



City of Palo Alto

Utilities Advisory Commission Staff Report

(ID # 11003)

Report Type: Agenda Items**Meeting Date: 2/5/2020****Council Priority: Climate/Sustainability and Climate Action Plan****Summary Title: Carbon Neutral Plan Update & RPS Compliance Strategies**

Title: 2. Staff recommends that the Utilities Advisory Commission (UAC) recommend that the Council adopt an amendment to the Carbon Neutral Plan

From: City Manager**Lead Department: Utilities****RECOMMENDATION**

Staff recommends that the Utilities Advisory Commission (UAC) recommend that the City Council adopt an amendment to the Carbon Neutral Plan (as shown in Attachment A) to 1) switch to an hourly carbon emissions accounting methodology using average hourly grid emissions factors to define “carbon neutrality” rather than the current annual accounting methodology, and 2) if needed, permit the use of unbundled RECs to neutralize any emissions resulting from the difference between emissions calculated under an annual accounting and hourly accounting methodology.

REQUEST

Staff seeks additional UAC feedback on a staff proposal to pursue a portfolio management strategy of selling CPAU’s California-based renewable energy (i.e., Bucket 1 RECs) which is not needed for RPS compliance, and replacing it with lower-cost renewable energy generated outside of California (Bucket 3 RECs)¹. Staff will refer to this strategy in the report as the “Renewable Exchange” strategy. Staff estimates that this policy could free up over \$3M per

¹ State law has established three different categories or “buckets” of renewable energy products—and sets limits on the degree to which a utility can rely on the less preferred categories to fulfill their RPS requirements. The first category (Bucket 1), the most preferred one, encompasses all renewable energy that is delivered into the California grid as it is generated. The second type of renewable energy (Bucket 2) consists of renewable energy generated out-of-state that is used by the out-of-state grid as it is generated, and then later an equal amount of energy from a different resource is delivered into the California grid. This type of arrangement is referred to as “firming and shaping” the resource’s output. The third category of renewable energy (Bucket 3) is the state’s least preferred one, and also the least expensive to procure. Bucket 3 encompasses all sales of RECs without any associated energy. In these “unbundled REC” transactions, the energy is generated and consumed (usually out-of-state) but the RECs are sold separately to a California utility. Technically Bucket 3 RECs can be located in California, but virtually all Bucket 3 RECs are generated outside the state.

year for sustainability efforts that benefit electric ratepayers, without raising rates or increasing carbon emissions of the electric portfolio. The UAC was interested in continuing to explore this proposal when it was discussed at its August 2019 meeting, and staff wishes to continue this discussion and provide an update based on the feedback it has since received on the idea from community stakeholders.

EXECUTIVE SUMMARY

This report is a follow-up to reports presented on the same topics in [August 2019](#), [June 2019](#), and [May 2019](#). Together, these reports satisfy Initiatives #4 and #5 of the City's 2018 [Electric Integrated Resource Plan \(EIRP\)](#)², which Council approved in December 2018.

This report goes into some detail on the background behind the adoption of the City's current policies related to carbon accounting and RPS procurement. It then summarizes the UAC's recent discussions on carbon emissions accounting methodologies and describes the hourly accounting approach that the UAC unanimously supported in August 2019 and the implications of switching to this approach for the Carbon Neutral Plan.

The report then describes several different RPS procurement strategies that the UAC has discussed in recent months—along with the financial impact to the utility of changing from its current RPS compliance strategy. Also presented are the implications for the City's carbon emissions reporting obligations associated with these RPS compliance strategy options. For now, staff recommends the approach where the City sells all renewable energy supplies that exceed its load (even if this yields a small residual emissions total under the hourly carbon accounting methodology), while seeking additional feedback and discussion on selling even more renewable energy than that and replacing it with Bucket 3 RECs (the Renewable Exchange strategy). The recommended strategy results in an average annual savings of \$2.3 million per year over the next eleven years (or about 0.27 cents/kWh, equivalent to a 1.5% rate change). The Renewable Exchange strategy, selling renewable energy in excess of state RPS requirements, merits more discussion and analysis, but could free up an additional \$1.0 million per year to devote to carbon reduction programs that benefit electric ratepayers over the next twelve years without increasing portfolio carbon emissions.

BACKGROUND

Over the past two years, staff has shared numerous presentations with the UAC related to the electric supply portfolio in the course of developing and implementing the 2018 [Electric Integrated Resource Plan \(EIRP\)](#). In the course of these discussions, UAC commissioners have clearly articulated two points. First, the UAC would like staff to pursue a supply portfolio that

² Initiative #4 of the Work Plan called for staff to evaluate the carbon content of the electric supply portfolio using hourly grid emissions intensity data, to consider the merits of buying carbon offsets to ensure the carbon content of the cumulative hourly portfolio is zero on an annual basis, and to reevaluate the manner in which the City communicates with customers about the carbon content of the electric portfolio. Initiative #5 of the Work Plan called for staff to investigate the merits of monetizing the City's excess renewable energy supplies in order to minimize the cost of maintaining an RPS compliant and carbon neutral electricity supply portfolio.

minimizes total cost to customers, while also minimizing carbon emissions. While in the past the City’s goal was to increase the amount of renewable energy in its portfolio (its RPS level), the fact that City has reached carbon neutrality has led the UAC to recommend pursuing a policy of maintaining carbon neutrality while calculating the portfolio’s carbon impact based on hourly and seasonal grid emissions.

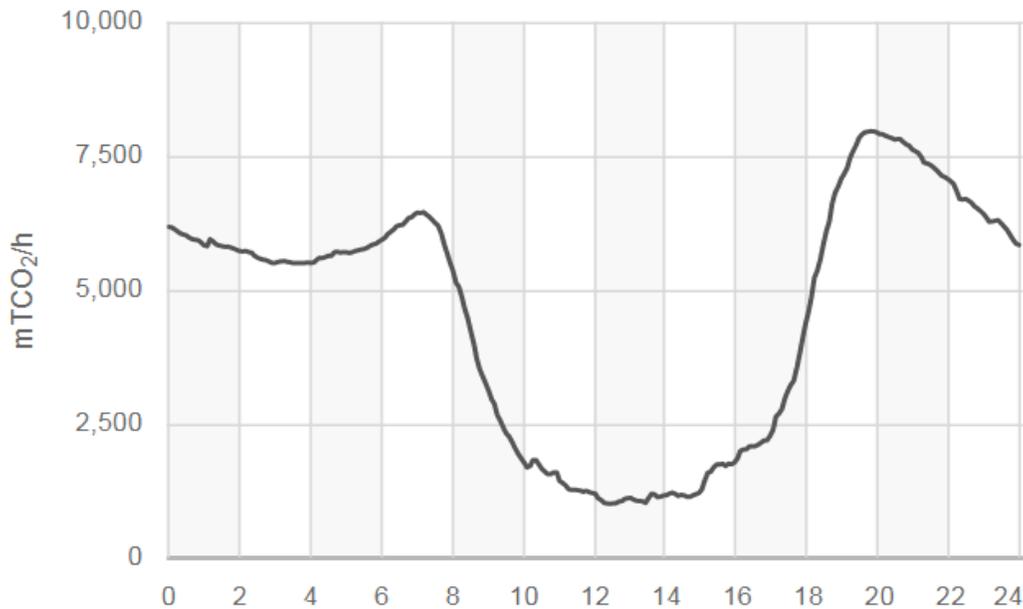
And second, the UAC wants staff to communicate with the public about the supply portfolio in a manner that is both accurate and accessible. Initial discussion on this topic occurred in [June](#) and [September](#) 2018 during discussions of the EIRP. A more in-depth discussion of this topic also occurred in May 2019 during discussion of carbon accounting methodologies for the City’s electric portfolio.

The May 2019 report also described a new accounting methodology being proposed by California Energy Commission (CEC) staff for quantifying emissions on Power Content Labels (PCLs) starting in 2021.³ Staff described the communications challenges that could result if the City adopts an accounting methodology that is at odds with the methodology used on the PCLs that are sent to customers every year. However, the UAC expressed a clear preference for employing an accounting methodology that most accurately represents the carbon emissions of the electric portfolio, even if it results in the reporting of two different portfolio emissions totals in some years.

When the [Carbon Neutral Plan](#) (Attachment A) was approved by Council in March 2013 ([Staff Report 3550](#), [Resolution 9322](#)), carbon neutrality was defined as a portfolio that “will demonstrate annual net zero greenhouse gas (GHG) emissions, measured at the Citygate, in accordance with The Climate Registry’s Electric Power Sector protocol for GHG emissions measurement and reporting.” In effect, this means that the City’s carbon neutral supplies (in megawatt-hours (MWh)) would be compared with the City’s total load on an annual basis, and if they equal or exceed the load then the City’s electric supply would be deemed to be carbon neutral. At the time, this accounting methodology was considered to be the most accurate accounting methodology that could be achieved—or needed. This was in part because in 2013 there was very little solar generation connected to the California Independent System Operator (CAISO) grid, and therefore the grid’s average emissions factors did not vary in the extreme manner that they do today—for example, as in the emissions rate chart shown in **Figure 1** below, for CAISO emissions on March 16, 2019. But, more practically, CAISO did not begin to publish grid emissions factor data with sub-annual granularity until 2018, and therefore a more granular accounting methodology was not feasible at that time.

³ The modifications to the Power Content Label were originally supposed to take effect in 2020, for the PCLs that report on 2019 supplies. However, in late 2019 the CEC announced a one-year delay in this implementation schedule.

Figure 1: CAISO Average CO₂ Emissions Rates for March 16, 2019



The City also has an RPS procurement policy separate from the Carbon Neutral Plan—the City first adopted an RPS target in 2002, and has updated its procurement policies numerous times since then, most recently in response to state RPS mandates. In pursuing these RPS procurement policies, the City has achieved its current RPS levels, which substantially exceed state-mandated levels. In fact, due to the procurement of long-term renewable supplies and long-term permanent load reductions experienced in recent years, RPS-eligible energy supplies (all supply sources other than large hydroelectric) currently represent more than 60% of retail energy sales, and combined with the City’s large hydro generation, total renewable and carbon free energy is approximately 111% of load in an average hydro year.

DISCUSSION

At the May and June 2019 UAC meetings, staff and the UAC discussed a wide range of potential changes to the City’s carbon accounting methodology and renewable energy procurement strategy. Subsequently, at the August 2019 meeting, staff and the UAC held a more thorough discussion of a narrower set of RPS compliance strategy options. At the August meeting, Commissioners expressed a consensus opinion that the City should switch its carbon accounting methodology to one based on hourly average emissions factors, and that the City should begin to sell some of its excess RPS supplies. The objective of this report is to seek a formal recommendation that Council codify the carbon accounting methodology change, and to seek further clarification around the recommended magnitude of RPS supplies to sell.

Carbon Neutral Plan Amendment: Carbon Accounting Methodology Change

In the May and June 2019 UAC reports on carbon accounting, staff presented six potential accounting methodologies. After thorough discussion of these options, a consensus among Commissioners emerged at the August 2019 meeting around one of them: Hourly Accounting

Method #1 (Method C). This approach entails an hourly comparison of the City’s supplies and load, with each hourly net load/supply value assigned the average hourly carbon emissions intensity of the CAISO grid to convert it to an hourly emissions total that the City’s electric portfolio is responsible for. These hourly emissions totals (which can be positive or negative, depending on whether or not the City’s load exceeds its carbon neutral supplies for that hour) would then be summed across the hours in a year. In addition, unbundled REC purchases *would* be permitted under this approach as a means to neutralize the carbon content of generic market energy purchases made to satisfy the City’s load.

To codify this change, staff requests that the UAC recommend that Council amend the Carbon Neutral Plan definition of carbon neutrality such that the electric portfolio “demonstrate annual net zero greenhouse gas (GHG) emissions, measured at the Citygate, by applying the average hourly carbon emissions intensity of the electricity on the CAISO grid to the City’s net load for each hour of the year.” The Plan would be further amended to note that unbundled RECs may be purchased to neutralize residual emissions that result from the use of an hourly carbon accounting methodology, and to make other minor updates. (See Attachment A for the proposed edits to the Carbon Neutral Plan.)

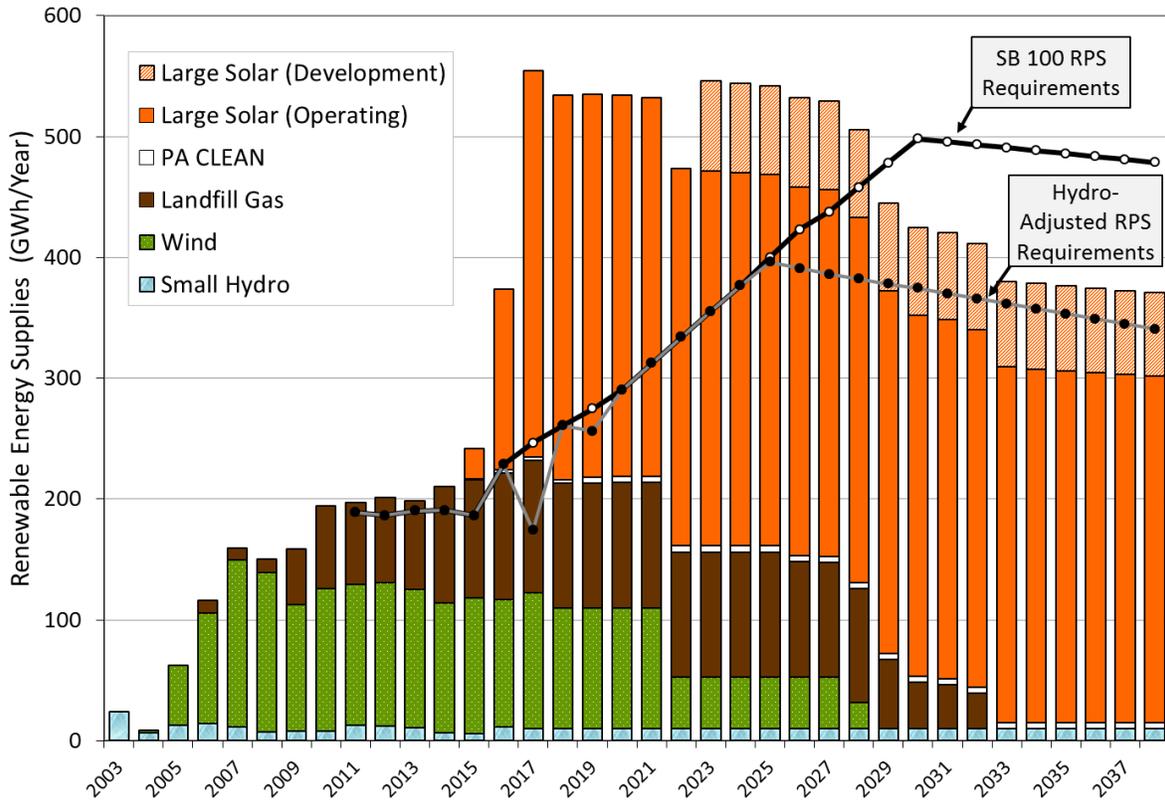
While this methodology will hold the City’s supply portfolio up to the strictest standard of emissions reporting (and would differ from the annual accounting methodology being proposed by the CEC for use in reporting emissions totals on a utility’s annual Power Content Label), the cost impact will be relatively small. Staff estimates that the impact of switching to this hourly carbon accounting methodology would result in an increase in supply costs of approximately \$60,000 in an average hydrological year due to the use of unbundled RECs to maintain carbon neutrality under the hourly accounting methodology. This approach corresponds to Strategy (b) described in the following section, below. Use of California-based, Bucket 1 renewable supplies (instead of unbundled RECs) would increase annual supply costs by roughly an additional \$700,000 per year in an average hydrological year. This approach would correspond to Strategy (a) in the following section, below.

Sales of Surplus RPS Supplies

Since the adoption of its first RPS target in 2002, the City has consistently maintained an RPS procurement goal that exceeds the statewide RPS mandate level, all while remaining under the City’s \$0.5 cent/kWh rate impact limit for renewables purchases. **Figure 2** illustrates the growth in the City’s RPS supplies over the past 15 years and how these supplies compare to the statewide RPS requirements.⁴ For calendar year (CY) 2018, the City’s actual RPS level was 63.9%—more than twice the state’s RPS requirement for that year of 29%.

⁴ Note that the state’s RPS procurement legislation, Senate Bill 100, includes a provision that exempts municipal utilities from meeting the RPS requirement level in years when the utility has received greater than 40% of its retail sales from large hydro generation contracts that were effective as of January 1, 2018. Thus Figure 2 includes a “hydro-adjusted RPS requirement” line, showing the volume of renewable supplies that the City would need to comply with SB 100 if it retains its existing hydro supplies, including renewing the Western contract in 2025.

Figure 2: Palo Alto's RPS Supplies and Procurement Requirements



In addition to exceeding statewide RPS procurement requirements, the City’s renewable supply portfolio is also composed entirely of higher-value in-state resources—where the environmental attribute (a Renewable Energy Certificate or “REC”) is “bundled” with the energy produced by the resource. In contrast, the state’s RPS regulations⁵ allow utilities to satisfy a portion of their procurement requirement (up to 10% of it) with lower cost out-of-state resources.

The June 2019 UAC report presented a fairly broad range of potential RPS strategies that the City could pursue—some of which would significantly increase the City’s electric supply costs, and others that would significantly decrease it. After a thorough discussion of these options at the June and August UAC meetings, a consensus opinion emerged among Commissioners that the City should begin selling some of its excess RPS supplies—although there was still significant debate about the extent to which the City should pursue such sales. At this point there appear to be three different options under consideration:

- a) *Sell Supplies That Exceed Load—and That are Not Needed to Maintain Carbon Neutrality:* Under this approach, staff has been selling off the renewable resources that exceed the City’s annual load—provided that those resources would not be needed to maintain a carbon neutral supply portfolio as determined using an hourly accounting

⁵ See Sec. 399.16(c)(2) of Public Utilities Code, and Sec. B(4) of the City’s Renewable Portfolio Standard Procurement Plan (2018).

methodology. Staff's carbon accounting analysis for calendar year 2018 indicates that the City will likely need to maintain an overall surplus of about 40,000 Bucket 1 RECs (4.5% of the City's total load) in order to maintain a Carbon Neutral portfolio under an hourly carbon accounting approach, without resorting to purchasing additional Bucket 3 RECs. Staff's analysis of this approach shows that it will generate cost savings while maintaining carbon neutrality (based on hourly carbon accounting), and there was unanimous support at the August meeting for pursuing this option.

- b) *Sell Supplies Exceeding Load*: This approach is similar to the first approach, except staff would sell off *all* renewable resources that exceed the City's annual load—even if doing so would result in a supply portfolio with net positive annual emissions, as determined using an hourly accounting methodology. (The resulting residual emissions—which staff estimates would be roughly 16,000 MT CO₂, or 42 lb CO₂/MWh, on average over this period—would then be neutralized using the Carbon Neutral Plan provision enabling staff to purchase unbundled RECs.) Staff recommends pursuing this slightly more aggressive procurement strategy, given that it is expected to yield a savings of an additional \$0.62 million per year relative to the first approach. Like the first option, this approach would also yield a Power Content Label that shows only RPS-eligible and hydroelectric supplies.
- c) *Sell Supplies Exceeding RPS Requirement (the "Renewable Exchange" strategy)*: Under this approach, the City would sell off all of its currently contracted renewable resources that exceed the state's RPS requirement level (not just those that exceed its load).⁶ The City would also "bucket swap," essentially trading its California-based renewable energy (associated with Bucket 1 RECs) for out of state renewable energy (associated with Bucket 3 RECs), to the extent allowable under the state's RPS regulations. This approach is similar to the "Minimally Compliant" approach discussed at the June 2019 UAC meeting, except the City would not apply its stock of excess RPS supplies that it has built up since 2010⁷ toward its RPS requirements in future years. The Renewable exchange strategy is expected to yield a savings of an additional \$1.70 million per year relative to the first approach. The residual emissions that this approach would yield (which would need to be neutralized with additional unbundled RECs) are estimated to be roughly 50,000 MT CO₂, or 131 lb CO₂/MWh.

At the August 2019 UAC meeting, Commissioners confirmed that the "Carbon Neutral Every Hour" approach and the "Minimally Compliant" strategy should no longer be considered. However, there appeared to be a fair amount of interest in pursuing the "Renewable Exchange" approach, in spite of the fact that this approach would result in having to report "Unspecified

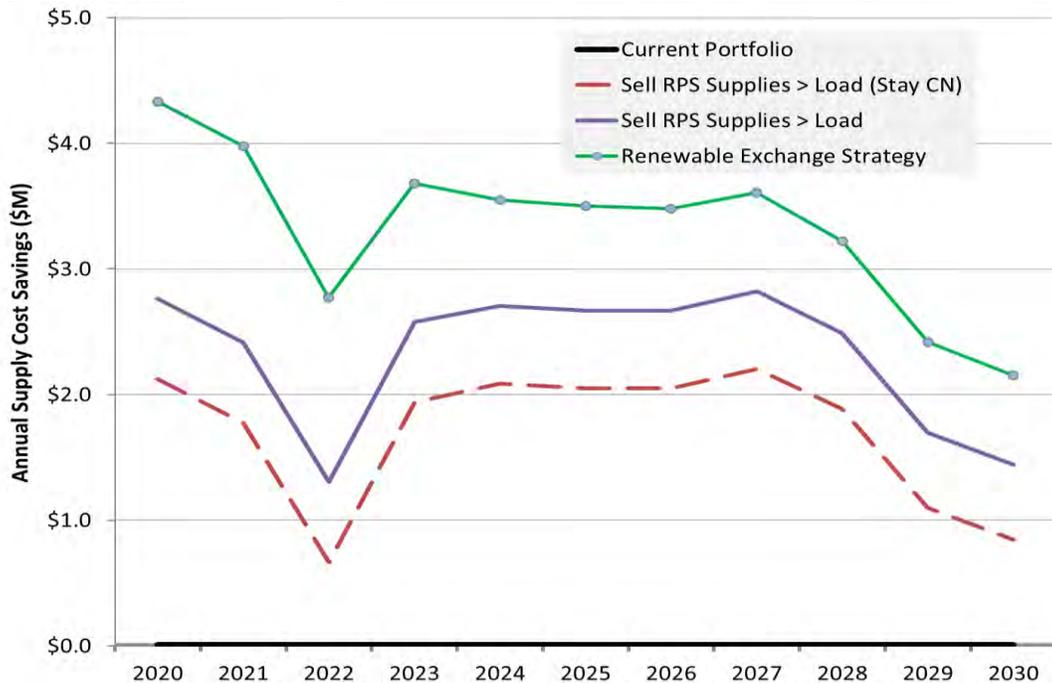
⁶ Purchases and sales of RECs with or without bundled energy are expressly permitted by Section 2.30.225 of the City's Municipal Code and Section G of the City's Energy Risk Management Policy. The City would not, however, be purchasing any additional in-state renewable resources with the intent to sell them in exchange for out-of-state renewable resources. In addition to likely being a money-losing strategy, this approach would violate the anti-speculation policy in Section C of the City's Energy Risk Management Policy.

⁷ This refers to the "Excess Procurement" and "Historic Carryover" provisions of the City's Renewable Portfolio Standard Procurement Plan, which was last updated and approved by Council in December 2018 as part of the EIRP approval process: <https://www.cityofpaloalto.org/civicax/filebank/documents/67789>.

sources of power" and positive net emissions on the City's Power Content Label. This interest in the "Renewable Exchange" approach, in spite of its drawbacks, was due to the fact that it would yield significantly greater cost savings, and if these savings are applied toward electrification or other decarbonization efforts, the result could be a greater overall emissions reduction.

Figure 3 below displays the annual supply cost savings (through 2030) of the three procurement strategy options described above, relative to the current portfolio. Attachment B shows these cost projections (and staff's estimates of REC costs) in more detail.

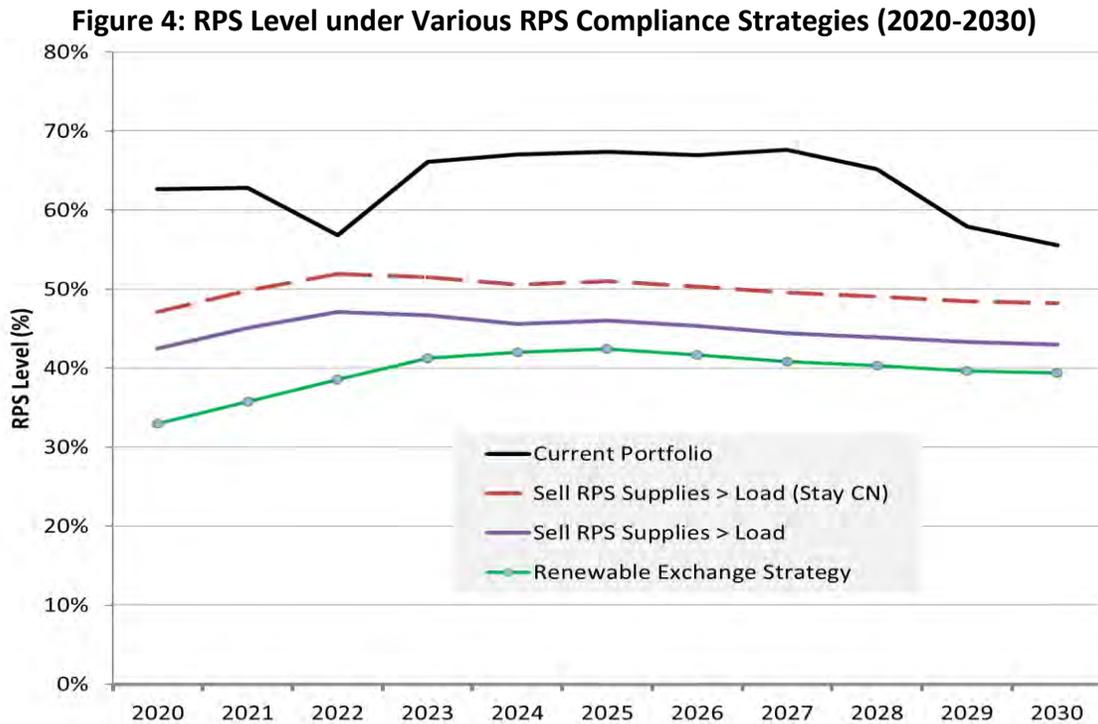
Figure 3: Supply Cost Savings under Various RPS Compliance Strategies (2020-2030)



Note that the downward trend in supply cost savings over time, as well as the dip in supply cost savings for 2022, is due to the timing of existing wind and landfill gas contracts expiring during that period (combined with a new solar contract coming online in 2023), along with the increases in the state's RPS requirement (which ultimately reaches 60% in 2030). As these existing contracts expire over time and the RPS requirement rises, the City would have fewer excess renewable supplies to sell.

This analysis indicates that simply selling the City's RPS supplies that exceed 104.5% of its annual load (thus maintaining enough surplus supplies so the portfolio remains carbon neutral under an hourly accounting standard) would reduce supply costs by an average of \$1.7 million per year, while selling *all* of the supplies that exceed the City's load would reduce costs by an additional \$0.62 million per year. Finally, utilizing the "Renewable Exchange" approach would reduce supply costs by an average of \$3.3 million per year over this 12-year period—or about \$1 million per year more than the "Sell Supplies Exceeding Load" approach.

Figure 4 below depicts the trajectory that the City’s annual RPS level is expected to take between now and 2030 under the three different RPS compliance strategies listed above, as well as the RPS level for the current portfolio, with no excess supplies being sold. Note that under state law, the City’s RPS compliance requirement is equivalent to the line shown for the “Renewable Exchange Strategy.”



Emissions Reporting Implications

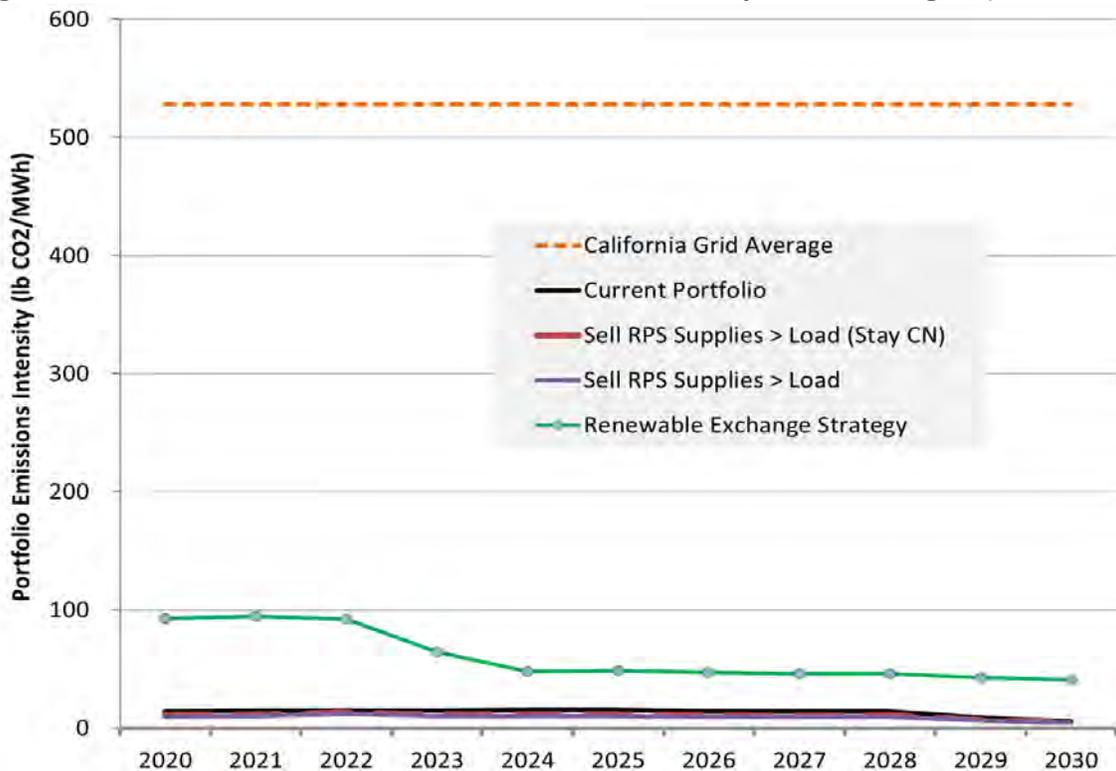
The City’s current portfolio, because of its significant surplus of carbon neutral resources relative to load, is expected to be responsible for *net negative* carbon emissions over the next 12 years (under average hydro conditions), under either the City’s existing annual carbon accounting methodology or an hourly carbon accounting methodology.⁸ However, staff recently learned that the CEC’s currently proposed Power Content Label carbon accounting methodology will result in the City having to report positive net emissions for all RPS compliance strategies under consideration, or even for the City’s current portfolio. (This is because the CEC’s PCL methodology ignores supplies that exceed a utility’s retail sales, and assigns a positive emissions value to landfill gas generation.) This is contrary to what staff reported to the UAC in August. However, it also means that the City will face a communications challenge related to the emissions intensity value reported to customers on its PCL regardless of the RPS procurement strategy option the City follows. And counterintuitively, it also means that if the City pursues either of the two “Sell RPS Supplies Exceeding Load” options, the emissions intensity reported

⁸ Based on the analysis of the City’s portfolio that staff presented in the May 2019 UAC report, a carbon accounting methodology using average hourly emissions factors yielded an annual carbon emissions total about 16,100 mT CO₂ greater than an annual accounting approach.

on the City’s PCL will actually *decrease* relative to the current portfolio (assuming that a portion of the RPS supplies sold are from the City’s landfill gas generation volumes).

Beginning in 2021, the City will be required to report the emissions associated with its electric supply on a Power Content Label every year (per AB 1110). Although the state’s Power Content Label regulations related to emissions reporting are still being finalized, it is expected that they will require utilities to report emissions associated with the purchase of out-of-state (Bucket 3) RECs. However, staff feels that Bucket 3 RECs have significant environmental value and merit when used as a carbon mitigation tool in the City’s Carbon Neutral Plan. (For a full discussion of this topic, please see Attachment B of the [August 2019 UAC report](#).) Figure 5 below depicts the average supply portfolio carbon emissions intensities that the City would be required to report on its annual PCL between now and 2030 under the three different RPS compliance strategies listed above (assuming the state’s draft PCL regulations are adopted).

Figure 5: PCL Emissions Intensities under Various RPS Compliance Strategies (2020-2030)



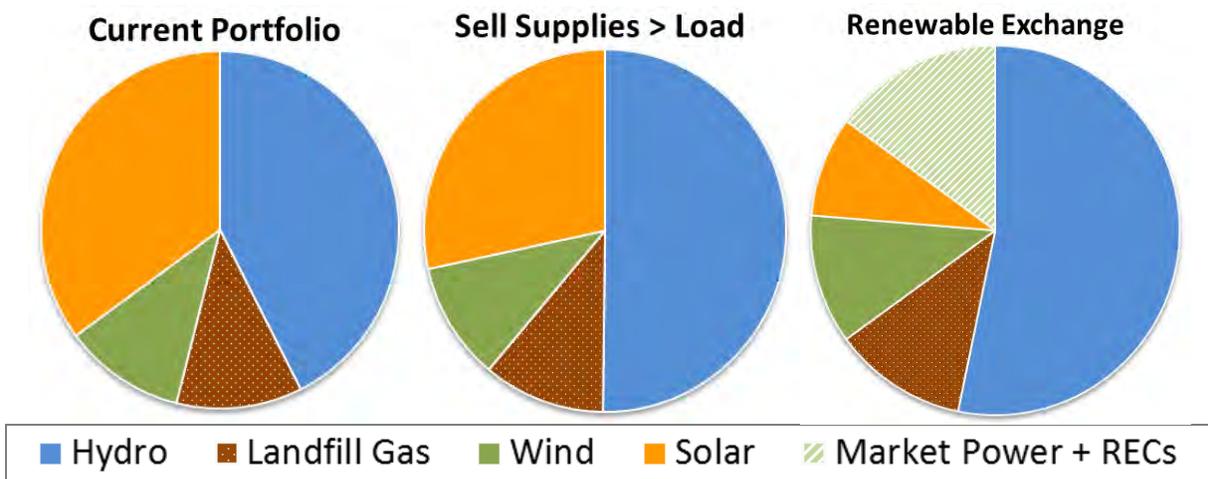
Note that while in all cases the City will be required to report a positive emissions intensity value on its future Power Content Labels, even the approach with the highest emissions intensity (the “Renewable Exchange” approach, with an average emissions intensity of 65 lb CO₂/MWh over this period) would be far lower than the California-wide average emissions intensity of 528 lb CO₂/MWh.⁹ So regardless of the RPS procurement option that the City elects,

⁹ U.S. Environmental Protection Agency’s eGRID 2016 data for the “CAMX” region: https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf

staff will need to carry out a focused public relations and engagement effort to help the public and the City’s most active stakeholders understand the environmentally beneficial intent of the strategy and how CPAU’s portfolio remains carbon neutral.

And finally, **Figure 6** below illustrates how customers would see the portfolio supply mix depicted on their annual Power Content Label for the year 2020, for the three primary RPS compliance strategy options listed above. (Note that the “Sell Supplies That Exceed Load—and That are Not Needed to Maintain Carbon Neutrality” approach is not shown below, because its Power Content Label would be nearly identical to that of the “Sell Supplies that Exceed Load” Power Content Label.)

Figure 6: Power Content Label Supply Charts for Various RPS Compliance Strategies in 2020



The information in the figures above, comparing the three major RPS compliance strategy options discussed in this report, along with the current portfolio, is summarized in **Table 1** below.

Table 1: Summary Comparison of Various RPS Compliance Strategy Options

	Status Quo	Sell Supplies > Load (While Remaining Carbon Neutral)	Sell Supplies > Load	Renewable Exchange Strategy
Supply Cost Savings (\$M/year)	---	\$1.7M	+\$0.6M (\$2.3M total)	+\$1.0M (\$3.3M total)
Retail Rate Savings (%)	---	1.1%	+0.5% (1.5% total)	+0.7% (2.2% total)
RPS Level (%)*	63%	50%	45%	39%
Hourly Accounting Emissions Intensity (lb CO₂/MWh)	(125)	0	42 (w/o RECs) 0 (with RECs)	131 (w/o RECs) 0 (with RECs)

PCL Emissions Intensity (lb CO₂/MWh)**	13	10	9	65
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(Average Impacts over 2020-2030 Timeframe)

*The average annual RPS level required under state RPS regulations during this period is 45.4%. The average RPS level for the “Renewable Exchange” approach is less than this due to the SB 100 exemption for municipal utilities with high concentrations of large hydro resources, as described above.

**The average emissions intensity for market power in California is assumed to be 944 lb CO₂/MWh, while the average emissions intensity of the state’s overall fuel mix is 528 lb CO₂/MWh.

CONCLUSION

In previous meetings, the UAC has expressed a preference for adopting a lower-cost RPS procurement strategy and for employing a carbon accounting methodology that uses hourly average emissions factors. The analysis in this report indicates that opting for those two approaches would yield significant supply cost savings, particularly if the City also chooses to continue the use of unbundled RECs to neutralize the residual emissions associated with the portfolio’s reliance on wholesale market power purchases in dry years.

As for what balance to strike between maintaining the City’s existing portfolio of in-state resources versus reducing supply costs and relying on out-of-state resources, staff feels that increasing the City’s reliance on out-of-state Bucket 3 RECs is justifiable on an environmental value basis. And initial conversations that staff has held with community stakeholders indicate some level of support for this position from them as well. However, before recommending a more aggressive RPS sales approach in order to reduce supply costs, staff is interested in receiving feedback from both the UAC and other members of the community (particularly the environmental community) on that issue. Staff plans to sell the City’s renewable resources that exceed 104.5% of its load for 2020 (as it did for 2019) while awaiting a final decision on whether to sell additional resources.

NEXT STEPS

In the coming weeks, staff will take the UAC’s recommendation regarding amendments to the Carbon Neutral Plan to the City Council for approval. Meanwhile, staff intends to continue to seek feedback from community stakeholders with respect to the environmental value of in-state versus out-of-state renewable resources, and the extent to which the City should swap the former for the latter in its supply portfolio. Staff expects to return to the UAC with a final recommendation on that matter in the next two months. After that, staff will take the UAC recommendation to the Finance Committee and the City Council. Although the details of the City’s resource procurement strategy are not currently codified (beyond the City’s Renewable Portfolio Standard Procurement Plan, which is designed to demonstrate compliance with the state’s RPS requirements), staff will still discuss the current approach with Council and seek validation of any significant changes, given the level of financial implications associated with this decision. If the Council supports selling some of the City’s excess renewable supplies, staff

would then begin soliciting interest from Community Choice Aggregation entities (CCAs) and others in short- or long-term acquisition of these resources.

In addition, in the next couple of years staff plans to carry out a broader and longer-term analysis of potential options for rebalancing the City's electric supply portfolio. This analysis will be presented in the context of making a decision on whether to renew the City's Western Base Resource hydro contract after the current one expires at the end of 2024. It will also take into account options for utilizing the City's share of the California-Oregon Transmission Project, after that resource reverts to the City's control at the end of 2023.

Staff will also continue to closely follow (and provide input on) the CEC's AB 1110 rulemaking process. Depending on the carbon accounting methodology the CEC finally adopts, staff will work to understand how the City's methodology can be aligned with the CEC approach, and, to the degree that it cannot, determine how to explain this difference to customers.

RESOURCE IMPACT

Staff estimates that switching to an hourly carbon accounting methodology, using average hourly emissions intensity factors, will result in an increase in supply costs of approximately \$60,000 in an average hydrological year. However, staff estimates that switching to a more aggressive sales approach to RPS compliance could result in a decrease in supply costs of about \$3.3 million per year through 2030 (equivalent to a rate reduction of about 2%, or 0.37 cents/kWh). But if the City instead chooses to sell only its renewable energy supplies that exceed 104.5% of its annual load (and thus are not needed to maintain an overall carbon neutral supply portfolio), the average supply cost savings are estimated to be about \$1.7 million per year through 2030 (equivalent to a rate reduction of about 1%, or 0.19 cents/kWh).

POLICY IMPLICATIONS

This report satisfies Initiatives #4 and #5 of the [EIRP Work Plan](#). This report is also in line with the Sustainability and Climate Action Plan goals of continuing to lower the carbon footprint of the community.

ENVIRONMENTAL REVIEW

The Utilities Advisory Commission's discussion of the City's RPS procurement strategy and carbon accounting methodology does not meet the definition of a project under Public Resources Code 21065 and therefore California Environmental Quality Act (CEQA) review is not required.

Attachments:

- Attachment A: Revised Carbon Neutral Plan
- Attachment B: RPS Portfolio Detail and Financial Opportunities Associated with Various Alternative Strategies (2020-2030)

Adopted by City Council on March 4, 2013

Revised by City Council on

City of Palo Alto Utilities Electric Supply Portfolio Carbon Neutral Plan

1. Carbon Neutral Definition

A carbon neutral electric supply portfolio will demonstrate annual net zero greenhouse gas (GHG) emissions, measured at the Citygate¹, ~~in accordance with The Climate Registry's Electric Power Sector protocol for GHG emissions measurement and reporting, by applying the average hourly carbon emissions intensity of the electricity on the CAISO grid to the City's net load for each hour of the year.~~

2. Carbon Neutral Plan Objective

Reduce the City of Palo Alto's overall community GHG emissions by achieving carbon neutrality for the Electric Supply Portfolio starting in calendar year 2013 within an annual rate impact not to exceed 0.15 cents per kilowatt-hour (¢/kWh) primarily through the: 1) engagement of customers to increase energy efficiency; 2) expansion of long-term renewable resource commitments; 3) promotion of local renewable resources; 4) continued reliance on existing hydroelectric resources; and 5) meeting short-term balancing requirements and/or neutralizing residual carbon through the use of short-term purchases of renewable resources and/or renewable energy certificates (RECs).

3. Resource Strategies

a. Energy Efficiency

- i. Continue to pursue energy efficiency strategies as identified in the Council-approved ten-year Energy Efficiency Plan.

b. Long-term Renewable Resources

- i. Continue to pursue the City's Renewable Portfolio Standard (RPS) goal to purchase renewable energy to supply at least ~~33~~60% of retail sales by ~~2015-2030~~ while ensuring that the retail rate impact of these purchases does not exceed 0.5 ¢/kWh.
- ii. Continue to pursue local renewable resources through the Palo Alto CLEAN ~~and PV Partners~~ programs.
- iii. Pursue additional ~~RPS-eligible~~, long-term renewable resources (beyond the RPS goals) to achieve a target of 100% carbon-free resources based on average year hydroelectric generation.

¹ Citygate is the location of the City's main meter where the City interconnects to the Pacific Gas and Electric transmission system. Emissions associated with the output of the locally sited fossil gas fired combustions units (COBUG), while not measured at Citygate, will be neutralized.

c. *Short-term Renewable Resources and Renewable Energy Certificates*

- i. ~~For calendar years 2013 through 2016, procure~~ short-term renewables, ~~if the price is comparable to that of an un-bundled REC;~~
- ii. ~~For calendar years 2013 through 2016, procure~~ or RPS-eligible, un-bundled RECs as needed to achieve carbon neutrality based on actual load and resources;
- iii. Neutralize anthropogenic GHG emissions associated with renewable resources with RPS-eligible unbundled-RECs, ~~which may or may not be RPS-eligible.~~

d. *Banking and Truing Up*

- i. In the event that there are surplus renewables beyond the load in a particular year, bank ~~as many~~ RECs ~~as allowable under the TCR EPS protocol~~ from qualifying renewables from that year to minimize the need for purchasing RECs in subsequent years.
- ii. Neutralize emissions associated with market purchases resulting from deviations between expected and actual load and renewable and hydroelectric generation resources with RPS-eligible unbundled-RECs, ~~which may or may not be RPS-eligible.~~
- iii. Neutralize residual emissions that result from applying an hourly emissions accounting methodology, rather than a net annual generation methodology, with RPS-eligible unbundled-RECs.

4. Hydroelectric Resources

- a. Continue to preserve and advocate for existing carbon-neutral hydroelectric generation resources that provide approximately 50% of average year resource needs.
- b. Plan for and acquire carbon neutral resources assuming average hydroelectric conditions going forward.
- c. Under adverse hydroelectric conditions, procure RPS-eligible unbundled-RECs, ~~which may or may not be RPS-eligible~~, to achieve carbon neutrality up to the 0.15 ¢/kWh rate impact limit and seek Council direction if carbon neutrality cannot be achieved within the rate impact limit.
- d. Under favorable hydroelectric conditions, where carbon neutral resources are expected to be surplus to needs, even after allowable banking, then pursue selling short-term renewable energy, or the renewable attributes, associated with one or more carbon-neutral resources in the portfolio.

5. Financial and Rate Payer Impacts

- a. In addition to the RPS annual rate impact limit of 0.5 ¢/kWh, the cost of achieving carbon neutrality shall not exceed 0.15 ¢/kWh based on an average hydro year.
- b. Revenues collected from surplus energy sales related to hydroelectric resources under favorable conditions (e.g. wet years), will be maintained within reserves to adjust for the cost of achieving carbon neutrality under adverse hydroelectric years.
- c. To the extent available and allowable, revenues from the auction of cap-and-trade allowances may be used to fund resources acquired to meet the carbon neutrality goals.

6. Reporting and Communication

- a. Develop a communication plan for stakeholders to inform them of the City's efforts towards achieving a carbon neutral electric supply.
- ~~b. Submit an annual, verified report of the carbon content of the electric supply portfolio to The Climate Registry.~~
- ~~c. Provide customers a report of the electric supply portfolio's carbon content to supplement the mandated Power Content Label.~~
- ~~d. Inform large commercial and/or corporate customers of the City's carbon neutral portfolio and its relevance to their individual corporate sustainability goals.~~
- ~~e.b. _____~~

~~7. Implementation Plan~~

~~The tasks that need to be completed in the next two years pending Council approval of the Carbon Neutral Plan in February 2013 are listed in the table below.~~

Item	Timeframe
1. Modify electric supply portfolio models and Energy Risk Management Policies, Guidelines and Procedures to account for Carbon Neutral objectives, balancing, banking of renewable attributes, reporting and financial impacts.	By April 2013
2. Modify the Long term Electric Acquisition Plan (LEAP) to include the carbon neutral objective	By June 2013
3. Develop communication plan to inform customers and stakeholders of Carbon Neutral Plan and efforts.	February to April 2013
4. Based on response to the Fall 2012 request for proposals, seek approval of new renewable power purchase agreements to meet the City's RPS up to approximately 100% of the long term resource needs in average hydro years.	December 2012 to June 2013
5. Determine resource needs for CY 2013 through CY 2016 and develop plan to acquire short term renewable resources.	By June 2013
6. Determine long term renewable purchase volumes for beyond CY 2016 and develop plan to acquire long term renewable resources.	By September 2013
7. Procure RECs as needed to neutralize carbon emissions based on actual load and resources for CY 2013.	By May 2014
8. Along with annual Power Content Label, produce and report to customers the carbon intensity of the electric supply portfolio.	May/June 2014 and annually thereafter
9. Produce and submit Electric Power Sector (EPS) and Local Governments Operation Protocol (LGOP) reports to The Climate Registry (TCR) for CY 2013.	July and October 2014 and annually thereafter
10. Get independent verification of TCR reports and submit audited reports to TCR.	By December 2014 and annually thereafter
11. Redesign the Palo Alto Green program according to Council direction.	By December 2013

ATTACHMENT B: RPS Portfolio Detail and Financial Opportunities Associated with Various Alternative Strategies

	CY:	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Projected Load	MWh	884,038	878,070	862,820	856,136	840,781	833,916	823,597	810,971	804,070	795,754	792,068
Projected Retail Sales	MWh	853,097	847,338	832,621	826,171	811,354	804,728	794,772	782,587	775,928	767,902	764,346
Total RPS Requirement	%	33%	35.75%	38.50%	41.25%	44%	47%	50%	52%	54.67%	57.33%	60%
Bucket 1 Min	%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Bucket 3 Max	%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total RPS Requirement	MWh	281,522	302,923	320,559	340,796	356,996	378,222	397,386	406,945	424,174	440,264	458,607
Bucket 1 Min	MWh	211,141	227,192	240,419	255,597	267,747	283,667	298,039	305,209	318,130	330,198	343,956
Bucket 3 Max	MWh	28,152	30,292	32,056	34,080	35,700	37,822	39,739	40,695	42,417	44,026	45,861
Current Portfolio by Type												
Large Hydro	MWh	521,960	496,168	470,638	470,638	470,638	463,352	463,352	463,352	463,352	463,352	463,305
Small Hydro	MWh	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Solar	MWh	320,149	318,574	317,006	390,072	388,045	386,029	384,024	382,030	380,046	378,073	376,111
Wind	MWh	100,178	100,087	42,708	42,672	42,672	42,672	42,672	42,672	21,336	-	-
Landfill Gas	MWh	103,773	103,489	103,489	103,489	103,489	103,489	95,275	94,528	94,528	56,922	38,242
Total Renewables	MWh	534,100	532,150	473,203	546,232	544,206	542,190	531,971	529,230	505,910	444,996	424,353
Bucket 0	MWh	213,951	213,576	156,197	156,161	156,161	156,161	147,946	147,200	125,864	66,922	48,242
Bucket 1	MWh	320,149	318,574	317,006	390,072	388,045	386,029	384,024	382,030	380,046	378,073	376,111
RPS Level	%	62.6%	62.8%	56.8%	66.1%	67.1%	67.4%	66.9%	67.6%	65.2%	57.9%	55.5%
Large Hydro Level	%	61.2%	58.6%	56.5%	57.0%	58.0%	57.6%	58.3%	59.2%	59.7%	60.3%	60.6%
Hydro-Adjusted RPS Requirement	%	33.0%	35.8%	38.5%	41.3%	42.0%	42.4%	41.7%	40.8%	40.3%	39.7%	39.4%
Total RECs Available	MWh	534,100	532,150	473,203	546,232	544,206	542,190	531,971	529,230	505,910	444,996	424,353
Total RECs to Sell (Bucket 1)	MWh	280,731	259,519	184,700	239,516	237,561	234,951	233,693	241,918	224,592	170,901	153,416
Total Bucket 3 to Buy	MWh	28,152	30,292	32,056	34,080	34,072	34,138	33,142	31,923	31,258	30,455	30,104
Bucket 1 Premium	\$/MWh	\$ 16.00	\$ 16.00	\$ 16.00	\$ 16.00	\$ 15.50	\$ 15.50	\$ 15.50	\$ 15.50	\$ 15.00	\$ 15.00	\$ 15.00
Bucket 3 Premium	\$/MWh	\$ 1.50	\$ 1.60	\$ 1.70	\$ 1.80	\$ 1.90	\$ 2.00	\$ 2.10	\$ 2.20	\$ 2.30	\$ 2.40	\$ 2.50
Total Financial Opportunities												
Sell RPS Supplies > Load (Stay CN)	\$M	\$ (2.1)	\$ (1.8)	\$ (0.7)	\$ (1.9)	\$ (2.1)	\$ (2.0)	\$ (2.0)	\$ (2.2)	\$ (1.9)	\$ (1.1)	\$ (0.8)
Sell RPS Supplies > Load	\$M	\$ (2.8)	\$ (2.4)	\$ (1.3)	\$ (2.6)	\$ (2.7)	\$ (2.7)	\$ (2.7)	\$ (2.8)	\$ (2.5)	\$ (1.7)	\$ (1.4)
Sell RPS Supplies > RPS Req. Total	\$M	\$ (4.3)	\$ (4.0)	\$ (2.8)	\$ (3.7)	\$ (3.5)	\$ (3.5)	\$ (3.5)	\$ (3.6)	\$ (3.2)	\$ (2.4)	\$ (2.1)
Bucket Swapping	\$M	\$ (0.4)	\$ (0.4)	\$ (0.5)	\$ (0.5)	\$ (0.5)	\$ (0.5)	\$ (0.4)	\$ (0.4)	\$ (0.4)	\$ (0.4)	\$ (0.4)
Residual Emissions Cleanup	\$M	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1
Sell RPS Supplies > RPS Req.	\$M	\$ (4.0)	\$ (3.7)	\$ (2.4)	\$ (3.3)	\$ (3.2)	\$ (3.1)	\$ (3.1)	\$ (3.3)	\$ (2.9)	\$ (2.1)	\$ (1.8)