

**INTEGRATED RESOURCE PLAN (IRP)**

Date:

IRPs shall consider all reasonable opportunities to meet future energy resource requirements using Demand Side Management techniques, new renewable resources and other programs that will provide retail consumers with electricity at the lowest possible costs, and minimize, to the extent practicable, adverse environmental effects.

To meet your Integrated Resource Planning reporting requirement, complete the following. Unaddressed items will be deemed incomplete and not eligible for approval. Western reserves the right to require customers to provide any supporting back-up data used to support and develop this report.

**Customer Contact Information:**

(Provide contact information for your organization. Contact person should be able to answer questions concerning the plan)

<b>Customer Name:</b>	<b>Sacramento Municipal Utility District (SMUD)</b>
<b>Address:</b>	<b>6201 S Street, Sacramento, CA 95817</b>
<b>Contact Person:</b>	<b>Sara Elsevier</b>
<b>Title:</b>	<b>Manager, Resource Planning, Enterprise Strategy</b>
<b>Phone Number:</b>	<b>(916) 732-5056</b>
<b>E-Mail Address:</b>	<b>Sara.Elsevier@SMUD.org</b>
<b>Website:</b>	

**Type of Customer:**

(Check one as applicable)

<input checked="" type="checkbox"/>	<b>Municipal</b>
<input type="checkbox"/>	<b>State</b>
<input type="checkbox"/>	<b>Federal</b>
<input type="checkbox"/>	<b>Irrigation District</b>
<input type="checkbox"/>	<b>Water District</b>
<input type="checkbox"/>	<b>Other (Specify) _____</b>

**Identification of Resource Options (considerations that may be used to develop potential options include cost, market potential, consumer preferences, environmental impacts, demand or energy impacts, implementation issues, revenue impacts, and commercial availability):**

Supply-side options:

(Including, but not limited to: purchase power contracts and conventional and renewable generation)

<b>List existing supply-side options:</b>	<b>List future supply-side resource options considered and evaluated:</b>
Hydro (including WAPA Hydro)	Wind (onshore and offshore)
Gas Cogen	Solar
Gas Turbine	Stand-alone Storage (short/long duration)
Wind (onshore)	Solar with Storage
Solar	Biomass/Biogas
Storage (stand-alone)	Geothermal
PV with Storage	Hydrogen power
Biomass	Carbon capture and sequestration
Biogas/Digester gas	
Geothermal	
Market Purchases	

Demand-side options:

<b>List existing demand-side options:</b>	<b>List future demand-side resource options considered and evaluated:</b>
Residential Air Conditioning Load Management (A/C Switches)	Wi-Fi Thermostats
PowerDirect (Commercial AutoDR)	Residential Battery Storage
Curtailment Agreement	Residential 2-way AC switches
	Residential Air Conditioning Load Management (A/C Switches)
	PowerDirect (Commercial AutoDR)
	Curtailment Agreement

Resource options chosen:

(Provide a narrative statement that describes the option chosen and clearly demonstrates that decisions were based on a reasonable analysis of the options)

Sacramento Municipal Utility District (SMUD) continues its integrated resource planning (IRP) process to focus on achieving the long run resource planning goals, the Strategic Direction 9 (SD-9), first established and adopted by its Board of Directors in 2004. Further, SMUD continues planning its resource portfolio to meet California’s mandated environmental goals and the more aggressive greenhouse gas (GHG) emission reduction goals established by SMUD’s board of directors and as described in SMUD’s 2030 Zero Carbon Plan. Pursuit of these goals requires a balanced and integrated planning approach to ensure environmental goals are met while maintaining reliable service at reasonable rates for its customers.

It is a core value of SMUD to provide its customer-owners with a reliable, affordable, and equitable power supply using an integrated resource planning process. SMUD is

committed to eliminate GHG emissions from its generation supply by 2030, while assuring reliability of the system, minimizing environmental impacts on land, habitat, water quality, and air quality, and keep rates affordable for its ratepayers. In reducing its GHG emissions, SMUD will be investing in energy efficiency, clean distributed energy resources, renewable resources, energy storage, clean and emissions free fuels, new technologies and business models, and savings through electrification of vehicles, building and equipment.

In keeping with this policy, SMUD shall also achieve the following:

- a) Pursue energy efficiency and electrification to reduce carbon emissions by 365,000 metric tons from buildings and 1,000,000 metric tons from transportation in 2030 (the equivalent of 112,000 single family homes and 288,000 passenger vehicles electrified).
- b) Procure renewable resources to meet or exceed the state’s mandate of 44% of SMUD’s retail sales by 2024, 52% by 2027, and 60% of its retail sales by 2030 and thereafter, excluding additional renewable energy acquired for certain customer programs.
- c) In meeting GHG reduction goals, SMUD shall:
  - 1. Emphasize local and regional benefits.
  - 2. Improve equity for under-served communities.
- d) Explore, develop, and demonstrate emerging GHG-free technologies and business models.
- e) Promote cost effective, clean distributed generation through SMUD programs.

**Action Plan:**

**Specific Action Items to be Implemented Over the Next 5 Years:**

(Lists are not meant to be inclusive, complete and provide other action items as applicable)

**Energy Consumption Improvements:**

Proposed Items	Begin Date	End Date	Est. KW capacity savings per year	Est. KWh savings per year	Milestones to evaluate accomplishments
Home Electric Reports	2024	2028	13,109	22,800,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Low Income EE	2024	2028	1,903	1,002,000	Monthly, Annual Tracking and Reporting. Periodic

					M&V
Advanced Homes EE	2024	2028	12,586	12,975,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Existing MF EE	2024	2028	3,583	2,525,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Home Appliances	2024	2028	7,478	3,039,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Advanced Commercial EE	2024	2028	51,553	17,935,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Complete Energy Solutions EE	2024	2028	5,112	4,990,000	Monthly, Annual Tracking and Reporting. Periodic M&V
Express Energy Solutions	2024	2028	9,636	8,580,000	Monthly, Annual Tracking and Reporting. Periodic M&V

**Renewable Energy Activities:** (Please note, the Est. kW and kWh are average annual dependable capacity and associated generation, not savings)

Proposed Items	Begin Date	End Date	Est. kW savings per year	Est. kWh savings per year	Milestones to evaluate accomplishments
BTM Solar	On-Going	N/A	370,716	819,521,172	Monthly, Annual Tracking and Reporting
BTM Storage	On-Going	N/A	15,240	(3,615,015)	Monthly, Annual Tracking and Reporting

**Load Management Techniques:**

Proposed Items	Begin Date	End Date	Est. kW savings per year	Est. kWh savings per year	Milestones to evaluate accomplishments
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Load Management devices – Residential Air Conditioning Load Management (A/C Switches) Emergency Only	6-1-77	On-Going	52,000	N/A	N/A
Load management systems – Commercial AutoDR	6-1-2015	On-Going	28,700	N/A	M&V analysis conducted after each event
Curtailment Agreement	6-1-2016	On-Going	6,500	N/A	M&V analysis conducted after each event
Wifi Thermostats	06/2022	N/A	30,000	N/A	M&V conducted after each peak season
Residential Battery Storage	06/2023	N/A	16,000	N/A	M&V conducted annually
Residential 2-way AC switches	06/2023	N/A	12,200	N/A	Periodic M&V to be conducted

**Environmental Effects:**

(Provide a narrative statement that sets forth the efforts taken to minimize adverse environmental effects of new resource acquisitions)

In its resource planning, SMUD will first achieve its core values, including reliability, rate competitiveness, access to credit, customer service, safety, and environmental protection. Therefore, environmental protection is one of the main objectives in SMUD’s resource planning. Energy efficiency and conservation is our first choice in resource planning, which offers the most environmental benefits.

Renewable resources are SMUD’s primary generation resource options moving forward. SMUD will procure adequate renewables to comply with California’s RPS, which requires 44% renewable generation by 2024, and 60% renewable by 2030, excluding additional renewable energy acquired for voluntary green customer programs such as SMUD’s SolarShares and Greenergy programs. Beyond the RPS, SMUD’s 2030 Zero Carbon Plan will require renewables beyond those needed to meet RPS needs, which SMUD is actively planning to procure. While renewables and energy storage can help SMUD achieve up to 90% of our greenhouse gas reduction goals, we will need new technologies such as long duration energy storage, clean alternative fuels, carbon capture and sequestration, and new customer programs to help eliminate the remaining GHG in our energy supply. SMUD has focused its efforts in the last several years identifying partners to advance, test, pilot, and scale successful technologies in these areas.

**Public Participation:**

(Customers must provide ample opportunity for full public participation in preparing and developing an IRP. Provide a brief description of public involvement activities, including how information was gathered)

from the public, how public concerns were identified, how information was shared with the public, and how it responded to the public comments)

Public involvement activities include phone and mail surveys, focus groups, and public workshops. Public workshops allow customers to interact with SMUD staff in an informal setting. In some cases, SMUD staff attends community meetings to discuss and gather feedback on proposed changes. Results from these activities are reported to the Board of Directors at committee meetings, public hearings, and regular board meetings. Public hearings are organized by the Board for the sole purpose of hearing comments from SMUD staff, customers and organizations on specific issues and proposed changes. Schedules and agendas for SMUD's committee meetings and regular board meetings are shown on the Public Access cable channel. Public meeting documents and video or audio are archived on SMUD.org for viewing after meetings have occurred.

As shown below, SMUD has a track record of involving its Board of Directors and customers in IRP related decisions.

In 2021, SMUD conducted a comprehensive public process with its Board of Directors and communities to develop its 2030 Zero Carbon Plan which replaced the previous 2018 IRP. Several public Board meetings were held to engage with customers, communities, industry, and other stakeholders. Our outreach process included four principal paths:

- **Three virtual presentations** to our customers and community organizations in December 2020. In December 2020, we held two virtual meetings for residential customers and one meeting for community organizations. The objective was to introduce the 2030 Zero Carbon Plan and collect feedback. We sent email invitations to the meeting to a representative cross-section of our residential customers. We also invited every not-for-profit organization we are connected to in the Sacramento region, as well as subscribers to our listserves, and we announced the meetings via social media. This outreach resulted in 415 participants in the two residential customer meetings and 82 participants in the community meeting.
- **An online survey** to collect feedback and views from our customers and community organizations on the development of the 2030 Zero Carbon Plan and their sentiments about their own climate investment plans and willingness to partner with SMUD. Survey results include our customers' concerns for improving air quality, having affordable electricity options, maintaining reliable energy, and achieving zero carbon in a way that benefits all communities. Most customers support SMUD's Zero Carbon goal and are willing to partner with SMUD by personally taking actions to reduce Sacramento GHG. A full summary of the survey results is posted on [smud.org/ZeroCarbon](https://smud.org/ZeroCarbon).
- **Seven virtual stakeholder workshops** with selected groups and organizations. We organized meetings to solicit input from a wide range of key stakeholders. Each group met twice – once at the beginning of our 2030 Zero Carbon Plan development process in mid-December 2020 and once at the end of February 2021 to learn about the results of our studies and key recommendations we intended to include in the Plan. These workshops included participants from community organizations and nonprofits, environmental groups, the solar + storage industry and local business leaders.
- **Three industry expert panel discussions** to help our Board, SMUD staff and the public learn more about the latest technologies and ideas for decarbonizing

our power supply. With the support of SEPA, we convened leading experts from around the nation to help inform the SMUD Board and our staff of the latest technology developments, research, products, and services that should be considered when aiming to be a zero-carbon utility by 2030. We hosted a total of three industry expert panels over the course of three Board meetings that included 11 experts. These meetings were open to the public and some members of the public also provided comments during the process.

- **Biannual Public Board meetings** where members of the public have opportunities to learn about the progress of the 2030 Zero Carbon Plan and provide comments. All of SMUD's Board and Board Committee meetings are public, and our customers and other members of the public will have ongoing opportunities to provide public comment on our 2030 Zero Carbon Plan and other topics.

Most people who attended our meetings expressed strong support for our 2030 Zero Carbon Plan. While some expressed concerns over potential cost increases and emphasized the need for all communities and customers to be part of the solutions (including under-represented or under-resourced communities), most were enthusiastic and expressed interest in partnering with SMUD to support our goals.

In parallel with the meetings mentioned above, we developed a webpage, [smud.org/ZeroCarbon](https://smud.org/ZeroCarbon), where interested participants could register for the meetings, learn more about our 2030 Zero Carbon Vision, sign up for future notifications, get answers to frequently asked questions, progress reports, and give SMUD input for the 2030 Zero Carbon Plan. The meeting recordings are posted on this webpage.

### Future Energy Service Projections:

(Provide a load forecast to show expected growth or expansion; or a narrative statement concerning expected future growth)

Calendar Year	Peak Demand (kW)	Total Energy (kWh)
2024	2,746,884	10,568,864,674
2025	2,743,875	10,630,176,207
2026	2,743,262	10,755,701,753
2027	2,738,428	10,903,276,545
2028	2,749,435	11,223,035,153

or Narrative Statement:

#### **Commercial Rate Structure and Critical Peak Pricing (CPP)**

In 2019, the Board approved a restructure of the commercial rates. The restructure accomplished several things: align the time periods with market costs, make the rate components consistent for each rate, and reduce the energy prices while increasing the fixed component prices. These changes, accomplished over a span of 8 years, send accurate cost signals to customers to encourage them to shift load out of the peak time period, and by reducing the energy prices, encourage electrification. The transition to the restructured rates was completed in Q1 2022.

In 2021, the Board approved a Critical Peak Pricing (CPP) rate, in which events may be called for 1 to 4 hours, up to 50 hours per summer. During an event, customers pay a premium on any energy they receive from SMUD but are also offered a premium on any energy they send to the grid. To balance the rate and encourage customers to participate, customers are offered a discount on energy received from SMUD during the summer off-peak and summer mid-peak time periods. This rate allows customer to actively participate in helping us meet our carbon reduction goals by reducing energy during the times when the grid is most stressed. This rate went into effect June 2022.

In 2021, SMUD adopted a new solar and storage rate to promote solar paired with storage. The rate went into effect in March 2022.

#### **Measurement Strategies:**

(Provide a brief description of measurement strategies for options identified in the IRP to determine whether the IRP's objectives are being met. These validation methods must include identification of the baseline from which a customer will measure the benefits of its IRP implementation)

SMUD's ambitious goal of the 2030 Zero Carbon Plan (ZCP) is to eliminate carbon emissions from our power supply by 2030. Our ZCP is a flexible road map to achieve our zero-carbon goal while ensuring all customers and communities we serve reap the benefits of decarbonization. The ZCP laid out a high-level road map of key activities and timelines in the following 5 areas of focus:

- 1. Natural Gas Generation Repurposing:** Replace 2 power plants (McClellan and Campbell) with renewable and storage resources and retool the remaining fleet of 3 power plants (Carson, Procter & Gamble, and Cosumnes) to drastically



reduce operations and emissions.

- 2. Proven Clean Technology:** Add up to 3500 MW of new renewable energy and storage and grow roof top solar and batteries (as outlined below) for an approximately 90% reduction of greenhouse gas emissions.

Utility Scale:

- Local Solar: 1100-1500 MW
- Local Battery Storage: 700-1100 MW
- Wind (various locations): 300-500 MW
- Geothermal (various locations): 100-220 MW
- Regional Solar: 100 MW

Customer-Owned Adoption of Solar and Storage:

- Customer Rooftop Solar: 250-500 MW
- Customer Battery Storage: 50-250MW

- 3. New Technology & Business Models:** Emerging technologies and new programs play a critical role in our plan, specifically to eliminate the remaining 10% of carbon emissions. We are focused on identifying opportunities to explore game changing technologies such as carbon capture and storage, long duration energy storage, and alternative fuels such as hydrogen and pilot and scale new customer programs that help leverage their connected devices to further reduce use of our natural gas plants. We're focused on four main areas of technology:

- Electrification, Education and demand flexibility
- Virtual power plants (VPP)
- Vehicle-to-grid technology (V2G)
- New grid-scale technologies including carbon capture and storage, clean alternative fuels, and long duration energy storage.

Customer-Owned Resources (incl above) and Customer-Focused Programs:

- 360-1300 MW (depending on the rate of customer adoption and the success of the programs and technologies)

- 4. Financial Impact and Options:** Limit rate impacts to the rate of inflation by expanding partnerships and securing grants to offset costs and generate operational efficiencies.

- 5. Maximize Community Benefits:** as part of the plan SMUD created and is implementing a Community Impact Strategy focused on engaging with under resourced communities, providing education, outreach programs and incentives to ensure no customers are left behind.

Our ZCP progress is measured by tracking the progress of the projects, pilots, and activities identified in the ZCP compared to the baseline. The plan was intended to be flexible by design to adapt as new technology emerges, costs decline, and customers adopt more distributed energy resource and other technology. Activities may accelerate or decline in individual areas based on overall progress and advancement in specific areas.

While there are many elements to the ZCP, at a summary level, the unit of measure of progress is GHG reduction and the MWs of new renewable energy and storage as identified in the ZCP to achieve those reductions. Replacing and retooling the 5 natural gas power plants is dependent on significantly growing the renewable energy and storage resources. Expected growth in customer demand side programs is excluded from the forecast for the time being, as it's a little too early to forecast the trajectory of customer adoption of DERs and enrollment in our new programs.

We are forecasting to meet the plan in 2026, but it will have a steep curve in the latter years with challenges due to the economy, supply chain, and demand for renewable projects in our region. We are preparing now, by continuing to work on the utility scale renewable projects that are forecasted to come on-line in early 2026. This will put us in a position to begin the initial steps of our thermal transition plan, i.e. to replace the McClellan and Campbell natural gas plants with solar and battery storage. With reliability a priority, we will evaluate the performance of these new resources and the resource needs of the state as we develop the replacement plans. We're also developing an important project pipeline, as it takes, on average, 5 years to develop a project from site identification, planning, environmental studies, permitting, engineering, procurement and construction.

We continue to execute the strategies and priorities laid out in the ZCP, looking for development opportunities, issuing solicitations, evaluations of long duration energy storage technologies and pursuing grants and partnerships for pilot projects utilizing emerging technologies.

Progress is communicated to the Board twice a year, in the Spring and Fall, via a public presentation. In addition, a written annual progress report is issued in the Spring. All presentations and progress reports are published on SMUD's website. Further, staff reports annually on the prior year's accomplishments under SMUD's Strategic Direction 9, Resource Planning, which includes SMUD's overarching goals under the 2030 Zero Carbon Plan.

### **Monitoring and Verification (M&V) of SMUD's Customer Programs**

Evaluation of SMUD's Zero Carbon customer offerings – including Energy Efficiency, Building Electrification, Transportation Electrification, and Load flexibility - are needed to improve program operation and effectiveness, to accurately measure the impacts of programs and ensure that they deliver the projected capacity and energy savings, and to provide assurance that program investments are sound and prudent.

The goal of SMUD's evaluation is to provide strategic information to enable appropriate and knowledgeable decisions on the part of program managers, program planners, resource planners, and management. Activities include accurately measuring energy, carbon, and demand savings by program and technology, characterizing markets and potential, assessing customer and trade ally response to programs, providing early warning of program operations problems, and identifying areas and means of program improvement.

Although the needs for program evaluation may appear straightforward, the uses of

program evaluation information are many and the methods for collection and analyzing evaluation information are complex. SMUD uses the guidelines developed by the California Public Utilities Commission: “California Evaluation Framework” (June 2004), and “California Energy Efficiency Evaluation Protocol” (April 2006) to provide guidance on methodological approaches and study focus needed to perform specific types of evaluations. This framework also provides SMUD the flexibility for the use of alternative evaluation approaches, especially when they can be shown to provide reliable results.

SMUD establishes regular M&V action plans and prioritizes evaluations of programs and pilots with new delivery models or technologies. SMUD allocates approximately 1% of its’ customer programs budget to the function of M&V. In 2021 and 2022, SMUD completed evaluations of its My Energy Optimizer virtual power plant program, Smart Homes new residential construction energy efficiency and electrification program, and residential space and water heating electrification incentives.

### **Measuring Renewable Generation and Purchases**

In addition to planning to and reporting of SMUD’s SD9 resource planning strategic direction objectives as described earlier; the following additional reporting requirements ensure SMUD’s resource planning objectives are being met.

#### **Renewable Portfolio Standard (RPS) Reporting:**

The California Energy Commission (CEC) requires annual reporting of renewable generation used for compliance for the Renewables Portfolio Standard for local publicly owned electric utilities. The CEC requires monitoring of the renewable energy using the Western Renewable Energy Generation Information System (WREGIS), which is an independent, renewable energy tracking system for the region covered by the Western Electricity Coordinating Council (WECC). WREGIS tracks renewable energy generation from units that register in the system by using verifiable data and creating renewable energy certificates (REC) for this generation.

#### **Power Content Label Reporting**

Senate Bill 1305, Statutes of 1997c required electricity retail suppliers to disclose information to their customers about the energy resources used to generate the electricity they sell. As directed, the CEC created a way of displaying this information called the Power Content Label (PCL).

The PCL provides utility customers with information about the energy resources used to generate electricity, enabling customers to compare the power "content" of one electricity product with that of others. Each electricity retail supplier must provide a PCL for products they offer to their customers, including those products that are in addition to their standard electricity product offerings such as SMUD’s Solar Shares and Greenergy voluntary green programs. Retail suppliers are required to notify their customers of the availability of the PCL electronically or via paper mail at least once a year.

**IRP Approval:**

(Indicate that all of the IRP requirements have been met by having the responsible official sign below; **or** provide documentation that the IRP has been approved by the appropriate governing body)

<b>Sara Elsevier</b> (Name – Print or type)	<b>Manager, Resource Planning</b> (Title)
<b>Sara Elsevier</b> (Signature)	<b>6/29/2023</b> (Date)

**Other Information:**

(Provide/attach additional information if necessary)

N/A