

## 2018 Integrated Resource Plan

Approved by Board  
December 14, 2017

*Peninsula Clean Energy is San Mateo County's locally-controlled electricity provider. We are reducing greenhouse gas emissions and offering customer choice at competitive rates.*



# PCE 2018 Integrated Resource Plan

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## I. Executive Summary

The Peninsula Clean Energy (PCE) Integrated Resource Plan (IRP) provides guidance for serving the electric needs of the residents and businesses in San Mateo County while meeting PCE's policy objectives and regulatory requirements over a 10-year planning period from 2018-2027.<sup>1</sup> PCE's existing and planned supply commitments will enable PCE to fulfill regulatory mandates and voluntary procurement targets related to renewable, greenhouse gas-free (GHG-free) and conventional (non-renewable) energy.

This IRP addresses how PCE will meet the following targets by managing a portfolio of energy and capacity resources to:

- Meet California's Renewable Portfolio Standard (RPS) requirements of 29% of retail electricity sales to come from renewable energy sources in 2018. This percentage increases to 50% by 2030.
- Provide the necessary capacity reserves to meet California's Resource Adequacy (RA) regulatory requirements for load-serving entities.
- Maintain a minimum renewable energy content of 50% for its ECOplus product, and 100% for its ECO100 product, while working towards a goal of increasing PCE's renewable content to 100% renewable energy for all PCE customers by 2025.
- Meet its GHG-free target of 85% for 2018, and increase its GHG-free energy by 5% per year to 100% GHG-free in 2021.

PCE has taken steps to ensure delivery of a reliable, environmentally responsible power supply by:

- Contracting with Direct Energy (Energy America, LLC) and Constellation (Exelon Generation Company, LLC) to supply the majority of PCE's energy needs on a short-to medium-term basis.
- Contracting for significant volumes of bundled renewable energy through medium-and long-term project-specific power purchase agreements (PPAs).
- Contracting to meet PCE's RA obligations.

## II. Introduction

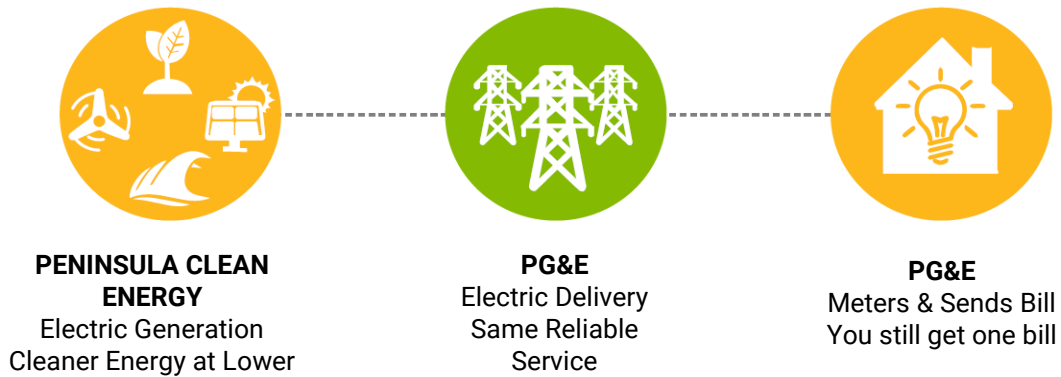
Peninsula Clean Energy (PCE), a community choice energy (CCE) program, is San Mateo County's official electricity provider. Community choice energy programs (also known as community choice aggregators, or CCAs) are locally controlled organizations that enable residents and businesses a choice regarding the energy sources for their electricity. PCE is a joint powers agency, formed in February 2016, consisting of the County of San Mateo and all twenty of its cities. Following a comprehensive feasibility study, elected officials from each member jurisdiction unanimously agreed to form PCE to meet their local climate action goals and for the benefit of San Mateo County.

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<sup>1</sup> The California Public Utilities Commission (CPUC) is in the process of developing the requirements for the IRP that will be submitted to them for certification. This IRP is for PCE's internal planning purposes and is not what will be submitted to the CPUC for certification.

PCE is the default electric generation provider for all the county’s residents and businesses, and for any new or relocated customers. As demonstrated in Figure 1, PCE provides electricity to residents and businesses in San Mateo County, while PG&E continues to maintain the electrical wires and other infrastructure, and PG&E meters customers’ electricity usage and sends customers’ bills. PCE’s customers receive one bill from PG&E which includes the charges from PCE as well as the charges for PG&E’s delivery costs as well as their natural gas usage.

Figure 1: How Community Choice Energy Works



PCE began serving the first phase of customers in October 2016, which were all of the small and medium commercial customers and 20% of residential customers. The second phase of customers were enrolled in April 2017, consisting of all other customers, including large commercial and industrial, agricultural, and the remaining residential customers.

PCE provides cleaner and greener electricity, at lower rates than the incumbent investor-owned utility (IOU), Pacific Gas & Electric Company (PG&E). PCE plans for and secures commitments from a diverse portfolio of energy generating resources to reliably serve the electric energy requirements of its customers over the near-, mid-, and long-term planning horizons.

This IRP documents PCE’s current procurement status and outlines PCE’s resource planning policies and objectives over the ten-year planning timeframe. Periodically, PCE staff will update the IRP and submit it to PCE’s Board for approval. Such approval is made in consideration of applicable regulatory requirements, PCE policy objectives, energy market conditions, anticipated changes in electricity sales, ongoing procurement activities, and any other considerations that may affect how PCE carries out its resource planning.

The IRP has four primary purposes:

- (1) Document current procurement status following our first year of operations;
- (2) Quantify resource needs over a ten-year planning period;
- (3) Articulate relevant energy procurement<sup>2</sup> policies;

<sup>2</sup> Within this IRP, energy procurement means purchases of energy products, including electricity, capacity, energy efficiency, distributed generation, demand response, and energy storage.

- (4) Communicate PCE’s resource planning policies, objectives and planning framework to the public and key stakeholder groups.

In practical terms, the IRP specifies the energy procurement policies adopted by PCE’s Board and serves as a guideline to PCE staff regarding day-to-day energy planning and procurement activities.

### III. Regulatory Mandates

CCEs are primarily regulated by their local governing authority. In the case of PCE, this is the Board of Directors. Each member jurisdiction from San Mateo County has one seat on the Peninsula Clean Energy Board of Directors (except for San Mateo County, which has two) for a total of 22 board members.

Additionally, as a load serving entity<sup>3</sup> (LSE) in California, PCE is required to meet certain regulatory requirements. There are several regulatory bodies that provide oversight of LSEs as outlined in Figure 2 below. The primary requirements are the renewable portfolio standard (RPS) and resource adequacy (RA), but PCE is also subject to requirements related to disclosing power sources, energy storage and contract term length among others. In future versions of this IRP, PCE will add any new or changed regulatory requirements as appropriate.

Figure 2: Regulatory Agencies and Roles



#### California Air Resources Board (CARB)

The California Air Resources Board (CARB) is charged with protecting the public from the harmful effects of air pollution and developing programs and actions to fight climate change. Reducing air pollution and protecting public health guide CARB’s actions. CCEs are required to report retail sales to CARB as part of the Power Source Disclosure Reporting requirements.



#### California Energy Commission (CEC)

The CEC is the state's primary energy policy and planning agency. It is committed to reducing energy costs and environmental impacts of energy use - such as greenhouse gas emissions - while ensuring a safe, resilient, and reliable supply of energy. CCEs report to the CEC regarding RA, RPS compliance, and Power Source Disclosure Reporting.

<sup>3</sup> Load Serving Entities (LSEs) are entities responsible for securing electric energy, transmission service and other related services to meet the electrical demand of its end-use customers. LSEs include investor owned utilities (IOUs), publicly owned or municipally-owned utilities (POUs or MOUs), rural electric cooperatives, Native American utilities, community choice energy programs (CCEs), direct access providers (DA providers), and other electric service providers (ESPs).



**California Independent System Operator (CAISO)**

CAISO is responsible for managing and operating the bulk of the wholesale electricity grid in CA. The ISO grants equal access to transmission lines and coordinates competing and diverse energy resources into the grid where it is distributed to consumers. It also operates a competitive wholesale power market designed to promote a broad range of resources at lower prices. CCEs work with CAISO to report RA compliance, as well as to participate in the buying and selling of electricity in the CAISO market.



**California Public Utilities Commission (CPUC)**

The CPUC regulates privately owned electric, natural gas, telecommunications, water, and transportation companies. The CPUC’s role in relation to CCEs is to assure that the CCE’s program elements are consistent with utility tariffs and with CPUC rules designed to protect consumers. The CPUC certifies CCA implementation plans, but it does not have authority to approve or reject a CCA’s implementation plan, to decertify a CCA, or to regulate the CCA’s program except to the extent that its program elements may affect utility operations and the rates and services to other customers. Although the CPUC’s regulatory jurisdiction over CCAs is more limited than over IOUs, CCAs still must comply with certain requirements including RA and the RPS.

**Renewable Portfolio Standard**

PCE’s current RPS requirements are mandated by Senate Bill 2 (1X) passed in 2011. This bill mandated RPS procurement requirements within multi-year compliance periods. For the current compliance period (2017-2020), PCE is required to procure renewables in the quantities identified in Table 1 below.

**Table 1: RPS Renewable Procurement Targets**

Year	Procurement Requirement (% of retail sales)
2017	27%
2018	29%
2019	31%
2020	33%



Further, this legislation established portfolio content categories (PCC) for RPS procurement. The PCCs (these are also sometimes referred to as buckets) are defined as follows:

- PCC 1: Bundled electricity and renewable energy certificates (RECs)<sup>4</sup> from a resource located within California or delivering directly to California without substituting electricity from another source;
- PCC 2: Electricity and RECs that cannot be delivered to California without substituting electricity from another, non-renewable source;<sup>5</sup> and
- PCC 3: Unbundled RECs from RPS-eligible facilities that are sold separately from the power generated by the facility and therefore do not meet the conditions of category 1 or category 2.<sup>6</sup>

The legislation set minimum and maximum limits on certain procurement that can be used for compliance with the RPS program. During the current RPS Compliance Period, a minimum of 75% of required RPS procurement must be sourced from PCC 1 resources and a maximum of 10% can be sourced from PCC 3 resources. The difference can be sourced from PCC 2.

### SB 350

In October 2015, Senate Bill 350 (SB 350) was signed into law establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. SB 350 established California's 2030 GHG reduction target of 40% below 1990 levels. To accomplish this, SB 350 set ambitious targets for renewable energy and energy efficiency. In particular, SB 350 increases California's RPS goal from 33% by 2020 to 50% by 2030. The corresponding CPUC regulations require that transitions from the previous mandate will be implemented gradually with straight line increases during each year of the compliance regime.

Additionally, SB 350 established the following requirements which specifically apply to CCEs.

- CCEs must have at least 65% of their RPS procurement under contracts of 10 years or longer beginning in 2021;
- CCEs may offer energy efficiency programs which will be eligible to count toward statewide energy efficiency targets;<sup>7</sup>
- While maintaining independent governing authority, CCEs will submit IRPs to the CPUC for certification. The California Public Utilities Commission (CPUC) is in the process of

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<sup>4</sup> RECs, also known as renewable energy credits, green certificates, green tags, or tradable renewable certificates, represent the environmental attributes of the power produced from renewable energy projects and are sold separately from commodity electricity. They are tradable certificates that represent proof that one megawatt-hour of electricity was produced by a renewable energy source and delivered into the electric grid and are used to track the characteristics of a renewable energy generating facility.

<sup>5</sup> This is due to the intermittency of renewable energy sources. Various requirements are in place to assure that the substitution of non-renewable sources is relatively contemporaneous with the generation by the renewable source, and that the substitute electricity represents a purchase of new energy (it is "incremental" to the load-serving entity's existing energy supply).

<sup>6</sup> If the RECs are unbundled and sold separately, then the purchaser of the RECs has bought the legal right to the renewable attributes they represent. This means that the energy originally associated with the RECs can no longer be considered renewable or to originate from a renewable source.

<sup>7</sup> CCE programs are not required to provide energy efficiency programs under SB 350. If a CCE program does not offer its own energy efficiency program, CCE customers continue to be eligible for energy efficiency programs offered by the local Investor Owned Utility (which is PG&E in the case of PCE).

developing the requirements for the IRP that will be submitted to them for certification. This IRP is for PCE's internal planning purposes and is not what will be submitted to the CPUC for certification.

### Resource Adequacy (RA)

LSEs including CCEs are required to comply with the CPUC RA program. The purpose of the RA program is to:

- Ensure the availability of sufficient generating capacity to maintain grid reliability;
- Provide for "reserve" capacity to promote resource sufficiency during periods of extreme demand and infrastructure outages;
- Incentivize the construction of new generation in areas that are resource constrained (to reduce reliability risks); and
- Ensure the availability of "flexible" or "fast response" generators that will be needed to address resource intermittency (to promote grid reliability in a system that relies heavily on renewable generating resources).

There are three types of RA products that PCE must procure to meet its compliance requirements. The first two products are defined by locational characteristics and the third is defined by ability to quickly ramp up generation and respond to CAISO orders.

- System RA (defined by location):
  - Sourced within the CAISO Balancing Area
  - Generators must be located in Northern California for CCEs operating within the PG&E footprint (a small amount can come from Southern California)
  - System requirements are determined based on each LSE's CEC-adjusted peak load forecast plus a 15% planning reserve margin
- Local RA (defined by location):
  - Local requirements are determined based on an annual CAISO study
  - Local RA procurement obligations require PCE to purchase a certain amount of RA capacity from generators located within the following regions
    - Greater Bay area
    - PG&E Other (consists of the Humboldt, North Coast/North Bay, Sierra, Stockton, Greater Fresno, and Kern regions)
- Flexible RA (defined by generating characteristics):
  - Qualifying generating resources must be able to respond to CAISO dispatch instructions and manage variations in load/resource output
  - No location requirements
  - Flexible Requirements are based on an annual CAISO study

RA from a particular resource will be characterized as either Local or System depending on location and either Flex or not Flex depending on its ability to respond to CAISO instructions.

RA is not actual energy or even the right to purchase energy. Instead, it is a mechanism to ensure that there is enough generation on the grid to ensure reliability. All LSEs must procure RA based on the amount of load they serve.

### Power Source Disclosure Program

The Power Source Disclosure Program requires retail suppliers of electricity (i.e., companies that sell electricity directly to end users) to provide consumers with periodic updates regarding the types of generating resources (and related fuel sources) that are used to produce the electricity that they use. Information is communicated to such customers in the form of a power content label. PCE as a Community Choice Aggregator must complete these reporting requirements for the power content label.

### AB 1110

Assembly Bill 1110 (AB 1110) was signed into law on September 26, 2016 to inform consumers of the GHG emissions intensity of their electricity and improve the transparency of the Power Content Label. As part of this bill, regulators will adopt a methodology for calculating GHG emissions intensities for electricity sources, calculate California's overall GHG emissions intensity, and adopt guidelines for reporting GHG emissions intensities.

PCE will apply pertinent emissions calculation methodologies, once finalized, when performing future emissions calculations related to its electric supply portfolio.


### AB 2514

The California Energy Storage Bill, AB 2514, was signed into law in September 2010 and established energy storage targets for IOUs, CCEs, and other LSEs in September 2013. The applicable CPUC decision established an energy storage procurement target for CCEs and other LSEs equal to 1 percent of their forecasted 2020 peak load. The decision requires that contracts be in place by 2020 and projects be installed by 2024. Beginning on January 1, 2018, and every two years thereafter, LSEs must file an advice letter demonstrating progress toward meeting this target and a description of the methodologies for insuring projects are cost-effective.

## IV. PCE Procurement Goals and Policies

In addition to the regulatory mandates reviewed above, PCE has set its own set of goals and policies that go beyond the RPS requirements. PCE policy is directed on an ongoing basis by PCE's Board and guides development of this IRP and related procurement activities. PCE's strategic goals, shown in Figure 3, were adopted in October 2016 and address procurement principles and targets.

Figure 3: PCE Strategic Goals

 <p><b>PCE Strategic Goals</b>  <i>Adopted by PCE's Board of Directors in October 2016</i></p>	
<b>Design a diverse power portfolio that is greenhouse gas free</b>	
<ul style="list-style-type: none"> <li>• 100% GHG free by 2021</li> <li>• 100% CA RPS-eligible renewable energy<sup>8</sup> by 2025</li> <li>• Minimum of 20 MWs of new local power by 2025</li> </ul>	
<b>Continually strive to offer ECOplus at rates that are at parity or lower than PG&amp;E rates</b>	
<b>Stimulate development of new renewable energy projects and clean-tech innovation in San Mateo County and California through PCE's procurement activities</b>	
<b>Demonstrate quantifiable economic benefits to the County/region and place a priority on local hiring and workforce development practices and environmental justice</b>	
<b>Implement programs to further reduce greenhouse gas emissions by investing in programs such as local clean power production, electric vehicles, energy efficiency, and demand response, and partnering effectively with local business, schools, and nonprofit organizations</b>	
<b>Maximize and maintain customer participation in PCE</b>	
<ul style="list-style-type: none"> <li>• Provide a superior customer experience</li> <li>• Develop PCE brand awareness and loyalty throughout the County</li> <li>• Actively encourage voluntary participation in its ECO100 renewable energy product</li> <li>• Actively encourage participation in other programs PCE develops</li> <li>• Achieve recognition from the EPA's Green Power Partnership for Green Power Communities for all cities with municipal accounts enrolled in ECO100 by 2018</li> </ul>	
<b>Build a financially sustainable organization</b>	
<ul style="list-style-type: none"> <li>• Build sufficient reserves in a rate stabilization fund</li> <li>• Achieve an investment grade credit rating by 2021</li> </ul>	
<b>Foster a work environment that espouses sustainable business practices and cultivates a culture of innovation, diversity, transparency, integrity, and commitment to the organization's mission and the communities it serves</b>	

<sup>8</sup> California RPS-eligible resources are defined by the California Energy Commission and designated as "Eligible Renewable Resources" (ERR). An ERR is a generating facility that meets all of the criteria set forth in Public Utilities Code Section 399.12, Public Resources Code Section 25741, and the California Energy Commission's "Renewables Portfolio Standard (RPS) Eligibility Guidebook," available at: <http://www.energy.ca.gov/portfolio/index.html>.

Further, PCE has developed the following three specific policies to guide power procurement:

1. PCE shall not use unbundled renewable energy credits (RECs) for meeting its renewable energy goals.
2. In sourcing electricity and resource adequacy, PCE will not procure electricity or resource adequacy from coal facilities.
3. PCE has published a Sustainable Workforce Policy. PCE desires to facilitate and accomplish all of the following objectives: (1) Support for and direct use of local businesses; (2) Support for and direct use of union members from multiple trades; (3) Support for and use of training and State of California approved apprenticeship programs, and pre-apprenticeship programs from within PCE’s service territory; and (4) Support for and direct use of green and sustainable businesses. For specific details on this policy, please refer to <https://www.peninsulacleanenergy.com/wp-content/uploads/2017/01/PCE-Policy-10-final-1.pdf>.

In meeting our renewable energy requirements, PCE’s initial goal is to have a mix of up to 25% of our renewable portfolio sourced from PCC2 and to fulfill the remaining renewable energy portion with PCC1. This mix is required for the state’s RPS needs, and has been carried over to fulfill PCE’s renewable needs beyond the RPS requirements. However, depending on availability and price, PCE may modify the 75%/25% split for renewable purchases to meet PCE’s renewable targets that exceed the RPS requirements.

Table 2 below outlines PCE’s targets by resource type to meet these regulatory requirements and goals.<sup>9</sup>

**Table 2: PCE Procurement Targets by Resource Type**

10 Year Portfolio Mix	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>PCC 1 Renewables</b>	37.5% - 42.5%	37.5% - 42.25%	37.5% - 41.25%	37.5% - 41.25%	37.5% - 41.0%	37.5% - 40.5%	37.5% - 40.0%	75.0% - 89.5%	75.0% - 89.0%	75.0% - 88.75%
<b>PCC 2 Renewables</b>	7.25% - 12.5%	7.75% - 12.5%	8.25% - 12.5%	8.75% - 12.5%	9.0% - 12.5%	9.5% - 12.5%	10% - 12.5%	10.5% - 25.0%	11% - 25.0%	11.25% - 25.0%
<b>PCC 3 Renewables</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>GHG-Free Energy</b>	35%	40%	45%	50%	50%	50%	50%	0%	0%	0%
<b>System Energy</b>	15%	10%	5%	0%	0%	0%	0%	0%	0%	0%

### GHG-Free by 2021

Reducing electric utility-sector GHG emissions is one of PCE’s charter objectives. PCE started with a 75% GHG-free supply portfolio in 2016 and increased to a target of 80% in 2017. The total GHG-free energy supply will increase by 5% per year, with the goal of achieving a 100% GHG-free supply portfolio by 2021. Early in the planning period, the GHG-free proportion of PCE’s resource mix will consist of both RPS-eligible renewable energy and additional GHG-free electricity, mostly sourced from large hydro facilities. In subsequent years, PCE will increase its

<sup>9</sup> Actual annual percentages may differ from projections if resource availability or market conditions preclude cost-effective procurement.

supply of renewable energy as we move toward our goal of a 100% renewable energy supply portfolio by 2025.

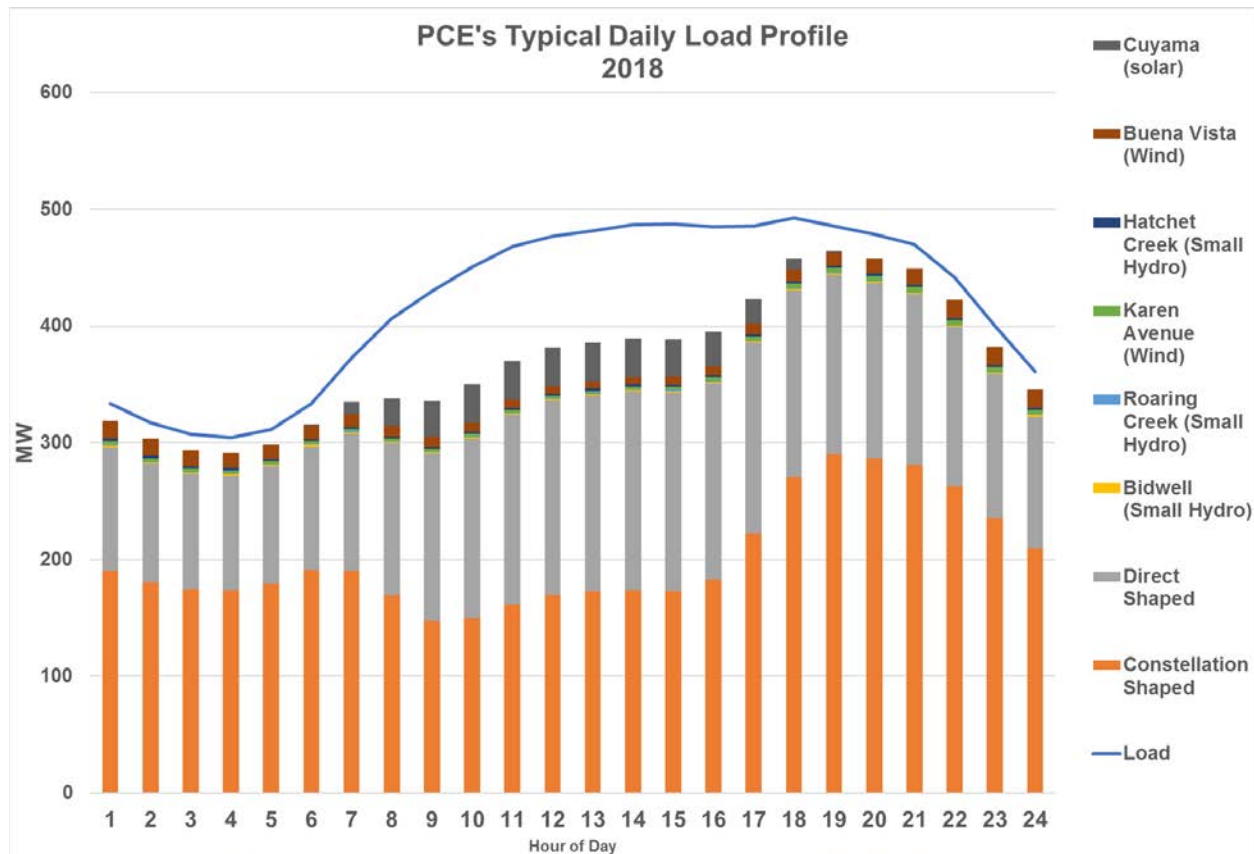
**100% Renewable by 2025**

PCE intends to replace the conventional and non-renewable GHG-free energy resources in its supply portfolio with renewable resources. Actual annual renewable content percentages may differ from projections, if resource availability or market conditions preclude cost-effective procurement, but the primary goal is to achieve a 100% renewable supply no later than 2025.

Further, in providing customers with 100% renewable energy, PCE intends to match its electricity supply portfolio to its customer electricity demand profile on a time coincident basis. This means that for every hour of the year, we want the amount we are procuring from generators to be equal to the amount that our customers are consuming in that hour.

Figure 4 below shows PCE’s average load profile and contracted supply by hour for 2018. The blue line is the customer load or how much electricity we expect PCE’s customers to use in a particular hour and the bars represent the electricity that we have contracted for in that hour. To meet our goal in 2025, each of these bars would represent contracts for renewable energy and would reach up to the blue bar for every hour of the year.

Figure 4: PCE's Typical Daily Load Profile, 2018



**No Use of Unbundled Renewable Energy Certificates**

The RPS allows load-serving entities to meet a portion of their RPS requirements with unbundled RECs. These are otherwise known as PCC 3, or Bucket 3. PCE has made a commitment not to procure unbundled RECs to meet either its RPS requirements or its additional requirements to provide customers with 50% or 100% renewable energy. Members of PCE’s Board, Executive Committee, and Citizens Advisory Committee expressed concerns about how unbundled RECs have been used and misused to give the impression that polluters are more “green” and “clean” than they actually are. Although each unbundled REC is created because 1 MWh of renewable energy has been generated to create that REC, the use of unbundled RECs has created confusion in the market. There was general consensus that PCE should set an example in the industry and among CCEs to adopt a policy to not use Unbundled RECs. To maintain progress toward its 100% renewable energy target, PCE is focused on procurement of bundled renewable energy supply throughout the planning period.

**V. Customers and Consumption Forecast**

**Enrolled Customers**

PCE’s service territory covers the 20 cities located in San Mateo County plus the unincorporated areas of the county. Within this service area, PCE serves approximately 300,000 customer accounts representing approximately 765,000 residents. Table 3 shows the breakdown between commercial/industrial customers and residential customers in PCE’s service territory. Customers are automatically enrolled in PCE and have the option to opt-out of PCE and return to PG&E for electric service. Customer participation rates are expressed as the proportion of customers currently served by PCE relative to the total number of electric customers in San Mateo County eligible for PCE service.<sup>10</sup> The difference between such numbers reflects the subset of customers who have voluntarily opted out of the PCE program, retaining bundled service by PG&E. As of publication, the customer participation rate associated with PCE’s membership is approximately 98% (i.e., the opt-out rate is approximately 2%).

**Table 3: PCE Participation by Customer Type**

	Total PCE	Residential	Commercial & Industrial
<b>Number of Customers</b>	286,692	258,677	28,015
		90.2%	9.8%
<b>Total Retail Sales (kWh)<sup>11</sup></b>	2,332,308,507	803,274,560	1,529,033,946
		34.4%	65.6%

<sup>10</sup> Direct Access customers are not automatically enrolled in a CCE program. The Direct Access (DA) Program allows a limited selection of non-residential consumers in California to purchase their electricity from an ESP rather than from their IOU or default electricity supplier.

<sup>11</sup> Retail kilowatt-hour (kWh) sales in Table 3 do not represent a full calendar year of electricity sales. Data shown covers sales from January 1, 2017 through November 22, 2017; retail service from January to March 2017 was for Phase 1 customers only; retail service for all customers was complete in May 2017.

**PCE Rollout – Phases 1 and 2**

PCE rolled out its program in two phases –Phase 1 launched on October 1, 2016 and enrolled approximately one-third of the customer base, and Phase 2 launched on April 1, 2017 enrolling the remainder of the customer base. In both phases, most customer opt-outs occurred within a 120-day period beginning 60 days prior to each customer’s scheduled service commencement and continuing for 60 days thereafter. This period of time is generally referred to as the “enrollment period”. During PCE’s enrollment periods, prospective and enrolled customers received at least four mailed notices, which explained PCE’s service options and the opt-out process as well as other terms and conditions of service.

**Load Forecast**

PCE’s electricity load forecast is based on a historical count of customers by end-use classification (i.e. residential, commercial, industrial) and class-typical monthly energy consumption estimates, derived from historical data, to yield a monthly energy forecast by customer class. Hourly class-specific load profiles are then used to break down the monthly energy forecast into more granular time-of-use and peak demand values to create a forecast of the amount of electricity consumed by PCE customers for every hour of the year.

PCE’s long term load forecast is primarily influenced by the number of customers that PCE serves, as well as customer end-use classifications, energy usage, and expected customer participation rates. Typical variables that drive the load forecast are weather, economic cycles, population growth, and changes in customer consumption patterns such as increased use of electric vehicles.

PCE’s load in 2016 was 277 gigawatt hours (GWh)<sup>12</sup> and in 2017, we are projecting 3,026 GWh. The projected load for 2018 and going forward is approximately 3,700 GWh. PCE’s 2016 load represented only the first phase of enrollments for 25% of the year. For 2017, PCE did not start serving our full retail load until April resulting in forecasted load that is slightly lower than when PCE is serving its full load for the entire year, which will occur in 2018.

**Retail Products**

PCE customers can choose between two different product options, ECOplus and ECO100. Each product has a different amount of energy from renewable sources such as solar and wind. Table 4 summarizes customer participation in each product as of mid-2017.

**Table 4: Participation Rates by Product in 2017**

	Total PCE	ECOplus	Eco100
<b>Number of Customers</b>	286,692	281,916	4,776
		98.3%	1.7%
<b>Total Retail Sales (kWh)<sup>13</sup></b>	2,332,308,506	2,272,145,380	60,163,126
		97.4%	2.6%

<sup>12</sup> 1 gigawatt hour (GWh) = 1000 megawatt hours (MWh) = 1,000,000 kilowatt hours (kWh)

<sup>13</sup> Retail kilowatt-hour (kWh) sales in Table 4 do not represent a full calendar year of electricity sales. Data shown covers sales from January 1, 2017 through November 22, 2017; retail service from January to March 2017 was for Phase 1 customers only; retail service for all customers was complete in May 2017.



### ECOplus

ECOplus is PCE’s default electric option, in which new customers are automatically enrolled. ECOplus rates are set at 5% below PG&E’s generation rates. Fifty percent of the electricity comes from renewable sources and this product will be 85% GHG-free in 2018. Renewable sources may include such sources as wind, solar, and small hydro. GHG-free includes both renewable sources and sources that do not count for the RPS and do not emit GHG emissions. This is generally comprised of large hydro.



### ECO100

Customers can choose to “opt up” to ECO100 and receive 100% of their electricity from renewable energy resources and is 100% GHG-Free. ECO100 costs \$0.01 per kWh more than ECOplus.

Customer participation in ECO100 directly impacts the quantity of incremental renewable energy volumes that PCE must procure to ensure that its broader supply portfolio includes sufficient renewable energy volume to support both ECOplus and ECO100 participation. As of mid-2017, over 4,000 accounts opted-up to ECO100. As part of their emission reduction targets and sustainability goals, 14 cities and the County enrolled all of their accounts in ECO100 in 2017.



Starting in January 2018, the ECO100 product will be certified by the Center for Resource Solutions’ (CRS) Green-e certification program. For 20 years, CRS has developed and implemented consumer-protection standards for the voluntary renewable energy and carbon offset markets through the Green-e programs. These standards mandate a rigorous accountability for retail products sold to consumers, bringing a level of transparency that can bolster consumer confidence in the industry. Green-e Energy is North America’s leading voluntary certification program for renewable energy. Since 1997, Green-e Energy has certified renewable energy that meets environmental and consumer protection standards developed in conjunction with leading environmental, energy, and policy organizations. Green-e Energy requires that sellers of certified renewable energy disclose clear and useful information to potential customers, allowing consumers to make informed choices.

### Power Content Label

PCE’s Power Content Label (PCL) is a key customer communication tool that provides information regarding PCE’s actual mix of various energy sources during the previous year of operation. This is a requirement of the Power Source Disclosure program discussed in Section III. The 2016 PCL (Figure 5) quantifies PCE’s aggregate renewable energy supply during the three months that PCE provided service, during PCE’s initial rollout. Projections for calendar years 2017 and 2018 for ECOplus and ECO100 are illustrated in Figures 6, 7, and 8 below. The Product Content Label is not necessarily representative of the expected resource mix beyond 2016 and 2017, as PCE will be building its portfolio going forward and relying less on the power mix provided by its early contracts with Direct Energy and Constellation.

Figure 5: PCE 2016 Power Content Label

<b>2016 POWER CONTENT LABEL</b>			
<b>Peninsula Clean Energy</b>			
<b>ENERGY RESOURCES</b>	<b>ECOplus</b>	<b>ECO100</b>	<b>2016 CA Power Mix**</b>
<b>Eligible Renewable</b>	<b>58%</b>	<b>100%</b>	<b>25%</b>
Biomass & waste	0%		2%
Geothermal	0%		4%
Small hydroelectric	18%		2%
Solar	0%		8%
Wind	40%	100%	9%
<b>Coal</b>	<b>0%</b>		<b>4%</b>
<b>Large Hydroelectric</b>	<b>27%</b>		<b>10%</b>
<b>Natural Gas</b>	<b>0%</b>		<b>37%</b>
<b>Nuclear</b>	<b>0%</b>		<b>9%</b>
<b>Other</b>	<b>0%</b>		<b>0%</b>
<b>Unspecified sources of power*</b>	<b>15%</b>		<b>15%</b>
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<p>* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.</p> <p>** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the identified year.</p>			
For specific information about this electricity product, contact:		<b>Peninsula Clean Energy</b>  <b>1-866-966-0110</b>	
For general information about the Power Content Label, contact the California Energy Commission at:		California Energy Commission 844-421-6229 <a href="http://www.energy.ca.gov/pcl/">http://www.energy.ca.gov/pcl/</a>	

Figure 6: PCE 2017 Projected ECOplus Resource Mix<sup>14</sup>

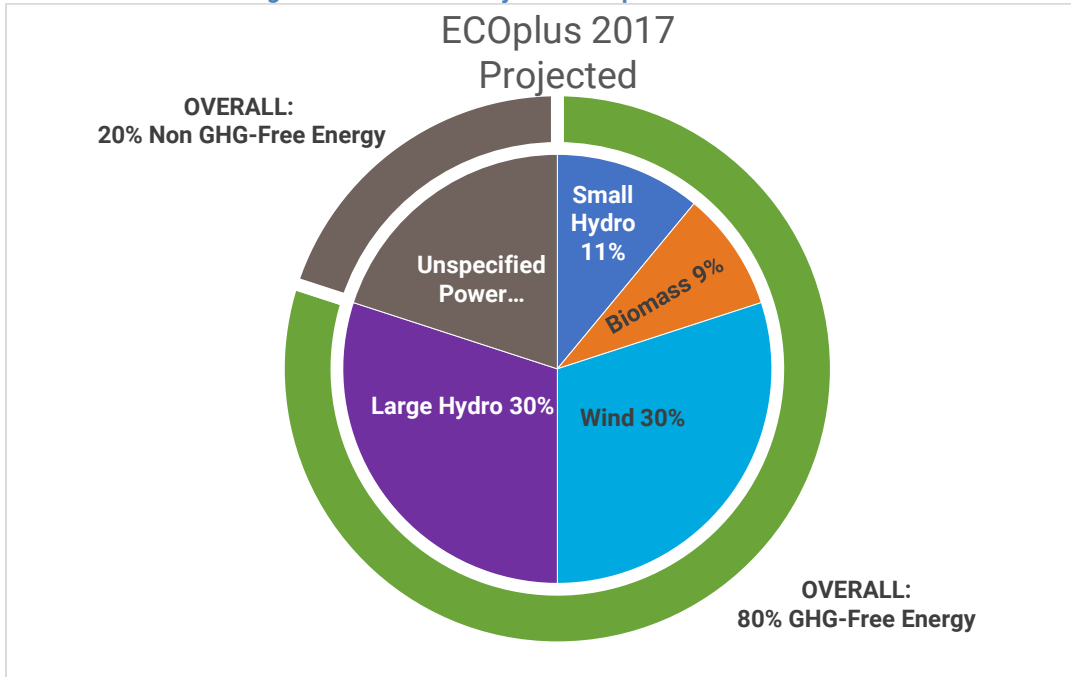
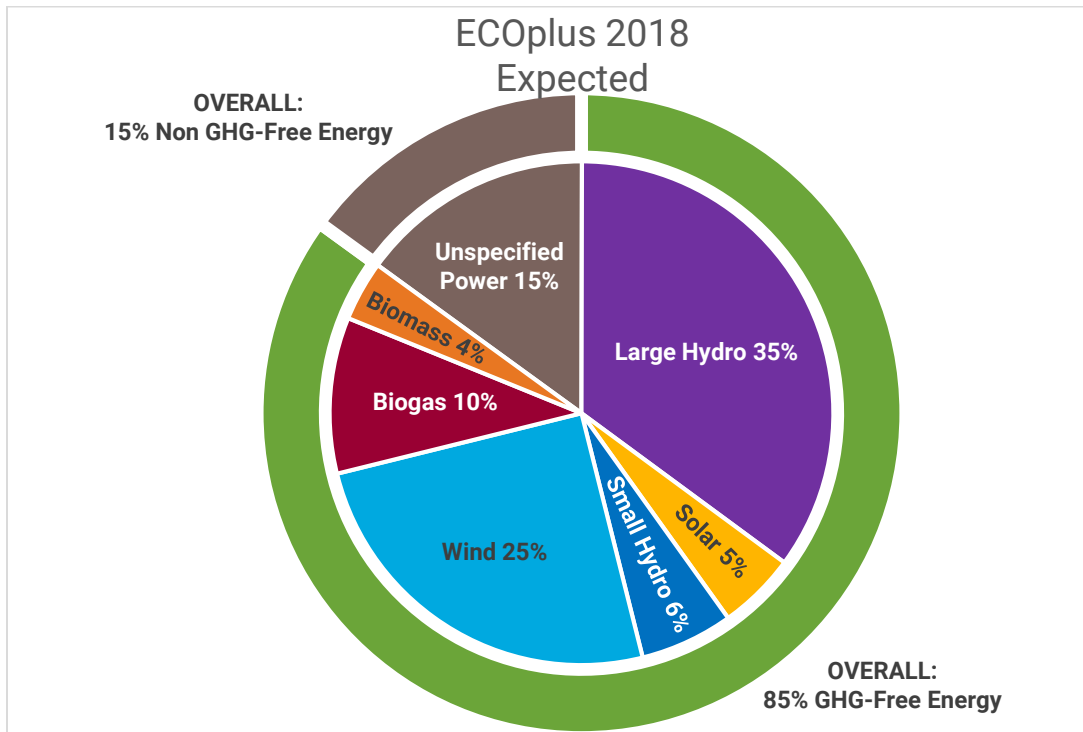
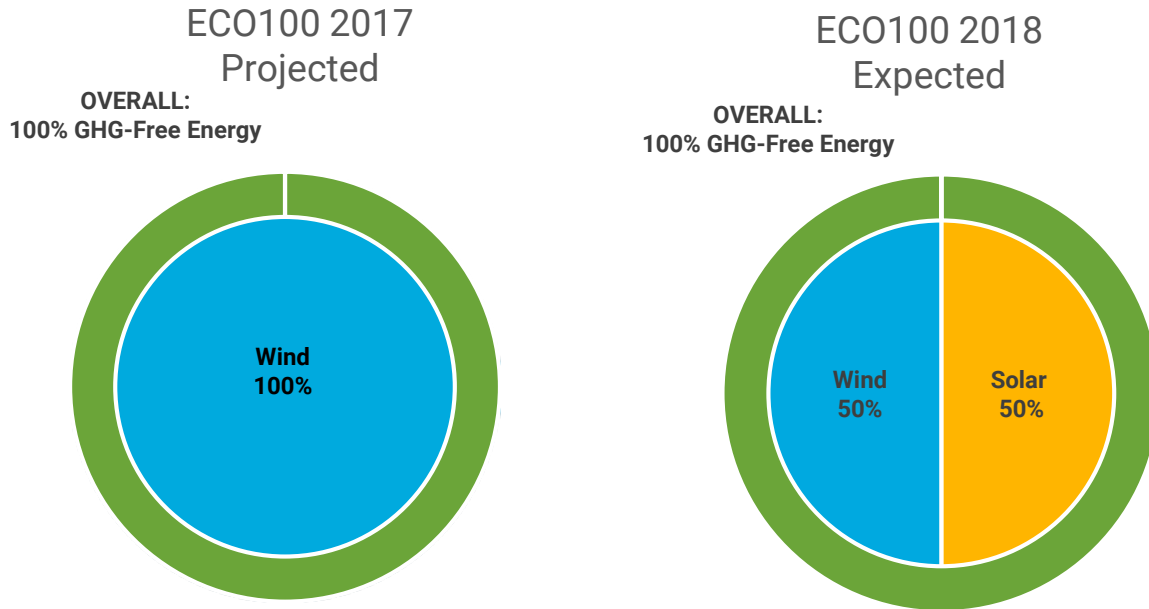


Figure 7: PCE 2018 Expected ECOplus Resource Mix



<sup>14</sup> Unspecified power refers to energy bought through the CAISO market, but not traceable to a specific source. Due to the energy mix in CA, this is primarily energy generated from the combustion of natural gas. PCE has received a small amount of power from biomass generation due to non-project specific contracts to procure RPS eligible renewable energy. PCE has not contracted specifically for energy generation from biomass sources.

Figure 8: PCE 2017 Projected and 2018 Expected ECO100 Resource Mix



## VI. Current Procurement Status

Since PCE began procuring energy in mid-2016, we have executed 18 contracts for a variety of energy products to meet PCE’s needs throughout 2017 and going forward. PCE’s contract portfolio includes a variety of suppliers, term lengths, product types, quantities, generation technologies and resource locations among other considerations. This emphasis on building a diversified portfolio of power supply sources will continue to be a cornerstone of PCE’s procurement strategy.

These contracts are summarized in Table 5 and Table 6 below and in Appendix A: Description of PCE’s Mid-2017 Resources. PCE is 100% contracted for 2017 and 87% contracted through 2018, with generally increasing open positions in later years, which will be filled gradually according to the policies and goals outlined in this plan.

Table 5: Summary of PCE Executed Power Purchase Agreements (PPAs)

Project	Counterparty	Technology	Capacity (MW)	Term	Term Length (Months)	Location
BUNDLED RENEWABLE PPAs						
Wright	Frontier	Solar	200	11/19-11/44	300	Merced County, CA
Mustang Two	Recurrent Energy	Solar	100	12/19-12/34	180	Kings County, CA
Hatchet	Hydrodynamics	Hydro	7.5	3/17-3/22	60	Shasta County, CA
Buena Vista	Leeward	Wind	38	4/17-4/22	60	Contra Costa County, CA
Shiloh	Avangrid	Wind	150	1/19-12/23	60	Solano County, CA
Karen Avenue	EDCC	Wind	11.7	7/17-6/20	36	Riverside County, CA
Roaring Creek	Hydrodynamics	Hydro	2	3/17-3/19	24	Shasta County, CA
Bidwell	Hydrodynamics	Hydro	2	3/17-3/19	24	Shasta County, CA
Cuyama	First Solar	Solar	40	1/18-12/18	12	Sant Barbara County, CA

Table 6: Summary of PCE Executed Energy Contracts

Counterparty	Term	Term Length (Months)
<b>BUNDLED RENEWABLE</b>		
Direct Energy	10/16-12/26	120
Constellation	4/17-12/18	21
Powerex	6/17-12/18	19
PG&E	5/17-12/17	8
<b>CARBON FREE</b>		
Direct Energy	10/16-12/20	51
Powerex	7/17-6/18	12
Morgan Stanley	4/17-5/18	8.5
<b>UNSPECIFIED / SYSTEM</b>		
Direct Energy	10/16-12/20	51
Constellation	4/17-12/18	21

To serve customer needs during the initial rollout periods, PCE signed a full-service contract with Direct Energy to provide the renewable energy, GHG-free energy and unspecified system power as well as capacity (resource adequacy) to meet PCE’s needs during the initial rollout period. This structure was instrumental in minimizing administrative and operational complexities at the time of PCE’s Phase 1 launch in October 2016. PCE also signed a very small 10-year contract with Direct Energy in 2016 to meet a regulatory requirement for long-term contracts based on PCE’s initial Phase 1 load.

For PCE’s Phase 2 expansion in April 2017, PCE signed a series of contracts to provide resources to PCE’s expanded customer base. These included a contract with Constellation Energy to provide a hedge for PCE’s system power, as well as contracts for GHG-free energy and renewable energy purchases.

As part of the Phase 2 expansion, PCE signed contracts to purchase all or a portion of the generation from a specific energy project in the form of a power purchase agreement (PPA). PCE also purchases renewable and GHG-free energy to meet state RPS requirements as well as internal renewable and GHG-free targets. To the extent that PCE’s energy needs are not fulfilled through the use of renewable energy or other GHG-free generating resources, it should be assumed that such supply will be sourced from system energy (consisting primarily of natural gas generating technologies) – i.e., “generic” energy purchases from the wholesale market that are not directly associated with specific generators.

### Project-Specific Power Purchase Agreements

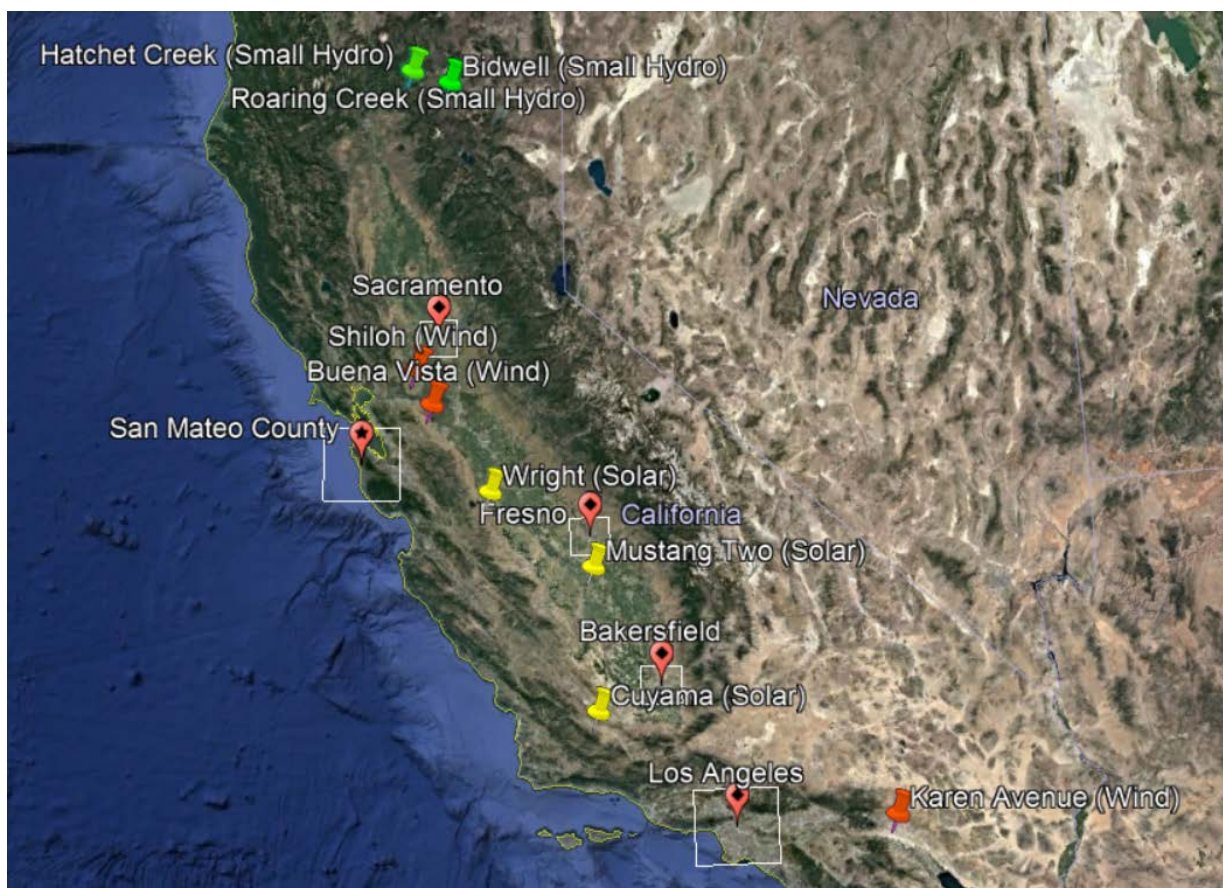
In October 2016, PCE launched a Renewables Request for Proposals (RFP) and received numerous, competitive offers from developers. The early contracts signed from this RFP emphasized near-term deliveries and relatively short tenors, primarily from existing resources. In addition, PCE has signed two long-term, renewable PPAs from this solicitation. In general, these resources will begin deliveries in the 2019-2021 timeframe and will continue delivering to PCE for 15 to 25 years.

Since inception, PCE has executed nine project-specific PPAs with RPS eligible generating sources including the following

- 3 small hydroelectric projects;
- 3 utility scale solar projects; and
- 3 wind energy projects.

We are currently receiving power from the three hydro projects and two of the wind projects. The pushpins in Figure 9 identify the locations of these nine projects throughout California.

Figure 9: Map of PCE's Project Locations



### Renewable Energy and GHG-Free Contracts

PCE has executed three contracts to provide PCC1 renewable energy to help PCE meet its RPS and voluntary renewable energy obligations in 2017 and 2018 and three GHG-free contracts to help PCE meet its GHG-free goals for 2017 and 2018. PCE has a sufficient supply of RPS-eligible renewable resources in excess of the 27% RPS requirement in 2017 and the 29% requirement in 2018. Further, PCE has procured enough renewable energy to meet its 50% voluntary target during the 2017 calendar year.

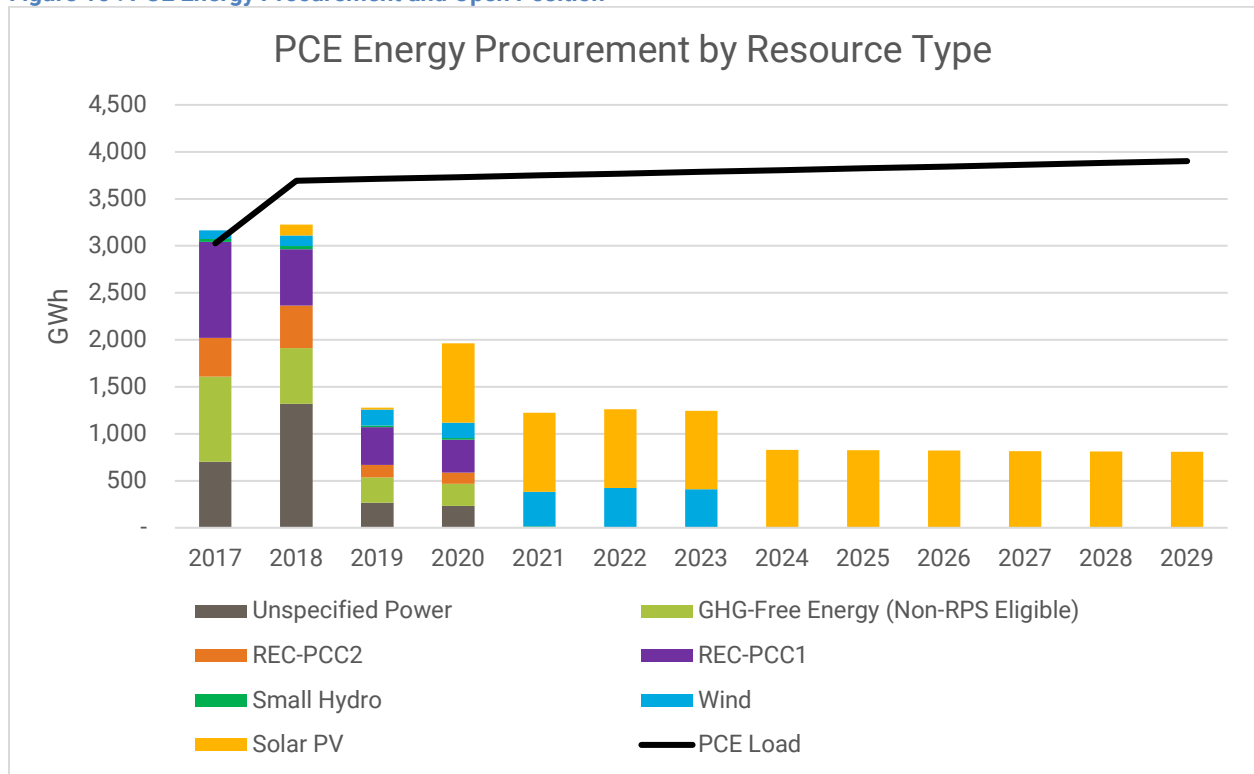
### System Energy

After accounting for renewable and GHG-free energy, the remaining energy supply is comprised of unspecified system energy purchases. This refers to energy bought through the CAISO market, but not traceable to a specific source. Within California, conventional generation generally refers to power sources that rely on the combustion of natural gas.<sup>15</sup> In the Direct Energy and Constellation contracts, PCE uses fixed prices for system energy to hedge residual market price exposure in its supply portfolio. Any remaining energy balancing will be conducted through the CAISO market via purchases and sales during the operating horizon.

## VII. Resource Needs

Beyond its current contractual commitments, PCE will procure additional energy products to ensure that the future energy needs of its customers are met in a reliable, cost-effective manner. This section sets forth PCE’s planned resource volumes and quantifies the net resource need or “open position” that remains after accounting for energy from PCE’s existing resource portfolio. Figure 10 below shows PCE’s procurement to date and open position.

Figure 10 : PCE Energy Procurement and Open Position



### Open Position

PCE manages its supply commitments with the objective of balancing cost stability and cost minimization, while leaving some flexibility to take advantage of market opportunities or

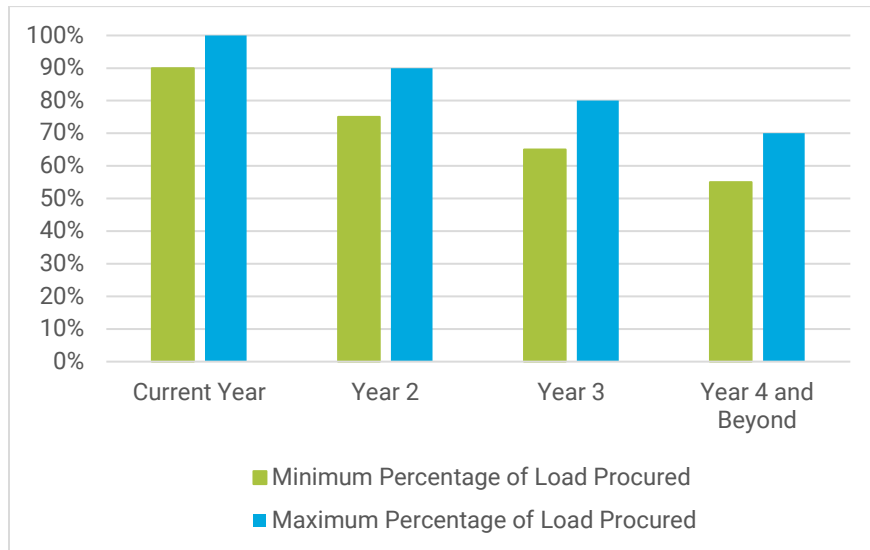
<sup>15</sup> PCE policy prohibits unit-specific purchases from coal facilities for energy or resource adequacy.

technological improvements that may arise. PCE monitors its open position separately for each RPS category, GHG-free resources, conventional resources, and on a total portfolio basis. PCE is targeting the guidelines in Table 7 and Figure 11 below to manage its open position. This will also allow us to maintain a regular procurement cycle as short and mid-term contracts end.

Table 7: PCE Open Position Guidelines

	Percentage of Load Procured	
	Min	Max
<b>Current Year</b>	90%	100%
<b>Year 2</b>	75%	90%
<b>Year 3</b>	65%	80%
<b>Year 4</b>	55%	70%

Figure 11: PCE Open Position Guidelines

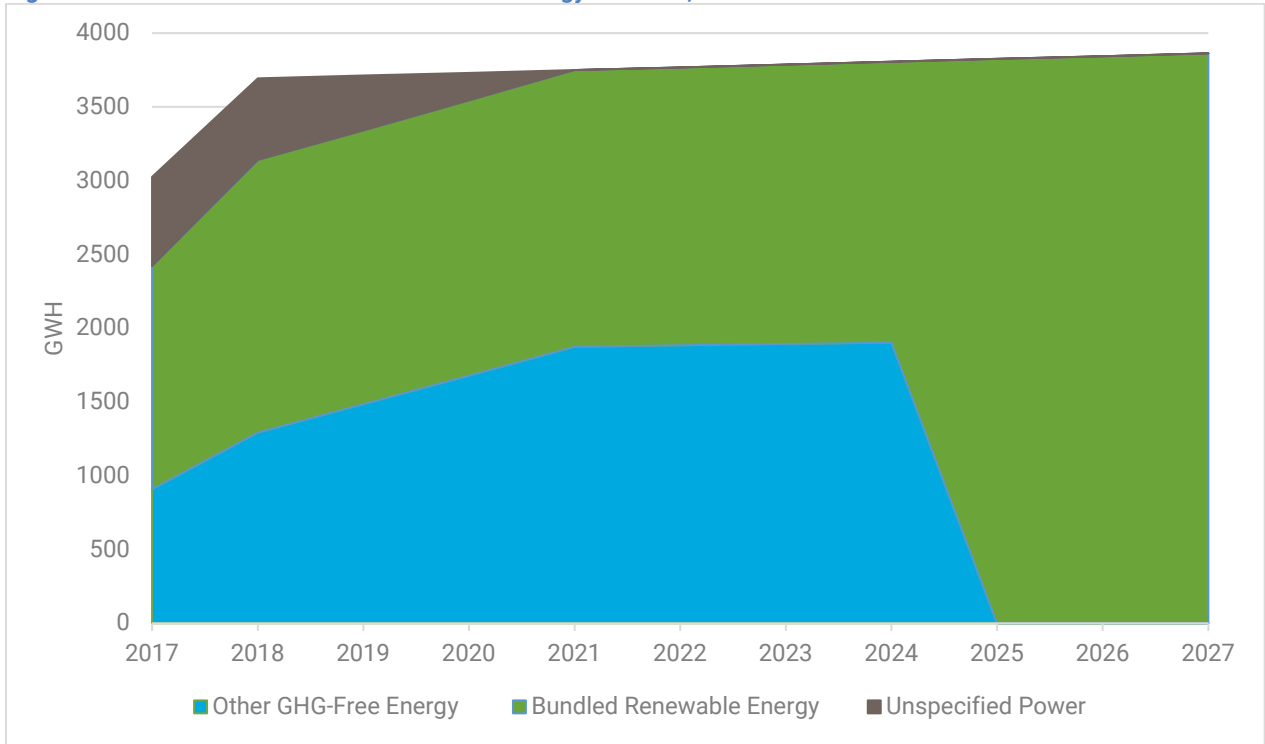


### Meeting and Exceeding California’s Renewable Portfolio Standard (RPS)

PCE meets its renewable energy requirements with a combination of RPS-eligible energy products. As Figure 12 illustrates, the proportion of PCE’s resource mix that is sourced from bundled renewable energy products will significantly increase as PCE transitions toward 100% renewable energy content in 2025.

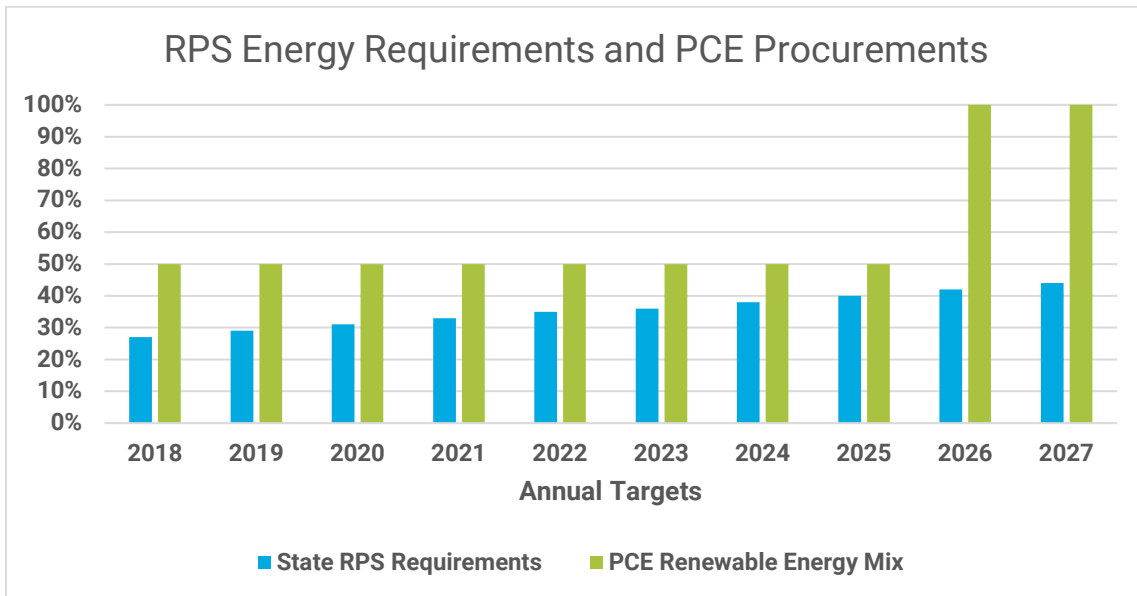


Figure 12: PCE Renewable and Non-renewable Energy Volumes, 2018-2027



Based on targeted renewable energy percentages, PCE intends to significantly outpace California’s annual RPS procurement mandates throughout the planning period. Figure 13 illustrates how PCE’s procurement targets for renewable energy compare to California’s RPS requirements, and demonstrate how PCE is procuring significantly more than required by the RPS, and greatly exceeding the state’s goals.

Figure 13: RPS Energy Requirements and PCE Procurement Targets, 2018-2027

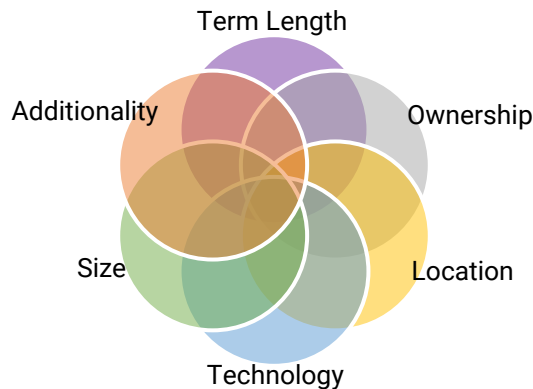


## VIII. Designing a Diverse and Balanced Portfolio

PCE’s goal is to fulfill its open position with a diverse set of contracts. PCE uses a portfolio risk management approach in its power purchasing program, seeking low cost supply as well as diversity among technologies, production profiles, project sizes, project locations, counterparties, term lengths and timing of market purchases to cost average over time, including remaining cognizant of the value of open market positions. These factors are taken into consideration when PCE engages the market and PCE has developed specific guidelines for each of these diversification factors. Figure 14 identifies the attributes PCE strives to balance in terms of diversity of its power supply. In 2018 and beyond, PCE will strive to procure resources to meet the guidelines outlined in this section. Actual procurement may differ from these guidelines, if resource availability or market conditions preclude cost-effective procurement. As this document is updated and as the market changes, these guidelines may also be updated. The primary goal is to strive to achieve a diverse portfolio that will allow us to achieve our renewable goals while managing risk.

The guidelines outlined in this section are important to help PCE meet its goals and to provide a well-balanced portfolio. PCE is focused on providing a green product to customers at rates that are at parity or lower than PG&E’s. To stay competitive and create a sustainable business, PCE is very focused on meeting the guidelines at competitive prices and will carefully evaluate any procurement decisions to ensure PCE can maintain its low rates to customers.

Figure 14: Contract Diversity Attributes



### Additionality

Additionality means that a project or activity would not have happened without the buyer. PCE is setting a guideline that we target a minimum 50% of the portfolio be procured from new projects by 2025. New means projects that PCE causes to be built or repowered. Repowered projects are typically wind energy projects where older turbines are replaced by new state-of-

the-art turbines. For a repowered facility to count towards the definition of “additionality”, it would require a significant investment for the repowering of the facility.

**Term Length**

PCE intends to fulfill the renewable portion of the portfolio with a combination of short, mid-term and longer-term contracts, which provides cost stability for the supply portfolio.

In order to effectively plan and manage its portfolio, PCE differentiates contracts by their term length as follows:

- Short-term: up to twelve months;
- Medium-term: longer than twelve months, up to five years;
- Intermediate-term: longer than five years, up to ten years;
- Long-term: longer than ten years.

As discussed above, SB 350 requires that PCE procure 65% of its RPS requirement from long-term contracts starting in 2021. Table 8 below identifies PCE’s RPS requirement during this compliance timeline and the minimum long-term contract requirement according to SB 350.

**Table 8: PCE Contract Term Length – Statutory Requirements**

	2021	2022	2023	2024	2025	2026	2027
<b>RPS Requirement</b>	35%	36%	38%	40%	42%	43%	45%
<b>Long Term Required per SB350 (%)<sup>16</sup></b>	23%	24%	25%	26%	27%	28%	29%
<b>Retail Sales (GWh)</b>	3,768	3,787	3,806	3,825	3,844	3,863	3,882
<b>Long Term Required (GWh)<sup>17</sup></b>	850	896	942	989	1,037	1,085	1,133

PCE is setting a guideline to go beyond this minimum requirement and procure at least 50% of our portfolio from long-term contracts. This will help to meet our additionality guideline above as most new projects require long-term contracts to secure financing. The remainder of our portfolio will be comprised of contracts with short, medium and intermediate term lengths. Table 9 identifies guidelines around the percentage of the PCE portfolio from contracts in each term length category by year.

<sup>16</sup> This is calculated as 65% of our RPS requirement (a statutory requirement) as identified in the row above.

<sup>17</sup> This is the GWh equivalent to 65% of our RPS requirement identified in the rows above.

Table 9: PCE Contract Term Length Guidelines

	2021	2022	2023	2024	2025	2026	2027
<b>Long Term Req'd per SB350 (%)</b>	23%	24%	25%	26%	27%	28%	29%
<b>Long Term Additional</b>	27%	26%	25%	24%	23%	22%	21%
<b>Total Long Term (&gt;10 years)</b>	50%	50%	50%	50%	50%	50%	50%
<b>Short (&lt;1 year)</b>	15%	15%	15%	15%	15%	15%	15%
<b>Medium (1-5 years)</b>	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%
<b>Intermediate (6-10 years)</b>	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%

PCE is targeting 15% of its procurement in short-term contracting to allow us to react to changes in the market price of power and provide flexibility with PCE’s load.<sup>18</sup> This also allows PCE to respond to disruptive technologies that might change the energy industry landscape.

**Project Size**

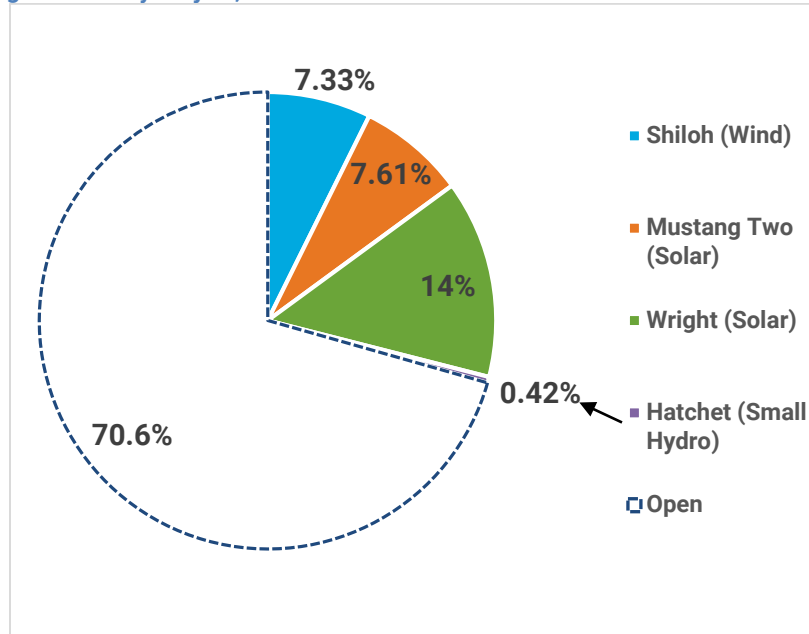
In building a diverse portfolio, PCE is focused on contracting with projects of varying sizes. We have also set a guideline to target that no one project make up more than 15% of our portfolio by GWh production at the time of contract execution as identified in Table 10 below. For reference, Figure 15 shows the percentage of our load by project in 2021. Our largest project, Wright is equal to 14% of our load.

Table 10: PCE Project Size Guidelines

Guideline
Pursue diversity of project sizes
No one project output makes up more than 15% of GWh load

<sup>18</sup> The recent fires in northern California resulted in Sonoma Clean Power losing close to 5% of its customer base. Although PCE hopes that a natural disaster does not occur here, keeping a portion of PCE’s portfolio extremely flexible mitigates this risk.

Figure 15: PCE Percentage of Load by Project, 2021



### Ownership

Diversity in ownership limits PCE’s exposure to any one company and the risk of that company going bankrupt or otherwise going out of business. PCE also wants to ensure that the counterparties we work with have sufficient experience to develop or operate the project. As indicated in Table 11 below, PCE is targeting that no more than 15% of our load is contracted with any one owner at the time of contract execution and that the counterparties PCE works with have experience developing and operating projects of similar type and size.

Table 11: PCE Project Ownership Guidelines

Guideline
No more than 15% of GWh load from any one owner
Experience developing & operating similar size projects
Financing plan and successful track record with finance organizations
Project owner is not an organization that opposes CCAs
Financially stable organization

### Resource and Technology Mix

PCE has no explicit preference for specific renewable energy technologies. However, PCE is targeting a diverse set of technologies in our portfolio as shown in Table 12 below. This will limit our exposure to any one manufacturer and will help to meet our goal of matching our supply portfolio to our load profile. To support this, PCE is targeting to procure no more than 20-25% of our load from any one manufacturer. This will help mitigate risk that one manufacturer has a problem with their solar modules or wind turbines, or goes out of business.

Table 12: PCE Resource and Technology Mix Guidelines

Guideline
Procure from diverse set of technologies to match supply to load
No more than 20-25% of load from any one manufacturer

**Location**

PCE considers a number of factors to manage risk with regard to a project’s location. First, PCE considers the cost to transmit the energy from the project location to the PCE service territory. This transmission cost evaluation, which uses historical prices of energy as well as future price projections, is known as congestion analysis.

We also want to identify projects that help to meet our goal of 100% renewable energy by 2025 and to match our generation portfolio to our load on a time coincident basis. For some renewable energy resources, the type of resource and location can affect the projected generation profile. We will evaluate this generation profile alongside our other guidelines to determine whether a project could help to fill a hole in our generation profile.

In consideration of these goals, PCE is setting the guidelines identified in Table 13 with regard to project location.

Table 13: PCE’s Project Location Guidelines

Guideline
Prioritize projects / locations to minimize congestion pricing
No more than 15% of load from one LMP <sup>19</sup> / interconnection point
Supports PCE’s Sustainable Workforce Policy
Evaluate environmental impacts
Prioritize projects that help to match supply to load

**Procurement Methods**

PCE may use a variety of methods to contract for power, including competitive solicitations and bilaterally negotiated agreements. Through a competitive solicitation, PCE issues an RFP and evaluates multiple proposals in the context of market conditions before entering negotiations with those respondents that provide the most compelling offers. Occasionally, PCE will issue ad hoc competitive solicitations or engage in independent bilateral negotiations to meet specific resource needs. Alternatively, particularly in markets with sufficient transparency to

<sup>19</sup> LMP refers to “Locational Marginal Price”, a term used by the California Independent System Operator (CAISO) to price electricity deliveries into the California grid based on the location of that project.

ensure competitive outcomes, PCE may negotiate short-term transactions via its scheduling coordinator or independent energy brokers or marketers. Such markets may include:

- i. System energy at defined CAISO trading hubs for defined (e.g. peak, off-peak, baseload, shaped, or custom) products;
- ii. Short-term RA capacity.

### RA Purchases

PCE primarily procures RA in two ways:

- Bilateral contracts with counterparties, after sending out a request for competitive proposals to companies that may have RA products to offer.
- PCE receives the resource adequacy value/benefit from several of its renewable energy contracts. For example, PCE receives a small amount of RA from the Karen Avenue Wind and the Buena Vista Wind projects.

## IX. Developing Local Resources

The PCE Board has set a target to develop 20 MW of new power projects in San Mateo County by 2025. PCE has an ongoing net energy metering program, as described below. Additionally, PCE staff is currently working to establish criteria and specific program parameters to guide further local development.

### Net Energy Metering (“NEM”)

PCE solar customers can enroll in the Net Energy Metering (NEM) program. NEM is a special billing arrangement that allows customers with solar PV systems to get the full retail value of the electricity their system generates. A special meter tracks the difference between the amount of electricity a customer’s solar panels produce and the amount of electricity the customer uses during each billing cycle. When the panels produce more electricity than is being used, customers receive a credit on their bill.

In PCE’s NEM program (as contrasted with PG&E’s NEM program):

- Energy consumption is reconciled monthly vs. annually;
- Surplus electricity produced monthly is credited at \$0.01/kWh above the retail value (equivalent to the ECO100 generation rate);
- Excess generation credits are never discounted; customers are always compensated at the full retail generation rate;
- Credits roll over each month helping to offset any generation charges throughout the year; and
- PCE issues customers a check yearly after the April billing cycle for any unused credits over \$100 (if less than \$100, credits roll over).

PCE currently has approximately 11,000 customer accounts representing 70 MW enrolled in its NEM program. PCE is dedicated to encouraging customers to generate their own renewable energy via rooftop solar. Through its NEM program, PCE offers a compelling incentive to promote customer-sited distributed generation within its service area. From PCE’s launch

through June 2017, for example, PCE NEM customers were offered over \$300,000 in NEM credits.

### New Program Development

During the next several years, PCE plans to evaluate and develop local renewable energy projects and complementary programs to serve PCE's customers. PCE is following a structured approach to identify worthy projects to pursue, including weighing them against a standard set of criteria. Selection criteria may include:

1. Projected GHG emissions reductions
2. Cost effectiveness
3. Number of customers served
4. Geographic diversity in San Mateo County communities served
5. Supports PCE's workforce policy
6. Helps PCE match supply to load
7. Implementation cost to PCE (staff and \$)
8. Contributes toward procurements goals of:
  - a. Creating 20 MW of new local power by 2025
  - b. 100% GHG-free power for 2021
  - c. 100% renewable energy by 2025
9. Benefits disadvantaged communities
10. Innovative, scalable, and replicable
11. Supports community resilience
12. Fills a gap in current utility offerings

PCE will be evaluating local programs during FY17-18 and possibly launching some pilot programs during that time. Full rollout of programs will occur in future years. Possible programs might include energy storage, electric vehicle programs, or demand response. Currently the San Mateo County Office of Sustainability administers some energy efficiency programs in PCE territory. PCE plans to work closely with the Office of Sustainability before considering any additional energy efficiency programs.



## Appendix A: Description of PCE’s Mid-2017 Resources

The following generation resources are listed in the same order as in Table 5 and Table 6, in descending order of contract term length, ranging from 25 years to six months. Table 14 below summarizes how each of these projects contributes towards our aforementioned diversity goals.

Table 14: PCE’s Executed Contracts and their Diversity Metrics

Generation Resource	Term Length	Ownership	Location	Technology	Size	Additionality	Legend
Wright							Meets all Guidelines
Mustang							Meets all Guidelines
Direct Energy							Meets Some Guidelines
Hatchet Creek							Meets Some Guidelines
Buena Vista							Not Applicable
Shiloh							Not Applicable
Karen Avenue							Not Applicable
Roaring Creek							Not Applicable
Bidwell Ditch							Not Applicable
Constellation							Not Applicable
Cuyama							Not Applicable
PG&E							Not Applicable
Powerex							Not Applicable
Morgan Stanley							Not Applicable

**Wright Solar Park** is a new 200 MW solar photovoltaic facility located in Merced County, CA less than 100 miles from San Mateo County. Under this PPA, the project will deliver over 500,000 MWh annually to PCE for 25 years beginning in 2019. The energy produced by the facility will count towards PCE’s PCC1 targets. The project is expected to create over 350 regional union jobs (about 650 job-years) during the construction period in 2018-2019.

**RE Mustang Two** is a new 100 MW solar photovoltaic facility located in Kings County, CA. Under this PPA, the project will deliver approximately 300,000 MWh annually to PCE for 15 years beginning in 2020. The energy produced by the facility will count towards PCE’s PCC1 targets.

**Direct Energy** provides load scheduling coordinator services as well as system energy, GHG-free energy, renewable energy and capacity through 2020. Following PCE’s launch in October 2016, the Direct Energy agreement provided for all of PCE’s resource requirements. The proportion of energy deliveries from this Direct Energy contract will diminish as PCE incrementally augments its resource portfolio with a diverse mix of other power suppliers.

**Hatchet Creek** is a 7.5 MW small hydro facility located in Shasta County, CA. The project began deliveries to PCE in March 2017, and will continue deliveries through March 2022. Annual

deliveries are about 16,500 MWh per year. The energy produced by the facility counts towards PCE's PCC1 targets.

**Buena Vista** is a 38 MW wind facility located in Contra Costa County, CA, in the Altamont Pass. The project began delivering renewable wind energy to PCE in April 2017, and will continue for 5 years through April 2022. Deliveries to PCE are about 90,000 MWh per year. The energy produced by the facility counts towards PCE's PCC1 targets. The project was repowered in December 2006 by replacing the original turbines with new and bigger turbines.

**Shiloh** is a 150 MW wind facility located in Solano County, CA. The project will start delivering energy to PCE on January 1, 2019, and will continue for five years through December 2023. Peninsula Clean Energy has contracted for an increasing capacity of Shiloh over the term, receiving a total of about 400,000 MWh over the five years. The energy produced by the facility will count towards PCE's PCC1 targets. The project started operating in 2006.

**Karen Avenue** is an 11.7 MW wind facility located in Riverside County, CA. PCE started receiving energy from this project on July 1, 2017 and will receive an average of 17,300 MWh in annual energy deliveries for three years through June 2020. The energy produced by the facility counts towards PCE's PCC1 targets. The project started operating in 1985.

**Roaring Creek** is a 2 MW small hydro facility located in Shasta County, CA. The project began delivering renewable energy to PCE in March 2017, and will continue for two years through March 2019. Annual deliveries are about 5,600 MWh per year. The energy produced by the facility counts towards PCE's PCC1 targets.

**Bidwell Ditch** is a 2 MW small hydro facility located in Shasta County, CA. The project began delivering renewable energy to PCE in March 2017, and will continue for two years through March 2019. Annual deliveries are about 11,000 MWh per year. The energy produced by the facility counts towards PCE's PCC1 targets.

**Constellation** has a two-year contract with PCE that delivers both conventional energy and PCC 2, bundled renewable energy to PCE. Constellation started delivering energy to PCE in 2017 during which PCE was transitioning from serving a portion of San Mateo County to all of San Mateo County. Over the course of the contract, Constellation will deliver around 550,000 MWh of bundled renewable energy.

**Cuyama** is a 40 MW solar photovoltaic facility located in Santa Barbara County, CA. PCE has entered into a one-year contract starting on January 1, 2018, during which the Cuyama facility will deliver around 115,000 MWh. The energy produced by the facility will count towards PCE's PCC1 targets.

**PG&E** has a one-year contract with PCE that started delivery in mid-2017. This contract counts towards PCE's PCC1 targets.

**Powerex** has a two-year contract with PCE that delivers both PCC 1 bundled renewable energy and GHG-free energy. Powerex started delivery to PCE in 2017

**Morgan Stanley** has a one year contract to deliver GHG-free energy in 2017 and 2018.

## Appendix B: List of Acronyms

AB	Assembly Bill
CAISO	California Independent System Operator. A non-profit organization that operates the California electric grid.
CCA	Community Choice Aggregation or Aggregator
CCE	Community Choice Energy
CdTe	Cadmium Telluride. A specific type of solar panel technology.
CEC	California Energy Commission. California's primary energy policy and planning agency.
CPUC	California Public Utilities Commission. A government agency that regulates services and utilities.
FY	Fiscal Year
GHG	Greenhouse Gas. An atmospheric gas produced by combustion of fossil fuels that is known driver of climate change.
GWh	Gigawatt-Hour. A unit of measurement for energy equal to 1000 Megawatt-hours.
IOU	Investor Owned Utility. A utility with shareholders such as Pacific Gas and Electric Company.
IRP	Integrated Resource Plan
kWh	Kilowatt-Hour. A unit of measurement for energy.
LMP	Locational Marginal Price. A location-specific price for a Megawatt-hour of energy
LSE	Load Serving Entity. An entity whose responsibility is supplying energy to a group of customers.
MW	Megawatt. A unit of measurement for power.
MWh	Megawatt-hour. A unit of measurement for energy equal to 1000 kilowatt-hours.
NEM	Net Energy Metering. A program in which self-generators of electricity can sell energy back to the grid.
PCC	Portfolio Content Category. A classification mechanism used under the Renewable Portfolio Standards to distinguish between different types of renewable energy.
PCE	Peninsula Clean Energy. Community Choice Energy Program for San Mateo County and the default electricity provider for San Mateo County.
PCL	Power Content Label. A state-mandated customer communication tool that informs customers about the energy mix supplied to them by their electricity provider.
PG&E	Pacific Gas and Electric Company. The investor owned utility that was previously San Mateo County's Official electricity provider.
PPA	Power Purchase Agreement. A legally binding agreement between a buyer and a seller of electricity for energy.
RA	Resource Adequacy. A CPUC mandated program designed to provide sufficient resources for the California grid and to provide incentives for the construction of new resources.
REC	Renewable Energy Certificate. A tradable certificate that represents proof that one megawatt-hour of electricity was produced by a renewable energy source and fed into the electric grid.
RFP	Request for Proposal
RPS	Renewable Portfolio Standard. A state mandated program that sets rules for renewable energy targets and goals.

SB	Senate Bill
SMC	San Mateo County
WECC	Western Electricity Coordinating Council. A non-profit organization whose mission is to ensure a reliable electric grid in the geographic area known as the Western Interconnection.