE	3CE	Central Coast Community Energy	2034	CCA	4,898.33
PGE	3CE	Central Coast Community Energy	2035	CCA	4,935.53
PGE	CPSF	CleanPowerSF	2023	CCA	2,943.85
PGE	CPSF	CleanPowerSF	2024	CCA	2,969.61
PGE	CPSF	CleanPowerSF	2025	CCA	2,992.90
PGE	CPSF	CleanPowerSF	2026	CCA	3,015.45
PGE	CPSF	CleanPowerSF	2027	CCA	3,039.05
PGE	CPSF	CleanPowerSF	2028	CCA	3,061.60
PGE	CPSF	CleanPowerSF	2029	CCA	3,089.80
PGE	CPSF	CleanPowerSF	2030	CCA	3,119.16
PGE	CPSF	CleanPowerSF	2031	CCA	3,152.83
PGE	CPSF	CleanPowerSF	2032	CCA	3,181.17
PGE	CPSF	CleanPowerSF	2033	CCA	3,215.15
PGE	CPSF	CleanPowerSF	2034	CCA	3,247.21
PGE	CPSF	CleanPowerSF	2035	CCA	3,292.89
PGE	EBCE	East Bay Community Energy	2023	CCA	6,651.95
PGE	EBCE	East Bay Community Energy	2024	CCA	6,739.80
PGE	EBCE	East Bay Community Energy	2025	CCA	6,815.88
PGE	EBCE	East Bay Community Energy	2026	CCA	6,887.17

PGE	EBCE	East Bay Community Energy	2027	CCA	6,954.65
PGE	EBCE	East Bay Community Energy	2028	CCA	7,026.50
PGE	EBCE	East Bay Community Energy	2029	CCA	7,100.58
PGE	EBCE	East Bay Community Energy	2030	CCA	7,179.74
PGE	EBCE	East Bay Community Energy	2031	CCA	7,259.20
PGE	EBCE	East Bay Community Energy	2032	CCA	7,326.11
PGE	EBCE	East Bay Community Energy	2033	CCA	7,393.58
PGE	EBCE	East Bay Community Energy	2034	CCA	7,461.20
PGE	EBCE	East Bay Community Energy	2035	CCA	7,539.97
PGE	KCCP	King City Community Power	2023	CCA	33.86
PGE	KCCP	King City Community Power	2024	CCA	34.12
PGE	KCCP	King City Community Power	2025	CCA	34.33
PGE	KCCP	King City Community Power	2026	CCA	34.55
PGE	KCCP	King City Community Power	2027	CCA	34.80
PGE	KCCP	King City Community Power	2028	CCA	35.05
PGE	KCCP	King City Community Power	2029	CCA	35.39
PGE	KCCP	King City Community Power	2030	CCA	35.73
PGE	KCCP	King City Community Power	2031	CCA	36.17
PGE	KCCP	King City Community Power	2032	CCA	36.54
PGE	KCCP	King City Community Power	2033	CCA	37.00
PGE	KCCP	King City Community Power	2034	CCA	37.46
PGE	KCCP	King City Community Power	2035	CCA	37.95
PGE	MCE	Marin Clean Energy	2023	CCA	5,728.63
PGE	MCE	Marin Clean Energy	2024	CCA	5,758.94
PGE	MCE	Marin Clean Energy	2025	CCA	5,755.61
PGE	MCE	Marin Clean Energy	2026	CCA	5,759.26
PGE	MCE	Marin Clean Energy	2027	CCA	5,766.74
PGE	MCE	Marin Clean Energy	2028	CCA	5,795.21
PGE	MCE	Marin Clean Energy	2029	CCA	5,827.36
PGE	MCE	Marin Clean Energy	2030	CCA	5,955.34
PGE	MCE	Marin Clean Energy	2031	CCA	5,982.79
PGE	MCE	Marin Clean Energy	2032	CCA	6,039.93
PGE	MCE	Marin Clean Energy	2033	CCA	6,040.19
PGE	MCE	Marin Clean Energy	2034	CCA	6,066.94
PGE	MCE	Marin Clean Energy	2035	CCA	6,098.58
PGE	PCEA	Peninsula Clean Energy Authority	2023	CCA	3,424.82
PGE	PCEA	Peninsula Clean Energy Authority	2024	CCA	3,455.72
PGE	PCEA	Peninsula Clean Energy Authority	2025	CCA	3,461.01
PGE	PCEA	Peninsula Clean Energy Authority	2026	CCA	3,495.78
PGE	PCEA	Peninsula Clean Energy Authority	2027	CCA	3,554.01
PGE	PCEA	Peninsula Clean Energy Authority	2028	CCA	3,620.17
PGE	PCEA	Peninsula Clean Energy Authority	2029	CCA	3,666.17
PGE	PCEA	Peninsula Clean Energy Authority	2030	CCA	3,721.49
PGE	PCEA	Peninsula Clean Energy Authority	2031	CCA	3,780.66
PGE	PCEA	Peninsula Clean Energy Authority	2032	CCA	3,847.92
PGE	PCEA	Peninsula Clean Energy Authority	2033	CCA	3,897.29
PGE	PCEA	Peninsula Clean Energy Authority	2034	CCA	3,960.71
PGE	PCEA	Peninsula Clean Energy Authority	2035	CCA	4,032.71
PGE	PIONEER	Pioneer Community Energy	2023	CCA	1,888.43
PGE	PIONEER	Pioneer Community Energy	2024	CCA	1,904.69
PGE	PIONEER	Pioneer Community Energy	2025	CCA	1,916.17
PGE	PIONEER	Pioneer Community Energy	2026	CCA	1,926.85
PGE	PIONEER	Pioneer Community Energy	2027	CCA	1,938.95
PGE	PIONEER	Pioneer Community Energy	2028	CCA	1,951.69
PGE	PIONEER	Pioneer Community Energy	2029	CCA	1,968.03
PGE	PIONEER	Pioneer Community Energy	2030	CCA	1,986.47
PGE	PIONEER	Pioneer Community Energy	2031	CCA	2,006.21
PGE	PIONEER	Pioneer Community Energy	2032	CCA	2,023.27
PGE	PIONEER	Pioneer Community Energy	2033	CCA	2,044.07
PGE	PIONEER	Pioneer Community Energy	2034	CCA	2,065.07

PGE	PIONEER	Pioneer Community Energy	2035	CCA	2,089.92
PGE	RCEA	Redwood Coast Energy Authority	2023	CCA	674.13
PGE	RCEA	Redwood Coast Energy Authority	2024	CCA	677.92
PGE	RCEA	Redwood Coast Energy Authority	2025	CCA	678.67
PGE	RCEA	Redwood Coast Energy Authority	2026	CCA	680.61
PGE	RCEA	Redwood Coast Energy Authority	2027	CCA	682.11
PGE	RCEA	Redwood Coast Energy Authority	2028	CCA	683.33
PGE	RCEA	Redwood Coast Energy Authority	2029	CCA	684.37
PGE	RCEA	Redwood Coast Energy Authority	2030	CCA	685.27
PGE	RCEA	Redwood Coast Energy Authority	2031	CCA	686.06
PGE	RCEA	Redwood Coast Energy Authority	2032	CCA	686.77
PGE	RCEA	Redwood Coast Energy Authority	2033	CCA	687.38
PGE	RCEA	Redwood Coast Energy Authority	2034	CCA	687.96
PGE	RCEA	Redwood Coast Energy Authority	2035	CCA	688.50
PGE	SJCE	San José Clean Energy	2023	CCA	3,789.74
PGE	SJCE	San José Clean Energy	2024	CCA	3,820.79
PGE	SJCE	San José Clean Energy	2025	CCA	3,844.49
PGE	SJCE	San José Clean Energy	2026	CCA	3,867.62
PGE	SJCE	San José Clean Energy	2027	CCA	3,894.50
PGE	SJCE	San José Clean Energy	2028	CCA	3,921.64
PGE	SJCE	San José Clean Energy	2029	CCA	3,957.58
PGE	SJCE	San José Clean Energy	2030	CCA	3,995.71
PGE	SJCE	San José Clean Energy	2031	CCA	4,040.38
PGE	SJCE	San José Clean Energy	2032	CCA	4,079.40
PGE	SJCE	San José Clean Energy	2033	CCA	4,126.86
PGE	SJCE	San José Clean Energy	2034	CCA	4,174.19
PGE	SJCE	San José Clean Energy	2035	CCA	4,227.40
PGE	SVCEA	Silicon Valley Clean Energy Authority	2023	CCA	3,654.29
PGE	SVCEA	Silicon Valley Clean Energy Authority	2024	CCA	3,681.47
PGE	SVCEA	Silicon Valley Clean Energy Authority	2025	CCA	3,700.66
PGE	SVCEA	Silicon Valley Clean Energy Authority	2026	CCA	3,720.83
PGE	SVCEA	Silicon Valley Clean Energy Authority	2027	CCA	3,744.51
PGE	SVCEA	Silicon Valley Clean Energy Authority	2028	CCA	3,767.83
PGE	SVCEA	Silicon Valley Clean Energy Authority	2029	CCA	3,799.80
PGE	SVCEA	Silicon Valley Clean Energy Authority	2030	CCA	3,833.43
PGE	SVCEA	Silicon Valley Clean Energy Authority	2031	CCA	3,874.42
PGE	SVCEA	Silicon Valley Clean Energy Authority	2032	CCA	3,909.98
PGE	SVCEA	Silicon Valley Clean Energy Authority	2033	CCA	3,953.07
PGE	SVCEA	Silicon Valley Clean Energy Authority	2034	CCA	3,995.93
PGE	SVCEA	Silicon Valley Clean Energy Authority	2035	CCA	4,043.64
PGE	SOMA	Sonoma Clean Power	2023	CCA	2,208.14
PGE	SOMA	Sonoma Clean Power	2024	CCA	2,227.09
PGE	SOMA	Sonoma Clean Power	2025	CCA	2,241.23
PGE	SOMA	Sonoma Clean Power	2026	CCA	2,254.51
PGE	SOMA	Sonoma Clean Power	2027	CCA	2,269.72
PGE	SOMA	Sonoma Clean Power	2028	CCA	2,285.47
PGE	SOMA	Sonoma Clean Power	2029	CCA	2,305.87

PGE	SOMA	Sonoma Clean Power	2030	CCA	2,328.20
PGE	SOMA	Sonoma Clean Power	2031	CCA	2,353.02
PGE	SOMA	Sonoma Clean Power	2032	CCA	2,374.63
PGE	SOMA	Sonoma Clean Power	2033	CCA	2,400.97
PGE	SOMA	Sonoma Clean Power	2034	CCA	2,427.39
PGE	SOMA	Sonoma Clean Power	2035	CCA	2,457.92
PGE	VCEA	Valley Clean Energy Alliance	2023	CCA	727.31
PGE	VCEA	Valley Clean Energy Alliance	2024	CCA	718.40
PGE	VCEA	Valley Clean Energy Alliance	2025	CCA	729.10
PGE	VCEA	Valley Clean Energy Alliance	2026	CCA	740.65
PGE	VCEA	Valley Clean Energy Alliance	2027	CCA	751.72
PGE	VCEA	Valley Clean Energy Alliance	2028	CCA	764.61
PGE	VCEA	Valley Clean Energy Alliance	2029	CCA	774.12
PGE	VCEA	Valley Clean Energy Alliance	2030	CCA	786.37
PGE	VCEA	Valley Clean Energy Alliance	2031	CCA	798.81
PGE	VCEA	Valley Clean Energy Alliance	2032	CCA	812.46
PGE	VCEA	Valley Clean Energy Alliance	2033	CCA	822.41
PGE	VCEA	Valley Clean Energy Alliance	2034	CCA	833.95
PGE	VCEA	Valley Clean Energy Alliance	2035	CCA	846.61
SCE	AVCE	Apple Valley Choice Energy	2023	CCA	257.34
SCE	AVCE	Apple Valley Choice Energy	2024	CCA	260.33
SCE	AVCE	Apple Valley Choice Energy	2025	CCA	262.17
SCE	AVCE	Apple Valley Choice Energy	2026	CCA	263.86
SCE	AVCE	Apple Valley Choice Energy	2027	CCA	266.23
SCE	AVCE	Apple Valley Choice Energy	2028	CCA	268.11
SCE	AVCE	Apple Valley Choice Energy	2029	CCA	269.93
SCE	AVCE	Apple Valley Choice Energy	2030	CCA	271.62
SCE	AVCE	Apple Valley Choice Energy	2031	CCA	273.14
SCE	AVCE	Apple Valley Choice Energy	2032	CCA	274.01
SCE	AVCE	Apple Valley Choice Energy	2033	CCA	275.00
SCE	AVCE	Apple Valley Choice Energy	2034	CCA	275.88
SCE	AVCE	Apple Valley Choice Energy	2035	CCA	276.96
SCE	3CE	Central Coast Community Energy	2023	CCA	553.70
SCE	3CE	Central Coast Community Energy	2024	CCA	551.01
SCE	3CE	Central Coast Community Energy	2025	CCA	548.29
SCE	3CE	Central Coast Community Energy	2026	CCA	545.56
SCE	3CE	Central Coast Community Energy	2027	CCA	542.84
SCE	3CE	Central Coast Community Energy	2028	CCA	540.12
SCE	3CE	Central Coast Community Energy	2029	CCA	537.41
SCE	3CE	Central Coast Community Energy	2030	CCA	534.72
SCE	3CE	Central Coast Community Energy	2031	CCA	532.07
SCE	3CE	Central Coast Community Energy	2032	CCA	529.42
SCE	3CE	Central Coast Community Energy	2033	CCA	533.00
SCE	3CE	Central Coast Community Energy	2034	CCA	536.46
SCE	3CE	Central Coast Community Energy	2035	CCA	540.25
SCE	CPASC	Clean Power Alliance	2023	CCA	10,901.82
SCE	CPASC	Clean Power Alliance	2024	CCA	11,015.38
SCE	CPASC	Clean Power Alliance	2025	CCA	11,087.48
SCE	CPASC	Clean Power Alliance	2026	CCA	11,154.57
SCE	CPASC	Clean Power Alliance	2027	CCA	11,248.74
SCE	CPASC	Clean Power Alliance	2028	CCA	11,321.00
SCE	CPASC	Clean Power Alliance	2029	CCA	11,397.82
SCE	CPASC	Clean Power Alliance	2030	CCA	11,466.83
SCE	CPASC	Clean Power Alliance	2031	CCA	11,543.04
SCE	CPASC	Clean Power Alliance	2032	CCA	11,589.56
SCE	CPASC	Clean Power Alliance	2033	CCA	11,643.36
SCE	CPASC	Clean Power Alliance	2034	CCA	11,692.24
SCE	CPASC	Clean Power Alliance	2035	CCA	11,744.26
SCE	DCE	Desert Community Energy	2023	CCA	444.00
SCE	DCE	Desert Community Energy	2024	CCA	456.45

SCE	DCE	Desert Community Energy	2025	CCA	459.91
SCE	DCE	Desert Community Energy	2026	CCA	461.33
SCE	DCE	Desert Community Energy	2027	CCA	462.99
SCE	DCE	Desert Community Energy	2028	CCA	464.89
SCE	DCE	Desert Community Energy	2029	CCA	467.04
SCE	DCE	Desert Community Energy	2030	CCA	469.42
SCE	DCE	Desert Community Energy	2031	CCA	472.05
SCE	DCE	Desert Community Energy	2032	CCA	474.93
SCE	DCE	Desert Community Energy	2033	CCA	478.04
SCE	DCE	Desert Community Energy	2034	CCA	481.40
SCE	DCE	Desert Community Energy	2035	CCA	485.00
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2023	CCA	552.80
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2024	CCA	610.35
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2025	CCA	615.01
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2026	CCA	619.34
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2027	CCA	625.16
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2028	CCA	630.11
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2029	CCA	635.50
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2030	CCA	640.32
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2031	CCA	645.45
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2032	CCA	648.93
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2033	CCA	652.90
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2034	CCA	656.53
SCE	PALMDALE	Energy for Palmdale's Independent Choice	2035	CCA	660.25
SCE	LCE	Lancaster Choice Energy	2023	CCA	589.26
SCE	LCE	Lancaster Choice Energy	2024	CCA	595.74
SCE	LCE	Lancaster Choice Energy	2025	CCA	599.86
SCE	LCE	Lancaster Choice Energy	2026	CCA	603.66
SCE	LCE	Lancaster Choice Energy	2027	CCA	608.98
SCE	LCE	Lancaster Choice Energy	2028	CCA	613.16
SCE	LCE	Lancaster Choice Energy	2029	CCA	617.43
SCE	LCE	Lancaster Choice Energy	2030	CCA	621.33
SCE	LCE	Lancaster Choice Energy	2031	CCA	625.23
SCE	LCE	Lancaster Choice Energy	2032	CCA	627.58
SCE	LCE	Lancaster Choice Energy	2033	CCA	630.28
SCE	LCE	Lancaster Choice Energy	2034	CCA	632.71
SCE	LCE	Lancaster Choice Energy	2035	CCA	635.45
SCE	OCPA	Orange County Power Authority	2023	CCA	3,581.79
SCE	OCPA	Orange County Power Authority	2024	CCA	3,942.95
SCE	OCPA	Orange County Power Authority	2025	CCA	3,973.07
SCE	OCPA	Orange County Power Authority	2026	CCA	4,001.06
SCE	OCPA	Orange County Power Authority	2027	CCA	4,038.60
SCE	OCPA	Orange County Power Authority	2028	CCA	4,070.64
SCE	OCPA	Orange County Power Authority	2029	CCA	4,105.44
SCE	OCPA	Orange County Power Authority	2030	CCA	4,136.55
SCE	OCPA	Orange County Power Authority	2031	CCA	4,169.66
SCE	OCPA	Orange County Power Authority	2032	CCA	4,192.14

SCE	OCPA	Orange County Power Authority	2033	CCA	4,217.79
SCE	OCPA	Orange County Power Authority	2034	CCA	4,241.19
SCE	OCPA	Orange County Power Authority	2035	CCA	4,265.26
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2023	CCA	225.46
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2024	CCA	227.74
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2025	CCA	229.23
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2026	CCA	230.63
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2027	CCA	232.58
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2028	CCA	234.09
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2029	CCA	235.74
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2030	CCA	237.21
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2031	CCA	238.91
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2032	CCA	239.98
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2033	CCA	241.22
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2034	CCA	242.35
SCE	PRIME	Pico Rivera Innovative Municipal Energy	2035	CCA	243.51
SCE	POMONA	Pomona Choice Energy	2023	CCA	386.84
SCE	POMONA	Pomona Choice Energy	2024	CCA	390.80
SCE	POMONA	Pomona Choice Energy	2025	CCA	393.61
SCE	POMONA	Pomona Choice Energy	2026	CCA	396.20
SCE	POMONA	Pomona Choice Energy	2027	CCA	399.73
SCE	POMONA	Pomona Choice Energy	2028	CCA	402.69
SCE	POMONA	Pomona Choice Energy	2029	CCA	405.84
SCE	POMONA	Pomona Choice Energy	2030	CCA	408.68
SCE	POMONA	Pomona Choice Energy	2031	CCA	411.58
SCE	POMONA	Pomona Choice Energy	2032	CCA	413.48
SCE	POMONA	Pomona Choice Energy	2033	CCA	415.67
SCE	POMONA	Pomona Choice Energy	2034	CCA	417.66
SCE	POMONA	Pomona Choice Energy	2035	CCA	419.77
SCE	RMEA	Rancho Mirage Energy Authority	2023	CCA	280.26
SCE	RMEA	Rancho Mirage Energy Authority	2024	CCA	283.27
SCE	RMEA	Rancho Mirage Energy Authority	2025	CCA	284.97
SCE	RMEA	Rancho Mirage Energy Authority	2026	CCA	286.55
SCE	RMEA	Rancho Mirage Energy Authority	2027	CCA	288.84
SCE	RMEA	Rancho Mirage Energy Authority	2028	CCA	290.47
SCE	RMEA	Rancho Mirage Energy Authority	2029	CCA	292.09
SCE	RMEA	Rancho Mirage Energy Authority	2030	CCA	293.58
SCE	RMEA	Rancho Mirage Energy Authority	2031	CCA	295.16
SCE	RMEA	Rancho Mirage Energy Authority	2032	CCA	295.99
SCE	RMEA	Rancho Mirage Energy Authority	2033	CCA	296.96
SCE	RMEA	Rancho Mirage Energy Authority	2034	CCA	297.83
SCE	RMEA	Rancho Mirage Energy Authority	2035	CCA	298.85
SCE	SJP	San Jacinto Power	2023	CCA	167.99
SCE	SJP	San Jacinto Power	2024	CCA	169.89
SCE	SJP	San Jacinto Power	2025	CCA	171.04
SCE	SJP	San Jacinto Power	2026	CCA	172.08
SCE	SJP	San Jacinto Power	2027	CCA	173.57

SCE	SJP	San Jacinto Power	2028	CCA	174.71
SCE	SJP	San Jacinto Power	2029	CCA	175.82
SCE	SJP	San Jacinto Power	2030	CCA	176.85
SCE	SJP	San Jacinto Power	2031	CCA	177.82
SCE	SJP	San Jacinto Power	2032	CCA	178.35
SCE	SJP	San Jacinto Power	2033	CCA	178.97
SCE	SJP	San Jacinto Power	2034	CCA	179.52
SCE	SJP	San Jacinto Power	2035	CCA	180.19
SCE	SBCE	Santa Barbara Clean Energy	2023	CCA	340.61
SCE	SBCE	Santa Barbara Clean Energy	2024	CCA	344.03
SCE	SBCE	Santa Barbara Clean Energy	2025	CCA	346.43
SCE	SBCE	Santa Barbara Clean Energy	2026	CCA	348.65
SCE	SBCE	Santa Barbara Clean Energy	2027	CCA	351.69
SCE	SBCE	Santa Barbara Clean Energy	2028	CCA	354.17
SCE	SBCE	Santa Barbara Clean Energy	2029	CCA	356.88
SCE	SBCE	Santa Barbara Clean Energy	2030	CCA	359.30
SCE	SBCE	Santa Barbara Clean Energy	2031	CCA	361.93
SCE	SBCE	Santa Barbara Clean Energy	2032	CCA	363.67
SCE	SBCE	Santa Barbara Clean Energy	2033	CCA	365.65
SCE	SBCE	Santa Barbara Clean Energy	2034	CCA	367.47
SCE	SBCE	Santa Barbara Clean Energy	2035	CCA	369.34
SDGE	CEA	Clean Energy Alliance	2023	CCA	1,266.71
SDGE	CEA	Clean Energy Alliance	2024	CCA	1,487.19
SDGE	CEA	Clean Energy Alliance	2025	CCA	1,496.06
SDGE	CEA	Clean Energy Alliance	2026	CCA	1,504.22
SDGE	CEA	Clean Energy Alliance	2027	CCA	1,512.16
SDGE	CEA	Clean Energy Alliance	2028	CCA	1,520.15
SDGE	CEA	Clean Energy Alliance	2029	CCA	1,528.80
SDGE	CEA	Clean Energy Alliance	2030	CCA	1,538.83
SDGE	CEA	Clean Energy Alliance	2031	CCA	1,551.38
SDGE	CEA	Clean Energy Alliance	2032	CCA	1,560.79
SDGE	CEA	Clean Energy Alliance	2033	CCA	1,571.53
SDGE	CEA	Clean Energy Alliance	2034	CCA	1,580.06
SDGE	CEA	Clean Energy Alliance	2035	CCA	1,589.35
SDGE	OCPA	Orange County Power Authority	2023	CCA	22.45
SDGE	OCPA	Orange County Power Authority	2024	CCA	169.46
SDGE	OCPA	Orange County Power Authority	2025	CCA	170.47
SDGE	OCPA	Orange County Power Authority	2026	CCA	171.40
SDGE	OCPA	Orange County Power Authority	2027	CCA	172.31
SDGE	OCPA	Orange County Power Authority	2028	CCA	173.22
SDGE	OCPA	Orange County Power Authority	2029	CCA	174.20
SDGE	OCPA	Orange County Power Authority	2030	CCA	175.35
SDGE	OCPA	Orange County Power Authority	2031	CCA	176.78
SDGE	OCPA	Orange County Power Authority	2032	CCA	177.85
SDGE	OCPA	Orange County Power Authority	2033	CCA	179.07
SDGE	OCPA	Orange County Power Authority	2034	CCA	180.04
SDGE	OCPA	Orange County Power Authority	2035	CCA	181.10
SDGE	SDCP	San Diego Community Power	2023	CCA	7,422.00
SDGE	SDCP	San Diego Community Power	2024	CCA	7,932.00
SDGE	SDCP	San Diego Community Power	2025	CCA	7,979.31
SDGE	SDCP	San Diego Community Power	2026	CCA	8,022.80
SDGE	SDCP	San Diego Community Power	2027	CCA	8,065.19
SDGE	SDCP	San Diego Community Power	2028	CCA	8,107.78
SDGE	SDCP	San Diego Community Power	2029	CCA	8,153.91
SDGE	SDCP	San Diego Community Power	2030	CCA	8,207.38
SDGE	SDCP	San Diego Community Power	2031	CCA	8,274.38
SDGE	SDCP	San Diego Community Power	2032	CCA	8,324.52
SDGE	SDCP	San Diego Community Power	2033	CCA	8,381.84
SDGE	SDCP	San Diego Community Power	2034	CCA	8,427.34
SDGE	SDCP	San Diego Community Power	2035	CCA	8,476.83

Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2023	SMJ	132.48
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2024	SMJ	132.48
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2025	SMJ	133.49
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2026	SMJ	134.42
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2027	SMJ	135.68
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2028	SMJ	136.74
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2029	SMJ	137.83
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2030	SMJ	138.82
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2031	SMJ	139.78
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2032	SMJ	140.39
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2033	SMJ	141.09
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2034	SMJ	141.72
Bear Valley Electric Service	BEAR	Bear Valley Electric Service	2035	SMJ	142.42
Liberty Utilities	LIB	Liberty Utilities	2023	SMJ	557.67
Liberty Utilities	LIB	Liberty Utilities	2024	SMJ	557.67
Liberty Utilities	LIB	Liberty Utilities	2025	SMJ	561.20
Liberty Utilities	LIB	Liberty Utilities	2026	SMJ	564.80
Liberty Utilities	LIB	Liberty Utilities	2027	SMJ	568.80
Liberty Utilities	LIB	Liberty Utilities	2028	SMJ	571.91
Liberty Utilities	LIB	Liberty Utilities	2029	SMJ	575.63
Liberty Utilities	LIB	Liberty Utilities	2030	SMJ	579.47
Liberty Utilities	LIB	Liberty Utilities	2031	SMJ	583.93
Liberty Utilities	LIB	Liberty Utilities	2032	SMJ	587.55
Liberty Utilities	LIB	Liberty Utilities	2033	SMJ	591.50
Liberty Utilities	LIB	Liberty Utilities	2034	SMJ	595.24
Liberty Utilities	LIB	Liberty Utilities	2035	SMJ	599.16
PacifiCorp	PCORP	PacifiCorp	2023	SMJ	871.48
PacifiCorp	PCORP	PacifiCorp	2024	SMJ	874.56
PacifiCorp	PCORP	PacifiCorp	2025	SMJ	873.57
PacifiCorp	PCORP	PacifiCorp	2026	SMJ	876.03
PacifiCorp	PCORP	PacifiCorp	2027	SMJ	879.11
PacifiCorp	PCORP	PacifiCorp	2028	SMJ	884.04
PacifiCorp	PCORP	PacifiCorp	2029	SMJ	884.19
PacifiCorp	PCORP	PacifiCorp	2030	SMJ	886.08
PacifiCorp	PCORP	PacifiCorp	2031	SMJ	887.88
PacifiCorp	PCORP	PacifiCorp	2032	SMJ	892.46
PacifiCorp	PCORP	PacifiCorp	2033	SMJ	892.14
PacifiCorp	PCORP	PacifiCorp	2034	SMJ	894.41
PacifiCorp	PCORP	PacifiCorp	2035	SMJ	896.63

Individual LSE Behind-the-Meter Photovoltaic (BTM PV) Forecast Assignments for Use in 2022 LSE IRPs

Assigned per June 15, 2022 ALJ Ruling - https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=485625915

Generation (GWh) (measured at customer, not grossed up for T&D losses)

Service A	Type	LSE CPU(	LSE Name	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
PGE	IOU	PGE	Pacific Gas	3,907	4,240	4,552	4,867	5,198	5,536	5,893	6,226	6,588	6,935	7,309	7,663	8,006
PGE	ESP		Pacific Gas	1,655	1,783	1,903	2,024	2,149	2,281	2,408	2,531	2,647	2,761	2,867	2,966	3,055
PGE	CCA	3CE	Central Coa	662	719	771	824	881	941	1,000	1,058	1,115	1,170	1,224	1,275	1,324
PGE	CCA	CPSF	CleanPower	428	465	500	536	573	613	653	693	733	771	809	845	883
PGE	CCA	EBCE	East Bay Co	966	1,055	1,138	1,223	1,312	1,407	1,501	1,595	1,687	1,776	1,861	1,942	2,022
PGE	CCA	KCCP	King City Co	5	5	6	6	7	7	7	8	8	9	9	10	10
PGE	CCA	MCE	Marin Clean	832	901	961	1,023	1,088	1,160	1,232	1,323	1,390	1,464	1,520	1,579	1,636
PGE	CCA	PCEA	Peninsula Cl	497	541	578	621	671	725	775	827	878	933	981	1,031	1,081
PGE	CCA	PIONEER	Pioneer Cor	274	298	320	342	366	391	416	441	466	490	514	538	560
PGE	CCA	RCEA	Redwood C	98	106	113	121	129	137	145	152	159	166	173	179	185
PGE	CCA	SJCE	San José Cl	550	598	642	687	735	785	837	888	939	989	1,039	1,087	1,134
PGE	CCA	SVCEA	Silicon Valle	531	576	618	661	706	754	803	852	900	948	995	1,040	1,084
PGE	CCA	SOMA	Sonoma Cle	321	348	374	401	428	458	487	517	547	576	604	632	659
PGE	CCA	VCEA	Valley Clean	106	112	122	132	142	153	164	175	186	197	207	217	227
SCE	IOU	SCE	Southern Ca	4,975	5,374	5,783	6,212	6,661	7,123	7,603	8,099	8,615	9,142	9,679	10,225	10,774
SCE	ESP		Southern Ca	424	457	489	522	555	590	625	663	700	739	779	819	860
SCE	CCA	AVCE	Apple Valley	49	53	57	61	66	71	75	80	85	90	96	101	106
SCE	CCA	COBP	Baldwin Par	-	-	-	-	-	-	-	-	-	-	-	-	-
SCE	CCA	3CE	Central Coa	53	57	61	65	68	72	76	80	84	89	94	100	105
SCE	CCA	CPASC	Clean Powe	731	795	856	919	986	1,055	1,126	1,200	1,276	1,354	1,433	1,513	1,595
SCE	CCA	DCE	Desert Com	64	71	76	82	87	93	99	106	112	119	127	134	142
SCE	CCA	PALMDALE	Energy for P	53	63	68	73	79	84	90	96	102	109	115	122	129
SCE	CCA	LCE	Lancaster C	119	130	140	150	161	172	184	196	208	221	234	247	260
SCE	CCA	OCPA	Orange Cou	345	409	440	473	508	544	582	621	662	703	745	788	831
SCE	CCA	PRIME	Pico Rivera	14	16	17	18	19	21	22	24	25	27	28	30	32
SCE	CCA	POMONA	Pomona Ch	12	13	14	15	16	17	18	19	21	22	23	25	26
SCE	CCA	RMEA	Rancho Mira	72	78	84	90	97	103	110	117	125	132	140	147	155
SCE	CCA	SJP	San Jacinto	38	41	44	48	51	55	58	62	66	70	74	78	82
SCE	CCA	SBCE	Santa Barba	33	36	38	41	44	47	51	54	57	61	65	68	72
SCE	CCA	WCE	Western Co	-	-	-	-	-	-	-	-	-	-	-	-	-
SDGE	IOU	SDGE	San Diego C	875	772	823	877	934	990	1,048	1,106	1,165	1,223	1,281	1,338	1,393
SDGE	ESP		San Diego C	779	836	891	948	1,006	1,065	1,123	1,180	1,235	1,290	1,344	1,397	1,449
SDGE	CCA	CEA	Clean Energ	251	316	338	362	386	411	436	461	486	511	536	560	585
SDGE	CCA	OCPA	Orange Cou	4	36	39	41	44	47	50	53	55	58	61	64	67
SDGE	CCA	SDCP	San Diego C	1,468	1,684	1,805	1,931	2,060	2,192	2,324	2,458	2,593	2,726	2,859	2,989	3,118

25 MMT in 2035

GHG benchmarks assigned per June 15, 2022 ALJ Ruling - https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=485625915

Utility	LSEs within Host Utility Territory	Proportion of Total Emissions	2030 Load (GWh)	2035 Load (GWh)	Proportion of 2030 Load within EDU	Proportion of 2035 Load within EDU	2030 GHG Emissions Benchmark (MMT)	2035 GHG Emissions Benchmark (MMT)
Bear Valley Electric Service	N/A	0.000587773	138.8195	142.4237	N/A	N/A	0.014	0.012
Liberty Utilities	N/A	0.002547815	579.4708	599.1643	N/A	N/A	0.063	0.051
Pacific Gas and Electric Company	Pacific Gas and Electric (Bundled)	0.338367402	28,019.5589	29,851.6421	0.360148471	0.366114920	3.013	2.466
	Pacific Gas and Electric (Direct Access)		11,393.0000	11,393.0000	0.146439548	0.139729241	1.225	0.941
	Central Coast Community Energy		4,760.5600	4,935.5300	0.061189700	0.060531718	0.512	0.408
	CleanPowerSF		3,119.1600	3,292.8900	0.040092020	0.040385589	0.335	0.272
	East Bay Community Energy		7,179.7353	7,539.9690	0.092284489	0.092473813	0.772	0.623
	King City Community Power		35.7300	37.9500	0.000459254	0.000465437	0.004	0.003
	Marin Clean Energy		5,955.3400	6,098.5800	0.076546765	0.074795923	0.640	0.504
	Peninsula Clean Energy Authority		3,721.4857	4,032.7067	0.047833993	0.049459058	0.400	0.333
	Pioneer Community Energy		1,986.4700	2,089.9200	0.025533026	0.025631786	0.214	0.173
	Redwood Coast Energy Authority		685.2700	688.5000	0.008808095	0.008444096	0.074	0.057
	San José Clean Energy		3,995.7100	4,227.4000	0.051358726	0.051846870	0.430	0.349
	Silicon Valley Clean Energy Authority		3,833.4300	4,043.6400	0.049272865	0.049593149	0.412	0.334
	Sonoma Clean Power		2,328.2000	2,457.9200	0.029925442	0.030145115	0.250	0.203
	Valley Clean Energy Alliance		786.3719	846.6143	0.010107605	0.010383286	0.085	0.070
PacifiCorp	N/A	0.007461402	886.0800	896.6300	N/A	N/A	0.204	0.168
Southern California Edison Company	Southern California Edison (Bundled)	0.331706007	53,909.2120	55,275.8803	0.620027603	0.622365246	4.933	3.993
	Southern California Edison (Direct Access)		13,420.8510	13,420.8510	0.154357628	0.151108788	1.228	0.969
	Apple Valley Choice Energy		271.6200	276.9600	0.003123991	0.003118363	0.025	0.020
	Baldwin Park, City of		0.0000	0.0000	0.000000000	0.000000000	0.000	0.000
	Central Coast Community Energy		534.7200	540.2500	0.006149991	0.006082813	0.049	0.039
	Clean Power Alliance		11,466.8300	11,744.2600	0.131883789	0.132231621	1.049	0.848
	Desert Community Energy		469.4200	485.0000	0.005398954	0.005460739	0.043	0.035
	Energy for Palmdale's Independent Choice		640.3184	660.2467	0.007364513	0.007433886	0.059	0.048
	Lancaster Choice Energy		621.3300	635.4500	0.007146121	0.007154694	0.057	0.046
	Orange County Power Authority		4,136.5522	4,265.2616	0.047575850	0.048023669	0.378	0.308
	Pico Rivera Innovative Municipal Energy		237.2100	243.5100	0.002728230	0.002741741	0.022	0.018
	Pomona Choice Energy		408.6800	419.7700	0.004700363	0.004726298	0.037	0.030
	Rancho Mirage Energy Authority		293.5800	298.8500	0.003376560	0.003364828	0.027	0.022
	San Jacinto Power		176.8500	180.1900	0.002034010	0.002028805	0.016	0.013
	Santa Barbara Clean Energy		359.2973	369.3414	0.004132397	0.004158510	0.033	0.027
	Western Community Energy		0.0000	0.0000	0.000000000	0.000000000	0.000	0.000
San Diego Gas & Electric Company	San Diego Gas and Electric (Bundled)	0.088426808	3,694.0194	3,787.4129	0.210418652	0.210708105	0.473	0.386
	San Diego Gas and Electric (Direct Access)		3,940.0000	3,940.0000	0.224430195	0.219197104	0.505	0.401
	Clean Energy Alliance		1,538.8253	1,589.3452	0.087654532	0.088421283	0.197	0.162
	Orange County Power Authority		175.3453	181.1020	0.009988018	0.010075388	0.022	0.018
	Solana Energy Alliance		0.0000	0.0000	0.000000000	0.000000000	0.000	0.000
	San Diego Community Power		8,207.3800	8,476.8300	0.467508603	0.471598119	1.052	0.863
TOTAL		**0.7690972**	**183,906.4331758**	**189,964.9911526**			**18.852**	**15.213**

				Wind								Solar			
Based on 2009 Weather			Avg Capacity Factor	31%	25%	31%	24%	51%	47%	46%	55%	30%	33%	34%	20%
			Aggregated Category	Wind CAISO	Wind CAISO	Wind CAISO	Wind Out Of State	Wind Out Of State	Wind Out Of State	Wind Offshore	Wind Offshore	Solar	Solar	Solar	Solar Distributed
Month	Day	Hour		Wind Baseline California	Wind New PG&E	Wind New SCE SDG&E	Wind Pacific Northwest	Wind Wyoming	Wind New Mexico	Wind Offshore Morro Bay	Wind Offshore Humboldt	Solar Baseline California	Solar New PG&E	Solar New SCE SDG&E	Solar Distributed
1	1	1		10%	7%	18%	38%	100%	96%	100%	31%	0%	0%	0%	0%
1	1	2		10%	10%	19%	37%	100%	96%	100%	56%	0%	0%	0%	0%
1	1	3		10%	13%	22%	36%	100%	97%	100%	82%	0%	0%	0%	0%
1	1	4		11%	13%	25%	35%	100%	97%	100%	100%	0%	0%	0%	0%
1	1	5		11%	14%	25%	32%	100%	98%	100%	100%	0%	0%	0%	0%
1	1	6		13%	14%	28%	29%	99%	98%	100%	100%	0%	0%	0%	0%
1	1	7		15%	14%	32%	26%	98%	97%	100%	100%	0%	0%	0%	0%
1	1	8		15%	15%	30%	24%	71%	84%	100%	100%	19%	16%	34%	4%
1	1	9		12%	11%	20%	20%	48%	85%	92%	100%	39%	1%	67%	13%
1	1	10		9%	7%	16%	17%	76%	96%	86%	100%	47%	5%	75%	20%
1	1	11		9%	6%	14%	23%	97%	97%	82%	100%	51%	10%	76%	30%
1	1	12		9%	8%	10%	52%	99%	96%	82%	100%	53%	18%	75%	34%
1	1	13		8%	9%	7%	64%	100%	94%	85%	100%	53%	18%	75%	34%
1	1	14		6%	9%	5%	70%	100%	93%	87%	100%	50%	13%	75%	31%
1	1	15		4%	7%	4%	66%	99%	88%	84%	100%	46%	9%	73%	23%
1	1	16		3%	6%	4%	60%	98%	88%	73%	100%	36%	5%	61%	17%
1	1	17		4%	7%	3%	51%	99%	95%	62%	100%	10%	0%	8%	5%
1	1	18		5%	10%	4%	39%	100%	97%	57%	100%	0%	0%	2%	0%
1	1	19		5%	10%	4%	27%	100%	98%	58%	100%	0%	0%	0%	0%
1	1	20		5%	10%	5%	24%	100%	98%	63%	100%	0%	0%	0%	0%
1	1	21		5%	13%	5%	11%	100%	98%	64%	100%	0%	0%	0%	0%
1	1	22		5%	13%	5%	1%	100%	98%	60%	100%	0%	0%	0%	0%
1	1	23		6%	14%	6%	0%	100%	97%	58%	100%	0%	0%	0%	0%
1	1	24		7%	17%	7%	3%	100%	97%	65%	100%	0%	0%	0%	0%
1	2	1		7%	27%	8%	15%	100%	96%	73%	100%	0%	0%	0%	0%
1	2	2		9%	39%	8%	35%	100%	96%	67%	100%	0%	0%	0%	0%
1	2	3		11%	44%	8%	44%	100%	95%	51%	100%	0%	0%	0%	0%
1	2	4		14%	46%	8%	63%	100%	95%	38%	100%	0%	0%	0%	0%
1	2	5		16%	39%	8%	64%	100%	94%	34%	100%	0%	0%	0%	0%
1	2	6		18%	35%	7%	52%	100%	93%	32%	100%	0%	0%	0%	0%
1	2	7		23%	36%	7%	48%	99%	91%	22%	100%	0%	0%	0%	0%
1	2	8		29%	36%	7%	63%	97%	67%	12%	100%	19%	14%	34%	2%
1	2	9		26%	28%	5%	74%	89%	53%	8%	100%	43%	3%	67%	9%
1	2	10		22%	25%	3%	64%	87%	68%	9%	99%	47%	8%	75%	13%
1	2	11		30%	25%	9%	51%	92%	65%	24%	91%	52%	14%	74%	18%
1	2	12		37%	23%	17%	43%	92%	60%	43%	86%	55%	30%	74%	19%
1	2	13		48%	29%	26%	41%	94%	57%	59%	84%	67%	73%	74%	26%
1	2	14		57%	31%	33%	38%	95%	57%	92%	85%	57%	72%	55%	20%
1	2	15		62%	31%	37%	28%	96%	55%	87%	85%	53%	69%	47%	18%
1	2	16		57%	28%	34%	22%	97%	52%	96%	82%	40%	60%	32%	8%
1	2	17		57%	25%	40%	16%	96%	60%	98%	76%	8%	5%	8%	3%
1	2	18		57%	23%	42%	14%	95%	65%	89%	73%	0%	0%	2%	0%
1	2	19		55%	19%	44%	14%	96%	75%	96%	70%	0%	0%	0%	0%
1	2	20		51%	17%	41%	15%	95%	88%	100%	68%	0%	0%	0%	0%
1	2	21		49%	21%	39%	15%	93%	91%	100%	69%	0%	0%	0%	0%
1	2	22		50%	28%	43%	14%	90%	92%	100%	62%	0%	0%	0%	0%
1	2	23		49%	29%	46%	11%	78%	91%	100%	46%	0%	0%	0%	0%
1	2	24		47%	28%	45%	7%	52%	93%	100%	30%	0%	0%	0%	0%
1	3	1		47%	29%	45%	5%	29%	96%	100%	21%	0%	0%	0%	0%
1	3	2		48%	28%	46%	5%	36%	96%	100%	17%	0%	0%	0%	0%
1	3	3		47%	28%	48%	5%	61%	96%	100%	15%	0%	0%	0%	0%
1	3	4		43%	29%	48%	6%	76%	95%	100%	13%	0%	0%	0%	0%
1	3	5		39%	31%	44%	8%	88%	95%	100%	10%	0%	0%	0%	0%
1	3	6		37%	33%	39%	8%	94%	95%	100%	8%	0%	0%	0%	0%
1	3	7		31%	35%	35%	7%	96%	93%	100%	7%	0%	0%	0%	0%
1	3	8		24%	33%	32%	5%	97%	81%	100%	6%	16%	13%	12%	3%
1	3	9		16%	23%	27%	4%	97%	98%	100%	5%	34%	4%	21%	12%
1	3	10		22%	27%	27%	2%	97%	100%	100%	5%	50%	29%	48%	27%
1	3	11		34%	32%	29%	0%	95%	100%	100%	5%	48%	13%	44%	41%
1	3	12		42%	35%	30%	0%	91%	100%	97%	6%	60%	34%	62%	53%
1	3	13		45%	35%	31%	0%	89%	100%	88%	9%	53%	48%	58%	46%
1	3	14		44%	32%	32%	0%	89%	99%	86%	12%	44%	38%	52%	35%
1	3	15		40%	27%	30%	0%	87%	96%	95%	17%	32%	52%	41%	26%
1	3	16		37%	25%	27%	2%	77%	76%	100%	27%	30%	44%	53%	18%
1	3	17		34%	26%	23%	5%	64%	65%	100%	41%	4%	22%	1%	4%
1	3	18		37%	34%	26%	3%	53%	58%	100%	46%	0%	0%	0%	0%
1	3	19		39%	36%	31%	1%	42%	56%	100%	51%	0%	0%	0%	0%
1	3	20		41%	34%	38%	3%	31%	51%	100%	57%	0%	0%	0%	0%
1	3	21		40%	30%	41%	2%	21%	41%	100%	61%	0%	0%	0%	0%
1	3	22		41%	28%	45%	0%	14%	28%	100%	57%	0%	0%	0%	0%
1	3	23		42%	30%	48%	0%	9%	17%	85%	46%	0%	0%	0%	0%
1	3	24		41%	32%	49%	0%	9%	9%	73%	38%	0%	0%	0%	0%
1	4	1		41%	31%	50%	0%	13%	10%	70%	31%	0%	0%	0%	0%
1	4	2		42%	27%	53%	0%	24%	28%	73%	30%	0%	0%	0%	0%
1	4	3		42%	28%	55%	0%	36%	48%	76%	25%	0%	0%	0%	0%
1	4	4		43%	27%	55%	4%	38%	50%	80%	23%	0%	0%	0%	0%
1	4	5		45%	27%	54%	6%	39%	51%	87%	20%	0%	0%	0%	0%
1	4	6		46%	24%	54%	8%	40%	56%	100%	12%	0%	0%	0%	0%
1	4	7		46%	22%	53%	7%	38%	59%	100%	3%	0%	0%	0%	0%
1	4	8		43%	21%	50%	7%	43%	62%	100%	0%	21%	17%	36%	4%
1	4	9		41%	18%	50%	6%	42%	66%	100%	0%	50%	5%	72%	16%

1	4	10	45%	16%	54%	4%	31%	67%	92%	0%	57%	10%	78%	34%
1	4	11	40%	12%	50%	0%	25%	63%	78%	8%	67%	77%	78%	51%
1	4	12	35%	11%	46%	0%	23%	53%	81%	21%	64%	26%	77%	55%
1	4	13	30%	9%	41%	0%	20%	46%	90%	48%	66%	27%	79%	55%
1	4	14	27%	7%	38%	0%	18%	39%	84%	70%	66%	14%	78%	48%
1	4	15	22%	4%	37%	0%	15%	35%	96%	100%	62%	17%	76%	39%
1	4	16	19%	5%	35%	0%	13%	38%	100%	100%	50%	9%	63%	26%
1	4	17	15%	7%	30%	0%	17%	43%	100%	100%	14%	1%	8%	6%
1	4	18	13%	6%	30%	0%	29%	40%	100%	100%	0%	0%	1%	0%
1	4	19	11%	8%	31%	0%	42%	33%	65%	100%	0%	0%	0%	0%
1	4	20	11%	10%	32%	0%	48%	27%	70%	100%	0%	0%	0%	0%
1	4	21	12%	12%	32%	1%	52%	26%	64%	100%	0%	0%	0%	0%
1	4	22	14%	12%	33%	10%	57%	23%	51%	100%	0%	0%	0%	0%
1	4	23	13%	12%	33%	6%	62%	18%	49%	100%	0%	0%	0%	0%
1	4	24	12%	11%	33%	0%	67%	13%	41%	100%	0%	0%	0%	0%
1	5	1	11%	16%	31%	0%	75%	6%	34%	100%	0%	0%	0%	0%
1	5	2	11%	20%	30%	0%	84%	2%	25%	100%	0%	0%	0%	0%
1	5	3	10%	19%	28%	0%	92%	0%	19%	100%	0%	0%	0%	0%
1	5	4	11%	13%	29%	0%	94%	2%	10%	100%	0%	0%	0%	0%
1	5	5	10%	15%	27%	0%	96%	4%	3%	97%	0%	0%	0%	0%
1	5	6	9%	18%	24%	1%	97%	5%	0%	72%	0%	0%	0%	0%
1	5	7	9%	16%	20%	1%	97%	9%	0%	65%	0%	0%	0%	0%
1	5	8	8%	17%	16%	1%	92%	25%	0%	66%	12%	0%	23%	3%
1	5	9	8%	19%	7%	1%	71%	51%	0%	55%	26%	0%	25%	12%
1	5	10	8%	17%	5%	0%	67%	66%	2%	40%	35%	35%	41%	25%
1	5	11	13%	16%	4%	2%	99%	85%	4%	28%	46%	33%	44%	28%
1	5	12	22%	18%	10%	6%	99%	96%	8%	13%	49%	49%	50%	34%
1	5	13	35%	20%	20%	11%	99%	99%	14%	7%	51%	36%	54%	28%
1	5	14	44%	21%	29%	15%	99%	99%	26%	8%	44%	18%	34%	28%
1	5	15	51%	22%	37%	22%	99%	97%	49%	10%	44%	8%	50%	21%
1	5	16	51%	22%	39%	35%	100%	87%	82%	8%	23%	1%	21%	9%
1	5	17	54%	20%	38%	50%	100%	87%	98%	5%	7%	1%	6%	4%
1	5	18	53%	16%	34%	53%	100%	89%	85%	2%	0%	0%	2%	0%
1	5	19	42%	14%	33%	61%	100%	89%	81%	0%	0%	0%	0%	0%
1	5	20	34%	12%	32%	62%	100%	85%	79%	0%	0%	0%	0%	0%
1	5	21	26%	10%	31%	63%	100%	81%	90%	2%	0%	0%	0%	0%
1	5	22	18%	9%	29%	62%	100%	79%	91%	9%	0%	0%	0%	0%
1	5	23	15%	10%	26%	60%	100%	82%	84%	20%	0%	0%	0%	0%
1	5	24	14%	12%	27%	54%	100%	88%	90%	35%	0%	0%	0%	0%
1	6	1	13%	13%	25%	45%	100%	85%	100%	43%	0%	0%	0%	0%
1	6	2	13%	14%	23%	49%	99%	97%	100%	48%	0%	0%	0%	0%
1	6	3	14%	13%	25%	49%	99%	100%	100%	49%	0%	0%	0%	0%
1	6	4	13%	11%	26%	53%	99%	100%	100%	41%	0%	0%	0%	0%
1	6	5	11%	10%	23%	52%	99%	100%	100%	32%	0%	0%	0%	0%
1	6	6	10%	11%	23%	54%	98%	100%	100%	26%	0%	0%	0%	0%
1	6	7	10%	10%	21%	53%	98%	99%	100%	22%	0%	0%	0%	0%
1	6	8	7%	9%	17%	51%	96%	100%	100%	25%	6%	0%	7%	1%
1	6	9	4%	7%	9%	47%	94%	99%	100%	23%	27%	0%	51%	12%
1	6	10	4%	4%	7%	44%	99%	99%	93%	23%	38%	3%	53%	25%
1	6	11	3%	3%	6%	38%	100%	98%	82%	25%	53%	8%	66%	36%
1	6	12	5%	2%	6%	40%	100%	99%	77%	26%	53%	10%	75%	45%
1	6	13	7%	1%	8%	57%	100%	99%	78%	22%	52%	9%	75%	48%
1	6	14	8%	2%	11%	74%	100%	99%	79%	16%	50%	10%	76%	41%
1	6	15	7%	3%	12%	88%	99%	99%	83%	11%	49%	10%	60%	34%
1	6	16	5%	4%	9%	94%	99%	99%	91%	9%	41%	40%	63%	21%
1	6	17	3%	5%	9%	97%	99%	99%	98%	8%	14%	1%	11%	6%
1	6	18	3%	8%	8%	97%	99%	96%	99%	8%	0%	0%	2%	0%
1	6	19	3%	7%	6%	99%	97%	96%	92%	8%	0%	0%	0%	0%
1	6	20	4%	6%	5%	99%	94%	96%	87%	9%	0%	0%	0%	0%
1	6	21	6%	3%	5%	99%	93%	96%	85%	11%	0%	0%	0%	0%
1	6	22	6%	1%	7%	99%	88%	97%	81%	12%	0%	0%	0%	0%
1	6	23	6%	1%	9%	99%	93%	97%	71%	12%	0%	0%	0%	0%
1	6	24	6%	2%	9%	99%	99%	97%	66%	12%	0%	0%	0%	0%
1	7	1	6%	2%	9%	99%	99%	97%	65%	15%	0%	0%	0%	0%
1	7	2	7%	5%	9%	99%	100%	98%	64%	20%	0%	0%	0%	0%
1	7	3	7%	6%	9%	99%	100%	98%	63%	26%	0%	0%	0%	0%
1	7	4	7%	6%	10%	97%	100%	99%	63%	31%	0%	0%	0%	0%
1	7	5	6%	6%	11%	95%	100%	99%	59%	35%	0%	0%	0%	0%
1	7	6	6%	5%	11%	94%	100%	99%	50%	37%	0%	0%	0%	0%
1	7	7	6%	4%	12%	94%	100%	98%	39%	42%	0%	0%	0%	0%
1	7	8	5%	3%	12%	95%	100%	99%	30%	46%	19%	17%	23%	3%
1	7	9	5%	4%	7%	93%	100%	100%	30%	53%	44%	1%	48%	14%
1	7	10	6%	6%	5%	91%	100%	100%	35%	65%	49%	5%	63%	24%
1	7	11	5%	3%	6%	88%	100%	100%	39%	71%	52%	12%	72%	32%
1	7	12	4%	0%	7%	79%	100%	100%	41%	73%	53%	17%	67%	39%
1	7	13	4%	1%	8%	75%	100%	100%	39%	74%	54%	25%	65%	41%
1	7	14	4%	2%	9%	76%	100%	100%	36%	78%	52%	17%	62%	42%
1	7	15	3%	2%	8%	78%	100%	100%	35%	81%	47%	16%	61%	34%
1	7	16	4%	4%	7%	79%	100%	99%	37%	84%	39%	18%	64%	21%
1	7	17	6%	6%	7%	80%	100%	99%	42%	89%	13%	29%	11%	6%
1	7	18	7%	8%	8%	82%	100%	99%	50%	99%	0%	0%	2%	0%
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1	7	24	6%	10%	20%	99%	100%	100%	41%	100%	0%	0%	0%	0%
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1	15	7	38%	48%	42%	6%	21%	12%	8%	3%	0%	0%	0%	0%
1	15	8	35%	48%	41%	5%	18%	5%	7%	4%	21%	20%	38%	4%
1	15	9	26%	42%	35%	4%	15%	1%	7%	4%	50%	26%	73%	22%

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1	17	12	22%	9%	29%	11%	99%	64%	0%	0%	75%	77%	79%	63%
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1	20	23	25%	34%	25%	8%	99%	57%	6%	6%	0%	0%	0%	0%
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1	22	20	11%	4%	4%	9%	66%	61%	0%	1%	0%	0%	0%	0%
1	22	21	11%	6%	3%	15%	50%	64%	0%	1%	0%	0%	0%	0%
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1	22	23	9%	8%	2%	27%	35%	73%	0%	0%	0%	0%	0%	0%
1	22	24	7%	9%	3%	29%	27%	76%	0%	0%	0%	0%	0%	0%
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1	23	2	6%	11%	1%	25%	21%	80%	0%	2%	0%	0%	0%	0%
1	23	3	6%	14%	0%	26%	20%	81%	1%	4%	0%	0%	0%	0%
1	23	4	7%	20%	0%	31%	16%	80%	2%	6%	0%	0%	0%	0%
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1	26	5	33%	21%	52%	41%	11%	84%	100%	100%	0%	0%	0%	0%
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1	26	7	32%	20%	52%	25%	12%	82%	100%	100%	0%	0%	0%	0%
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1	26	10	22%	10%	53%	7%	3%	99%	100%	100%	56%	31%	58%	39%
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1	28	21	32%	34%	29%	27%	82%	97%	100%	100%	0%	0%	0%	0%
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1	28	24	56%	49%	51%	23%	79%	94%	100%	100%	0%	0%	0%	0%
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1	31	2	14%	18%	32%	19%	100%	46%	59%	100%	0%	0%	0%	0%
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2	7	22	10%	26%	5%	4%	78%	92%	29%	54%	0%	0%	0%	0%
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2	9	24	62%	25%	82%	12%	88%	92%	100%	0%	0%	0%	0%	0%
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2	17	22	35%	13%	26%	7%	86%	83%	3%	0%	0%	0%	0%	0%
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2	17	24	29%	11%	25%	8%	94%	83%	0%	13%	0%	0%	0%	0%
2	18	1	26%	10%	23%	9%	93%	87%	0%	26%	0%	0%	0%	0%
2	18	2	24%	9%	23%	10%	94%	85%	0%	41%	0%	0%	0%	0%
2	18	3	24%	10%	22%	10%	74%	86%	0%	57%	0%	0%	0%	0%
2	18	4	22%	10%	22%	11%	58%	87%	0%	69%	0%	0%	0%	0%
2	18	5	20%	11%	19%	11%	52%	86%	2%	80%	0%	0%	0%	0%
2	18	6	17%	10%	18%	11%	51%	85%	5%	91%	0%	0%	0%	0%
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2	19	19	23%	21%	35%	0%	100%	63%	8%	100%	0%	0%	1%	0%
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2	20	24	10%	17%	15%	6%	39%	94%	4%	8%	0%	0%	0%	0%
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2	23	7	22%	51%	4%	6%	64%	61%	67%	100%	0%	0%	0%	0%
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2	23	12	51%	77%	37%	0%	74%	99%	45%	100%	58%	39%	44%	30%
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2	23	14	48%	75%	38%	0%	61%	99%	41%	100%	65%	88%	48%	32%
2	23	15	47%	74%	35%	0%	55%	99%	38%	100%	62%	88%	66%	32%
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2	23	17	38%	62%	23%	1%	61%	88%	30%	100%	38%	35%	48%	12%
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2	24	16	17%	15%	8%	88%	99%	84%	8%	75%	46%	66%	58%	36%
2	24	17	15%	13%	8%	70%	98%	75%	5%	65%	42%	68%	45%	18%

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2	25	15	70%	48%	89%	91%	93%	97%	5%	50%	79%	91%	94%	47%
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2	25	19	55%	38%	63%	91%	92%	99%	3%	25%	0%	0%	1%	0%
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2	26	2	61%	32%	62%	36%	97%	97%	9%	58%	0%	0%	0%	0%
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2	28	8	36%	30%	50%	24%	77%	16%	5%	57%	26%	3%	54%	11%
2	28	9	41%	28%	56%	19%	69%	10%	9%	40%	55%	49%	84%	24%

2	28	10	48%	28%	60%	15%	61%	2%	14%	46%	58%	69%	83%	41%
2	28	11	43%	28%	53%	12%	48%	0%	17%	52%	68%	57%	82%	48%
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3	1	1	14%	23%	23%	34%	52%	25%	47%	100%	0%	0%	0%	0%
3	1	2	13%	21%	25%	36%	59%	20%	46%	100%	0%	0%	0%	0%
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3	1	4	13%	22%	23%	35%	57%	12%	42%	100%	0%	0%	0%	0%
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3	1	6	11%	25%	16%	30%	62%	11%	27%	100%	0%	0%	0%	0%
3	1	7	11%	23%	14%	31%	49%	8%	25%	100%	3%	0%	5%	0%
3	1	8	12%	21%	12%	23%	25%	6%	26%	100%	31%	23%	44%	7%
3	1	9	10%	21%	8%	17%	17%	4%	24%	100%	50%	33%	76%	18%
3	1	10	13%	27%	7%	11%	19%	5%	30%	100%	67%	69%	84%	30%
3	1	11	16%	39%	6%	7%	21%	7%	33%	100%	70%	60%	87%	40%
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3	1	14	26%	58%	7%	7%	55%	15%	16%	100%	75%	77%	86%	40%
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3	1	16	38%	63%	12%	6%	47%	26%	15%	100%	56%	56%	82%	23%
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3	3	12	64%	81%	58%	5%	100%	89%	100%	100%	77%	95%	85%	53%
3	3	13	66%	77%	63%	2%	100%	90%	100%	100%	83%	95%	89%	49%
3	3	14	70%	72%	68%	0%	100%	88%	100%	100%	74%	95%	92%	41%
3	3	15	71%	62%	71%	0%	100%	75%	100%	100%	59%	94%	81%	38%
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3	4	2	41%	22%	45%	9%	92%	7%	74%	13%	0%	0%	0%	0%
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3	6	4	41%	16%	41%	23%	26%	80%	27%	20%	0%	0%	0%	0%
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3	6	6	36%	15%	37%	16%	43%	82%	42%	21%	0%	0%	0%	0%
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3	7	19	11%	12%	2%	85%	55%	100%	25%	100%	0%	0%	1%	0%
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3	9	10	62%	22%	60%	11%	1%	94%	100%	43%	85%	99%	95%	49%
3	9	11	63%	20%	65%	11%	1%	97%	100%	42%	89%	100%	97%	64%
3	9	12	65%	19%	71%	10%	5%	99%	100%	47%	88%	100%	70%	79%
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3	10	23	15%	18%	28%	7%	15%	22%	72%	100%	0%	0%	0%	0%
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3	19	2	9%	15%	13%	0%	16%	66%	100%	0%	0%	0%	0%	0%
3	19	3	9%	11%	14%	2%	17%	63%	100%	0%	0%	0%	0%	0%
3	19	4	9%	9%	13%	4%	20%	58%	100%	0%	0%	0%	0%	0%
3	19	5	8%	7%	11%	4%	24%	54%	100%	0%	0%	0%	0%	0%
3	19	6	6%	6%	8%	5%	28%	46%	100%	0%	0%	0%	0%	0%
3	19	7	5%	5%	6%	6%	29%	36%	100%	0%	8%	8%	12%	1%
3	19	8	4%	4%	3%	4%	24%	25%	100%	0%	30%	36%	45%	15%
3	19	9	2%	1%	1%	1%	16%	15%	100%	0%	66%	78%	73%	37%
3	19	10	2%	0%	1%	0%	12%	7%	100%	1%	76%	64%	85%	53%
3	19	11	3%	1%	3%	3%	11%	0%	100%	2%	83%	78%	88%	66%
3	19	12	3%	0%	4%	7%	11%	1%	100%	4%	85%	82%	86%	73%
3	19	13	3%	1%	5%	12%	11%	5%	100%	5%	90%	96%	87%	73%
3	19	14	3%	2%	6%	14%	13%	7%	100%	5%	87%	96%	84%	68%
3	19	15	3%	4%	5%	13%	13%	9%	100%	4%	83%	96%	85%	61%
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3	19	18	15%	10%	10%	9%	35%	54%	100%	0%	12%	25%	8%	6%
3	19	19	25%	16%	17%	10%	68%	78%	100%	1%	0%	0%	1%	0%
3	19	20	34%	17%	26%	11%	87%	85%	100%	1%	0%	0%	0%	0%
3	19	21	33%	15%	26%	12%	84%	80%	100%	1%	0%	0%	0%	0%
3	19	22	31%	16%	25%	13%	74%	75%	100%	1%	0%	0%	0%	0%
3	19	23	28%	18%	25%	13%	69%	71%	100%	1%	0%	0%	0%	0%
3	19	24	25%	19%	25%	12%	68%	68%	100%	0%	0%	0%	0%	0%
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3	20	2	18%	16%	25%	9%	78%	56%	100%	0%	0%	0%	0%	0%
3	20	3	16%	15%	25%	8%	83%	35%	100%	0%	0%	0%	0%	0%
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3	20	15	15%	12%	11%	72%	0%	31%	95%	7%	88%	95%	98%	63%
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3	20	17	29%	19%	17%	61%	25%	28%	100%	3%	52%	73%	65%	25%
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3	20	21	53%	22%	42%	25%	93%	2%	75%	2%	0%	0%	0%	0%
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3	20	23	46%	25%	43%	12%	92%	47%	76%	2%	0%	0%	0%	0%
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3	21	9	37%	31%	25%	0%	79%	7%	2%	9%	68%	51%	91%	27%
3	21	10	35%	34%	31%	0%	88%	8%	1%	29%	82%	73%	98%	38%
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3	21	12	41%	45%	36%	0%	85%	22%	5%	88%	85%	78%	72%	51%
3	21	13	53%	54%	45%	0%	82%	31%	10%	99%	86%	82%	79%	51%
3	21	14	64%	60%	56%	0%	82%	40%	17%	92%	78%	82%	81%	48%
3	21	15	68%	63%	63%	0%	85%	47%	23%	86%	77%	98%	91%	48%
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3	21	17	68%	71%	65%	0%	97%	49%	32%	86%	44%	75%	56%	16%
3	21	18	61%	66%	59%	0%	98%	55%	35%	80%	11%	25%	9%	4%
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3	21	20	60%	50%	57%	0%	95%	59%	38%	73%	0%	0%	0%	0%
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3	22	1	60%	35%	69%	0%	61%	84%	100%	92%	0%	0%	0%	0%
3	22	2	65%	39%	68%	0%	66%	76%	100%	96%	0%	0%	0%	0%
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3	22	4	70%	37%	69%	2%	96%	92%	100%	100%	0%	0%	0%	0%
3	22	5	71%	37%	70%	3%	99%	85%	100%	100%	0%	0%	0%	0%
3	22	6	78%	45%	73%	6%	97%	76%	100%	100%	0%	0%	0%	0%
3	22	7	82%	48%	77%	7%	79%	68%	100%	100%	10%	3%	26%	3%
3	22	8	92%	49%	96%	6%	86%	96%	100%	100%	33%	47%	64%	16%
3	22	9	94%	52%	99%	7%	78%	91%	100%	100%	56%	95%	81%	33%

3	22	10	95%	54%	100%	12%	52%	62%	100%	100%	77%	100%	50%	39%
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3	22	12	94%	56%	100%	16%	10%	83%	100%	100%	67%	78%	80%	63%
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3	24	14	17%	13%	16%	36%	100%	69%	100%	55%	95%	100%	100%	77%
3	24	15	18%	14%	15%	44%	100%	71%	100%	70%	90%	100%	100%	66%
3	24	16	18%	14%	14%	51%	99%	68%	100%	87%	80%	94%	92%	49%
3	24	17	14%	13%	10%	56%	90%	48%	100%	91%	57%	75%	66%	28%
3	24	18	11%	15%	5%	60%	73%	27%	100%	74%	15%	25%	16%	7%
3	24	19	14%	25%	5%	63%	61%	18%	100%	60%	0%	0%	1%	0%
3	24	20	15%	33%	9%	62%	53%	18%	100%	54%	0%	0%	0%	0%
3	24	21	18%	37%	15%	62%	50%	25%	100%	50%	0%	0%	0%	0%
3	24	22	22%	36%	18%	63%	50%	28%	100%	45%	0%	0%	0%	0%
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3	25	4	17%	23%	22%	46%	58%	50%	100%	43%	0%	0%	0%	0%
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3	25	6	13%	18%	19%	30%	37%	58%	100%	33%	0%	0%	0%	0%
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3	25	14	18%	17%	21%	37%	73%	99%	100%	17%	91%	98%	91%	69%
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3	25	20	66%	32%	50%	51%	21%	91%	100%	51%	0%	0%	0%	0%
3	25	21	66%	29%	54%	51%	12%	85%	100%	55%	0%	0%	0%	0%
3	25	22	66%	28%	68%	52%	7%	72%	100%	74%	0%	0%	0%	0%
3	25	23	64%	28%	77%	55%	1%	75%	100%	85%	0%	0%	0%	0%
3	25	24	61%	29%	78%	60%	0%	90%	100%	78%	0%	0%	0%	0%
3	26	1	55%	31%	75%	63%	0%	96%	100%	68%	0%	0%	0%	0%

3	26	2	51%	36%	73%	63%	0%	96%	100%	63%	0%	0%	0%	0%
3	26	3	50%	38%	76%	56%	5%	96%	100%	65%	0%	0%	0%	0%
3	26	4	50%	39%	80%	51%	19%	91%	100%	67%	0%	0%	0%	0%
3	26	5	50%	42%	83%	48%	60%	92%	100%	64%	0%	0%	0%	0%
3	26	6	49%	44%	84%	44%	95%	93%	100%	62%	0%	0%	0%	0%
3	26	7	38%	36%	80%	35%	99%	96%	100%	68%	18%	18%	31%	4%
3	26	8	29%	30%	80%	27%	99%	100%	100%	79%	58%	70%	77%	21%
3	26	9	29%	42%	75%	34%	99%	99%	100%	70%	73%	91%	51%	44%
3	26	10	32%	49%	58%	24%	99%	99%	100%	60%	85%	99%	58%	59%
3	26	11	34%	50%	44%	19%	97%	99%	100%	67%	92%	99%	73%	73%
3	26	12	37%	50%	39%	15%	92%	99%	100%	90%	96%	100%	100%	80%
3	26	13	41%	52%	37%	11%	89%	99%	100%	100%	96%	100%	100%	80%
3	26	14	46%	53%	36%	8%	86%	99%	100%	100%	94%	100%	100%	75%
3	26	15	53%	52%	36%	6%	83%	92%	100%	100%	89%	99%	99%	66%
3	26	16	55%	47%	36%	4%	87%	65%	100%	100%	79%	95%	94%	49%
3	26	17	52%	37%	37%	2%	89%	54%	100%	100%	57%	78%	68%	28%
3	26	18	39%	32%	37%	4%	86%	65%	100%	100%	14%	29%	16%	7%
3	26	19	36%	42%	34%	8%	89%	78%	100%	100%	0%	0%	2%	0%
3	26	20	35%	46%	31%	11%	91%	94%	100%	100%	0%	0%	0%	0%
3	26	21	36%	41%	32%	12%	90%	98%	100%	100%	0%	0%	0%	0%
3	26	22	36%	35%	35%	9%	84%	76%	100%	100%	0%	0%	0%	0%
3	26	23	44%	34%	42%	9%	77%	44%	100%	100%	0%	0%	0%	0%
3	26	24	54%	37%	47%	9%	72%	49%	100%	100%	0%	0%	0%	0%
3	27	1	57%	42%	49%	10%	63%	48%	100%	100%	0%	0%	0%	0%
3	27	2	56%	47%	47%	11%	53%	46%	100%	96%	0%	0%	0%	0%
3	27	3	58%	50%	47%	11%	51%	49%	100%	89%	0%	0%	0%	0%
3	27	4	62%	51%	48%	13%	44%	55%	100%	96%	0%	0%	0%	0%
3	27	5	61%	50%	48%	18%	26%	61%	95%	100%	0%	0%	0%	0%
3	27	6	56%	48%	48%	25%	18%	63%	87%	100%	0%	0%	0%	0%
3	27	7	49%	44%	46%	27%	13%	66%	83%	100%	22%	21%	36%	6%
3	27	8	56%	35%	63%	18%	9%	59%	76%	100%	66%	74%	85%	27%
3	27	9	64%	38%	78%	24%	9%	42%	69%	98%	84%	94%	99%	49%
3	27	10	57%	39%	75%	28%	9%	30%	64%	99%	91%	99%	100%	64%
3	27	11	49%	34%	70%	34%	9%	29%	59%	100%	95%	100%	100%	76%
3	27	12	42%	28%	64%	38%	16%	37%	53%	100%	96%	99%	100%	81%
3	27	13	37%	22%	58%	44%	25%	50%	50%	100%	96%	99%	100%	81%
3	27	14	32%	18%	51%	53%	39%	68%	46%	100%	94%	99%	100%	77%
3	27	15	27%	15%	43%	63%	49%	78%	41%	100%	90%	98%	100%	65%
3	27	16	22%	14%	35%	68%	55%	81%	36%	100%	81%	94%	94%	49%
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3	27	24	10%	25%	15%	32%	92%	87%	15%	100%	0%	0%	0%	0%
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3	28	4	12%	27%	22%	22%	90%	84%	17%	100%	0%	0%	0%	0%
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3	28	8	9%	12%	16%	21%	68%	40%	24%	93%	65%	73%	82%	27%
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3	28	21	32%	26%	19%	74%	41%	63%	100%	100%	0%	0%	0%	0%
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3	29	1	52%	20%	40%	96%	82%	82%	100%	100%	0%	0%	0%	0%
3	29	2	52%	22%	41%	94%	81%	75%	100%	100%	0%	0%	0%	0%
3	29	3	55%	34%	41%	92%	81%	71%	100%	100%	0%	0%	0%	0%
3	29	4	57%	41%	43%	89%	81%	71%	100%	100%	0%	0%	0%	0%
3	29	5	60%	44%	45%	83%	88%	74%	100%	100%	0%	0%	0%	0%
3	29	6	60%	46%	44%	79%	93%	73%	100%	100%	0%	0%	0%	0%
3	29	7	54%	45%	39%	78%	93%	50%	100%	100%	12%	20%	11%	5%
3	29	8	59%	52%	41%	88%	92%	66%	100%	100%	47%	72%	48%	20%
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3	29	10	90%	83%	82%	97%	99%	99%	100%	100%	84%	98%	92%	60%
3	29	11	93%	85%	91%	97%	99%	99%	100%	100%	94%	100%	99%	72%
3	29	12	95%	85%	96%	97%	99%	99%	100%	100%	94%	100%	98%	79%
3	29	13	97%	84%	98%	97%	98%	100%	100%	100%	97%	100%	100%	78%
3	29	14	98%	84%	99%	96%	97%	100%	100%	100%	95%	100%	100%	72%
3	29	15	98%	83%	99%	94%	92%	100%	100%	100%	91%	100%	97%	59%
3	29	16	98%	82%	99%	91%	68%	100%	100%	100%	81%	96%	89%	43%
3	29	17	97%	78%	99%	88%	82%	99%	100%	100%	59%	81%	61%	24%

3	29	18	93%	69%	99%	76%	100%	99%	100%	100%	17%	29%	16%	7%
3	29	19	93%	68%	98%	67%	100%	99%	100%	100%	0%	0%	1%	0%
3	29	20	88%	66%	95%	59%	99%	99%	100%	100%	0%	0%	0%	0%
3	29	21	70%	59%	89%	56%	95%	99%	100%	100%	0%	0%	0%	0%
3	29	22	52%	49%	81%	53%	95%	99%	100%	100%	0%	0%	0%	0%
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3	30	6	48%	50%	47%	16%	100%	99%	100%	84%	0%	0%	0%	0%
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3	30	14	32%	26%	39%	19%	100%	100%	100%	100%	95%	99%	100%	78%
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3	30	17	14%	12%	18%	21%	100%	99%	87%	100%	59%	77%	68%	29%
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3	31	14	6%	7%	3%	99%	99%	99%	53%	48%	93%	100%	93%	69%
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3	31	17	32%	24%	27%	99%	76%	78%	89%	81%	53%	77%	38%	27%
3	31	18	44%	26%	39%	96%	59%	66%	100%	96%	13%	12%	9%	7%
3	31	19	60%	31%	51%	84%	50%	66%	100%	100%	0%	0%	2%	0%
3	31	20	66%	33%	49%	70%	47%	67%	100%	100%	0%	0%	0%	0%
3	31	21	66%	34%	46%	62%	52%	62%	100%	100%	0%	0%	0%	0%
3	31	22	67%	37%	50%	54%	50%	51%	100%	100%	0%	0%	0%	0%
3	31	23	67%	38%	59%	49%	39%	53%	100%	100%	0%	0%	0%	0%
3	31	24	69%	36%	68%	49%	21%	69%	100%	100%	0%	0%	0%	0%
4	1	1	69%	34%	72%	48%	14%	87%	100%	87%	0%	0%	0%	0%
4	1	2	68%	35%	70%	46%	24%	91%	100%	71%	0%	0%	0%	0%
4	1	3	67%	38%	67%	38%	33%	94%	100%	55%	0%	0%	0%	0%
4	1	4	65%	41%	65%	27%	28%	93%	100%	42%	0%	0%	0%	0%
4	1	5	61%	41%	63%	20%	16%	94%	100%	31%	0%	0%	0%	0%
4	1	6	53%	41%	60%	17%	7%	93%	100%	19%	0%	0%	0%	0%
4	1	7	39%	37%	52%	17%	1%	91%	100%	10%	18%	13%	24%	5%
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4	1	10	38%	48%	43%	9%	5%	100%	100%	0%	90%	99%	100%	65%
4	1	11	35%	44%	30%	11%	16%	100%	100%	0%	94%	100%	100%	77%
4	1	12	33%	40%	24%	13%	31%	100%	100%	0%	96%	100%	100%	83%
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4	1	14	28%	31%	17%	14%	52%	100%	100%	0%	94%	100%	100%	78%
4	1	15	25%	28%	16%	14%	47%	100%	100%	1%	88%	99%	98%	66%
4	1	16	22%	23%	16%	16%	33%	100%	100%	2%	78%	95%	91%	50%
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4	2	2	21%	14%	37%	43%	54%	92%	100%	43%	0%	0%	0%	0%
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4	2	4	21%	10%	42%	34%	63%	72%	100%	75%	0%	0%	0%	0%
4	2	5	22%	10%	37%	33%	73%	69%	100%	100%	0%	0%	0%	0%
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4	2	8	14%	9%	6%	28%	96%	85%	100%	100%	64%	77%	83%	20%
4	2	9	14%	8%	3%	54%	90%	86%	100%	90%	81%	94%	96%	39%

4	2	10	21%	13%	10%	64%	86%	86%	100%	85%	90%	100%	100%	52%
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4	2	12	47%	24%	39%	71%	90%	94%	100%	83%	97%	100%	100%	66%
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4	2	15	82%	50%	76%	72%	93%	96%	100%	92%	90%	100%	99%	57%
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4	2	17	88%	54%	93%	50%	56%	66%	100%	100%	60%	82%	67%	23%
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4	2	21	81%	42%	82%	42%	18%	51%	100%	100%	0%	0%	0%	0%
4	2	22	79%	40%	83%	55%	26%	74%	100%	100%	0%	0%	0%	0%
4	2	23	77%	38%	85%	53%	49%	94%	100%	100%	0%	0%	0%	0%
4	2	24	76%	39%	84%	52%	63%	97%	100%	100%	0%	0%	0%	0%
4	3	1	75%	40%	85%	52%	61%	96%	100%	100%	0%	0%	0%	0%
4	3	2	76%	43%	85%	49%	69%	90%	100%	100%	0%	0%	0%	0%
4	3	3	76%	46%	84%	44%	81%	83%	100%	100%	0%	0%	0%	0%
4	3	4	75%	44%	86%	39%	77%	78%	100%	100%	0%	0%	0%	0%
4	3	5	75%	43%	88%	35%	65%	79%	100%	100%	0%	0%	0%	0%
4	3	6	76%	44%	89%	40%	42%	74%	100%	100%	0%	0%	0%	0%
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4	3	8	82%	47%	98%	34%	59%	76%	100%	100%	63%	75%	82%	26%
4	3	9	91%	64%	98%	32%	88%	84%	100%	100%	85%	96%	98%	47%
4	3	10	92%	66%	96%	17%	86%	94%	100%	100%	89%	100%	48%	62%
4	3	11	92%	68%	96%	9%	78%	99%	100%	100%	94%	100%	64%	80%
4	3	12	94%	70%	97%	8%	63%	100%	100%	100%	94%	100%	63%	82%
4	3	13	94%	71%	99%	7%	37%	100%	100%	100%	93%	100%	51%	82%
4	3	14	93%	70%	100%	8%	20%	100%	100%	100%	95%	100%	87%	76%
4	3	15	92%	68%	99%	9%	20%	100%	100%	100%	91%	100%	80%	66%
4	3	16	89%	66%	99%	10%	16%	100%	100%	100%	81%	100%	47%	46%
4	3	17	86%	61%	98%	13%	12%	100%	100%	100%	61%	85%	37%	28%
4	3	18	81%	49%	93%	20%	15%	100%	100%	100%	19%	33%	12%	8%
4	3	19	76%	46%	80%	37%	31%	100%	100%	100%	0%	0%	1%	0%
4	3	20	68%	44%	69%	55%	71%	100%	100%	100%	0%	0%	0%	0%
4	3	21	57%	40%	60%	58%	94%	100%	100%	100%	0%	0%	0%	0%
4	3	22	48%	40%	50%	52%	90%	99%	100%	100%	0%	0%	0%	0%
4	3	23	40%	39%	44%	47%	91%	99%	100%	88%	0%	0%	0%	0%
4	3	24	31%	36%	41%	41%	85%	100%	100%	77%	0%	0%	0%	0%
4	4	1	27%	33%	41%	35%	85%	100%	100%	71%	0%	0%	0%	0%
4	4	2	25%	32%	41%	30%	94%	100%	83%	70%	0%	0%	0%	0%
4	4	3	25%	35%	41%	26%	95%	100%	69%	70%	0%	0%	0%	0%
4	4	4	23%	33%	37%	22%	96%	100%	61%	63%	0%	0%	0%	0%
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4	4	9	28%	14%	18%	3%	100%	100%	30%	25%	87%	100%	99%	52%
4	4	10	24%	9%	16%	1%	100%	100%	26%	26%	93%	100%	100%	68%
4	4	11	20%	5%	15%	1%	100%	100%	21%	24%	96%	100%	100%	79%
4	4	12	16%	4%	13%	3%	100%	100%	18%	18%	97%	100%	100%	86%
4	4	13	13%	3%	12%	6%	100%	100%	17%	11%	97%	100%	100%	85%
4	4	14	11%	2%	10%	9%	100%	100%	19%	4%	95%	100%	100%	80%
4	4	15	10%	2%	8%	13%	100%	100%	19%	1%	92%	100%	100%	69%
4	4	16	10%	2%	8%	18%	100%	100%	17%	0%	84%	98%	97%	52%
4	4	17	10%	2%	8%	23%	99%	100%	13%	0%	65%	83%	74%	30%
4	4	18	10%	2%	7%	26%	99%	99%	7%	0%	21%	34%	22%	9%
4	4	19	10%	2%	7%	31%	98%	99%	2%	1%	0%	0%	2%	0%
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4	5	8	34%	17%	39%	11%	95%	5%	2%	6%	73%	85%	91%	32%
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4	5	11	63%	41%	56%	6%	90%	0%	3%	6%	97%	100%	100%	82%
4	5	12	58%	41%	48%	5%	90%	0%	4%	3%	98%	100%	100%	87%
4	5	13	51%	37%	40%	5%	88%	1%	5%	0%	98%	100%	100%	87%
4	5	14	43%	30%	33%	6%	89%	6%	6%	0%	96%	100%	100%	80%
4	5	15	36%	24%	27%	6%	88%	13%	6%	0%	92%	100%	100%	69%
4	5	16	29%	18%	22%	6%	87%	21%	5%	0%	85%	99%	98%	52%
4	5	17	23%	14%	17%	6%	65%	23%	4%	0%	65%	85%	75%	31%
4	5	18	21%	10%	14%	6%	53%	15%	1%	3%	21%	34%	23%	9%
4	5	19	27%	11%	19%	10%	49%	10%	0%	8%	0%	0%	2%	0%
4	5	20	34%	16%	27%	16%	43%	9%	0%	13%	0%	0%	0%	0%
4	5	21	40%	25%	33%	18%	44%	8%	0%	16%	0%	0%	0%	0%
4	5	22	40%	32%	35%	15%	50%	7%	0%	19%	0%	0%	0%	0%
4	5	23	36%	37%	37%	9%	57%	6%	0%	20%	0%	0%	0%	0%
4	5	24	30%	36%	38%	6%	62%	8%	2%	20%	0%	0%	0%	0%
4	6	1	25%	32%	38%	3%	68%	21%	4%	19%	0%	0%	0%	0%

4	6	2	22%	38%	38%	4%	72%	43%	5%	18%	0%	0%	0%	0%
4	6	3	23%	42%	39%	7%	75%	48%	5%	18%	0%	0%	0%	0%
4	6	4	27%	45%	41%	11%	77%	33%	5%	19%	0%	0%	0%	0%
4	6	5	34%	47%	44%	15%	78%	18%	5%	20%	0%	0%	0%	0%
4	6	6	42%	48%	48%	17%	72%	10%	7%	21%	0%	0%	1%	0%
4	6	7	45%	47%	45%	15%	79%	5%	10%	24%	28%	29%	47%	9%
4	6	8	38%	35%	40%	8%	95%	1%	15%	23%	71%	82%	90%	31%
4	6	9	53%	29%	44%	6%	91%	0%	19%	15%	87%	99%	99%	52%
4	6	10	59%	33%	42%	5%	85%	0%	22%	6%	92%	100%	100%	69%
4	6	11	54%	33%	35%	2%	75%	0%	24%	1%	96%	100%	100%	80%
4	6	12	47%	31%	29%	0%	67%	0%	23%	0%	97%	100%	100%	81%
4	6	13	40%	26%	25%	0%	60%	0%	20%	0%	97%	100%	100%	83%
4	6	14	33%	20%	20%	0%	59%	0%	16%	0%	95%	100%	100%	75%
4	6	15	25%	15%	15%	0%	58%	0%	12%	0%	90%	100%	100%	66%
4	6	16	18%	13%	12%	0%	47%	0%	9%	0%	80%	95%	93%	50%
4	6	17	16%	12%	7%	0%	29%	2%	9%	2%	56%	79%	70%	29%
4	6	18	21%	15%	5%	0%	38%	19%	12%	2%	17%	30%	20%	8%
4	6	19	26%	17%	5%	0%	65%	44%	16%	1%	0%	0%	2%	0%
4	6	20	25%	16%	8%	2%	92%	60%	21%	0%	0%	0%	0%	0%
4	6	21	22%	17%	10%	0%	98%	70%	24%	0%	0%	0%	0%	0%
4	6	22	20%	22%	11%	0%	99%	70%	29%	0%	0%	0%	0%	0%
4	6	23	20%	30%	11%	0%	99%	68%	35%	0%	0%	0%	0%	0%
4	6	24	21%	35%	12%	1%	99%	68%	43%	0%	0%	0%	0%	0%
4	7	1	22%	38%	14%	8%	99%	72%	54%	0%	0%	0%	0%	0%
4	7	2	21%	40%	17%	15%	100%	76%	61%	1%	0%	0%	0%	0%
4	7	3	20%	43%	20%	22%	100%	78%	67%	1%	0%	0%	0%	0%
4	7	4	16%	38%	20%	25%	100%	80%	66%	1%	0%	0%	0%	0%
4	7	5	15%	33%	20%	26%	100%	82%	54%	0%	0%	0%	0%	0%
4	7	6	14%	26%	21%	26%	99%	73%	46%	0%	0%	0%	1%	0%
4	7	7	13%	19%	18%	25%	99%	54%	38%	0%	28%	30%	43%	9%
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4	7	10	42%	26%	37%	11%	99%	66%	40%	11%	91%	100%	100%	59%
4	7	11	59%	40%	46%	10%	99%	72%	39%	26%	96%	100%	100%	67%
4	7	12	71%	48%	57%	10%	99%	73%	34%	40%	97%	100%	100%	82%
4	7	13	79%	51%	69%	9%	99%	71%	31%	42%	79%	16%	100%	58%
4	7	14	80%	47%	82%	8%	99%	73%	28%	38%	80%	100%	100%	50%
4	7	15	79%	46%	94%	7%	99%	74%	25%	35%	73%	100%	100%	45%
4	7	16	80%	49%	98%	6%	92%	67%	21%	32%	65%	98%	94%	34%
4	7	17	80%	45%	98%	5%	71%	44%	18%	27%	49%	83%	67%	14%
4	7	18	77%	35%	93%	4%	78%	32%	17%	26%	11%	35%	17%	5%
4	7	19	69%	28%	86%	5%	82%	35%	22%	26%	0%	0%	2%	0%
4	7	20	64%	24%	85%	5%	74%	53%	28%	26%	0%	0%	0%	0%
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4	7	23	62%	20%	81%	19%	71%	87%	18%	37%	0%	0%	0%	0%
4	7	24	59%	20%	77%	39%	81%	91%	14%	42%	0%	0%	0%	0%
4	8	1	57%	22%	76%	55%	88%	93%	13%	38%	0%	0%	0%	0%
4	8	2	53%	22%	71%	59%	86%	90%	12%	34%	0%	0%	0%	0%
4	8	3	52%	21%	66%	56%	75%	83%	11%	31%	0%	0%	0%	0%
4	8	4	50%	20%	62%	60%	58%	82%	9%	25%	0%	0%	0%	0%
4	8	5	49%	19%	58%	69%	46%	86%	8%	25%	0%	0%	0%	0%
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4	8	9	55%	22%	64%	52%	21%	99%	5%	35%	80%	75%	99%	43%
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4	8	11	63%	23%	66%	22%	49%	100%	3%	28%	82%	100%	100%	55%
4	8	12	69%	26%	74%	21%	57%	100%	4%	20%	80%	100%	97%	71%
4	8	13	74%	30%	84%	28%	63%	100%	6%	14%	87%	100%	98%	61%
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4	9	3	46%	17%	50%	15%	14%	99%	6%	54%	0%	0%	0%	0%
4	9	4	43%	18%	48%	10%	11%	100%	4%	24%	0%	0%	0%	0%
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4	9	6	33%	19%	32%	10%	8%	100%	5%	7%	0%	0%	3%	0%
4	9	7	25%	19%	20%	8%	11%	100%	4%	4%	28%	22%	47%	6%
4	9	8	20%	20%	12%	9%	15%	100%	2%	2%	58%	23%	86%	19%
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4	9	11	16%	27%	7%	8%	13%	100%	0%	0%	83%	73%	100%	45%
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4	9	13	24%	26%	16%	8%	9%	100%	0%	1%	82%	90%	96%	56%
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4	10	5	17%	3%	12%	6%	59%	21%	68%	25%	0%	0%	0%	0%
4	10	6	16%	4%	10%	11%	52%	15%	82%	25%	0%	0%	0%	0%
4	10	7	14%	4%	10%	13%	37%	15%	97%	20%	12%	9%	18%	4%
4	10	8	13%	4%	14%	8%	20%	24%	100%	15%	35%	38%	51%	15%
4	10	9	10%	4%	15%	2%	13%	27%	100%	13%	51%	78%	74%	27%
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4	10	11	8%	3%	18%	0%	13%	40%	100%	17%	69%	85%	79%	51%
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4	10	14	24%	12%	38%	0%	31%	83%	100%	43%	68%	78%	80%	50%
4	10	15	38%	17%	50%	1%	43%	93%	100%	52%	51%	13%	69%	39%
4	10	16	50%	20%	56%	1%	56%	97%	100%	60%	56%	4%	56%	29%
4	10	17	58%	22%	57%	1%	64%	98%	100%	56%	43%	42%	60%	14%
4	10	18	61%	21%	53%	3%	79%	99%	100%	49%	12%	1%	11%	6%
4	10	19	63%	24%	52%	6%	89%	100%	100%	44%	0%	0%	1%	0%
4	10	20	67%	28%	56%	11%	90%	97%	100%	38%	0%	0%	0%	0%
4	10	21	66%	29%	54%	19%	90%	92%	100%	30%	0%	0%	0%	0%
4	10	22	61%	27%	54%	30%	91%	95%	100%	23%	0%	0%	0%	0%
4	10	23	56%	28%	51%	39%	90%	97%	100%	19%	0%	0%	0%	0%
4	10	24	53%	30%	46%	39%	88%	98%	100%	16%	0%	0%	0%	0%
4	11	1	52%	33%	44%	39%	82%	97%	100%	12%	0%	0%	0%	0%
4	11	2	50%	33%	43%	37%	74%	81%	100%	5%	0%	0%	0%	0%
4	11	3	47%	32%	45%	35%	60%	59%	100%	1%	0%	0%	0%	0%
4	11	4	47%	30%	47%	35%	46%	61%	100%	0%	0%	0%	0%	0%
4	11	5	45%	29%	49%	36%	37%	78%	100%	0%	0%	0%	0%	0%
4	11	6	45%	28%	49%	31%	38%	76%	100%	1%	0%	0%	0%	0%
4	11	7	40%	22%	46%	17%	25%	81%	100%	5%	25%	14%	18%	7%
4	11	8	37%	17%	50%	20%	29%	87%	100%	15%	64%	81%	43%	25%
4	11	9	31%	11%	47%	23%	72%	71%	100%	26%	79%	96%	54%	38%
4	11	10	31%	11%	45%	23%	98%	68%	100%	34%	89%	100%	60%	61%
4	11	11	33%	12%	46%	21%	99%	77%	100%	41%	87%	55%	55%	70%
4	11	12	35%	12%	48%	20%	100%	84%	100%	42%	93%	100%	56%	76%
4	11	13	39%	16%	48%	19%	100%	90%	100%	38%	92%	100%	77%	78%
4	11	14	46%	20%	49%	21%	99%	88%	100%	30%	89%	100%	79%	72%
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4	11	16	55%	26%	50%	28%	77%	93%	100%	15%	80%	96%	82%	50%
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4	11	20	47%	34%	34%	23%	87%	57%	100%	7%	0%	0%	0%	0%
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4	11	22	42%	22%	29%	15%	65%	54%	100%	15%	0%	0%	0%	0%
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4	12	10	16%	5%	12%	64%	91%	99%	52%	86%	92%	100%	100%	67%
4	12	11	12%	4%	11%	69%	95%	100%	54%	85%	96%	100%	100%	77%
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4	13	10	9%	3%	3%	54%	14%	0%	100%	78%	75%	73%	93%	58%
4	13	11	8%	4%	5%	54%	17%	2%	100%	84%	88%	91%	98%	69%
4	13	12	7%	5%	4%	54%	25%	7%	100%	98%	88%	100%	95%	74%
4	13	13	5%	6%	4%	52%	43%	13%	100%	100%	87%	99%	90%	73%
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4	13	16	18%	19%	10%	53%	85%	23%	100%	100%	58%	90%	53%	41%
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4	13	18	42%	34%	21%	61%	32%	20%	100%	100%	15%	9%	12%	8%
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4	13	21	45%	25%	28%	48%	74%	21%	100%	100%	0%	0%	0%	0%
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4	14	6	43%	53%	32%	21%	24%	66%	100%	100%	1%	0%	3%	0%
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4	14	12	84%	82%	75%	27%	90%	78%	100%	100%	91%	100%	72%	80%
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4	15	6	80%	48%	77%	56%	15%	47%	100%	100%	2%	0%	2%	0%
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4	15	8	82%	43%	94%	27%	13%	89%	100%	64%	68%	87%	55%	34%
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4	15	11	82%	43%	82%	27%	26%	98%	100%	67%	96%	95%	98%	85%
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4	17	1	19%	36%	33%	11%	60%	77%	100%	15%	0%	0%	0%	0%

4	17	2	18%	30%	35%	8%	42%	86%	100%	17%	0%	0%	0%	0%
4	17	3	17%	23%	35%	4%	33%	78%	100%	18%	0%	0%	0%	0%
4	17	4	17%	20%	31%	1%	36%	73%	100%	19%	0%	0%	0%	0%
4	17	5	15%	17%	27%	1%	37%	71%	100%	17%	0%	0%	0%	0%
4	17	6	13%	15%	23%	1%	42%	71%	100%	15%	3%	0%	8%	0%
4	17	7	11%	10%	19%	3%	44%	89%	100%	12%	36%	36%	53%	12%
4	17	8	20%	7%	34%	9%	48%	91%	100%	8%	73%	85%	89%	34%
4	17	9	24%	5%	38%	25%	53%	93%	100%	4%	87%	99%	99%	54%
4	17	10	23%	4%	32%	38%	65%	93%	99%	3%	93%	100%	100%	68%
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4	17	15	14%	9%	15%	63%	83%	97%	100%	47%	91%	100%	100%	68%
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4	18	5	29%	37%	41%	21%	71%	68%	100%	100%	0%	0%	0%	0%
4	18	6	24%	34%	36%	17%	76%	52%	100%	100%	4%	0%	9%	0%
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4	18	9	24%	12%	39%	0%	94%	54%	88%	100%	86%	96%	99%	52%
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4	18	12	24%	7%	37%	3%	88%	68%	57%	100%	97%	100%	100%	81%
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4	18	16	17%	3%	26%	3%	71%	79%	48%	100%	81%	94%	95%	51%
4	18	17	16%	4%	24%	2%	57%	66%	49%	100%	62%	81%	75%	31%
4	18	18	14%	4%	17%	0%	47%	47%	49%	100%	23%	36%	25%	10%
4	18	19	12%	6%	11%	0%	51%	35%	50%	100%	1%	0%	2%	0%
4	18	20	12%	8%	10%	0%	62%	20%	50%	100%	0%	0%	0%	0%
4	18	21	10%	11%	13%	0%	77%	19%	49%	100%	0%	0%	0%	0%
4	18	22	9%	19%	18%	0%	82%	39%	45%	100%	0%	0%	0%	0%
4	18	23	12%	27%	24%	0%	78%	50%	39%	100%	0%	0%	0%	0%
4	18	24	15%	30%	31%	1%	80%	42%	33%	100%	0%	0%	0%	0%
4	19	1	19%	28%	35%	3%	83%	31%	30%	100%	0%	0%	0%	0%
4	19	2	22%	26%	38%	8%	83%	24%	29%	100%	0%	0%	0%	0%
4	19	3	28%	27%	42%	10%	84%	18%	27%	100%	0%	0%	0%	0%
4	19	4	34%	31%	52%	11%	88%	13%	26%	100%	0%	0%	0%	0%
4	19	5	39%	34%	64%	9%	88%	11%	24%	100%	0%	0%	0%	0%
4	19	6	39%	37%	65%	7%	64%	12%	22%	100%	5%	0%	10%	0%
4	19	7	33%	31%	56%	4%	34%	50%	18%	100%	37%	39%	54%	12%
4	19	8	30%	21%	48%	0%	30%	45%	14%	100%	73%	85%	90%	33%
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4	25	2	55%	28%	79%	16%	20%	87%	97%	100%	0%	0%	0%	0%
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4	25	11	30%	15%	61%	13%	50%	61%	98%	100%	97%	100%	100%	82%
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4	25	17	50%	33%	55%	74%	60%	100%	100%	100%	66%	85%	79%	33%
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4	26	2	46%	32%	55%	54%	37%	75%	100%	100%	0%	0%	0%	0%
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4	26	8	12%	11%	15%	6%	99%	76%	100%	100%	73%	82%	89%	35%
4	26	9	10%	8%	10%	3%	99%	85%	100%	100%	87%	96%	99%	53%
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4	26	11	9%	3%	6%	1%	99%	87%	100%	100%	96%	100%	100%	80%
4	26	12	11%	4%	10%	0%	98%	87%	100%	100%	97%	100%	100%	84%
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4	26	14	24%	12%	29%	0%	93%	89%	100%	100%	95%	100%	100%	80%
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4	26	24	43%	24%	37%	22%	17%	61%	100%	100%	0%	0%	0%	0%
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4	27	2	40%	26%	31%	26%	13%	34%	100%	100%	0%	0%	0%	0%
4	27	3	40%	27%	29%	27%	9%	24%	100%	100%	0%	0%	0%	0%
4	27	4	36%	28%	25%	28%	7%	21%	100%	100%	0%	0%	0%	0%
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4	28	2	54%	31%	48%	66%	94%	55%	68%	17%	0%	0%	0%	0%
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4	29	15	24%	22%	24%	24%	18%	49%	57%	1%	90%	100%	100%	68%
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5	3	12	62%	48%	43%	4%	2%	42%	10%	8%	90%	100%	100%	70%
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5	4	8	29%	22%	50%	7%	93%	43%	0%	100%	56%	13%	68%	24%
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5	4	12	23%	57%	17%	30%	96%	81%	0%	100%	88%	77%	98%	67%
5	4	13	29%	63%	19%	34%	95%	82%	4%	100%	87%	91%	98%	66%
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5	4	20	51%	68%	56%	52%	82%	7%	26%	100%	0%	0%	0%	0%
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5	4	22	55%	67%	57%	54%	84%	8%	17%	100%	0%	0%	0%	0%
5	4	23	58%	66%	60%	64%	81%	21%	16%	100%	0%	0%	0%	0%
5	4	24	59%	64%	61%	71%	70%	51%	15%	100%	0%	0%	0%	0%
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5	5	2	54%	50%	62%	70%	55%	53%	19%	100%	0%	0%	0%	0%
5	5	3	56%	52%	63%	64%	62%	48%	21%	100%	0%	0%	0%	0%
5	5	4	57%	50%	61%	64%	72%	46%	23%	100%	0%	0%	0%	0%
5	5	5	55%	44%	62%	66%	74%	48%	21%	94%	0%	0%	0%	0%
5	5	6	51%	43%	60%	65%	50%	36%	22%	87%	6%	0%	13%	1%
5	5	7	46%	39%	52%	65%	67%	38%	22%	82%	31%	27%	46%	11%
5	5	8	57%	42%	65%	98%	88%	53%	21%	76%	56%	60%	77%	28%
5	5	9	60%	44%	67%	99%	87%	65%	19%	69%	83%	94%	89%	44%

5	5	10	64%	45%	62%	99%	85%	73%	18%	63%	90%	99%	88%	66%
5	5	11	67%	47%	58%	99%	93%	82%	17%	59%	94%	100%	94%	63%
5	5	12	70%	49%	58%	99%	98%	91%	20%	55%	96%	100%	96%	69%
5	5	13	74%	51%	63%	97%	99%	96%	22%	48%	96%	100%	97%	73%
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5	5	16	80%	56%	81%	96%	94%	99%	36%	27%	81%	94%	91%	48%
5	5	17	79%	57%	83%	95%	84%	97%	40%	25%	65%	82%	75%	30%
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5	6	9	17%	57%	18%	20%	55%	32%	21%	70%	87%	99%	98%	51%
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5	6	24	52%	30%	51%	65%	90%	70%	84%	2%	0%	0%	0%	0%
5	7	1	50%	30%	51%	61%	81%	62%	94%	1%	0%	0%	0%	0%
5	7	2	51%	29%	50%	58%	80%	60%	100%	0%	0%	0%	0%	0%
5	7	3	50%	28%	48%	55%	75%	63%	100%	0%	0%	0%	0%	0%
5	7	4	48%	28%	45%	54%	67%	69%	100%	0%	0%	0%	0%	0%
5	7	5	45%	28%	42%	54%	65%	74%	100%	0%	0%	0%	0%	0%
5	7	6	38%	29%	38%	46%	55%	53%	100%	0%	9%	8%	17%	2%
5	7	7	22%	25%	27%	55%	93%	36%	100%	0%	45%	51%	64%	16%
5	7	8	18%	28%	19%	76%	95%	44%	100%	2%	75%	88%	89%	34%
5	7	9	17%	32%	14%	81%	95%	40%	100%	7%	88%	100%	99%	55%
5	7	10	13%	29%	10%	79%	92%	39%	100%	14%	93%	100%	99%	70%
5	7	11	11%	25%	9%	78%	90%	46%	100%	25%	96%	100%	100%	80%
5	7	12	12%	23%	9%	77%	89%	56%	100%	41%	97%	100%	100%	86%
5	7	13	14%	24%	11%	75%	89%	68%	100%	55%	97%	100%	100%	85%
5	7	14	18%	27%	13%	68%	92%	78%	100%	70%	95%	100%	100%	80%
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5	8	24	30%	46%	39%	0%	0%	96%	100%	100%	0%	0%	0%	0%
5	9	1	28%	44%	40%	4%	0%	98%	100%	100%	0%	0%	0%	0%

5	9	2	26%	43%	39%	8%	0%	95%	100%	100%	0%	0%	0%	0%
5	9	3	23%	40%	36%	14%	0%	93%	100%	100%	0%	0%	0%	0%
5	9	4	21%	40%	34%	19%	0%	93%	100%	100%	0%	0%	0%	0%
5	9	5	19%	38%	33%	22%	0%	87%	100%	100%	0%	0%	0%	0%
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5	9	17	57%	26%	55%	0%	16%	51%	100%	100%	65%	82%	79%	29%
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5	9	20	62%	31%	46%	0%	19%	85%	100%	100%	0%	0%	1%	0%
5	9	21	57%	37%	43%	0%	15%	79%	100%	100%	0%	0%	0%	0%
5	9	22	53%	44%	44%	1%	10%	78%	100%	100%	0%	0%	0%	0%
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5	10	2	48%	42%	44%	4%	6%	70%	100%	100%	0%	0%	0%	0%
5	10	3	44%	39%	41%	5%	6%	73%	100%	100%	0%	0%	0%	0%
5	10	4	40%	39%	39%	6%	5%	76%	100%	100%	0%	0%	0%	0%
5	10	5	33%	38%	36%	6%	4%	72%	100%	100%	0%	0%	0%	0%
5	10	6	24%	34%	32%	6%	5%	51%	100%	85%	10%	9%	17%	3%
5	10	7	12%	23%	20%	4%	7%	46%	100%	50%	44%	47%	63%	15%
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5	10	18	23%	24%	27%	0%	12%	28%	100%	0%	28%	42%	31%	13%
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5	10	20	45%	34%	44%	3%	40%	13%	100%	0%	0%	0%	1%	0%
5	10	21	48%	28%	39%	2%	42%	8%	100%	0%	0%	0%	0%	0%
5	10	22	45%	25%	37%	14%	44%	4%	100%	0%	0%	0%	0%	0%
5	10	23	42%	25%	36%	38%	47%	1%	100%	0%	0%	0%	0%	0%
5	10	24	41%	28%	36%	20%	52%	46%	100%	1%	0%	0%	0%	0%
5	11	1	42%	29%	37%	19%	54%	92%	100%	2%	0%	0%	0%	0%
5	11	2	44%	28%	38%	29%	52%	81%	100%	2%	0%	0%	0%	0%
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5	11	8	28%	14%	34%	41%	60%	20%	100%	6%	73%	86%	89%	31%
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5	11	10	23%	13%	34%	48%	37%	10%	100%	7%	92%	100%	100%	62%
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5	11	16	74%	48%	64%	81%	15%	57%	100%	26%	83%	96%	95%	52%
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5	11	20	70%	36%	54%	68%	52%	92%	100%	34%	0%	0%	1%	0%
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5	11	23	71%	30%	75%	47%	88%	85%	100%	38%	0%	0%	0%	0%
5	11	24	72%	32%	76%	43%	87%	84%	100%	43%	0%	0%	0%	0%
5	12	1	68%	32%	72%	45%	78%	81%	100%	45%	0%	0%	0%	0%
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5	12	3	58%	28%	67%	49%	72%	73%	100%	40%	0%	0%	0%	0%
5	12	4	56%	30%	64%	49%	79%	71%	100%	35%	0%	0%	0%	0%
5	12	5	54%	33%	62%	48%	84%	70%	100%	26%	0%	0%	0%	0%
5	12	6	47%	33%	55%	50%	68%	50%	100%	23%	10%	9%	18%	2%
5	12	7	39%	22%	52%	79%	35%	43%	100%	20%	45%	48%	64%	13%
5	12	8	36%	20%	48%	92%	35%	40%	100%	23%	73%	86%	89%	30%
5	12	9	30%	19%	39%	93%	50%	44%	100%	20%	86%	98%	99%	49%
5	12	10	23%	18%	28%	91%	51%	48%	100%	18%	93%	100%	100%	63%
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5	12	15	60%	32%	53%	89%	99%	64%	100%	43%	91%	100%	99%	67%
5	12	16	68%	35%	66%	91%	99%	65%	100%	54%	83%	98%	92%	54%
5	12	17	74%	38%	78%	88%	99%	63%	100%	50%	66%	83%	75%	34%

5	12	18	79%	41%	81%	81%	99%	58%	100%	47%	29%	44%	31%	14%
5	12	19	80%	41%	79%	67%	99%	67%	100%	47%	6%	18%	4%	1%
5	12	20	80%	42%	80%	58%	98%	66%	100%	49%	0%	0%	1%	0%
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5	13	1	63%	42%	72%	37%	65%	94%	100%	25%	0%	0%	0%	0%
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5	18	10	25%	22%	16%	7%	0%	8%	0%	94%	75%	94%	87%	61%
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5	19	15	76%	39%	62%	60%	19%	38%	61%	100%	87%	99%	95%	67%
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5	19	20	62%	31%	53%	58%	87%	72%	100%	100%	0%	0%	1%	0%
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5	19	24	45%	30%	53%	41%	84%	44%	100%	100%	0%	0%	0%	0%
5	20	1	41%	31%	52%	39%	82%	25%	100%	100%	0%	0%	0%	0%

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5	20	7	16%	14%	11%	15%	63%	12%	100%	100%	41%	52%	60%	17%
5	20	8	16%	10%	9%	7%	73%	7%	100%	100%	59%	85%	76%	37%
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5	20	12	28%	11%	22%	1%	33%	7%	100%	100%	90%	100%	94%	82%
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5	20	14	37%	17%	30%	0%	35%	31%	100%	100%	93%	100%	99%	77%
5	20	15	42%	19%	31%	0%	23%	48%	100%	100%	86%	99%	95%	67%
5	20	16	47%	20%	32%	0%	16%	55%	100%	100%	77%	95%	89%	53%
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5	28	12	15%	16%	8%	0%	4%	0%	0%	100%	95%	99%	100%	73%
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5	28	14	16%	22%	10%	0%	3%	0%	1%	93%	93%	99%	99%	69%
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5	28	18	42%	32%	16%	0%	13%	7%	0%	56%	28%	14%	35%	13%
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5	30	20	23%	32%	31%	48%	51%	2%	12%	6%	0%	0%	1%	0%
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5	30	24	19%	22%	33%	47%	61%	10%	9%	5%	0%	0%	0%	0%
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5	31	2	18%	16%	30%	42%	70%	17%	5%	2%	0%	0%	0%	0%
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6	4	12	19%	11%	42%	6%	8%	20%	1%	28%	92%	100%	88%	73%
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6	4	15	38%	20%	57%	0%	8%	26%	0%	45%	82%	20%	83%	64%
6	4	16	50%	24%	71%	0%	6%	23%	0%	41%	81%	96%	75%	52%
6	4	17	61%	27%	86%	3%	1%	27%	0%	33%	60%	85%	41%	35%
6	4	18	66%	28%	87%	11%	0%	49%	0%	27%	29%	52%	24%	17%
6	4	19	66%	28%	79%	26%	4%	77%	0%	27%	5%	8%	4%	2%
6	4	20	65%	26%	71%	41%	13%	65%	0%	26%	0%	0%	0%	0%
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6	20	12	52%	30%	68%	0%	100%	32%	100%	100%	95%	100%	100%	63%
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6	20	24	53%	26%	49%	53%	25%	37%	100%	100%	0%	0%	0%	0%
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6	22	2	42%	38%	34%	35%	18%	46%	100%	100%	0%	0%	0%	0%
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7	6	16	69%	40%	63%	77%	0%	18%	93%	27%	84%	98%	96%	56%
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7	6	18	77%	42%	74%	62%	33%	32%	91%	50%	40%	60%	46%	19%
7	6	19	72%	37%	67%	55%	58%	53%	88%	66%	9%	14%	20%	3%
7	6	20	65%	37%	59%	48%	77%	55%	86%	87%	0%	0%	1%	0%
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7	13	24	48%	37%	62%	32%	84%	83%	51%	100%	0%	0%	0%	0%
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7	14	2	41%	37%	65%	25%	82%	64%	58%	100%	0%	0%	0%	0%
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7	14	4	33%	34%	53%	20%	73%	36%	56%	100%	0%	0%	0%	0%
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7	14	10	4%	0%	1%	0%	97%	8%	23%	100%	89%	98%	98%	67%
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7	14	12	4%	1%	5%	0%	99%	18%	20%	100%	95%	99%	99%	81%
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7	22	2	38%	28%	31%	43%	48%	1%	100%	74%	0%	0%	0%	0%
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7	22	7	12%	10%	13%	7%	3%	12%	100%	100%	38%	46%	46%	14%
7	22	8	7%	7%	6%	2%	0%	10%	99%	100%	66%	82%	78%	34%
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7	22	10	4%	5%	1%	0%	3%	15%	91%	100%	86%	98%	94%	65%
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7	22	12	6%	13%	2%	0%	6%	14%	99%	100%	80%	100%	83%	78%
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7	24	21	33%	26%	8%	8%	33%	25%	82%	100%	0%	0%	0%	0%
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7	25	2	24%	15%	9%	5%	3%	24%	91%	100%	0%	0%	0%	0%
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7	26	11	3%	3%	3%	2%	3%	0%	17%	100%	91%	96%	96%	73%
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7	29	8	33%	11%	33%	62%	72%	31%	13%	7%	68%	82%	83%	24%
7	29	9	31%	11%	37%	57%	69%	39%	11%	4%	82%	94%	95%	43%
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7	29	12	34%	16%	41%	33%	59%	49%	10%	3%	95%	100%	100%	79%
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7	29	20	66%	34%	57%	55%	36%	11%	28%	0%	0%	0%	1%	0%
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8	6	24	52%	23%	63%	75%	49%	31%	53%	0%	0%	0%	0%	0%
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8	7	2	54%	23%	67%	89%	57%	30%	58%	0%	0%	0%	0%	0%
8	7	3	52%	21%	65%	88%	64%	33%	54%	0%	0%	0%	0%	0%
8	7	4	51%	20%	62%	78%	72%	35%	50%	1%	0%	0%	0%	0%
8	7	5	49%	18%	58%	69%	85%	37%	47%	3%	0%	0%	0%	0%
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8	7	14	36%	18%	45%	15%	6%	70%	34%	27%	95%	100%	100%	77%
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8	12	14	11%	16%	15%	37%	44%	6%	78%	19%	91%	92%	97%	76%
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8	14	20	68%	30%	56%	43%	14%	17%	100%	100%	0%	0%	0%	0%
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8	14	22	65%	29%	66%	35%	36%	18%	100%	100%	0%	0%	0%	0%
8	14	23	63%	32%	69%	29%	56%	22%	100%	100%	0%	0%	0%	0%
8	14	24	63%	35%	66%	25%	71%	32%	100%	100%	0%	0%	0%	0%
8	15	1	62%	33%	63%	25%	74%	44%	100%	100%	0%	0%	0%	0%
8	15	2	58%	37%	60%	25%	76%	49%	100%	100%	0%	0%	0%	0%
8	15	3	55%	39%	57%	24%	76%	51%	100%	100%	0%	0%	0%	0%
8	15	4	50%	35%	53%	22%	76%	54%	100%	100%	0%	0%	0%	0%
8	15	5	47%	32%	49%	20%	68%	55%	100%	100%	0%	0%	0%	0%
8	15	6	40%	28%	42%	14%	43%	36%	100%	100%	7%	4%	11%	0%
8	15	7	27%	18%	33%	8%	52%	51%	100%	100%	35%	38%	51%	9%
8	15	8	21%	11%	34%	1%	44%	53%	93%	100%	69%	79%	85%	26%
8	15	9	10%	5%	25%	0%	25%	49%	78%	100%	84%	95%	97%	46%
8	15	10	4%	2%	18%	1%	11%	49%	63%	100%	91%	99%	99%	64%
8	15	11	4%	4%	15%	2%	3%	55%	56%	100%	95%	100%	100%	75%
8	15	12	5%	6%	14%	4%	3%	62%	52%	100%	96%	99%	100%	82%
8	15	13	6%	7%	16%	5%	3%	68%	50%	100%	96%	96%	100%	82%
8	15	14	8%	8%	20%	5%	0%	71%	55%	100%	94%	99%	100%	77%
8	15	15	11%	11%	24%	4%	6%	70%	66%	100%	90%	94%	99%	67%
8	15	16	16%	15%	29%	3%	7%	64%	80%	100%	82%	88%	94%	53%
8	15	17	22%	21%	32%	0%	5%	49%	92%	100%	66%	74%	79%	33%
8	15	18	29%	27%	36%	0%	6%	31%	100%	100%	29%	40%	32%	13%
8	15	19	40%	32%	39%	0%	25%	26%	100%	100%	4%	12%	3%	1%
8	15	20	49%	35%	39%	10%	76%	29%	100%	100%	0%	0%	1%	0%
8	15	21	51%	38%	36%	42%	62%	41%	100%	100%	0%	0%	0%	0%
8	15	22	48%	38%	35%	64%	25%	54%	100%	100%	0%	0%	0%	0%
8	15	23	46%	35%	36%	58%	18%	64%	100%	100%	0%	0%	0%	0%
8	15	24	44%	36%	37%	51%	18%	71%	99%	100%	0%	0%	0%	0%
8	16	1	44%	37%	39%	45%	30%	77%	98%	100%	0%	0%	0%	0%

8	16	2	43%	35%	40%	42%	46%	77%	100%	100%	0%	0%	0%	0%
8	16	3	41%	34%	39%	41%	59%	74%	100%	100%	0%	0%	0%	0%
8	16	4	39%	33%	37%	40%	62%	72%	100%	100%	0%	0%	0%	0%
8	16	5	36%	33%	36%	34%	56%	68%	92%	100%	0%	0%	0%	0%
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8	16	11	2%	2%	6%	0%	5%	22%	45%	100%	95%	100%	100%	76%
8	16	12	3%	4%	7%	0%	4%	29%	43%	100%	96%	99%	100%	82%
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8	16	14	3%	6%	11%	0%	5%	40%	46%	100%	94%	99%	100%	77%
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8	16	19	32%	27%	33%	2%	3%	25%	73%	100%	4%	14%	3%	1%
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8	16	24	39%	32%	32%	0%	0%	19%	77%	100%	0%	0%	0%	0%
8	17	1	41%	35%	33%	5%	4%	19%	82%	100%	0%	0%	0%	0%
8	17	2	40%	34%	32%	11%	13%	20%	82%	100%	0%	0%	0%	0%
8	17	3	38%	33%	31%	18%	24%	20%	80%	100%	0%	0%	0%	0%
8	17	4	34%	32%	30%	20%	33%	21%	75%	100%	0%	0%	0%	0%
8	17	5	29%	32%	27%	17%	32%	22%	69%	100%	0%	0%	0%	0%
8	17	6	24%	32%	22%	13%	17%	18%	64%	100%	5%	4%	9%	0%
8	17	7	15%	21%	12%	6%	14%	9%	62%	100%	34%	36%	50%	10%
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8	17	12	7%	7%	3%	0%	4%	40%	47%	100%	96%	100%	100%	79%
8	17	13	8%	10%	4%	0%	6%	44%	46%	100%	96%	100%	100%	81%
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8	17	22	42%	24%	30%	12%	38%	35%	75%	100%	0%	0%	0%	0%
8	17	23	38%	27%	30%	14%	46%	11%	73%	100%	0%	0%	0%	0%
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8	18	3	23%	26%	30%	20%	62%	27%	47%	100%	0%	0%	0%	0%
8	18	4	18%	26%	28%	23%	61%	28%	38%	100%	0%	0%	0%	0%
8	18	5	14%	27%	25%	27%	60%	23%	30%	100%	0%	0%	0%	0%
8	18	6	12%	27%	22%	23%	62%	13%	24%	100%	2%	0%	7%	0%
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8	18	10	5%	2%	4%	0%	46%	26%	9%	100%	89%	98%	98%	57%
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8	19	3	30%	16%	32%	41%	28%	75%	2%	4%	0%	0%	0%	0%
8	19	4	29%	14%	31%	34%	39%	84%	0%	1%	0%	0%	0%	0%
8	19	5	27%	13%	29%	25%	56%	88%	0%	0%	0%	0%	0%	0%
8	19	6	24%	12%	27%	19%	44%	75%	0%	0%	4%	0%	9%	0%
8	19	7	18%	8%	19%	9%	60%	93%	0%	0%	32%	34%	48%	9%
8	19	8	13%	5%	14%	3%	78%	84%	0%	0%	66%	75%	82%	22%
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8	19	17	21%	30%	9%	0%	72%	43%	0%	0%	60%	78%	72%	32%

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8	20	10	12%	5%	3%	6%	89%	61%	0%	8%	87%	98%	96%	59%
8	20	11	10%	7%	3%	3%	89%	50%	0%	10%	92%	98%	97%	70%
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8	20	19	27%	26%	24%	24%	47%	61%	9%	38%	2%	8%	2%	0%
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8	20	24	39%	19%	41%	49%	0%	43%	6%	70%	0%	0%	0%	0%
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8	21	11	2%	3%	10%	7%	0%	9%	4%	100%	74%	95%	82%	67%
8	21	12	4%	6%	14%	8%	0%	7%	6%	100%	76%	95%	82%	67%
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8	21	16	35%	17%	50%	19%	9%	14%	11%	100%	64%	57%	80%	42%
8	21	17	50%	22%	59%	28%	24%	23%	10%	100%	29%	10%	49%	23%
8	21	18	54%	28%	62%	46%	56%	41%	7%	100%	12%	27%	13%	9%
8	21	19	53%	30%	54%	61%	70%	58%	4%	100%	1%	0%	1%	0%
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8	21	21	50%	25%	36%	74%	65%	58%	0%	100%	0%	0%	0%	0%
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8	21	23	48%	29%	37%	38%	75%	44%	3%	100%	0%	0%	0%	0%
8	21	24	44%	31%	33%	22%	78%	42%	5%	100%	0%	0%	0%	0%
8	22	1	41%	29%	25%	16%	79%	38%	6%	100%	0%	0%	0%	0%
8	22	2	40%	27%	18%	14%	74%	30%	7%	100%	0%	0%	0%	0%
8	22	3	36%	29%	17%	13%	69%	21%	10%	100%	0%	0%	0%	0%
8	22	4	31%	32%	13%	14%	69%	14%	11%	100%	0%	0%	0%	0%
8	22	5	32%	32%	14%	16%	68%	8%	8%	100%	0%	0%	0%	0%
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8	22	7	28%	19%	19%	9%	43%	4%	6%	100%	5%	0%	3%	4%
8	22	8	26%	12%	24%	2%	30%	4%	9%	100%	17%	35%	17%	15%
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8	22	12	19%	20%	9%	0%	0%	12%	13%	100%	70%	27%	74%	66%
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8	22	14	21%	27%	9%	0%	3%	24%	20%	100%	54%	4%	54%	59%
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8	22	19	23%	39%	5%	2%	93%	58%	37%	100%	0%	0%	2%	0%
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8	25	2	29%	18%	21%	51%	0%	22%	61%	1%	0%	0%	0%	0%
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8	30	8	23%	19%	12%	0%	48%	45%	78%	100%	63%	78%	74%	29%
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8	30	14	53%	38%	30%	2%	32%	37%	69%	100%	84%	95%	92%	71%
8	30	15	60%	41%	35%	3%	33%	33%	75%	100%	77%	94%	88%	60%
8	30	16	62%	40%	39%	4%	40%	31%	80%	100%	66%	88%	77%	45%
8	30	17	56%	39%	42%	6%	47%	32%	81%	100%	46%	74%	52%	26%

8	30	18	48%	35%	37%	8%	62%	38%	81%	100%	14%	31%	14%	8%
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9	23	2	21%	37%	27%	41%	72%	14%	50%	5%	0%	0%	0%	0%
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9	30	20	30%	37%	22%	22%	100%	99%	100%	68%	0%	0%	0%	0%
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9	30	22	38%	36%	29%	35%	100%	99%	100%	86%	0%	0%	0%	0%
9	30	23	48%	44%	35%	32%	99%	99%	100%	90%	0%	0%	0%	0%
9	30	24	56%	44%	42%	29%	99%	99%	97%	92%	0%	0%	0%	0%
10	1	1	62%	46%	47%	26%	98%	99%	82%	93%	0%	0%	0%	0%
10	1	2	66%	49%	52%	23%	99%	97%	73%	91%	0%	0%	0%	0%
10	1	3	69%	51%	55%	22%	99%	94%	69%	85%	0%	0%	0%	0%
10	1	4	69%	51%	56%	20%	99%	96%	63%	77%	0%	0%	0%	0%
10	1	5	69%	49%	59%	17%	99%	98%	56%	73%	0%	0%	0%	0%
10	1	6	67%	47%	62%	15%	99%	98%	48%	69%	0%	0%	0%	0%
10	1	7	61%	43%	60%	14%	100%	100%	40%	68%	25%	23%	42%	7%
10	1	8	63%	35%	70%	8%	100%	100%	35%	70%	67%	77%	85%	28%
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10	1	10	62%	20%	81%	3%	100%	99%	23%	94%	90%	96%	100%	65%
10	1	11	52%	17%	73%	0%	100%	99%	19%	100%	93%	96%	99%	74%
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10	1	16	10%	10%	16%	8%	99%	90%	54%	100%	71%	83%	84%	39%
10	1	17	9%	9%	13%	13%	96%	66%	57%	100%	39%	55%	44%	17%
10	1	18	9%	8%	12%	21%	85%	63%	57%	100%	1%	3%	2%	1%
10	1	19	9%	16%	11%	29%	74%	68%	56%	100%	0%	0%	1%	0%
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10	2	10	3%	2%	2%	18%	97%	52%	55%	100%	85%	92%	95%	59%
10	2	11	2%	1%	1%	15%	97%	58%	59%	100%	88%	92%	95%	68%
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10	2	13	4%	3%	3%	12%	96%	71%	74%	100%	88%	92%	94%	65%
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10	2	16	20%	9%	21%	15%	86%	51%	100%	100%	53%	83%	67%	33%
10	2	17	28%	13%	25%	17%	65%	24%	100%	100%	31%	53%	35%	15%

10	2	18	38%	19%	25%	23%	59%	13%	100%	100%	0%	1%	2%	1%
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10	2	20	62%	26%	30%	47%	40%	7%	100%	100%	0%	0%	0%	0%
10	2	21	56%	27%	36%	48%	31%	7%	100%	100%	0%	0%	0%	0%
10	2	22	53%	32%	40%	46%	22%	7%	100%	100%	0%	0%	0%	0%
10	2	23	53%	32%	37%	43%	13%	6%	100%	100%	0%	0%	0%	0%
10	2	24	53%	35%	36%	38%	6%	6%	100%	100%	0%	0%	0%	0%
10	3	1	51%	33%	34%	37%	0%	12%	100%	100%	0%	0%	0%	0%
10	3	2	48%	28%	32%	39%	0%	25%	100%	100%	0%	0%	0%	0%
10	3	3	46%	29%	30%	36%	0%	45%	100%	88%	0%	0%	0%	0%
10	3	4	44%	31%	29%	34%	3%	62%	100%	75%	0%	0%	0%	0%
10	3	5	44%	31%	27%	32%	7%	75%	100%	71%	0%	0%	0%	0%
10	3	6	46%	33%	27%	37%	9%	77%	100%	72%	0%	0%	0%	0%
10	3	7	43%	32%	23%	39%	7%	49%	100%	69%	23%	21%	36%	6%
10	3	8	27%	26%	16%	34%	8%	35%	100%	65%	62%	73%	78%	24%
10	3	9	34%	26%	26%	54%	8%	35%	100%	58%	78%	88%	91%	47%
10	3	10	37%	23%	33%	57%	3%	23%	100%	58%	85%	92%	94%	63%
10	3	11	40%	22%	36%	55%	0%	21%	100%	61%	89%	94%	95%	72%
10	3	12	46%	25%	43%	53%	0%	23%	100%	62%	90%	94%	89%	77%
10	3	13	57%	30%	52%	50%	0%	28%	100%	72%	90%	94%	94%	76%
10	3	14	69%	38%	65%	46%	0%	34%	100%	92%	85%	94%	94%	68%
10	3	15	78%	49%	75%	49%	3%	34%	100%	100%	80%	92%	92%	55%
10	3	16	88%	63%	84%	54%	11%	30%	100%	100%	63%	83%	79%	34%
10	3	17	91%	72%	91%	51%	36%	31%	100%	100%	35%	44%	37%	16%
10	3	18	86%	69%	81%	43%	59%	51%	100%	100%	0%	1%	2%	1%
10	3	19	77%	65%	69%	47%	64%	65%	100%	100%	0%	0%	1%	0%
10	3	20	72%	61%	59%	63%	66%	62%	100%	100%	0%	0%	0%	0%
10	3	21	71%	57%	52%	84%	51%	61%	100%	100%	0%	0%	0%	0%
10	3	22	71%	55%	54%	97%	41%	62%	100%	100%	0%	0%	0%	0%
10	3	23	71%	54%	59%	99%	44%	61%	100%	100%	0%	0%	0%	0%
10	3	24	70%	51%	64%	100%	47%	57%	100%	100%	0%	0%	0%	0%
10	4	1	70%	44%	67%	100%	51%	53%	100%	100%	0%	0%	0%	0%
10	4	2	66%	37%	66%	100%	47%	42%	100%	100%	0%	0%	0%	0%
10	4	3	64%	32%	66%	100%	37%	36%	100%	100%	0%	0%	0%	0%
10	4	4	61%	30%	66%	100%	32%	24%	100%	100%	0%	0%	0%	0%
10	4	5	53%	26%	65%	100%	33%	16%	100%	100%	0%	0%	0%	0%
10	4	6	48%	23%	65%	100%	39%	18%	100%	100%	0%	0%	0%	0%
10	4	7	47%	19%	72%	100%	43%	21%	100%	100%	20%	18%	33%	4%
10	4	8	53%	16%	87%	99%	55%	20%	100%	89%	60%	69%	77%	25%
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10	4	11	63%	15%	92%	100%	88%	59%	100%	91%	91%	95%	96%	73%
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10	4	14	75%	22%	96%	99%	85%	92%	100%	100%	86%	95%	95%	66%
10	4	15	77%	26%	95%	99%	82%	94%	100%	100%	78%	95%	91%	54%
10	4	16	78%	28%	92%	99%	71%	92%	100%	100%	68%	86%	79%	36%
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10	5	3	40%	12%	35%	74%	17%	74%	90%	38%	0%	0%	0%	0%
10	5	4	37%	13%	32%	71%	16%	71%	85%	27%	0%	0%	0%	0%
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10	6	5	17%	21%	42%	15%	83%	19%	9%	60%	0%	0%	0%	0%
10	6	6	17%	21%	44%	15%	68%	13%	9%	58%	0%	0%	0%	0%
10	6	7	17%	21%	43%	17%	69%	7%	8%	57%	19%	21%	33%	6%
10	6	8	14%	17%	31%	12%	78%	7%	9%	55%	63%	73%	81%	26%
10	6	9	26%	26%	29%	8%	69%	8%	11%	49%	80%	90%	94%	47%

10	6	10	30%	24%	24%	9%	65%	5%	14%	43%	87%	94%	97%	60%
10	6	11	27%	19%	19%	7%	61%	5%	17%	45%	90%	94%	96%	70%
10	6	12	23%	15%	15%	6%	58%	14%	20%	66%	91%	92%	96%	77%
10	6	13	21%	12%	12%	4%	55%	23%	22%	100%	90%	92%	96%	75%
10	6	14	19%	10%	10%	4%	56%	25%	22%	100%	87%	92%	95%	68%
10	6	15	17%	8%	8%	5%	59%	21%	21%	100%	81%	90%	93%	55%
10	6	16	14%	7%	6%	7%	50%	17%	18%	100%	67%	81%	80%	37%
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10	6	18	8%	7%	2%	14%	47%	13%	17%	100%	0%	0%	2%	0%
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10	6	21	18%	27%	26%	38%	73%	46%	21%	100%	0%	0%	0%	0%
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10	6	23	34%	33%	32%	32%	77%	54%	22%	100%	0%	0%	0%	0%
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10	7	1	44%	32%	35%	28%	80%	48%	20%	100%	0%	0%	0%	0%
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10	7	6	31%	31%	30%	37%	88%	40%	9%	100%	0%	0%	0%	0%
10	7	7	28%	29%	28%	30%	60%	32%	9%	100%	18%	10%	21%	5%
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10	7	10	11%	7%	10%	24%	26%	55%	13%	100%	85%	91%	92%	58%
10	7	11	11%	6%	8%	17%	18%	68%	15%	100%	88%	92%	94%	68%
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10	7	13	15%	9%	11%	9%	8%	89%	17%	100%	85%	92%	94%	68%
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10	7	15	23%	17%	16%	8%	0%	93%	20%	100%	81%	91%	89%	49%
10	7	16	29%	20%	19%	8%	0%	93%	21%	100%	67%	81%	77%	35%
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10	7	22	51%	25%	45%	13%	48%	38%	12%	100%	0%	0%	0%	0%
10	7	23	53%	26%	52%	20%	48%	41%	11%	100%	0%	0%	0%	0%
10	7	24	54%	25%	56%	23%	42%	44%	12%	100%	0%	0%	0%	0%
10	8	1	54%	24%	56%	21%	39%	50%	13%	100%	0%	0%	0%	0%
10	8	2	53%	21%	53%	21%	37%	44%	15%	100%	0%	0%	0%	0%
10	8	3	53%	20%	51%	21%	34%	42%	15%	100%	0%	0%	0%	0%
10	8	4	51%	19%	49%	19%	33%	46%	17%	100%	0%	0%	0%	0%
10	8	5	47%	18%	44%	15%	32%	48%	17%	100%	0%	0%	0%	0%
10	8	6	43%	17%	41%	12%	27%	48%	18%	100%	0%	0%	0%	0%
10	8	7	36%	15%	35%	9%	24%	35%	17%	100%	21%	21%	34%	5%
10	8	8	20%	10%	22%	3%	16%	55%	16%	100%	58%	73%	77%	20%
10	8	9	14%	8%	18%	0%	9%	70%	14%	100%	78%	88%	91%	44%
10	8	10	7%	5%	10%	0%	7%	71%	10%	100%	85%	92%	94%	61%
10	8	11	3%	3%	4%	0%	4%	72%	8%	100%	88%	92%	93%	72%
10	8	12	3%	3%	3%	2%	3%	75%	8%	100%	89%	92%	92%	76%
10	8	13	4%	4%	4%	3%	2%	78%	9%	100%	88%	92%	92%	74%
10	8	14	7%	6%	7%	4%	1%	80%	10%	100%	85%	92%	92%	66%
10	8	15	11%	8%	11%	4%	0%	80%	11%	100%	79%	91%	89%	54%
10	8	16	15%	11%	16%	4%	1%	73%	11%	100%	66%	82%	77%	36%
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10	8	18	30%	21%	34%	12%	14%	46%	10%	100%	0%	0%	2%	0%
10	8	19	38%	25%	41%	5%	23%	39%	9%	100%	0%	0%	1%	0%
10	8	20	38%	23%	38%	0%	33%	43%	10%	100%	0%	0%	0%	0%
10	8	21	37%	20%	34%	3%	45%	52%	10%	100%	0%	0%	0%	0%
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10	10	8	7%	18%	7%	20%	2%	5%	0%	100%	59%	69%	77%	15%
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10	10	18	21%	18%	18%	19%	21%	37%	0%	100%	0%	0%	2%	0%
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10	10	22	40%	28%	30%	20%	35%	43%	0%	100%	0%	0%	0%	0%
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10	10	24	38%	24%	33%	20%	41%	40%	0%	100%	0%	0%	0%	0%
10	11	1	36%	21%	34%	22%	47%	34%	0%	100%	0%	0%	0%	0%
10	11	2	35%	17%	34%	24%	52%	34%	0%	100%	0%	0%	0%	0%
10	11	3	35%	14%	34%	25%	57%	40%	0%	100%	0%	0%	0%	0%
10	11	4	36%	11%	34%	27%	60%	43%	0%	100%	0%	0%	0%	0%
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10	12	3	32%	15%	31%	23%	0%	55%	13%	3%	0%	0%	0%	0%
10	12	4	29%	13%	28%	26%	0%	43%	16%	4%	0%	0%	0%	0%
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10	13	3	46%	78%	30%	31%	48%	75%	100%	100%	0%	0%	0%	0%
10	13	4	44%	82%	26%	32%	50%	69%	100%	100%	0%	0%	0%	0%
10	13	5	44%	86%	24%	29%	51%	66%	100%	100%	0%	0%	0%	0%
10	13	6	49%	87%	24%	31%	48%	67%	100%	100%	0%	0%	0%	0%
10	13	7	51%	88%	23%	33%	49%	75%	100%	100%	8%	0%	9%	3%
10	13	8	60%	92%	30%	20%	65%	92%	100%	100%	18%	1%	17%	9%
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10	13	17	84%	98%	65%	23%	17%	55%	100%	100%	6%	39%	6%	5%

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10	15	1	26%	13%	26%	11%	96%	65%	5%	100%	0%	0%	0%	0%
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10	15	5	14%	19%	21%	6%	94%	64%	1%	86%	0%	0%	0%	0%
10	15	6	12%	19%	22%	4%	91%	64%	0%	76%	0%	0%	0%	0%
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10	15	11	14%	9%	19%	2%	38%	29%	0%	93%	83%	87%	88%	60%
10	15	12	13%	9%	18%	3%	40%	26%	0%	87%	84%	86%	88%	69%
10	15	13	10%	9%	17%	1%	44%	30%	3%	81%	83%	87%	88%	67%
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10	15	15	7%	6%	19%	0%	44%	42%	15%	79%	75%	85%	85%	49%
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10	15	19	13%	13%	19%	16%	30%	62%	45%	88%	0%	0%	0%	0%
10	15	20	14%	18%	24%	18%	25%	72%	47%	87%	0%	0%	0%	0%
10	15	21	15%	21%	28%	16%	17%	76%	47%	90%	0%	0%	0%	0%
10	15	22	16%	24%	32%	16%	13%	73%	46%	90%	0%	0%	0%	0%
10	15	23	18%	26%	35%	15%	12%	71%	45%	84%	0%	0%	0%	0%
10	15	24	19%	24%	38%	13%	12%	65%	43%	78%	0%	0%	0%	0%
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10	16	2	21%	26%	42%	11%	23%	51%	44%	82%	0%	0%	0%	0%
10	16	3	22%	28%	44%	13%	35%	50%	49%	78%	0%	0%	0%	0%
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10	16	8	29%	26%	40%	11%	22%	42%	41%	34%	47%	3%	74%	23%
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10	16	14	23%	9%	24%	0%	88%	0%	80%	11%	81%	86%	88%	56%
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10	17	5	14%	14%	35%	10%	55%	53%	82%	92%	0%	0%	0%	0%
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10	17	10	10%	8%	11%	0%	62%	46%	77%	70%	71%	85%	90%	49%
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10	18	18	61%	36%	53%	0%	18%	55%	44%	0%	0%	0%	1%	0%
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10	18	21	52%	32%	46%	0%	61%	75%	36%	1%	0%	0%	0%	0%
10	18	22	49%	30%	45%	1%	62%	80%	34%	4%	0%	0%	0%	0%
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10	18	24	47%	28%	44%	2%	23%	81%	31%	14%	0%	0%	0%	0%
10	19	1	45%	26%	44%	4%	3%	78%	29%	20%	0%	0%	0%	0%
10	19	2	44%	27%	43%	7%	5%	75%	24%	28%	0%	0%	0%	0%
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10	20	24	33%	28%	49%	0%	54%	18%	49%	4%	0%	0%	0%	0%
10	21	1	30%	27%	43%	0%	57%	13%	61%	5%	0%	0%	0%	0%

10	21	2	29%	29%	41%	0%	68%	8%	78%	7%	0%	0%	0%	0%
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10	21	5	30%	18%	39%	0%	71%	6%	94%	19%	0%	0%	0%	0%
10	21	6	25%	12%	36%	0%	63%	1%	87%	28%	0%	0%	0%	0%
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10	22	24	10%	28%	25%	5%	91%	1%	83%	49%	0%	0%	0%	0%
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10	23	4	11%	26%	29%	8%	91%	0%	68%	10%	0%	0%	0%	0%
10	23	5	12%	24%	32%	11%	87%	0%	66%	5%	0%	0%	0%	0%
10	23	6	15%	24%	34%	18%	74%	0%	63%	6%	0%	0%	0%	0%
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10	23	8	13%	22%	25%	34%	72%	0%	56%	12%	54%	60%	72%	20%
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10	23	11	7%	6%	20%	48%	56%	0%	44%	0%	82%	85%	87%	65%
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10	23	17	7%	8%	8%	86%	17%	21%	81%	1%	21%	33%	22%	8%
10	23	18	9%	10%	7%	82%	25%	30%	87%	1%	0%	0%	2%	0%
10	23	19	13%	13%	7%	73%	53%	31%	85%	2%	0%	0%	0%	0%
10	23	20	17%	16%	8%	65%	77%	29%	81%	5%	0%	0%	0%	0%
10	23	21	17%	16%	10%	55%	93%	27%	82%	11%	0%	0%	0%	0%
10	23	22	17%	17%	12%	50%	99%	25%	81%	25%	0%	0%	0%	0%
10	23	23	17%	20%	13%	49%	98%	33%	74%	45%	0%	0%	0%	0%
10	23	24	17%	26%	17%	47%	98%	45%	73%	63%	0%	0%	0%	0%
10	24	1	15%	23%	19%	45%	96%	55%	81%	80%	0%	0%	0%	0%
10	24	2	14%	20%	21%	41%	94%	65%	87%	99%	0%	0%	0%	0%
10	24	3	15%	22%	24%	41%	87%	74%	87%	100%	0%	0%	0%	0%
10	24	4	17%	24%	29%	39%	73%	77%	82%	100%	0%	0%	0%	0%
10	24	5	17%	24%	33%	36%	78%	79%	85%	100%	0%	0%	0%	0%
10	24	6	15%	23%	32%	38%	92%	82%	94%	100%	0%	0%	0%	0%
10	24	7	13%	21%	27%	38%	96%	71%	99%	100%	13%	9%	26%	2%
10	24	8	9%	19%	19%	33%	83%	61%	100%	100%	48%	61%	65%	20%
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10	24	10	6%	13%	2%	19%	65%	99%	100%	100%	78%	85%	86%	54%
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10	24	17	23%	22%	32%	3%	55%	82%	100%	100%	12%	30%	16%	8%

10	24	18	33%	30%	41%	2%	49%	83%	100%	100%	0%	0%	1%	0%
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10	26	8	21%	13%	34%	75%	38%	33%	35%	15%	45%	5%	70%	20%
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10	26	12	10%	8%	11%	55%	31%	5%	65%	100%	82%	83%	80%	68%
10	26	13	5%	9%	4%	75%	31%	6%	73%	79%	74%	83%	73%	64%
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10	26	18	18%	40%	2%	71%	45%	14%	100%	100%	0%	0%	1%	0%
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10	26	20	27%	38%	11%	56%	79%	40%	100%	100%	0%	0%	0%	0%
10	26	21	35%	40%	16%	58%	82%	57%	100%	100%	0%	0%	0%	0%
10	26	22	45%	48%	19%	61%	85%	71%	100%	100%	0%	0%	0%	0%
10	26	23	52%	55%	24%	65%	86%	82%	100%	100%	0%	0%	0%	0%
10	26	24	59%	54%	31%	69%	87%	87%	100%	100%	0%	0%	0%	0%
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10	27	2	72%	53%	44%	66%	89%	91%	100%	100%	0%	0%	0%	0%
10	27	3	75%	53%	51%	62%	86%	92%	100%	100%	0%	0%	0%	0%
10	27	4	76%	55%	62%	57%	80%	91%	100%	100%	0%	0%	0%	0%
10	27	5	79%	58%	70%	52%	74%	91%	100%	100%	0%	0%	0%	0%
10	27	6	83%	62%	77%	46%	73%	91%	100%	100%	0%	0%	0%	0%
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10	27	8	82%	63%	84%	37%	62%	91%	100%	100%	20%	27%	33%	11%
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10	27	10	86%	81%	100%	57%	14%	90%	100%	100%	65%	59%	62%	43%
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10	27	23	71%	57%	53%	50%	97%	100%	100%	100%	0%	0%	0%	0%
10	27	24	75%	56%	64%	46%	97%	100%	100%	100%	0%	0%	0%	0%
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10	28	8	79%	53%	62%	7%	98%	52%	100%	60%	56%	36%	72%	21%
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10	29	4	27%	30%	35%	3%	93%	46%	88%	0%	0%	0%	0%	0%
10	29	5	26%	31%	34%	8%	90%	51%	85%	2%	0%	0%	0%	0%
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10	29	11	29%	21%	35%	22%	100%	66%	62%	0%	84%	85%	89%	64%
10	29	12	29%	16%	31%	15%	100%	80%	60%	0%	84%	85%	88%	68%
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10	30	1	13%	16%	17%	47%	82%	70%	39%	0%	0%	0%	0%	0%
10	30	2	15%	15%	23%	49%	95%	76%	35%	0%	0%	0%	0%	0%
10	30	3	14%	19%	24%	53%	99%	81%	33%	0%	0%	0%	0%	0%
10	30	4	14%	19%	25%	61%	99%	82%	33%	0%	0%	0%	0%	0%
10	30	5	13%	19%	24%	67%	99%	83%	32%	0%	0%	0%	0%	0%
10	30	6	12%	18%	22%	72%	99%	85%	29%	0%	0%	0%	0%	0%
10	30	7	9%	17%	20%	73%	100%	81%	24%	0%	6%	4%	17%	1%
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10	31	10	22%	6%	48%	71%	99%	10%	81%	7%	79%	85%	89%	47%
10	31	11	22%	6%	46%	78%	99%	8%	76%	2%	82%	83%	88%	60%
10	31	12	22%	6%	40%	79%	99%	9%	78%	0%	82%	83%	87%	70%
10	31	13	20%	5%	34%	82%	97%	13%	84%	0%	82%	83%	87%	65%
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10	31	23	17%	16%	29%	26%	99%	63%	100%	87%	0%	0%	0%	0%
10	31	24	18%	21%	29%	25%	99%	66%	100%	100%	0%	0%	0%	0%
11	1	1	18%	22%	29%	29%	99%	67%	100%	100%	0%	0%	0%	0%

11	1	2	17%	22%	29%	36%	98%	71%	100%	100%	0%	0%	0%	0%
11	1	3	15%	21%	29%	41%	98%	77%	100%	100%	0%	0%	0%	0%
11	1	4	14%	21%	28%	45%	98%	83%	100%	100%	0%	0%	0%	0%
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11	23	21	51%	42%	52%	5%	85%	51%	73%	7%	0%	0%	0%	0%
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11	24	7	62%	48%	57%	7%	98%	0%	31%	20%	0%	0%	0%	0%
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11	24	14	38%	12%	58%	0%	92%	11%	11%	14%	73%	75%	81%	54%
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12	25	24	7%	19%	34%	46%	100%	60%	0%	30%	0%	0%	0%	0%
12	26	1	8%	18%	35%	46%	100%	56%	0%	31%	0%	0%	0%	0%

12	26	2	11%	20%	36%	47%	100%	56%	0%	30%	0%	0%	0%	0%
12	26	3	15%	22%	37%	49%	100%	57%	0%	30%	0%	0%	0%	0%
12	26	4	18%	23%	38%	46%	100%	57%	0%	31%	0%	0%	0%	0%
12	26	5	18%	22%	39%	44%	100%	57%	0%	35%	0%	0%	0%	0%
12	26	6	19%	21%	39%	42%	100%	57%	1%	44%	0%	0%	0%	0%
12	26	7	19%	20%	37%	38%	100%	53%	1%	56%	0%	0%	0%	0%
12	26	8	18%	19%	32%	34%	100%	48%	3%	57%	12%	0%	34%	1%
12	26	9	14%	16%	23%	25%	100%	55%	9%	53%	22%	17%	52%	11%
12	26	10	9%	10%	19%	21%	100%	43%	16%	60%	44%	64%	68%	25%
12	26	11	10%	8%	17%	18%	100%	30%	21%	71%	49%	48%	71%	27%
12	26	12	10%	6%	13%	16%	100%	23%	26%	87%	49%	46%	69%	28%
12	26	13	9%	5%	11%	17%	100%	21%	35%	100%	28%	20%	59%	22%
12	26	14	11%	6%	12%	18%	100%	22%	40%	100%	34%	61%	60%	26%
12	26	15	12%	6%	11%	18%	100%	23%	36%	100%	26%	25%	57%	20%
12	26	16	8%	6%	8%	16%	100%	24%	29%	100%	21%	0%	25%	11%
12	26	17	7%	7%	8%	19%	99%	31%	25%	100%	4%	0%	4%	1%
12	26	18	10%	9%	10%	24%	99%	37%	24%	100%	0%	0%	0%	0%
12	26	19	11%	11%	12%	26%	99%	41%	21%	100%	0%	0%	0%	0%
12	26	20	12%	14%	14%	28%	99%	43%	17%	100%	0%	0%	0%	0%
12	26	21	12%	16%	14%	29%	99%	44%	15%	100%	0%	0%	0%	0%
12	26	22	12%	17%	13%	29%	98%	44%	12%	100%	0%	0%	0%	0%
12	26	23	11%	19%	14%	29%	97%	48%	9%	100%	0%	0%	0%	0%
12	26	24	10%	21%	13%	30%	97%	53%	9%	100%	0%	0%	0%	0%
12	27	1	9%	19%	14%	33%	97%	55%	8%	100%	0%	0%	0%	0%
12	27	2	10%	15%	14%	37%	97%	53%	4%	100%	0%	0%	0%	0%
12	27	3	9%	14%	13%	40%	96%	47%	1%	100%	0%	0%	0%	0%
12	27	4	9%	13%	13%	40%	94%	41%	0%	100%	0%	0%	0%	0%
12	27	5	8%	11%	13%	36%	92%	41%	0%	100%	0%	0%	0%	0%
12	27	6	7%	10%	12%	32%	86%	38%	0%	100%	0%	0%	0%	0%
12	27	7	6%	11%	11%	29%	81%	33%	0%	100%	0%	0%	0%	0%
12	27	8	7%	16%	11%	26%	66%	18%	0%	100%	17%	0%	35%	3%
12	27	9	7%	13%	8%	22%	64%	16%	0%	100%	43%	3%	67%	19%
12	27	10	5%	8%	6%	16%	64%	16%	0%	100%	61%	36%	76%	36%
12	27	11	6%	8%	6%	14%	50%	14%	0%	100%	62%	53%	75%	48%
12	27	12	5%	8%	8%	11%	39%	13%	0%	100%	62%	60%	73%	48%
12	27	13	5%	6%	9%	9%	33%	14%	0%	100%	61%	51%	72%	43%
12	27	14	5%	6%	11%	8%	30%	15%	0%	100%	56%	44%	72%	37%
12	27	15	8%	6%	14%	6%	24%	16%	2%	85%	41%	43%	62%	28%
12	27	16	11%	5%	14%	5%	18%	12%	4%	76%	25%	38%	41%	15%
12	27	17	16%	9%	18%	4%	16%	9%	9%	66%	3%	12%	2%	1%
12	27	18	19%	13%	22%	6%	23%	8%	15%	55%	0%	0%	2%	0%
12	27	19	18%	14%	23%	8%	42%	7%	17%	45%	0%	0%	0%	0%
12	27	20	15%	14%	24%	9%	64%	6%	17%	36%	0%	0%	0%	0%
12	27	21	15%	15%	26%	8%	78%	4%	17%	31%	0%	0%	0%	0%
12	27	22	17%	17%	29%	8%	84%	3%	14%	27%	0%	0%	0%	0%
12	27	23	20%	19%	34%	8%	86%	3%	9%	23%	0%	0%	0%	0%
12	27	24	22%	20%	37%	8%	84%	2%	7%	18%	0%	0%	0%	0%
12	28	1	25%	22%	37%	7%	83%	1%	7%	11%	0%	0%	0%	0%
12	28	2	28%	23%	38%	8%	84%	2%	11%	7%	0%	0%	0%	0%
12	28	3	31%	24%	39%	8%	87%	3%	16%	6%	0%	0%	0%	0%
12	28	4	32%	26%	40%	9%	88%	4%	21%	5%	0%	0%	0%	0%
12	28	5	32%	27%	41%	11%	88%	5%	21%	5%	0%	0%	0%	0%
12	28	6	33%	28%	41%	11%	88%	6%	18%	5%	0%	0%	0%	0%
12	28	7	33%	28%	40%	11%	88%	5%	14%	3%	0%	0%	0%	0%
12	28	8	33%	28%	40%	11%	73%	0%	9%	2%	5%	0%	19%	2%
12	28	9	27%	24%	34%	10%	46%	0%	4%	0%	16%	36%	31%	10%
12	28	10	20%	18%	31%	8%	23%	0%	0%	0%	25%	7%	39%	18%
12	28	11	29%	19%	39%	6%	13%	0%	0%	0%	37%	14%	42%	24%
12	28	12	30%	16%	38%	5%	7%	1%	0%	0%	44%	38%	41%	31%
12	28	13	26%	13%	36%	6%	5%	5%	0%	0%	45%	31%	42%	29%
12	28	14	23%	12%	34%	6%	1%	6%	0%	1%	44%	43%	35%	28%
12	28	15	21%	10%	32%	5%	0%	9%	0%	2%	35%	10%	26%	20%
12	28	16	17%	9%	27%	5%	0%	18%	0%	2%	27%	12%	20%	10%
12	28	17	18%	10%	28%	7%	9%	26%	3%	3%	2%	0%	2%	1%
12	28	18	18%	13%	28%	10%	31%	26%	6%	3%	0%	0%	0%	0%
12	28	19	18%	15%	28%	11%	62%	19%	8%	1%	0%	0%	0%	0%
12	28	20	17%	15%	26%	11%	77%	12%	8%	0%	0%	0%	0%	0%
12	28	21	15%	16%	25%	11%	75%	8%	7%	0%	0%	0%	0%	0%
12	28	22	12%	15%	23%	11%	68%	8%	7%	0%	0%	0%	0%	0%
12	28	23	10%	11%	21%	12%	59%	8%	9%	0%	0%	0%	0%	0%
12	28	24	9%	10%	21%	11%	50%	10%	18%	0%	0%	0%	0%	0%
12	29	1	9%	9%	22%	10%	41%	15%	29%	1%	0%	0%	0%	0%
12	29	2	9%	7%	23%	8%	37%	14%	38%	8%	0%	0%	0%	0%
12	29	3	9%	6%	25%	8%	38%	14%	50%	15%	0%	0%	0%	0%
12	29	4	8%	7%	26%	7%	41%	13%	58%	27%	0%	0%	0%	0%
12	29	5	7%	5%	25%	6%	47%	10%	60%	43%	0%	0%	0%	0%
12	29	6	6%	4%	23%	6%	51%	8%	73%	72%	0%	0%	0%	0%
12	29	7	5%	4%	20%	5%	52%	9%	77%	100%	0%	0%	0%	0%
12	29	8	5%	8%	16%	3%	44%	11%	53%	100%	17%	16%	20%	4%
12	29	9	5%	9%	11%	0%	25%	12%	38%	100%	22%	59%	46%	16%
12	29	10	4%	5%	5%	0%	12%	9%	27%	100%	45%	10%	40%	28%
12	29	11	6%	9%	6%	0%	10%	7%	17%	100%	60%	18%	73%	38%
12	29	12	11%	14%	11%	0%	19%	9%	17%	100%	60%	20%	59%	44%
12	29	13	14%	19%	16%	0%	22%	18%	15%	100%	54%	22%	45%	46%
12	29	14	14%	17%	18%	0%	20%	33%	10%	100%	52%	14%	43%	33%
12	29	15	13%	19%	16%	0%	14%	48%	9%	100%	47%	7%	72%	23%
12	29	16	12%	27%	14%	0%	14%	53%	6%	100%	37%	1%	58%	13%
12	29	17	13%	38%	17%	0%	16%	59%	6%	41%	7%	1%	6%	2%

12	29	18	15%	38%	20%	1%	25%	62%	5%	32%	0%	0%	0%	0%
12	29	19	21%	46%	23%	2%	40%	64%	7%	38%	0%	0%	0%	0%
12	29	20	30%	53%	27%	2%	51%	72%	10%	37%	0%	0%	0%	0%
12	29	21	37%	53%	32%	5%	58%	79%	12%	31%	0%	0%	0%	0%
12	29	22	41%	50%	28%	9%	67%	87%	16%	25%	0%	0%	0%	0%
12	29	23	44%	43%	25%	9%	70%	88%	26%	23%	0%	0%	0%	0%
12	29	24	48%	37%	27%	6%	84%	89%	35%	23%	0%	0%	0%	0%
12	30	1	54%	34%	29%	4%	91%	89%	40%	20%	0%	0%	0%	0%
12	30	2	51%	28%	29%	1%	92%	84%	59%	18%	0%	0%	0%	0%
12	30	3	49%	24%	29%	0%	88%	80%	75%	21%	0%	0%	0%	0%
12	30	4	47%	20%	27%	0%	86%	79%	70%	22%	0%	0%	0%	0%
12	30	5	47%	18%	29%	0%	89%	79%	59%	21%	0%	0%	0%	0%
12	30	6	48%	16%	29%	0%	93%	78%	44%	18%	0%	0%	0%	0%
12	30	7	51%	16%	31%	1%	96%	80%	29%	12%	0%	0%	0%	0%
12	30	8	52%	13%	29%	1%	86%	76%	18%	8%	4%	0%	3%	3%
12	30	9	48%	11%	32%	1%	66%	98%	12%	5%	14%	1%	9%	8%
12	30	10	53%	9%	45%	0%	70%	99%	12%	4%	29%	3%	21%	16%
12	30	11	54%	7%	58%	0%	71%	99%	10%	6%	31%	46%	27%	27%
12	30	12	56%	7%	63%	0%	66%	98%	8%	10%	30%	17%	32%	29%
12	30	13	60%	7%	68%	3%	60%	97%	8%	17%	36%	29%	30%	33%
12	30	14	61%	8%	70%	4%	61%	98%	10%	25%	50%	69%	37%	28%
12	30	15	61%	8%	68%	5%	47%	98%	15%	28%	40%	68%	21%	24%
12	30	16	56%	7%	58%	8%	34%	95%	18%	29%	30%	20%	15%	15%
12	30	17	43%	7%	45%	14%	35%	88%	16%	35%	9%	17%	5%	3%
12	30	18	39%	7%	37%	21%	39%	76%	12%	45%	0%	0%	0%	0%
12	30	19	33%	8%	29%	29%	45%	70%	9%	58%	0%	0%	0%	0%
12	30	20	26%	10%	28%	38%	57%	69%	6%	83%	0%	0%	0%	0%
12	30	21	20%	11%	28%	41%	75%	72%	4%	100%	0%	0%	0%	0%
12	30	22	15%	10%	28%	36%	76%	80%	2%	100%	0%	0%	0%	0%
12	30	23	12%	7%	27%	26%	69%	85%	0%	100%	0%	0%	0%	0%
12	30	24	9%	6%	27%	18%	63%	88%	0%	100%	0%	0%	0%	0%
12	31	1	9%	8%	25%	16%	56%	88%	0%	100%	0%	0%	0%	0%
12	31	2	9%	10%	26%	10%	48%	87%	0%	100%	0%	0%	0%	0%
12	31	3	10%	13%	28%	4%	48%	89%	0%	100%	0%	0%	0%	0%
12	31	4	14%	17%	32%	0%	53%	91%	0%	100%	0%	0%	0%	0%
12	31	5	18%	20%	35%	0%	59%	93%	0%	100%	0%	0%	0%	0%
12	31	6	21%	21%	37%	0%	68%	93%	0%	100%	0%	0%	0%	0%
12	31	7	24%	24%	38%	0%	78%	89%	0%	100%	0%	0%	0%	0%
12	31	8	23%	28%	37%	2%	75%	77%	0%	100%	20%	14%	37%	5%
12	31	9	18%	24%	27%	6%	60%	70%	0%	100%	37%	57%	62%	19%
12	31	10	21%	28%	35%	8%	67%	47%	0%	100%	50%	69%	73%	36%
12	31	11	20%	31%	33%	8%	82%	22%	0%	100%	60%	72%	76%	42%
12	31	12	18%	28%	29%	9%	88%	8%	0%	100%	57%	56%	71%	50%
12	31	13	15%	24%	26%	9%	85%	2%	0%	100%	60%	70%	60%	39%
12	31	14	14%	24%	25%	9%	71%	4%	0%	100%	58%	55%	60%	42%
12	31	15	12%	24%	23%	9%	51%	9%	0%	100%	50%	70%	34%	32%
12	31	16	9%	24%	19%	4%	51%	11%	0%	100%	43%	60%	48%	15%
12	31	17	9%	25%	18%	8%	57%	17%	0%	100%	8%	23%	7%	5%
12	31	18	10%	29%	22%	6%	65%	25%	0%	100%	0%	0%	2%	0%
12	31	19	12%	30%	25%	1%	72%	32%	0%	100%	0%	0%	0%	0%
12	31	20	14%	32%	26%	0%	78%	37%	0%	100%	0%	0%	0%	0%
12	31	21	15%	31%	27%	2%	89%	43%	0%	100%	0%	0%	0%	0%
12	31	22	16%	33%	29%	7%	87%	54%	0%	100%	0%	0%	0%	0%
12	31	23	17%	35%	30%	10%	84%	65%	0%	100%	0%	0%	0%	0%
12	31	24	18%	36%	30%	11%	80%	75%	0%	100%	0%	0%	0%	0%

25 MMT in 2035

Hydro Specified Imports Profile (Capacity Factor %)

2024	1	2	3	4	5	6	7	8	9	10	11	12
1	63%	56%	67%	66%	70%	76%	60%	51%	51%	54%	38%	60%
2	52%	55%	67%	66%	70%	76%	60%	51%	51%	53%	51%	60%
3	50%	56%	67%	66%	70%	76%	60%	51%	51%	53%	44%	60%
4	49%	57%	67%	66%	70%	76%	60%	51%	51%	53%	40%	46%
5	51%	57%	67%	66%	70%	76%	60%	51%	51%	54%	54%	48%
6	65%	57%	67%	66%	70%	76%	60%	51%	52%	54%	54%	60%
7	66%	60%	68%	66%	68%	72%	60%	52%	38%	54%	54%	60%
8	66%	70%	67%	49%	54%	18%	60%	15%	0%	0%	54%	60%
9	66%	60%	54%	29%	38%	22%	0%	5%	0%	0%	0%	0%
10	22%	67%	19%	29%	11%	40%	0%	1%	0%	0%	0%	0%
11	4%	37%	8%	28%	11%	58%	0%	1%	0%	0%	0%	0%
12	3%	16%	8%	27%	11%	63%	0%	0%	0%	0%	0%	0%
13	4%	15%	8%	24%	14%	63%	0%	0%	0%	0%	0%	0%
14	6%	33%	9%	14%	19%	64%	0%	1%	0%	0%	0%	0%
15	20%	64%	21%	10%	56%	64%	0%	1%	0%	0%	0%	0%
16	28%	68%	44%	10%	58%	66%	0%	1%	11%	0%	0%	0%
17	65%	58%	46%	13%	64%	68%	35%	10%	26%	31%	54%	60%
18	66%	72%	67%	60%	71%	67%	60%	51%	52%	54%	56%	60%
19	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
20	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
21	65%	72%	67%	66%	71%	76%	60%	52%	52%	54%	56%	60%
22	65%	61%	67%	66%	70%	76%	60%	51%	52%	54%	54%	60%
23	65%	59%	67%	66%	70%	76%	60%	51%	52%	54%	54%	60%
24	65%	57%	67%	66%	70%	76%	60%	51%	52%	54%	54%	60%
2026	1	2	3	4	5	6	7	8	9	10	11	12
1	66%	72%	68%	66%	71%	76%	60%	52%	52%	53%	43%	60%
2	66%	72%	68%	66%	71%	76%	60%	52%	52%	53%	55%	60%
3	56%	72%	66%	66%	71%	76%	60%	52%	52%	53%	41%	60%
4	49%	72%	68%	66%	71%	76%	60%	52%	52%	53%	30%	46%
5	60%	72%	68%	66%	71%	76%	60%	52%	52%	53%	54%	48%
6	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
7	66%	72%	68%	66%	67%	73%	60%	44%	40%	54%	56%	60%
8	66%	72%	68%	43%	64%	17%	60%	9%	0%	0%	53%	60%
9	61%	72%	51%	31%	24%	25%	0%	4%	0%	0%	0%	0%
10	8%	61%	16%	29%	12%	41%	0%	1%	0%	0%	0%	0%
11	3%	1%	8%	29%	12%	54%	0%	1%	0%	0%	0%	0%
12	3%	1%	8%	30%	12%	61%	0%	1%	0%	0%	0%	0%
13	3%	1%	8%	26%	15%	63%	0%	1%	0%	0%	0%	0%
14	3%	1%	8%	11%	20%	63%	0%	1%	0%	0%	0%	0%
15	8%	1%	22%	10%	49%	64%	0%	1%	0%	0%	0%	0%
16	23%	59%	37%	10%	59%	65%	0%	1%	5%	0%	0%	0%
17	66%	72%	45%	12%	59%	67%	37%	13%	26%	32%	52%	60%
18	66%	72%	68%	61%	71%	73%	60%	52%	52%	54%	56%	60%
19	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
20	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
21	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
22	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
23	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
24	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	60%
2030	1	2	3	4	5	6	7	8	9	10	11	12
1	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	52%	58%
2	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	52%	58%
3	61%	72%	68%	66%	71%	76%	60%	51%	49%	53%	53%	57%
4	52%	72%	68%	66%	71%	76%	60%	51%	52%	53%	54%	53%
5	54%	72%	68%	66%	71%	76%	60%	51%	52%	54%	56%	56%
6	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	56%	58%
7	66%	72%	68%	59%	65%	24%	60%	52%	52%	54%	56%	59%
8	66%	72%	60%	29%	51%	24%	19%	8%	0%	0%	28%	58%
9	50%	72%	46%	29%	21%	40%	9%	3%	0%	0%	0%	0%
10	6%	14%	13%	29%	18%	56%	9%	3%	0%	0%	0%	0%
11	4%	8%	12%	29%	17%	62%	9%	3%	0%	0%	0%	0%
12	4%	6%	11%	28%	18%	64%	9%	3%	0%	0%	0%	0%
13	4%	6%	11%	27%	22%	66%	9%	3%	0%	0%	0%	0%

14	4%	8%	12%	25%	27%	66%	9%	3%	0%	0%	0%	0%
15	9%	11%	14%	21%	39%	66%	9%	3%	1%	0%	0%	0%
16	28%	72%	44%	15%	61%	66%	9%	3%	1%	0%	0%	0%
17	66%	72%	46%	16%	61%	66%	9%	3%	22%	31%	33%	59%
18	66%	72%	68%	53%	65%	67%	60%	51%	52%	54%	56%	59%
19	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	59%
20	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	59%
21	66%	72%	68%	66%	71%	76%	60%	52%	52%	54%	56%	59%
22	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	56%	59%
23	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	56%	59%
24	66%	72%	68%	66%	71%	76%	60%	51%	52%	54%	56%	59%
2035	1	2	3	4	5	6	7	8	9	10	11	12
1	66%	72%	68%	59%	67%	74%	60%	52%	52%	54%	50%	59%
2	66%	72%	68%	59%	68%	74%	60%	52%	47%	54%	48%	59%
3	66%	72%	68%	58%	68%	73%	60%	52%	52%	54%	43%	58%
4	54%	72%	68%	58%	68%	72%	60%	52%	52%	54%	50%	48%
5	55%	72%	68%	59%	68%	72%	60%	52%	52%	54%	56%	58%
6	66%	72%	68%	60%	68%	68%	60%	52%	52%	54%	56%	59%
7	66%	72%	68%	61%	65%	43%	60%	52%	51%	54%	55%	59%
8	66%	72%	60%	36%	52%	25%	7%	10%	0%	0%	47%	59%
9	39%	72%	34%	36%	34%	31%	8%	3%	0%	0%	0%	0%
10	7%	13%	25%	36%	21%	50%	8%	3%	0%	0%	0%	0%
11	6%	8%	23%	35%	21%	66%	8%	3%	0%	0%	0%	0%
12	6%	8%	22%	34%	21%	67%	8%	3%	0%	0%	0%	0%
13	6%	8%	19%	34%	26%	68%	9%	3%	0%	0%	0%	0%
14	6%	8%	17%	32%	32%	68%	14%	3%	0%	0%	0%	0%
15	8%	8%	13%	27%	37%	68%	14%	3%	0%	0%	0%	0%
16	24%	72%	27%	23%	65%	68%	14%	3%	0%	0%	0%	0%
17	66%	72%	29%	25%	65%	69%	14%	3%	24%	29%	37%	59%
18	66%	72%	68%	57%	66%	70%	55%	40%	52%	54%	56%	59%
19	66%	72%	68%	60%	68%	73%	60%	52%	52%	54%	56%	59%
20	66%	72%	68%	62%	68%	76%	60%	52%	52%	54%	56%	59%
21	66%	72%	68%	61%	68%	74%	60%	52%	52%	54%	56%	59%
22	66%	72%	68%	60%	68%	74%	60%	52%	52%	54%	56%	59%
23	66%	72%	68%	60%	68%	74%	60%	52%	52%	54%	56%	59%
24	66%	72%	68%	59%	68%	74%	60%	52%	52%	54%	56%	59%

Staff Report Item 9

To:	Ava Community Energy Authority Board of Directors
From:	Howard Chang, CEO
Subject:	Draft Budget Review for Fiscal Year 2026-2027
Date:	5/20/2026

Summary/Recommendation

Receive, review, and provide feedback on the Draft Budget for the next fiscal year.

Financial Impact

This is an informational item

Analysis and Context

Ava's fiscal years (FY) runs from July 1st through June 30th. Staff is presenting a draft version of next fiscal year's budget for the Board of Directors (the "Board") to review and provide feedback.

The attached presentation fills out the complete details on staff's best estimates and provides key discussion points.

Committee Recommendation

This item has been before the Executive Committee on May 6, 2026. Although this meeting was inquorate, any questions regarding clarification of certain details have been addressed in this presentation.

Attachments

A. Appendix A: Draft Budget FY 2026-2027 1-Pager
B. Draft Budget FY 2026-2027 presentation

APPENDIX A: Draft Budget FY 2026-2027 1-Pager

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2027 BUDGET BASE CASE	FY 2027 Delta	FY 2027 %D
Wholesale Load (MWh)	8,984,000	9,544,000	560,000	5.9%
Retail Load (MWh)	8,439,000	8,966,000	527,000	5.9%
Revenue & Other Sources				
Electricity Sales	869,170,000	815,730,000	(53,440,000)	-6.6%
Uncollectables	(8,692,000)	(10,197,000)	(1,505,000)	14.8%
GASB 62	35,327,000	5,250,000	(30,077,000)	-572.9%
Total Operating Revenue	**895,805,000**	**810,783,000**	(85,022,000)	-10.5%
Energy Operations				
Cost of Energy	836,970,000	756,505,000	(80,465,000)	-10.6%
Energy Services				
Data Management/CRM	10,080,000	9,980,000	1,180,000	11.8%
Billing & Metering	3,208,000	3,446,000	10,000	0.3%
Scheduling	768,000	792,000	42,000	5.3%
Cost of Energy Services	14,056,000	14,218,000	162,000	1.1%
Total Energy Expenses	**851,026,000**	**770,723,000**	(80,303,000)	-10.4%
Overhead Expenses				
Personnel	29,639,000	31,470,000	1,050,000	3.3%
Marketing & Communication	3,872,000	3,421,000	119,000	3.5%
Legal, Policy, & Regulatory Affairs	4,243,000	4,308,000	144,000	3.3%
Other Professional Services	3,518,000	4,387,000	149,000	3.4%
General & Administrative	7,095,000	9,975,000	333,000	3.3%
Total Overhead Expenses	48,367,000	53,561,000	5,194,000	9.7%
Total Operating Expenses	**899,393,000**	**824,284,000**	(75,109,000)	-9.1%
Non-Operating Revenue				
Interest Income	15,066,000	24,727,000	(8,667,000)	-35.1%
Other Non-Operating Revenue	49,000	48,000	0	0.0%
Total Non-Operating Revenue	15,115,000	24,775,000	9,660,000	39.0%
Non-Operating Expenses				
Local Development Funding	10,190,000	0	0	0.0%
Borrowing Interest	1,087,000	0	0	0.0%
Capital Expenditures	250,000	120,000	0	0.0%
Total Non-Operating Expenses	11,527,000	120,000	(11,407,000)	-9505.8%
NET NON-OPERATING REVENUES	**3,588,000**	**24,655,000**	21,067,000	85.4%
TOTAL NET REVENUES	**0**	**11,154,000**	11,154,000	100.0%

Attachment Staff Report Item 9B

Ava Community Energy

Fiscal Year 2026-2027 Draft Budget

Howard Chang, CEO | May 20, 2026

Introduction

- Every year in June, Ava Board of Directors (the "Board") approves the following fiscal year's budget
- This draft budget was reviewed by an ad hoc group of the Ex Comm on 5/6 and will be further reviewed by FAP (5/27) and Ex Comm (6/3) with approval scheduled for the meeting on June 17th.
- The Budget covers the overall categories of the General Operating Fund:
  - Revenues from Operations
  - Energy Operating Expenses (typically 90%+ of total expenses)
  - Services to Facilitate Energy Operations
  - Operational Overhead to Energy Operations
  - Non-Operating Revenues
  - Non-Operating Expenses, including a Capital Transfer to the Local Development Fund
- PG&E issued an updated ERRA filing on May 15 that materially altered the forecast in this presentation and was updated on 5/20, after the first review by ExComm
  - Staff may consider delaying the first review of the budget draft to post May ERRA filing in future years

Current Fiscal Year 2025-2026 Performance

- Details on “Actuals” are settlements through March and updated projections through June.
- Revenue is expected to settle above budget due to Board action on value proposition in December.
  - Other Operating Revenue is primarily fees and damages to Ava on energy contracts
- Cost of energy is coming in below expectations as market prices softened and higher than expected large hydro generation
- Total overhead is currently estimated at $6.5MM below budget due to opex reductions
- Non-operating activity is higher than expected as interest rates remain higher-for-longer and with the reduction of Local Development contributions
  - Borrowing interest expenses have been moved to General & Administrative overhead due to accounting treatment changes
- Overall Net Revenues are expected to come in at $83MM above estimates without using $35MM budgeted GASB 62 funds.

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2026 ACTUAL FY 2026	FY 2026 Delta	FY 2026 %D
Wholesale Load (MWh)	8,984,000	8,368,000	(616,000)	-6.9%
Retail Load (MWh)	8,439,000	7,887,000	(552,000)	-6.5%
Revenue & Other Sources				
Electricity Sales	869,170,000	890,848,000	21,678,000	2.5%
Uncollectables	(8,692,000)	(8,912,000)	(220,000)	2.5%
Other Operating Revenue	0	1,620,000	1,620,000	0.0%
GASB 62	35,327,000	0	(35,327,000)	-100.0%
Total Operating Revenue	**895,805,000**	**883,556,000**	**(12,249,000)**	**-1.4%**
Energy Operations				
Cost of Energy	836,970,000	770,312,000	(66,658,000)	-8.0%
Cost of Energy Services	14,056,000	14,252,000	196,000	1.4%
Total Energy Expenses	**851,026,000**	**784,564,000**	**(66,462,000)**	**-7.8%**
Overhead Expenses				
Total Overhead Expenses	48,367,000	41,828,000	(6,539,000)	-13.5%
Total Non-Operating Revenue	15,115,000	26,540,000	11,425,000	75.6%
Total Non-Operating Expenses	11,527,000	741,000	(10,786,000)	-93.6%
TOTAL NET REVENUES	**0**	**82,963,000**	**82,963,000**	**0.0%**

Fiscal Year 2026-2027 Draft Budget

Draft Budget Fiscal Year 2026-2027

- **Revenues:** Energy prices continue to soften, and with the resolution of Track 1 Ava's effective PCIA is lowering while PG&E's rates are increasing due to persistent costs in their portfolio
- **Cost of Energy:** Lower energy prices reduce open position costs
- **Overhead:** Increase in G&A is predominantly due to increased rent, a change in accounting treatment of credit facility fees, and increasing software costs
- **Non-Operating Activity:** Higher interest income and lower borrowing interest due to a change in accounting treatment of credit facility. No incremental contributions to Local Development Funding in fiscal year 2026-2 with current fund balance at $83.6MM

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2027 BUDGET BASE CASE	FY 2027 Delta	FY 2027 %D
Wholesale Load (MWh)	8,984,000	9,544,000	560,000	5.9%
Retail Load (MWh)	8,439,000	8,966,000	527,000	5.9%
Revenue & Other Sources				
Electricity Sales	869,170,000	815,730,000	(53,440,000)	-6.6%
Uncollectables	(8,692,000)	(10,197,000)	(1,505,000)	14.8%
GASB 62	35,327,000	5,250,000	(30,077,000)	-572.9%
Total Operating Revenue	**895,805,000**	**810,783,000**	(85,022,000)	-10.5%
Energy Operations				
Cost of Energy	836,970,000	756,505,000	(80,465,000)	-10.6%
Cost of Energy Services	14,056,000	14,218,000	162,000	1.1%
Total Energy Expenses	**851,026,000**	**770,723,000**	(80,303,000)	-10.4%
Overhead Expenses				
Total Overhead Expenses	48,367,000	53,561,000	5,194,000	9.7%
Total Operating Expenses	**899,393,000**	**824,284,000**	(75,109,000)	-9.1%
Non-Operating Revenue				
Total Non-Operating Revenue	15,115,000	24,775,000	9,660,000	39.0%
Total Non-Operating Expenses	11,527,000	120,000	(11,407,000)	-9505.8%
TOTAL NET REVENUES	**0**	**11,154,000**	11,154,000	100.0%

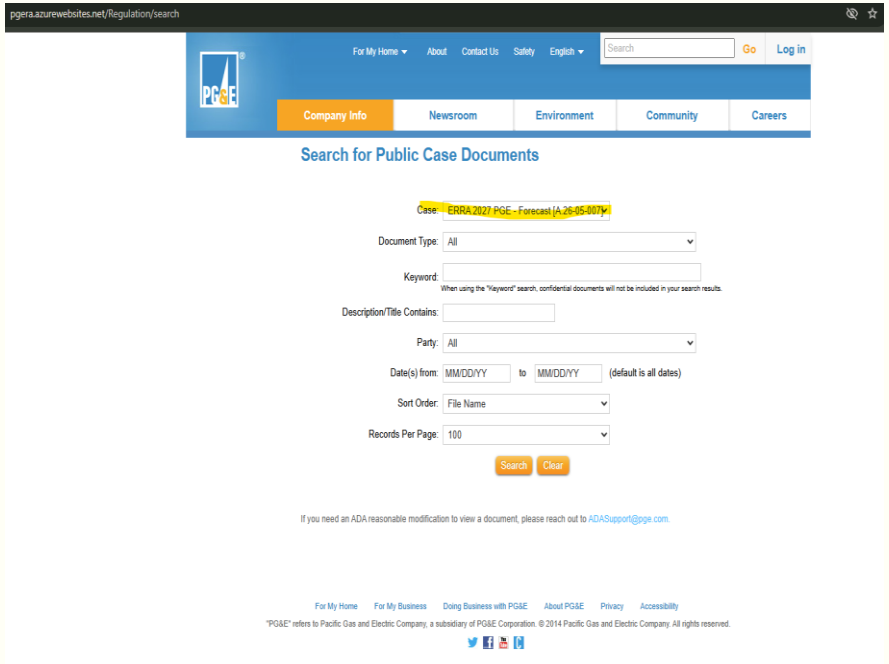
Expanded budget view shown in appendix

Draft Budget: Forecast Uncertainty

- May 15, 2026 ERRA filing provided a year-to-date update on a subset of the underlying assumptions that generate the PCIA and rates, but did not provide updated MPBs. Assumptions require additional diligence and validation. This is separate from potential changes that may come from the General Rate Case (GRC)
- PCIA Tracks 2 and 3 may have material impacts on PCIA and rate setting methodologies. Track 3 scope and timing presents the greatest uncertainty. 3 pre-scoping workshops have been scheduled for June.
- Load forecast uncertainty:
  - Weather conditions present the greatest impact on actualized load volume and shape
  - With the addition of SJC, estimates will become more accurate as Ava receives more data beyond initial enrollment
  - Longer-term: data center and electrification presents significant uncertainty as well
- New power generation project online dates may be delayed or moved forward impacting power portfolio expenses
- Energy prices are highly volatile and currently softening in response to a mild winter, accelerated melting snowpack, and new energy capacity coming online.
  - While forecasted summer prices are softening, actuals may vary greatly based on temperatures and demand
- Opaque portfolios with the IOU could lead to materially different MPBs in the October ERRA filing
- Interest rates and macroeconomic environment may change

May ERRA Addendum Filings

- The May 15 ERRA filing consists of the filing documents and the series of datasets called the “Working Papers”
  - The filing and working papers can be accessed through the PG&E Azure website here: https://pgera.azurewebsites.net/Regulation/search
    - Select the “ERRA 2027 PGE – Forecase [A.25-05-007]” case from the dropdown menu and click search to see all documents available for download



- Staff is still processing the working papers with consultants to get better color on the details
- What is known:
  - 2025 RA PCIA reform is in place at a steady state for 2027
  - Load appears to be materially lower for PG&E due to milder than expected weather to date and community load departure
  - PG&E's revenue requirements remain stable despite the reduction in load, increasing generation rates
- What is not known from the ERRA:
  - Direction on MPB settlement for all attributes
  - A significant portion of the filing is redacted due to market sensitive confidential information and our 3rd party consultant has access to this information, which may be shared on a very limited basis
  - There were some known errors/inconsistencies that are in the process of being validated and reconciled

PCIA & Operating Headroom

- Ava's generation rates to customers are indexed to PG&E's generation rate
- A portion of the generation cost is a charge from PG&E for the Power Charge Indifference Adjustment (PCIA)
  - The PCIA is how PG&E recovers "stranded costs or credits" for legacy generation resources



*Value calculated using "Market Price Benchmarks" (MPBs)

  - PCIA rates are based on an annual mark-to-market
    - For Energy, Resource Adequacy (RA), and Renewable Portfolio Standard (RPS) resources, the mark-to-market is against "Market Price Benchmarks" (MPBs)
    - Forecasts for MPBs are presented by the Investor-Owned Utilities (IOUs) in May and then updated in October to establish the following year's rates
    - PCIA and rates are "trued up" from forecast to actual, and any over-collection or under-collection is recovered in rates the following year.
    - Higher MPBs --> higher rates and lower PCIA = more operating headroom for Ava
    - Lower MPBs --> lower rates and higher PCIA = less operating headroom for Ava

PCIA Proceeding & Risk Elements

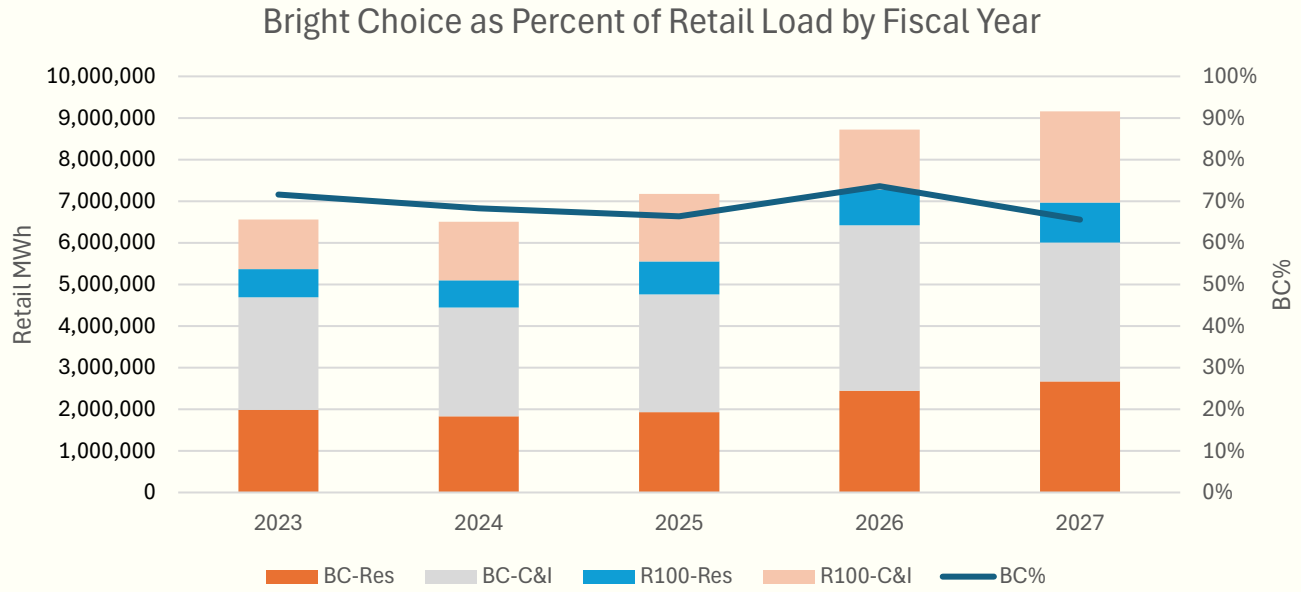
The CPUC has an ongoing proceeding regarding the PCIA, divided into "Tracks".

- Track 1
  - **CalCCA has appealed CPUC Track 1 decision; appeal is pending**
  - Revised the MPB for RA retroactive through 2025
  - Major driver for the much higher PCIA most Ava customers see in 2026 versus 2025
- Track 2
  - **Proceeding is ongoing; decision expected in time for inclusion in 2027 rates**
  - The CPUC is reviewing the methodology for valuing RECs that PG&E "banked" prior to 2019 but did not actually use for compliance purposes until 2025. An interim methodology values those RECs at $0. This increases the PCIA for most Ava customers versus what the PCIA would be if those RECs were valued at the current market price for RECs
  - Outcome indeterminate; CalCCA proposal would use current market prices for REC value, and lower the PCIA for most Ava customers versus status quo; PG&E proposal would make the status quo interim methodology permanent
- Track 3
  - **Scope and timing undetermined**
    - CCAs propose to address reviewing the Track One revisions to MPBs; aligning the RA MPB with the RA Slice of Day framework; revintaging of PCIA resources; PCIA GHG-free methodology; and potentially other structural changes to the PCIA
    - IOUs propose to prioritize changes to RPS MPBs ahead of any other issues, with changes to the brown power MPB next
  - Outcome indeterminate; CCA approach would likely reduce PCIA for most Ava customers if adopted while the IOU approach would likely raise the PCIA for most Ava customers if adopted



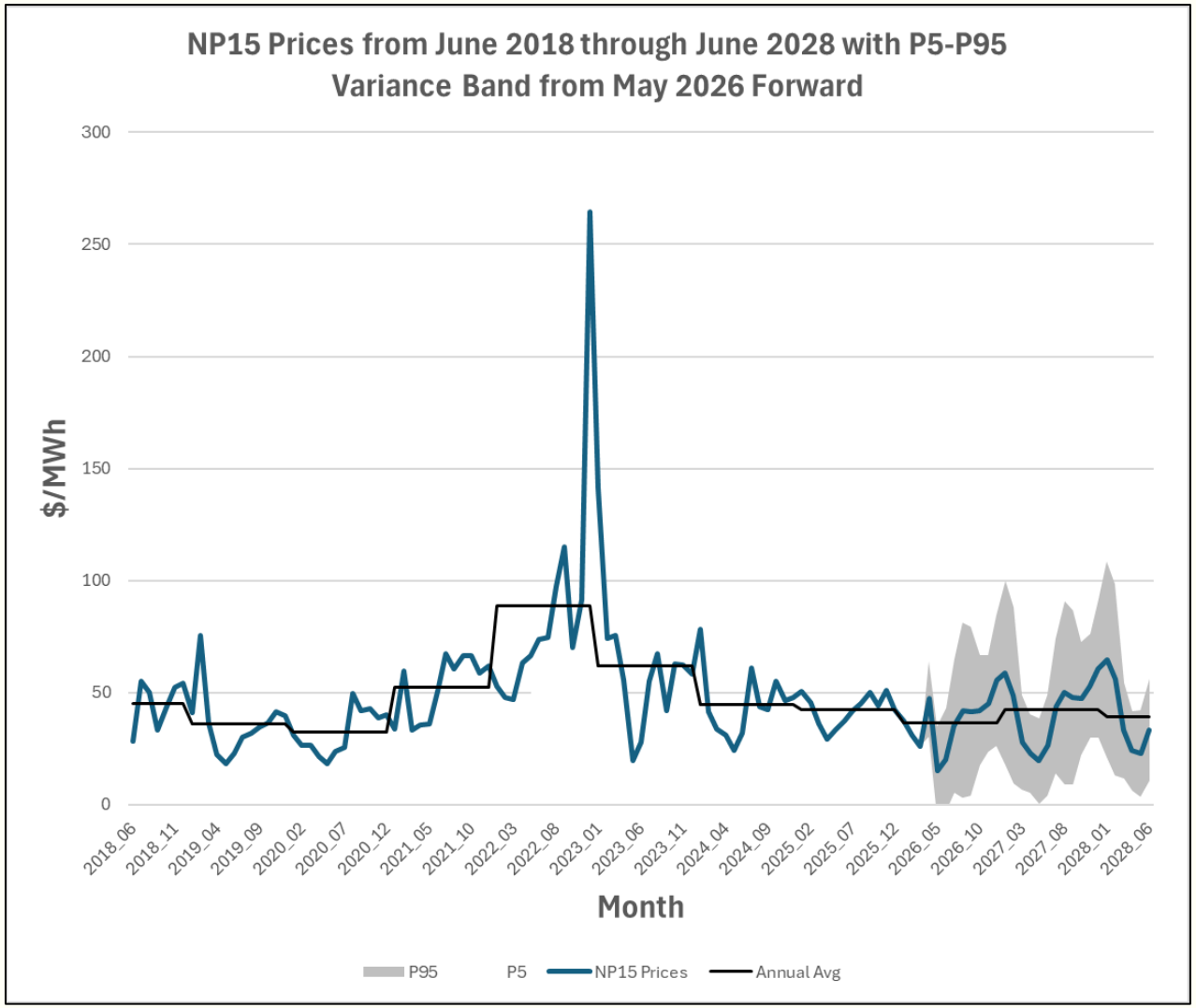
Electricity Product Load & Rates

- Renewable 100:
  - Originally set at $0.01/kWh above PG&E and has migrated down as Ava financials improved
  - Currently priced at $0.0175/kWh above PG&E rates
- Bright Choice:
  - Originally set at 1.5% discount to PG&E, reduced to a 1% discount in 2021,increased to a 3% discount in 2022, increased to 5% discount to PG&E rates in 2023. Latest adjustment was to 0.5% discount to PG&E in January of 2026
- The percent load of Bright Choice customers is estimated at ~66% for FY 2027



- Growth in Bright Choice in FY 2026 is due to unincorporated SJC
- Growth in Renewable 100 in FY 2027 is due to Fremont opt up
- Annual load and load shape can vary materially year to year and between budget to actuals due to weather, individual customer usage, and expansion to new territories

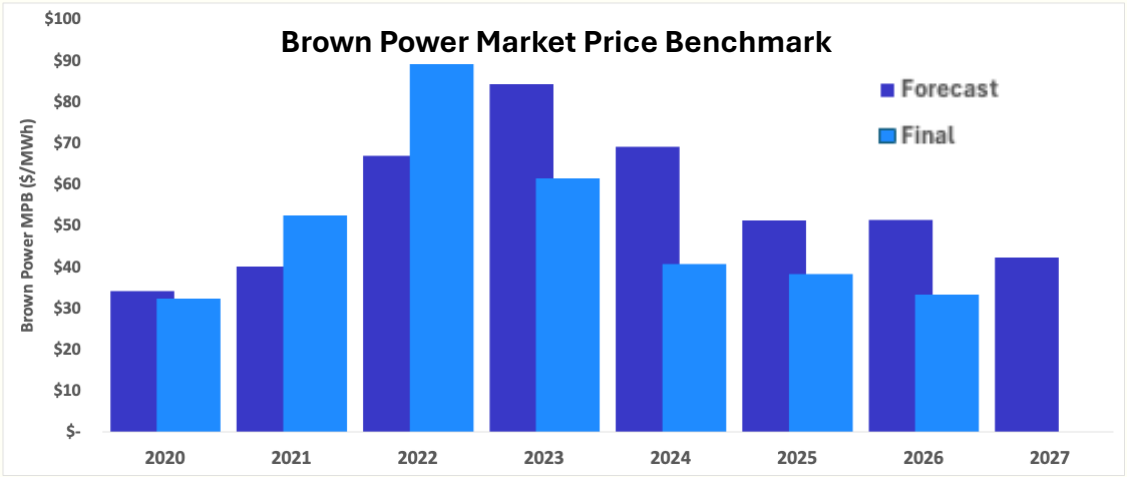
Brown Power Energy Price Volatility

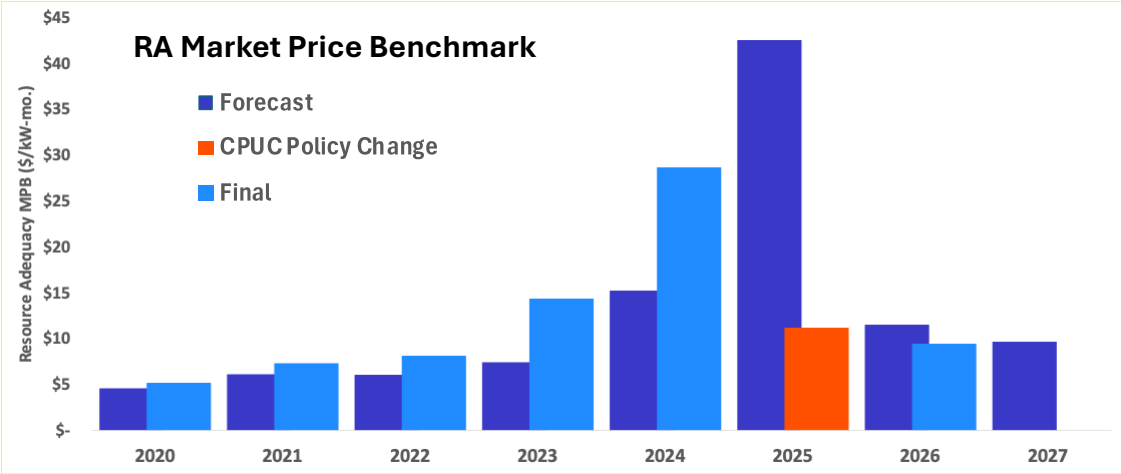


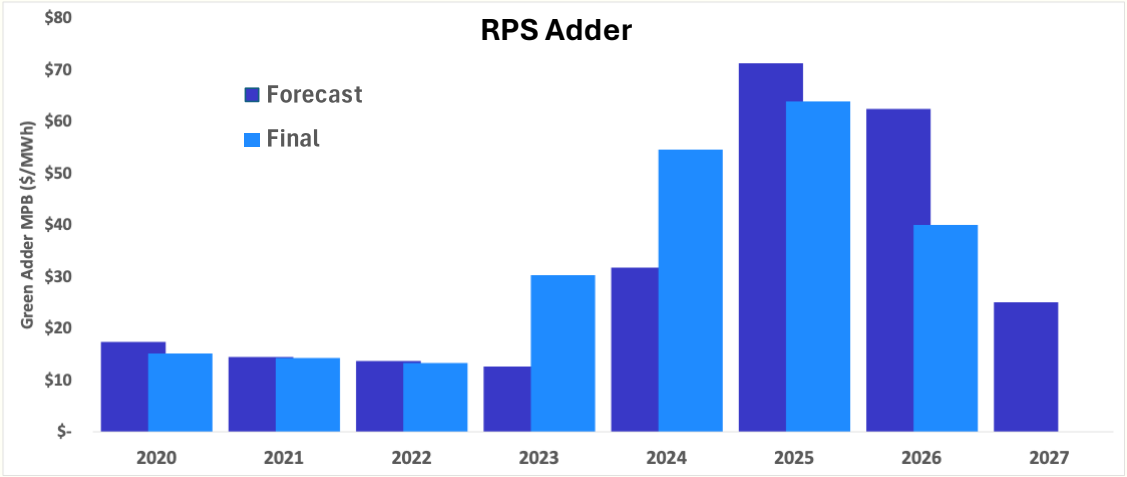
- Brown power prices are set by a number of factors impacting supply and demand, such weather, natural gas prices, system capacity, transmission congestion, etc.
- Volatility is high due to these uncertain and changing factors year to year
- Customer rates (generation and PCIA) are set based on a forecast while also incorporating a true up of the prior year's forecasted market prices with actualized prices
- 2026 rates were set by and 2026 forecasted prices and truing up 2025 actualized prices. 2027 rates will be set by 2027 forecasted prices and truing up 2026 actualized prices.

Market Price Benchmark Trends 2020-2027

- Forecast MPBs used to develop PCIA and generation rates are calculated in Sept each year:
  - Energy: Avg forward price during Sept for delivery the following year
  - REC: Avg executed contract price in the past 15 months for delivery in following year
  - RA: Avg executed contract price in the past 3 years for delivery the following year
- Forecasted vs. Final MPBs vary significantly, reflecting year to year market volatility
- RA MPB in 2025 reflects regulatory changes, no future PCIA reform is assumed in forecasts
- "Final" numbers in 2026 reflect actuals through March and updated forecast as of April

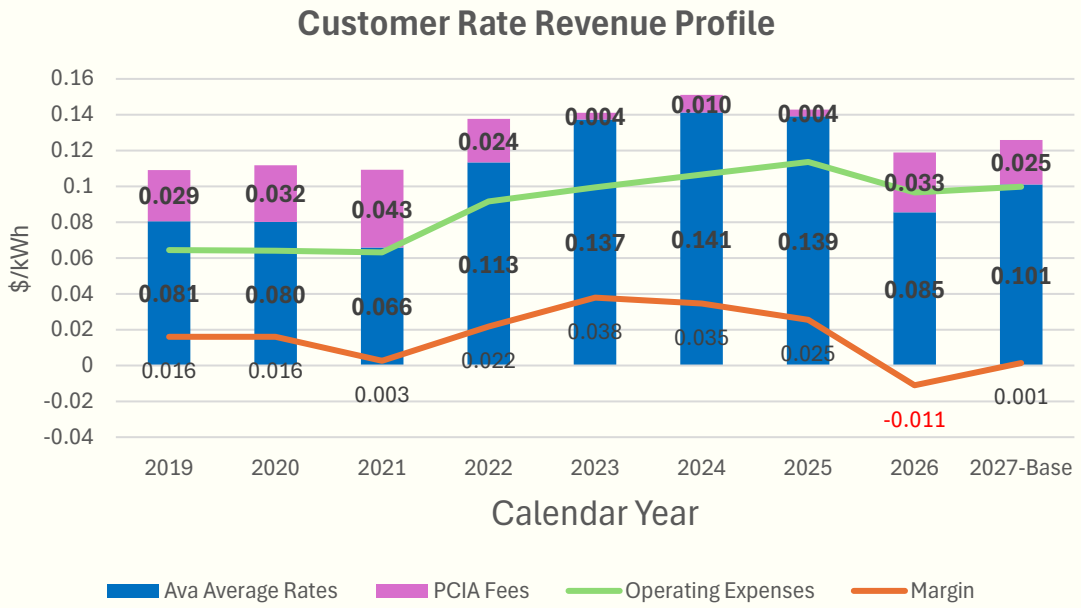


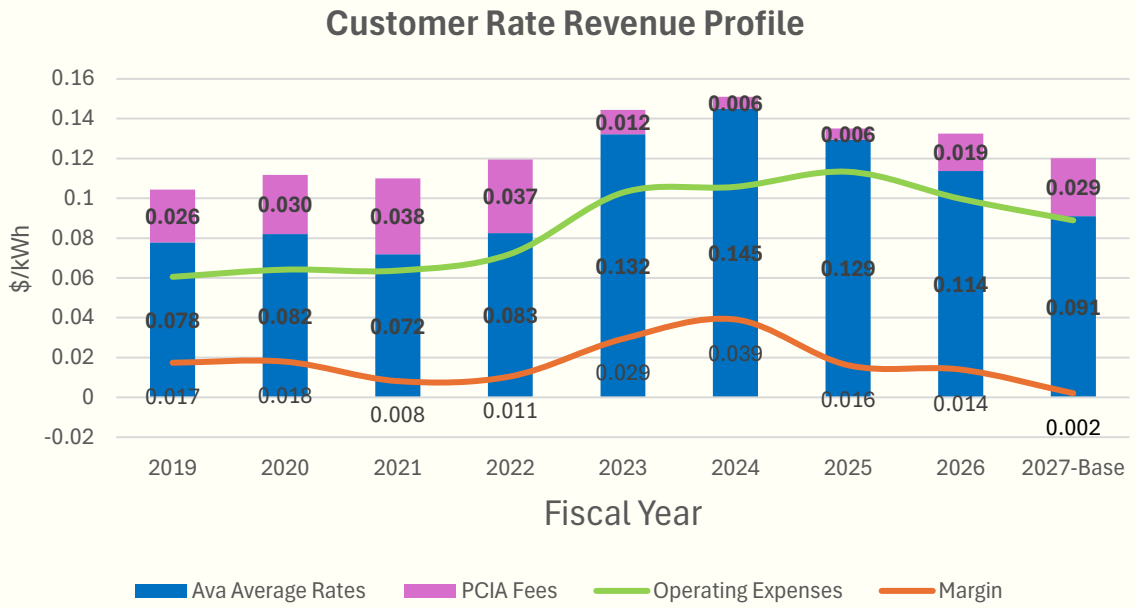




Expected Market Environment & Impact to Gen Rates & PCIA

- Rates increased and PCIA decreased from 2021 to 2025, driven by historic increases in market energy prices
- Since then, energy costs softened, setting PCIA higher and rates lower in 2026, in addition to substantive PCIA reform
- Lower prices are expected to continue through 2026 and we are forecasting a modest increase to generation rates and a lower PCIA in 2027, though rates remain stable
  - Between calendar year 2025 and 2026, customer rates dropped 20%, and between 2026 and 2027 Ava is estimating rates will increase 5.6% (inclusive of PCIA)
  - Between fiscal year 2025 and 2026, customer rates dropped 2%, and between 2026 and 2027, rates are expected to drop another 10%





Draft Budget: Revenues

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Electricity Sales	869,170,000	890,848,000	815,730,000	(53,440,000)	-6.6%
Uncollectables	(8,692,000)	(8,912,000)	(10,197,000)	(1,505,000)	14.8%
GASB 62	35,327,000	0	5,250,000	(30,077,000)	-572.9%
Total Operating Revenue	**895,805,000**	**883,556,000**	**810,783,000**	(85,022,000)	-10.5%

- Revenues from sales of electricity are expected increase as PG&E is expected to raise rates and PCIA is expected to decrease from previous year's budget
- Value proposition remains unchanged at 0.5% discount to PG&E for Bright Choice and a $0.0175 premium on Renewable 100 products
- Estimated bad debt slightly increased from 1.0% to 1.25% of billings based on rising trends and getting ahead of possible inflation increases due to oil market volatility
- Recognition of GASB 62 deferred revenue is not from the Rate Stabilization Fund but is half of the amount deferred from resolution R-2024-26, which allocated $10,504,837 to local, incremental generation and capacity from the 2023 RFO for projects starting in 2027

Draft Budget: Base Case Revenue Assumptions

Year	Energy		RPS		RA	
	Brown Power		RPS Adder		All RA ($/kW-mo)	
	Forecast	Final	Forecast	Final	Forecast	Final
2026	$ 51.13	$ 40.90	$ 62.45	$ 40.00	$ 11.53	$ 9.42
2027	$ 42.66	$ 42.66	$ 25.00	$ 25.00	$ 9.67	$ 9.67

- Base Case Assumptions have MPB's for calendar year 2026 down to align with market actuals and forwards year to date
- Forward looking prices in cost of energy reflect market price assumptions
- In addition to MPB assumptions, revenue requirement inputs directly from PG&E are critical in determining generation rates
  - In May ERRA filing, PG&E's revenue requirement stayed relatively flat despite declining load in 2027, which needs further diligence

FY 2026-2027 Scenarios & Sensitivities

Ava looked at possible alternative MPB/revenue scenarios —High-End and Low-End

- **High-end:** calendar year 2026 prices end up as current MPB forecasts from May ERRA filings, which are unchanged from the October ERRA filing
- **Low-end:** calendar year 2026 prices are one standard deviation down from current forward averages for brown power and Ava's base case RPS and RA estimates

	Base Case	Low End	High End
Revenues	810,783,000	741,506,000	900,593,000
Cost of Energy	770,723,000	751,537,000	843,483,000
Overhead	53,561,000	53,561,000	53,561,000
Net Non-Op	24,655,000	20,353,000	23,684,000
Net Revenues	11,154,000	(43,239,000)	27,233,000

	Base Case		Low End		High End	
MPBs	**2026**	**2027**	**2026**	**2027**	**2026**	**2027**
Power	34.05	42.66	23.70	33.28	40.90	47.61
RPS	40.00	25.00	40.00	25.00	62.45	62.45
RA	9.42	9.67	9.42	9.67	11.53	11.53

Draft Budget: Overview of Operating Expenses

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2026 ACTUAL FY 2026	FY 2027 BUDGET BASE CASE	FY 2027 Delta	FY 2027 %D
Energy Operations					
Cost of Energy	836,970,000	770,312,000	756,505,000	(80,465,000)	-10.6%
Cost of Energy Services	14,056,000	14,252,000	14,218,000	162,000	1.1%
Total Energy Expenses	**851,026,000**	**784,564,000**	**770,723,000**	(80,303,000)	-10.4%
Overhead Expenses					
Personnel	29,639,000	26,564,000	31,470,000	1,050,000	3.3%
Marketing & Communication	3,872,000	2,606,000	3,421,000	119,000	3.5%
Legal, Policy, & Regulatory Affairs	4,243,000	3,265,000	4,308,000	144,000	3.3%
Other Professional Services	3,518,000	2,425,000	4,387,000	149,000	3.4%
General & Administrative	7,095,000	6,968,000	9,975,000	333,000	3.3%
Total Overhead Expenses	48,367,000	41,828,000	53,561,000	5,194,000	9.7%
Total Operating Expenses	**899,393,000**	**826,392,000**	**824,284,000**	(75,109,000)	-9.1%

Expenses are divided into three overall cost center categories:

- **Energy Operations** which includes all energy, energy attributes, ancillary related costs and required management services such as scheduling, data management, and customer billing
  - This category comprises 93.5% of Ava's total operating expenses

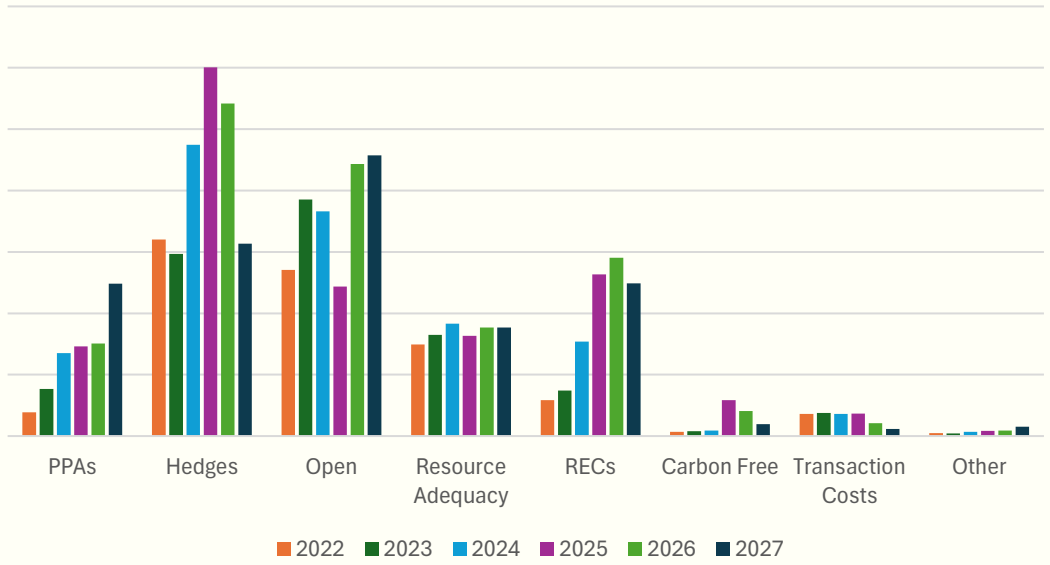
- **Overhead Operations** which includes all personnel and staffing needs as well as work function cost centers required to manage the organization at large, and is about 6.5% of total operating expenses

- **Non-Operating Expenses** which are all capital and capital transfer related costs, including Local Development Fund contributions. This category is presented and discussed in a later slide

Draft Budget: Energy Operations

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2026 ACTUAL FY 2026	FY 2027 BUDGET BASE CASE
Energy Operations			
Cost of Energy	836,970,000	770,312,000	756,505,000
Energy Services			
Data Management/CRM	10,080,000	10,238,000	9,980,000
Billing & Metering	3,208,000	3,268,000	3,446,000
Scheduling	768,000	746,000	792,000
Cost of Energy Services	14,056,000	14,252,000	14,218,000
Total Energy Expenses	**851,026,000**	**784,564,000**	**770,723,000**

Fiscal Year Cost of Energy Budget by Attribute



Energy Costs

- Costs are generally derived from a blend of contracted and open position for all energy attributes
  - Currently, renewables, carbon free, and RA are fully procured
  - Open prices are non-stressed, mean forecasted
  - Material increase in PPAs due to reduced revenue expectations from lower market prices

Draft Budget: Renewable & Large Hydro Content

Year	Bright Choice				CA-RPS %
	Renewable %	Carbon Free %	TCR*-Emission Factor	PSDR-Emission Factor	Renewable %
2018	41%	87%	101	*n/a*	29%
2019	60%	85%	135	*n/a*	31%
2020	40%	54%	*n/a*	580	33%
2021	41%	55%	*n/a*	577	36%
2022	45%	63%	*n/a*	566	39%
2023	49%	66%	*n/a*	521	41%
2024	52%	71%	*n/a*	455	44%
2025	56%	76%	*n/a*	387	47%
2026	60%	81%	*n/a*	315	49%
2027	64%	85%	*n/a*	241	52%
2028	67%	90%	*n/a*	163	55%
2029	71%	95%	*n/a*	83	57%
2030	75%	100%	*n/a*	-	60%

- In April 2022, the Board approved the “Path to Zero by 2030” plan for the Bright Choice product, as shown in the table to the left
- Periodically, the Board has approved adjusting targets to fit Ava’s financial position, typically raising targets
- In December 2025, the Board approved a compliance period approach across multiple years instead of single year targets specifically

	Annual Targets			Actuals/Forecast			
Year	Renewables	Lg. Hydro	Total	Renewables	Lg. Hydro	Total	Long/Short
2024	52.0%	29.0%	81.0%	62.0%	33.7%	95.6%	14.6%
2025	56.0%	25.0%	81.0%	56.5%	37.6%	94.1%	13.1%
2026	55.6%	21.0%	76.6%	54.7%	18.0%	72.7%	-3.9%
2027	64.0%	21.0%	85.0%	58.4%	12.3%	70.8%	-14.3%
Period*	**57.3%**	**23.7%**	**80.9%**	**57.9%**	**25.4%**	**83.3%**	**2.4%**

** Load Weighted*

This table shows where Ava currently stands with procurement relative to the compliance period, and annual, targets

Draft Budget: Fiscal Year Personnel Details

PERSONNEL	2026 BUDGET	2026 ACTUALS	2027 BUDGET	%Change
Salaries & Wages	23,171,000	21,233,000	23,070,000	-0.4%
Health Care/Benefits	3,242,000	2,456,000	4,884,000	50.6%
Retirement	2,745,000	2,461,000	2,983,000	8.7%
Payroll Expenses	481,000	414,000	533,000	10.8%
Total	29,639,000	26,564,000	31,470,000	6.2%

- FY 2026 Budget was set for 7 additional FTE (105 total) to build more depth and to continue addressing increased workflow in key areas to help scale operations further.
  - Ava is not filling 2 roles bringing the forecasted end of FY 2026 FTE to 103.
- FY 2027 Budget seeks to add 5 FTE (108 total) to provide added expertise and support in key areas and help to meet essential business needs.
  - 1) Contract Management Analyst 2) Finance Manager / Staff Accountant 3) Contract / Settlements Analyst
  - 4) Optimization Software Engineer 5) Data Analyst
- Compensation Adjustments:
  - COLA: 3%; Promotions/Wage Adjustments: 3%; AIP Compensation: 12%
  - Accounting for increased healthcare premiums and associated benefit costs (realized and expected)
- Change to benefits reflects some recategorization of expenses from Salaries & Wages to Health Care/Benefits

Public Hearing - AB 2561: Ava FY 25-26 YTD

FY 2025 - 2026 Budgeted Headcount	
Total Active FTE Budgeted	105
New FTE Budgeted	7
New FTE Filled to date	5
Average Time to Hire	67 Days
Vacancy Rate	29%
Retention Rate	95%
Average Turnover Rate	5%

**For recruitment, only new budgeted positions are included. This does not account for other roles, like backfill positions.*

**Reporting Period: FY 25-26; July '25 - April '26 (YTD at time of report)*

**Average Time to Hire: Days from role posted to start date.*

**FTE: Full-time employee; YTD: Year-to-date*

Ava has a strong retention rate of 95%, with only 5 terminations so far this year.

Hiring Decision: Ava elected not to fill 2 positions this FY, bringing the total budgeted FTE down to 103.

Challenges faced in hiring:

- Finding a great fit can take time, but it's worth it.
  - We are prudent in our hiring process, strategically planning the timing of hiring, carefully considering all aspects of the role and desired impact.
- Competition for talent is high, especially in the Bay Area

What helps us overcome challenges?

- A strategic and robust hiring approach
- Ava is mission-driven & a certified Great Place to Work!

This slide and data presented ensure compliance to AB 2561, which requires local public agencies to present the status of vacancies and recruitment and retention efforts at a public hearing before the governing board of the local agency at least once per fiscal year.

Draft Budget: Marketing & Communications

	BUDGET FY2026	ACTUALS FY2026	BUDGET FY2027	%Change
MARKETING				
Advertising & Promotions	1,130,000	256,000	713,000	-36.9%
Required Mailings	635,000	581,000	308,000	-51.5%
Communications	1,270,000	901,000	1,390,000	9.4%
Sponsorships	661,000	743,000	930,000	40.7%
Software & Subscriptions	176,000	126,000	80,000	-54.5%
Total	3,872,000	2,607,000	3,421,000	-11.6%

FY 2027 Summary of Adjustments:

- Continued notifications to unincorporated San Joaquin County solar customers
- Customer mailings for Fremont commercial Renewable 100 transition
- Investment to a brand awareness strategy and launch phase one of a multi-year awareness initiative
- Investment in sponsorships, fellow, partners to activate more robust community engagement

Draft Budget: Legal, Policy, & Regulatory Affairs

	BUDGET FY2026	ACTUALS FY2026	BUDGET FY2027	%Change
LEGAL, POLICY, & REGULATORY AFFAIRS				
Legal Consultants	3,143,000	2,527,000	3,110,000	-1.0%
Policy & Legistlative Consultants	740,000	539,000	750,000	1.4%
Software & Subscriptions	281,000	148,000	325,000	15.7%
Memberships & Sponsorships	79,000	52,000	123,000	55.7%
Total	4,243,000	3,266,000	4,308,000	1.5%

FY 2027 Summary of Adjustments

Legal:

- Litigation counsel: funding to cover active litigation; litigation readiness; other potential disputes
- Commercial counsel: all procurement activities other than power resources
- Software and implementation: Legal research resources; contract platform Phase 3 rollout

Policy and Regulatory Affairs

- Federal and state lobbyists
- Consultants for compliance and CAISO matters
- Potential AI services

Draft Budget: Professional Services

	BUDGET FY2026	ACTUALS FY2026	BUDGET FY2027	%Change
PROFESSIONAL SERVICES				
Operations	1,125,000	954,000	1,070,000	-4.9%
Human Resources	792,000	372,000	556,000	-29.8%
Technology/IT	860,000	606,000	910,000	5.8%
Power Resources	741,000	492,000	651,000	-12.1%
Other Services	0	0	1,200,000	0.0%
Total	3,518,000	2,424,000	4,387,000	24.7%

FY 2027 Summary of Adjustments:

- **Technology Consultants:** Expanding operations requires additional engineering and CRM structure and design support
- **Other Services:** Primarily reflects temporary consultants and contractors, which was recategorized and consolidated this year

Draft Budget: General & Administrative

	BUDGET FY2026	ACTUALS FY2026	BUDGET FY2027	%Change
GENERAL OPERATIONS				
Operational Expenses	950,000	2,063,000	2,270,000	138.9%
Memberships & Sponsorships	1,212,000	1,183,000	1,220,000	0.7%
Software & Subscriptions	2,880,000	2,550,000	3,927,000	36.4%
Small Equipment	310,000	60,000	270,000	-12.9%
Rent & Utilities	1,021,000	848,000	1,533,000	50.1%
Conferences & Prof. Development	381,000	53,000	311,000	-18.4%
HR & Recruiting	250,000	164,000	390,000	56.0%
Board & Director Fees	91,000	45,000	54,000	-40.7%
Total	7,095,000	6,966,000	9,975,000	40.6%

FY 2027 Summary of Adjustments:

- **Operational Expenses**: Increase is primarily due to accounting change for fees with line of credit
- **Memberships Dues & Sponsorships:** Costs associated with JPAs, trade associations, and industry associations (CalCCA, CCCFA, CCPower, CFEE, Veloz, etc.)
- **Software & Subscriptions:** Increases to cover additional software needs for IT, Power Resources, and EAS data and increased cyber security needs
- **Rent & Utilities:** Increase due to initation of primary lease agreement from a sub-lease agreement and no longer receiving TI related allowance
- **HR & Recruiting:** Some increase in recruiting costs for placing temporary consultants
- **Board & Director Fees:** These are reduced to more closely align with Board practices of requesting stipends

Draft Budget: Non-Operating Activity

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2026 ACTUAL FY 2026	FY 2027 BUDGET BASE CASE	*FY 2027 Delta*	*FY 2027 %D*
Non-Operating Revenue					
Interest Income	15,066,000	26,494,000	24,727,000	*(8,667,000)*	*-35.1%*
Grants	0	0	0	*0*	*0.0%*
Other Non-Operating Revenue	49,000	54,000	48,000	*0*	*0.0%*
Total Non-Operating Revenue	15,115,000	26,548,000	24,775,000	*9,660,000*	*39.0%*
Non-Operating Expenses					
Local Development Funding	10,190,000	190,000	0	*0*	*0.0%*
Borrowing Interest	1,087,000	0	0	*0*	*0.0%*
Capital Expenditures	250,000	551,000	120,000	*0*	*0.0%*
Total Non-Operating Expenses	11,527,000	741,000	120,000	*(11,407,000)*	*-9505.8%*
NET NON-OPERATING REVENUES	**3,588,000**	**25,807,000**	**24,655,000**	*21,067,000*	*85.4%*

Non-Operating Revenue

- **Interest Income:** Reflects "higher-for-longer" FED interest rate policy and expected balance drawdowns
  - Rates are estimated to hold at 3.5%
- **Other Non-Operating Revenue:** is expected income AT&T tower rent at the 8th Street building

Non-Operating Expenses

- **Borrowing Interest:** reduced due to changes in line of credit accounting
- **Capital Expenditures:** costs estimated for general improvements at 1999 Harrison St offices
- **Local Development:** no planned incremental contributions in light of the current fund balance and future planning work that is underway

Draft Budget: Local Development Fund Balance*

	Program Area	Balance
	Local Development	$2,800,000
BE+EE	Building Electrification	$14,600,000
	Building Efficiency Accelerator	$1,300,000
TE	Vehicle Electrification	$8,100,000
	Ava Charge	$15,900,000
	Bike Electric	$2,200,000
	SmartHome Charging	$5,700,000
Resilience	Critical Municipal Facilities (CMF)	$5,800,000
	SmartHome Battery	$10,900,000
	Resiliency Hubs	$5,600,000
BE+TE	Virtual Power Plant DERMS Platform	$1,900,000
Grants	Community Investment Grants	$8,800,00
	Total	**$83,600,000**

*Fund balance as of 1/31/26

Local Development – FY27 anticipated spend

Program Area	FY '27 Spend	Committed	FY'27 Activities
Program Roadmap	$500,000	$500,000	Local Development Programs Roadmap
Ava Charge	$2,640,000	$6,750,000	Development, Operations and Marketing for 5 Sites
Critical Municipal Facilities	$2,000,000	N/A - 25 yr PPA	Complete Projects, Establish operating reserves, bill customers
Grants	$600,000	$1,900,000	Issue new solicitation, select at least three grantees and Payments for contracted grants
SmartHome Battery incentives	$1,250,000	$10,900,000	Upfront and ongoing payments for SHB
Resilience Hub TA/Incentives	$1,500,000	$5,600,000	Upfront incentives and Technical Assistance costs
Building Efficiency Accelerator	$1,000,000	$1,000,000	Incentives for Commercial Heat Pump Water Heaters
Ava Bike Electric incentives	$2,200,000	$2,200,000	Bike Electric will add $4M from ACTC
Ava SmartHome Charging incentives	$300,000	$600,000	Enrollment incentives and VPP dispatch payment for SmartHome Charging program
Total	**$11,990,000**	**$29,450,000**	

Draft Budget: Deferred Revenues & Reserve Funds

Contribution Year	Contribution	Withdraws	Balance	Operating Expenses*	OpEx Year	PctCoverage
2018-2019	40,513,687	-	40,513,687	410,686,000	FY 2019-2020	9.9%
2019-2020	49,704,640	-	90,218,327	383,045,000	FY 2020-2021	23.6%
2020-2021	-	-	90,218,327	471,897,000	FY 2021-2022	19.1%
2021-2022	65,655,073	-	155,873,400	562,667,000	FY 2022-2023	27.7%
2022-2023	75,000,000	-	230,873,400	732,885,000	FY 2023-2024	31.5%
2023-2024	100,000,000	-	330,873,400	814,123,000	FY 2024-2025	40.6%
2024-2025	-	-	330,873,400	899,393,000	FY 2025-2026	*36.8%*
2025-2026*	***-***	***-***	***330,873,400***	***824,284,000***	***FY 2026-2027***	***40.1%***

*Operating Expenses are fiscal year ahead for coverage purposes: 2025-26 contribution year aligns with 2026-2027 OpEx

**Expected contribution with current policy as of 5/6/2026

Note: If $0 are contributed from 2025-2026 surplus, the balance of $330.9MM is 40.1% of FY 2026-27 OpEx

Deferred Revenue Usage	Balance	Guidance
Rate Stabilization Fund	162,546,828	R-2025-23 authorizes recognition of ~$35MM to balance FY25-26 budget R-2025-41 authorizes conversions from previous budget deferrals R-2025-42 & R-2025-51 authorizes RSF funding allocations
Clean Energy Investments	10,504,837	R-2023-37 authorizes deferral for specified use. R-2024-26 authorizes recognition in 2027

- Current reserve fund balance covers 40.1% of projected operating expenses for FY 2027
- Current FY surplus estimate of $83MM not included in balances
- Staff will bring recommendations for allocation of the surplus to the Board after completion of the annual audit in November
- Budget includes a release of $5.2MM, equal to 50% of the deferred revenues related to Clean Energy Investments

Draft Budget: Next Steps & Expected Updates

- Staff to incorporate additional diligence and updates based on the recent May ERRA filing
- Staff is working to update a 5-year forecast view for future board review, which was removed from the prior draft presentation due to the late May ERRA filing
  - Note that the reliability of any 5-year forecast on Generation rates is limited due to limited visibility into key PG&E inputs, such as revenue requirements
- Additional review by FAP (5/27) and Ex Comm (6/3) as needed
- Final delivery to Board (6/17) for approval
- Further review with the board mid-year to account for 2026 actuals and final 2027 rate setting
  - PG&E's October ERRA filing will provide a meaningful update
- To the extent the budget forecast materially changes following the October ERRA filing and AET, staff will consider mid-year budget adjustments as needed

Note: These budget scenarios are indicative and will change based on energy market conditions, developments in CPUC proceedings, and updates to PG&E ERRA and GRC filings

Staff is seeking feedback on any matters in preparation for June board approval

Appendix A: FY 2026-2027 Draft Budget Expanded View

Ava Community Energy	FY 2026 BUDGET FY 2026	FY 2027 BUDGET BASE CASE	FY 2027 Delta	FY 2027 %D
Wholesale Load (MWh)	8,984,000	9,544,000	560,000	5.9%
Retail Load (MWh)	8,439,000	8,966,000	527,000	5.9%
Revenue & Other Sources				
Electricity Sales	869,170,000	815,730,000	(53,440,000)	-6.6%
Uncollectables	(8,692,000)	(10,197,000)	(1,505,000)	14.8%
GASB 62	35,327,000	5,250,000	(30,077,000)	-572.9%
Total Operating Revenue	**895,805,000**	**810,783,000**	(85,022,000)	-10.5%
Energy Operations				
Cost of Energy	836,970,000	756,505,000	(80,465,000)	-10.6%
Energy Services				
Data Management/CRM	10,080,000	9,980,000	1,180,000	11.8%
Billing & Metering	3,208,000	3,446,000	10,000	0.3%
Scheduling	768,000	792,000	42,000	5.3%
Cost of Energy Services	14,056,000	14,218,000	162,000	1.1%
Total Energy Expenses	**851,026,000**	**770,723,000**	(80,303,000)	-10.4%
Overhead Expenses				
Personnel	29,639,000	31,470,000	1,050,000	3.3%
Marketing & Communication	3,872,000	3,421,000	119,000	3.5%
Legal, Policy, & Regulatory Affairs	4,243,000	4,308,000	144,000	3.3%
Other Professional Services	3,518,000	4,387,000	149,000	3.4%
General & Administrative	7,095,000	9,975,000	333,000	3.3%
Total Overhead Expenses	48,367,000	53,561,000	5,194,000	9.7%
Total Operating Expenses	**899,393,000**	**824,284,000**	(75,109,000)	-9.1%
Non-Operating Revenue				
Interest Income	15,066,000	24,727,000	(8,667,000)	-35.1%
Other Non-Operating Revenue	49,000	48,000	0	0.0%
Total Non-Operating Revenue	15,115,000	24,775,000	9,660,000	39.0%
Non-Operating Expenses				
Local Development Funding	10,190,000	0	0	0.0%
Borrowing Interest	1,087,000	0	0	0.0%
Capital Expenditures	250,000	120,000	0	0.0%
Total Non-Operating Expenses	11,527,000	120,000	(11,407,000)	-9505.8%
NET NON-OPERATING REVENUES	**3,588,000**	**24,655,000**	21,067,000	85.4%
TOTAL NET REVENUES	**0**	**11,154,000**	11,154,000	100.0%

Staff Report Item 10

To:	Ava Community Energy Authority Board of Directors
From:	Alex DiGiorgio, Sr. Manager, Public Engagement
Subject:	City of San Leandro's request for default service plan change (Informational)
Date:	May 20, 2026

Summary/Recommendation

This staff report proposes to 1) update Ava's Board of Directors regarding a recent San Leandro City Council Resolution requesting a citywide default rate product change from Ava's Renewable 100 (the current default option) to Bright Choice; and 2) provide historical background and potential next steps for this request within the context of Ava's Default Rate Product Change Policy. This item is informational for the Board of Directors.

Financial Impact

Staff is currently conducting analyses to forecast the financial impacts of transitioning San Leandro's citywide default service from Renewable 100 to Bright Choice, as well as evaluate operational procedures and customer communications. These analyses will be presented at a future Board meeting, along with recommended options to mitigate potential negative impacts to the agency, its customers, and communities.

Analysis and Context

On April 6, 2026, the San Leandro City Council passed a Resolution (attached) requesting Ava's Board approve a citywide default transition from Renewable 100 (San Leandro's current default option) to Bright Choice service, per Ava's updated Default Rate Product Change Policy.

On September 22, 2021, Ava's Board approved San Leandro City Council's request to change the City's default service option from Bright Choice to Renewable 100. At that time, the City's primary stated reason for requesting a default service transition to Renewable 100 was to help achieve the City's Climate Action Plan (CAP) goals. In accordance with the City Council's previous request, and the previous terms of Ava's Default Rate Product Change Policy, the City's residential customers transitioned from Bright Choice as the default option to Renewable 100 service in March of 2022, while the City's non-residential customers transitioned in October of that same year.

The City's municipal accounts started service in 2017 on (now sunsetted) Brilliant 100 service and have been on Renewable 100 service since September 2021. This service plan transition did not require Board action, as the City requested this change for their own accounts. Currently, all of San Leandro's residential and non-residential (e.g., commercial and industrial) customers default to Renewable 100 service, unless they fall within a specifically exempted category. These include the following:

- Residential customers on discount programs for income qualified households (e.g., CARE/FERA) and/or medical devices (e.g., Medical Baseline);
- Residential customers that started service while enrolled in an income qualified or medical device program; or
- Customers that have opted out of Ava service for either PG&E or Direct Access service;

The City's proposed transition from Renewable 100 to Bright Choice service would apply to approximately 21,500 residential customers and 3,500 non-residential customers. This corresponds to approximately 275 GWh of annual electric load (excluding the City's municipal accounts, which represent an additional 6 GWh of annual electric load, and were not included in the City's 4/6 Resolution), or 3% of Ava's total load, including unincorporated San Joaquin County. If approved by the Board, customers would be provided an opportunity to remain on Renewable 100 prior to the citywide default transition to Bright Choice.

Per Ava's Default Rate Product Change Policy, requests by Ava's JPA member-jurisdictions to change the default service option must be approved by Ava's Board by May 31 of a given year in order to be implemented by March of the following year. However, the policy allows for a different implementation schedule if one can be mutually agreed upon by Ava's Chief Executive Officer (CEO) and the JPA member, provided the CEO notifies the Board of the agreed upon schedule.

Once staff has completed its analyses, staff will bring an item to the Board with a recommendation and request for Board action. Currently, staff anticipate sbringing an item to the Board later this calendar year.

Attachments

A. Ava's Default Rate Product Change Policy (2024)
B. City of San Leandro City Council Resolution
C. City of San Leandro City Council Staff Report and attachments (B, C, D)

D. Presentation

Ava COMMUNITY ENERGY
DEFAULT RATE PRODUCT CHANGE POLICY

Policy Number: 15.1
Approval Date: 3/20/24
Agenda Item: Consent Item 17
Approved by Resolution: R-2024-24

The purpose of this Default Rate Product Change Policy is to specify a process for a Joint Powers Authority (JPA) member agency ("Member") to change its Default Rate Product[1] and to ensure that Ava Community Energy (Ava) is provided with sufficient notice and time to prepare for the change.

When approving a request from a Member to change the Default Rate Product ("Default Rate Product Change") after the Member's initial service enrollment, the Ava Board ("Board") and Member shall adhere to this Policy, which requires specific cooperation from the Member. This Policy shall not apply to a change in the Default Rate Product which is the result of a rate product closure.

Under this Policy, the Default Rate Product Change request from a Member and subsequent implementation must comply with the following requirements:

1. **Timeline for Board Approval and Implementation**: Any request for a Default Rate Product Change must be approved by the Board. The Board will consider Members' requests for Default Rate Product changes in the spring based on the following schedule:
    a. If the Board approves a Member's request for a Default Rate Product Change by May 31 the Default Rate Change will be implemented in March of the following year.
    b. Notwithstanding the foregoing, the Ava Chief Executive Officer ("CEO") and the Member may mutually agree upon a different implementation schedule, provided that the CEO provides the Board with notification of the agreed-upon schedule.

Board Approval By	Implementation Month
May 31 of Year A	March of Year A+1

2. **Exceptions to Implementation of Default Rate Product Change**: Notwithstanding anything contained in this Policy, in no event shall a Member's Board-approved Default Rate Product Change affect the following:

[1] For purposes of this Policy, the "Default Rate Product" is the AVA rate product option that each Member selected as the default for AVA customers within the Member's jurisdiction.

a. Prior customer enrollment actions. Any customer account that has affirmatively taken action to change its rate product will remain on the selected product.
b. Prior customer opt-out actions. Any customer account that has affirmatively taken action to opt out of Ava service will remain opted out.

3. **Frequency of Default Rate Product Change by a Member**: A Member may not change its Default Rate Product more than one (1) time every two (2) years.

4. **Ava Agency Requirements**: Upon the Board's approval of a Member's request for a Default Rate Product Change, Ava staff may engage in any of the following activities:
    a. Purchase or prepare to purchase the appropriate amount of resources to meet the expected change in demand associated with the Default Rate Product Change;
    b. Complete or prepare to complete additional regulatory compliance and reporting requirements, if any;
    c. Coordinate with Ava's data and call center services manager to make necessary operational adjustments;
    d. Evaluate fiscal impacts of the Default Rate Product Change;
    e. Examine Ava rates and any rate impacts;
    f. Coordinate and work with PG&E on billing considerations, if any;
    g. Prepare for and deploy customer communication efforts;
    h. Identify and address any other operational impacts or issues and take steps to mitigate those impacts/issues; or,
    i. Take any other action necessary to effectuate the Member's approved Default Rate Product Change.

5. **Member Requirements**: The Member requesting a Default Rate Product Change must commit to the following conditions for the change to be implemented:
    a. Collaboration. The Member shall work with Ava staff to develop and implement a customer communication plan;
    b. Co-Branding. The Member must agree to co-brand customer notifications with the Member's seal; and,
    c. Cost Coverage. Ava will cover the cost of any operational adjustments and the required customer notices, as detailed in Section 6.a, for the Member's first approved Default Rate Product Change. Costs associated with any subsequent Default Rate Product Changes will be charged to the Member.

6. **Customer Communication**: Ava will notify customers subject to a Member's approved Default Rate Product Change. Ava will lead, with support from the Member, the development and dissemination of customer notices.
    a. Required Notifications. Any customer accounts subject to a Member's approved Default Rate Product Change shall be sent a minimum of two

(2) notifications. A minimum of one (1) notice shall be sent prior to the change going into effect.

b. Optional Additional Notifications. In addition to the two (2) required notices referenced in Section 6.a., above, Ava staff will coordinate with a Member who wishes to develop and distribute additional customer notices and/or conduct additional communications such as social media campaigns, jurisdictional newsletters, Member press release, etc. The Member shall be responsible for the costs of such additional communications.

7. A customer may take an enrollment action to change their Ava rate product, to opt in to Ava service, or to opt out of Ava service at any time by notifying Ava through the standard channels of phone, interactive voice recording, or online form.

RESOLUTION THE CITY COUNCIL OF THE CITY OF SAN LEANDRO

RESOLUTION NO. 2026-033

RESOLUTION SELECTING BRIGHT CHOICE AS THE DEFAULT PRODUCT FOR SAN LEANDRO CUSTOMERS SERVED BY AVA COMMUNITY ENERGY

WHEREAS, the San Leandro City Council demonstrates its commitment to an environmentally sustainable future through its policy goals and actions, including energy reduction, clean energy programs, and the expansion of local renewable power supply; and

WHEREAS, in November 2016, the City of San Leandro City Council adopted Resolution No. 2016-160 authorizing San Leandro's participation in Alameda County's Community Choice Energy program known as East Bay Community Energy (EBCE); and

WHEREAS, in October 2023 EBCE announced and began operating under its new name, Ava Community Energy (Ava); and

WHEREAS, Ava offers two product choices with different emission-related profiles to customers: Bright Choice and Renewable 100, with the latter priced at a premium to Pacific Gas and Electric Company (PG&E) pricing and the former priced at a discount to PG&E prices; and

WHEREAS, in 2021 the San Leandro City Council selected Renewable 100 as the default choice for residents and businesses, with an exception for San Leandro customers that are income-qualified and enrolled in the California Alternate Rates for Energy (CARE), Family Electric Rate Assistance (FERA), and Medical Baseline programs remained at the Bright Choice rate; and

WHEREAS, the less expensive Bright Choice product was only 55% and 60% carbon-free in 2020 and 2021, respectively; and

WHEREAS, a September 18, 2024 resolution adopted by the Ava Board of Directors will result in Bright Choice being over 90 percent carbon-free in 2025 due to the addition of nuclear power into the Bright Choice power mix; and

WHEREAS, the significant improvement of Bright Choice's carbon-free profile, combined with the material deficit of San Leandro median household income when compared to the Alameda County median household income, make it in the public interest to replace Renewable 100 with Bright Choice attribute the default service plan provided by Ava to its customers based in San Leandro; and

WHEREAS, if approved, this would save the average residential customer approximately 45 dollars per year, or in aggregate approximately one million dollars per year for residents; and

WHEREAS, San Leandro Ava customers will continue to have the choice to change their enrollment to the higher-priced Renewable 100 product and also have the ability to opt out of purchasing electricity from Ava altogether.

NOW, **THEREFORE**, the City Council of the City of San Leandro does **RESOLVE** to select Bright Choice as its preference for the default product for San Leandro residential, commercial/industrial, and CARE/FERA/Medical Baseline accounts served by Ava.

Introduced by Mayor González and passed and adopted this 6th day of April 2026 by the following vote:

AYES:	Councilmembers J. Aguilar, V. Aguilar, Boldt, Simon, Viveros-Walton, and Mayor González	(6)
NOES:	None	(0)
ABSENT:	Councilmember Bowen	(1)

ATTEST: _____

Sarah K. Bunting
City Clerk

Staff Report (April 6, 2026)

Title
Adopt a Resolution Selecting Bright Choice as the Default Product for San Leandro Customers Served by Ava Community Energy

Staffreport

SUMMARY
Per a request from the Mayor, City staff presents for the City Council's consideration the attached draft Resolution that, if adopted by majority vote of the Council, would revert the default energy plan provided to San Leandro Ava Community Energy customers to be "Bright Choice" (BC), instead of "Renewable 100" (R-100). The Ava Bright Choice plan is the least expensive option. San Leandro residents or business owners who wish to purchase an energy package that is wholly derived from renewable sources would still retain the ability to opt-in to the Renewable 100 plan.

BACKGROUND
Ava Community Energy (formerly East Bay Community Energy) is a local, not-for-profit electricity provider, functioning as a Community Choice Aggregator throughout Alameda County that supplies cleaner power than PG&E by sourcing generation from renewable sources and reinvests some of its net operating revenue back into the community. PG&E delivers the power and manages the grid.

Below is a comparison of available energy plans as currently posted on the Ava Community Energy public website:

- Ava Renewable 100 (R-100) - 100% renewable sources (e.g. wind & solar), priced at 1 ¾ cent per kWh above PG&E rates.
- Ava Bright Choice (BC) - 62% renewable sources, priced at 0.5% below PG&E rates.
- PG&E - 23% renewable sources, priced at 0.5% above Ava Bright Choice rates.

MAYOR'S ANALYSIS

The primary intent of the proposed City Council resolution is to balance sustainability goals with economic equity for all San Leandro residents and businesses. According to the state of California, the City is officially designated as a disadvantaged community, with a median household income that lags Alameda County's median by more than $20,000 per year. When the City Council voted in 2021 to opt-up the entire community's default power mix to R-100, it shifted the financial burden of that action to local residents and business owners.

Moreover, the above action exceeded the intent of the relevant strategies referenced later in this staff report that are included in the City's adopted Climate Action Plan (CAP). More specifically, rather than merely *encouraging* local energy customers to opt-up to R-100, the Council's action served as a de facto requirement for them to opt-up in the absence of taking proactive action to opt-down to a less expensive energy mix.

Additionally, it is important to note that in the greater than five years that has passed since that 2021 action occurred, the renewable power portions of Ava Community Energy's Bright Choice plan have markedly improved. As a result, if San Leandro residents and businesses were defaulted to the Bright Choice plan, their resulting default power mix would be substantively improved as compared to what it otherwise would have been in 2021. Similarly, the Bright Choice renewable percentage is materially higher than that offered by PG&E. More specifically, it is approximately 2.7 times PG&E's renewable power mix percentage according to the above-referenced data that is publicly listed on Ava's website. Most importantly, according to the 2024 power content label, Bright Choice was at least 96% GHG-free in 2024. That is the last year for which a power content label has been published. 2025 is expected to be greater than 90% GHG-free according to Ava Energy's draft FY 2025-26 budget.

Lastly, because the City separately opted into the R-100 power mix plan, adoption of the proposed Resolution would have no impact on the power being used at City-owned municipal facilities and buildings. As a result, the City would continue to be able to lead by example through the usage of 100 percent renewable power at all City facilities.

STAFF ANALYSIS

On July 19, 2021, the City Council unanimously adopted the 2021 Climate Action Plan (CAP). The CAP is San Leandro's comprehensive strategy to reduce greenhouse gas (GHG) emissions and adapt to changing climate conditions. San Leandro's adopted General Plan also directs the preparation, ongoing implementation, and update of the CAP, providing the framework for San Leandro to reduce its community-wide GHG emissions in a manner consistent with State reduction targets through 2030 and longer-term goals for 2050. This document outlines both the City's successes to date in promoting environmental responsibility and provides a blueprint for continued sustainability.

Additionally, the CAP includes Renewable Energy Strategy (RE-1), which states: *"Encourage San Leandro households and businesses to switch from PG&E electricity supplies to East Bay Community Energy (now Ava), and commit to defaulting to Renewable 100 tier for 100-percent renewable energy"*.

On September 7, 2021, the City Council subsequently voted to upgrade the citywide default plan for all residences and businesses to the Renewable 100 (R-100) tier, using 100-percent renewable energy. Prior to the implementation date of the above action, the City of San Leandro Department of Public Works was also collaborating with EBCE to update the default power mix for all City-owned municipal facilities to R-100, consistent

with City Council direction. That latter change to the power mix for city facilities came into effect on October 1, 2021.

Nuclear Power Added to Bright Choice Energy Mix
In September 2024, the Ava Board of Directors voted to accept PG&E's Diablo Canyon Nuclear Power Plant energy allocation of greenhouse gas-free (GHG-free) power attributes into the Bright Choice product. This nuclear allocation lowered the overall carbon/GHG content in the Bright Choice power mix in 2025.

Unlike wind and solar power, nuclear power is considered by the State of California to be a non-renewable energy source despite not generating GHGs because of the following reasons:

- According to the California Energy Commission's Renewables Portfolio Standards Certification, a renewable resource is a natural resource that can be replenished naturally in a short period of time, or otherwise can be reused at a rate that keeps up with its consumption; and
- It relies on finite resources such as uranium.

Community Cost Savings
If the attached City Council Resolution is approved, it is anticipated that the change to the default power mix for San Leandro residents and businesses would become effective in March 2027, thereby allowing residential customers to realize an average savings of approximately $46 per year by March 2028. Customers that had already separately opted-in to the R-100 tier would stay in that tier after the proposed default change. As a result, City-owned municipal facilities would also remain in the R-100 fully renewable power mix.

Alameda County Green Business Program
Per the requirements of the Alameda County Green Business program, any business in the County seeking to become certified as a "Green Business" must opt into Ava Community Energy's R-100 plan. As a result, if the City Council were to adopt the proposed action, any businesses seeking such a certification or a renewal of such a certification would need to ensure that they are opted-up to R-100, rather than defaulting to other power mixes. Additionally, it is worth noting that the City of San Leandro Department of Public Works is currently in the process of certifying municipal facilities as Green Businesses to ensure city operations conserve energy, water, and materials resources wherever possible. This certification effort would not be directly impacted by adoption of the proposed Council Resolution, as noted above.

Fiscal Impacts
None. Given that municipal operations would retain the opted-in R-100 plan after the change, the proposed action would have no impact to the City's General Fund budget.

ATTACHMENTS
A: Draft Resolution

B: FY 2024 Analysis
C: FY 2025 Analysis
D: Ava Community Energy rate comparisons

Prepared by:

Kimberly Anderson, Management Analyst II, Public Works Department
Eric Engelbart, Deputy City Manager, City Manager's office

San Leandro Renewable 100 and Bright Choice Analysis

- To capture a full year with the current value proposition by Ava, the time period for analysis is from July 1, 2023 to June 30, 2024
- Analysis excludes Opted Out customers
- Bright Choice Savings and R100 Premium are compared to PG&E unless stated otherwise
- Customer groups are based on the most current customer enrollment information. Some customers in the BC or R100 groups may not have been on that product for the whole year

Table 1 - Annual Overview by Customer Class

Customer Class	Bright Choice			Renewable 100		
	Enrolled Customers as of Sept 2024	Annual Billed Usage (kWh)	Annual Bright Choice Savings	Enrolled Customers as of Sept 2024	Annual Billed Usage (kWh)	Annual R100 Premium
Commercial and Industrial	120	20,330,835	$ 119,259	3,517	189,905,066	$ 474,765
Municipal	24	2,126,530	$ 16,053	250	6,279,263	$ 15,700
Residential	8,366	42,223,650	$ 338,299	20,797	97,665,449	$ 244,184
Total	**8,510**	**64,681,015**	**$ 473,611**	**24,564**	**293,849,777**	**$ 734,650**

Table 2 - Annual Overview for CARE/FERA and Medical Baseline Customers

Product	Enrolled Customers as of Sept 2024	Annual Billed Usage (kWh)	Annual Bright Choice Savings	Annual R100 Premium
Bright Choice	5,955	21,730,552	$ 177,578	-
Renewable 100	2,756	8,535,167	-	$ 21,345

Note: CARE/FERA and Medical Baseline customers are defaulted to Bright Choice, but if a customer enrolls in these programs post-start of service, they may be on Renewable 100

Table 3 - Estimated Bright Choice Savings for R100 Customers

Customer Class	Enrolled Customers as of Sept 2024 [C]	Estimated BC Savings Compared to PG&E [A]	Billed R100 Premium Compared to PG&E [B]	Estimated Bill Difference Between R100 and BC [A + B]	Estimated Annual Bill Difference R100 and BC per Customer [A + B] / [C]
Commercial and Industrial	3,517	$ 1,463,711	$ 474,765	$ 1,938,477	$ 551
Municipal	250	$ 46,806	$ 15,700	$ 62,506	$ 250
Residential	20,797	$ 784,924	$ 244,184	$ 1,029,108	$ 49

San Leandro Renewable 100 and Bright Choice Analysis 2025

- To capture a full year with the current value proposition by Ava, the time period for analysis is from July 1, 2024 to June 30, 2025
- Analysis excludes Opted Out customers
- Bright Choice Savings and R100 Premium are compared to PG&E unless stated otherwise
- Customer groups are based on the most current customer enrollment information. Some customers within groups may not have been on CARE/FERA, Bright Choice or Renewable 100 for the whole year

Table 1 - Annual Overview by Customer Class

Customer Class	Bright Choice			Renewable 100		
	Currently Enrolled Customers	Annual Billed Usage (kWh)	Annual Bright Choice Savings	Currently Enrolled Customers	Annual Billed Usage (kWh)	Annual R100 Premium
Commercial and Industrial	129	26,789,458	$ 167,013	3,558	186,007,923	$ 465,022
Municipal	26	2,583,572	$ 18,519	252	6,226,527	$ 15,568
Residential	7,897	40,643,595	$ 305,390	21,486	97,791,217	$ 245,403
Total	**8,052**	**70,016,625**	**$ 490,921**	**25,296**	**290,025,667**	**$ 725,993**

Table 2 - Annual Overview for CARE/FERA and Medical Baseline Customers

Product	Currently Enrolled Customers	Annual Billed Usage (kWh)	Annual Bright Choice Savings	Annual R100 Premium
Bright Choice	5,449	28,144,109	$ 212,712.23	-
Renewable 100	3,459	19,239,069	-	$ 48,190.62

Note: CARE/FERA and Medical Baseline customers are defaulted to Bright Choice, but if a customer enrolls in these programs post-start of service, they may be on Renewable 100

Table 3 - Estimated Bright Choice Savings for R100 Customers

Customer Class	Currently Enrolled Customers [C]	Estimated BC Savings Compared to PG&E [A]	Billed R100 Premium Compared to PG&E [B]	Estimated Bill Difference Between R100 and BC [A + B]	Estimated Annual Bill Difference R100 and BC per Customer [A + B] / [C]
Commercial and Industrial	3,558	$ 1,360,911	$ 465,022	$ 1,825,932	$ 513
Municipal	252	$ 43,589	$ 15,568	$ 59,157	$ 235
Residential	21,486	$ 736,301	$ 245,403	$ 981,703	$ 46

AVERAGE MONTHLY COST COMPARISON BY PLAN
(RESIDENTIAL ELECTRIC 2025)

Per Ava Community Energy Website

RENEWABLE 100

100% renewable energy

Electric generation:
$51.48

Electric delivery:
$94.29

Additional non-Ava fees:
$3.26

TOTAL: $148.91

BRIGHT CHOICE

62% renewable energy

Electric generation:
$47.89

Electric delivery:
$94.29

Additional non-Ava fees:
$3.26

TOTAL: $145.32

PG&E

45% renewable energy

Electric generation:
$50.58

Electric delivery:
$94.29

Additional non-Ava fees:
$3.26

TOTAL: $148.01

This comparison is for an average residential E-TOU-C (Time of Use) customer using 360 kWh/month. Due to rounding, the rate components may not sum exactly to the total. Figures reflect Ava's actual power mix from 2024 (most recently published). Power mixes are published annually each summer for the preceding year.)

Ava Community Energy

City of San Leandro's Request for Default Service Plan Change (Informational)

May 20, 2026 | Alex DiGiorgio

Background: San Leandro Citywide Default Service

- On **April 6, 2026**, the San Leandro City Council passed a Resolution requesting Ava's Board to approve a citywide default service transition from Renewable 100 (the City's current default option) to Bright Choice, per Ava's Default Rate Product Change Policy.

- Previously, on **September 22, 2021**, Ava's Board approved the San Leandro City Council's request to change the City's default service option from Bright Choice to Renewable 100.

- In **March of 2022**, San Leandro's residential customers transitioned from Bright Choice as the default option to Renewable 100, while the City's commercial & industrial customers transitioned in **October of 2022**, per the timeline determined by the Council's 2021 Resolution and Ava's Policy at that time.
  - Exempted customers included: Income qualified (CARE/FERA); Medical Baseline; opt-outs
  - Customers also had an opportunity to remain on Bright Choice during the Renewable 100 default enrollment

Background: San Leandro by the Numbers

- San Leandro has about 21,500 residential and 3,500 non-residential customers
- Annual load 275 GWh, or 3% of Ava's load
  - Municipal facilities, 6 GWh, would remain on Renewable 100
- Note: Prior to the transition to Bright Choice, customers will be provided an opportunity to remain on Renewable 100.

Ava Default Rate Product Change Policy

- Per Ava's updated 2024 Default Rate Product Change Policy, requests by JPA member-jurisdictions to change their default service option must be approved by Ava's Board by May 31 to be implemented by March of the following year.

- The policy allows for a different implementation schedule if agreed upon by Ava's CEO and the JPA member.

- Procedurally, following a request to change a citywide default service option, Ava staff conduct analyses to evaluate the impact of the requested change to Ava's service area-wide customer base and internal operations.

- Customers who wish to remain on Renewable 100 will have the opportunity to do so.

Next Steps

- Staff is currently conducting analyses to forecast the financial impacts of transitioning San Leandro's citywide default service from Renewable 100 to Bright Choice as well as operational procedures.
- Results and options will be presented at a future Board meeting
  - Including recommended options to mitigate potential negative impacts to the agency, its customers, and communities.


Ava
Community Energy