MEMORANDUM

TO: **UTILITIES ADVISORY COMMISSION**

FROM: **UTILITIES DEPARTMENT**

DATE: **June 5, 2019**

3

SUBJECT: **Renewable Portfolio Standard Compliance Strategy and Carbon Emissions Accounting Methodology Options for the City's Electric Supply Portfolio**

REQUEST

Staff seeks UAC feedback on two separate but related issues:

(1) What procurement strategy to follow in order to comply with the state's renewable portfolio standard (RPS) mandate, and

(2) What accounting methodology to use in assessing the electric supply portfolio's annual carbon emissions.

EXECUTIVE SUMMARY

In the City's 2018 Electric Integrated Resource Plan (EIRP), approved by Council in December 2018, 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. In addition, 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. This report, which builds on a report presented in May 2019, satisfies these two EIRP Work Plan Initiatives.

This report describes several different procurement strategies that the City might pursue in order to comply with its state RPS requirements, along with the financial impact to the utility of changing from its current RPS compliance strategy. Based on current supply projections and market prices, staff estimates that the financial impact of switching to a minimum compliance RPS strategy could result in approximately $5 million in annual savings over the next 12 years (or just over 0.5 cents/kWh)—although realizing these savings would significantly impact the carbon intensity and renewable energy content that the City would have to report to customers on its annual Power Content Label (PCL). Other strategies could result in higher costs.

In addition, this report follows up on the aforementioned May 2019 UAC report, which calculated the carbon content of the City's actual 2018 electric portfolio under six different carbon accounting methodologies, by describing the financial impact of cleaning up the portfolio's "residual emissions" that could result, over the next several years, if the City switched carbon accounting methodologies or RPS compliance strategy. While switching to an

hourly carbon accounting approach from the current annual approach would result in a slight cost increase for the portfolio in dry years (on the order of $60,000 per year), utilizing carbon offsets to abate the City's residual emissions in dry years instead of unbundled RECs would have a much more significant impact (on the order of $600,000 in a very dry year). And these financial impacts would be far greater if the City also chooses to sell some of its excess RPS supplies, because doing so could result in greater levels of wholesale market power purchases and thus greater levels of residual emissions (depending on how much of our excess RPS supplies we sell).

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, two points have been clearly articulated. First, the UAC would like staff to pursue a supply portfolio that minimizes total cost to customers, while also minimizing carbon emissions—even at the expense of the portfolio's reported RPS level. This point was made most clearly in December 2017, when staff delivered a report to the UAC on potential changes the City could make to its strategy for complying with its Renewable Portfolio Standard (RPS) and Carbon Neutral Plan objectives.

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, when staff presented reports for the EIRP on the subject of potentially rebalancing the City's portfolio of long-term electric supply resources in order to better match these electric supplies with the City's load. A more in-depth discussion of this topic also occurred last month, when staff presented a report laying out several different accounting methodologies that could be used to quantify the carbon emitted by the City's electric supplies, and analyzing the City's actual 2018 electric supply emissions under each methodology.

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 next year. 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.

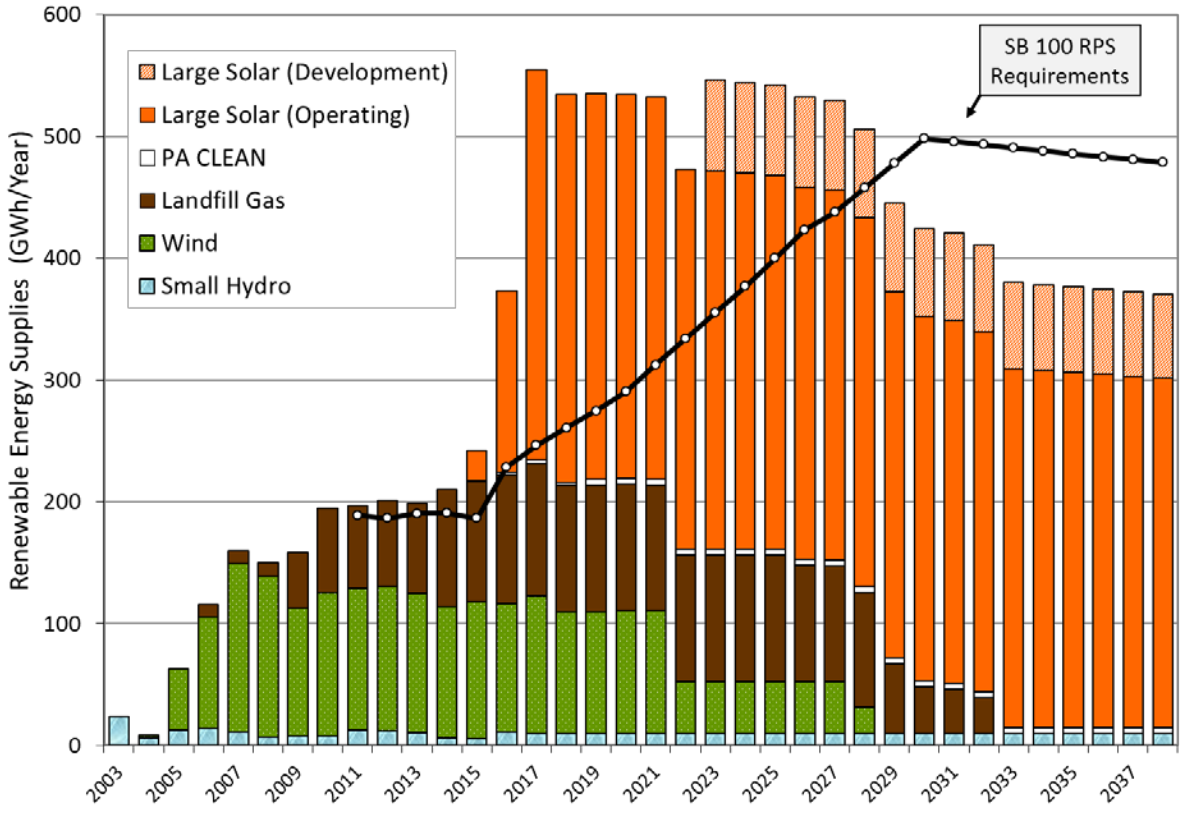
DISCUSSION

At the May 2019 UAC meeting, staff and the UAC discussed potential changes to the City's carbon accounting methodology and renewable energy procurement strategy. However, Commissioners expressed a strong desire to see estimates of the financial impact of any changes to the City's current approaches on these matters. The purpose of this report is to quantify the financial effects of these potential changes—as well as their impact on the City's RPS level and Power Content Label.

RPS Compliance Strategies

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, as well as an actual renewable energy procurement level that exceeds the statewide average. Figure 1 illustrates the growth in the City's RPS supplies over the past 15 years and how these supplies compare to the statewide RPS requirements.

Figure 1: Palo Alto's RPS Supplies and Procurement Requirements



For calendar year (CY) 2018, as Table 1 shows, the City's RPS level was 63.9%, whereas the state's RPS requirement for that year was only 29%.

Table 1: 2018 RPS Procurement and RPS Level

Retail Sales	**888,033**
Small Hydro	13,266

Landfill Gas	110,139
Wind	101,801
Solar	342,650
Renewables Total	**567,856**
RPS Level	**63.9%**

In addition to exceeding statewide RPS procurement requirements, the City's renewable supply portfolio is also composed entirely of relatively higher value in-state resources—where the renewable energy attribute (a Renewable Energy Certificate, or REC) is "bundled" with the energy produced by the resource. In contrast, the state's RPS mandate allows utilities to satisfy a portion of their procurement requirement with lower value out-of-state resources.[1]

Other procurement strategies the City could opt to pursue include:

a) *Minimally Compliant*: Under this approach, the City would sell off all of its renewable resources that exceed the state's RPS requirement level. The City would also sell some additional long-term renewable energy resources and replace those with market power purchases paired with unbundled (Bucket 3) RECs, to the extent allowable under the state's RPS regulations (up to 10% of the City's RPS requirement can be satisfied with this type of resource, per state RPS regulations). The City would also apply its stock of excess RPS supplies that it has built up since 2010[2] toward its RPS requirements in future years, enabling the sale of even larger volumes of renewable resources.

b) *Sell Excess Resources*: As noted above, the City's portfolio greatly exceeds the state's RPS requirements; in addition, under average hydrological conditions the City has an excess of overall carbon neutral supplies. The City could choose to sell off a portion of its renewable supplies—either the resources that exceed the City's total load, or all of the resources that exceed the state's RPS requirement level (replacing the energy with market power purchases, to the extent needed to serve load). For this analysis, staff will focus on the latter approach.

c) *Carbon Neutral Every Hour*: This approach would entail the most dramatic changes to the portfolio, and be the most expensive to pursue. In this approach, the City would sell

[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 renewable energy is generated and consumed (usually out-of-state) but the RECs are sold separately to a California utility.

[2] 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 Electric Integrated Resource Plan (EIRP) approval process: https://www.cityofpaloalto.org/civicax/filebank/documents/67789.

some of its solar and/or wind resources and replace them with baseload renewable resources. It would also alter the scheduling of its hydroelectric resources in order to have its combined carbon neutral resources match its load in all hours—essentially acting as though Palo Alto was an island. (Note that staff has not thoroughly examined the technical feasibility of this approach. Particularly in drier years, it may not be physically possible to achieve a perfect balance between load and supply in all hours of the year.)

Although the UAC recommended against the Carbon Neutral Every Hour approach rather strongly at the May 2019 meeting, this case can serve as a bookend, with the Minimally Compliant approach at the opposite end of the spectrum. There are other variations on these approaches that the City could pursue (e.g., buying Bucket 2 resources instead of or in addition to Bucket 3 resources, selling a portion of the City's solar or wind resources and replacing them with baseload renewables, or not using the City's supply of older excess RPS supplies) but these are the three primary options that will be analyzed in addition to the status quo.

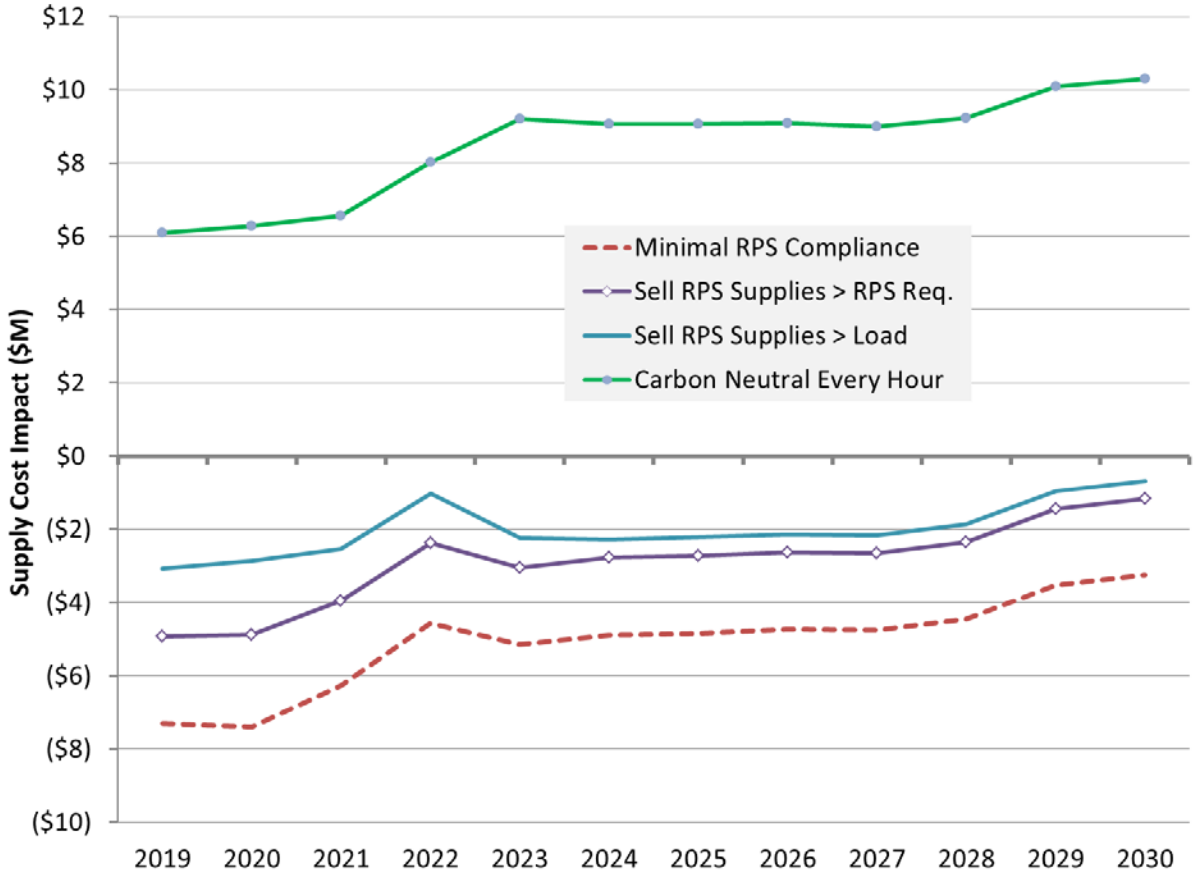
Attachment A provides year-by-year details on the City's projected load, renewable energy supplies, RPS level, RPS requirements, and supply of older excess (or "banked") RECs. It also provides staff's estimate of future Bucket 1 and Bucket 3 REC values[3] (independent of the physical energy that would be bought or sold in conjunction with the REC), and the resulting total financial opportunity available to the City if it opts to pursue a Minimal RPS Compliance strategy.

Figure 2 below displays the annual financial impact (through 2030) of each of the three aforementioned RPS procurement strategies, relative to the status quo approach. Note that the cost impact depicted here only reflects the sales revenue and/or purchase cost of renewable energy supplies, and is independent of the cost of cleaning up the residual emissions that might result from this change in RPS compliance strategy. The latter cost impact will be addressed later in this report. Also note that for the evaluation of the Carbon Neutral Every Hour approach, it is assumed that the City's wind and solar resources can be sold for a fixed price of $37.5 per MWh, and that purchasing baseload renewable supplies would cost $70 per MWh. For the analysis of this approach, staff also assumes that altering the City's scheduling approach for its hydro resources would carry a financial cost of $2 million per year.[4]

[3] Although a long-term forward market does not yet exist for RECs in California, staff assumes that Bucket 1 RECs—which currently carry a premium of $18 or $19 per MWh—will decline over the next several years, as the state's Community Choice Aggregators (CCAs) accelerate their long-term procurement and bring their own resources online. Bucket 3 REC prices, meanwhile, are expected to continue to increase slowly in the coming years, particularly after the federal Production Tax Credit (PTC) for wind projects expires.

[4] This model assumes that the City sells all but 100,000 MWh per year of its solar resources, and replaces these resources with enough baseload renewables to satisfy its total load. Hence, in the initial years, the City sells off far more renewable energy supplies than it purchases as replacement energy—which results in a relatively smaller supply cost impact, but a lower overall RPS level.

Figure 2: Change in Supply Cost Due to Switching RPS Compliance Strategy (2019-2030)



Note that the upward trend in supply cost impact over time, as well as the jump in supply cost impact 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—and also have to increase its purchases of baseload renewables under the Carbon Neutral Every Hour approach.

Under this set of assumptions, taking a minimal compliance approach to the RPS mandate would reduce supply costs by an average of $5.1 million per year over this 12-year period, selling the City's excess RPS supplies would reduce supply costs by an average of $2.9 million per year, and trying to achieve carbon neutrality every hour of the year would increase supply costs by an average of $8.5 million per year.

Carbon Accounting Methodologies

In the May 2019 UAC report on carbon accounting, staff presented six potential accounting methodologies:

1. The City's Current Method (Method A) – Procure carbon neutral resources equal to total load on an annual basis. In addition, unbundled RECs can be purchased in order to make generic market energy purchases effectively carbon neutral.
2. The Proposed Power Content Label (PCL) Method (Method B) – The CEC has proposed an accounting methodology, in order to implement Assembly Bill (AB) 1110,[5] that is similar to the City's current method (annual summation of resource supplies and load), except unbundled REC purchases would not be allowed to neutralize the carbon content of generic market energy purchases.
3. Hourly Accounting Method #1 (Method C) –An hourly comparison of the City's supplies and load, with each hourly net energy value assigned the average hourly carbon emissions intensity of the CAISO grid to convert it to an hourly emissions total. These hourly emissions totals would then be summed across the hours in a year. In addition, unbundled REC purchases *would* be allowed to neutralize the carbon content of generic market energy purchases.
4. Hourly Accounting Method #2 (Method D) – This approach is the same as Hourly Accounting Method #1, except that unbundled REC purchases would not be allowed to neutralize the carbon content of generic market energy purchases.
5. Hourly Accounting Method #1a (Method E) – Identical to Method C, except that it uses the grid's marginal hourly emissions factors, instead of average.
6. Hourly Accounting Method #2a (Method F) – Identical to Method D, except that it uses the grid's marginal hourly emissions factors, instead of average.

For 2018, a relatively dry hydrological year where the City's total carbon neutral supply resources nearly matched its load (carbon neutral supplies equaled 99.6% of the City's total load for the year), the emissions totals calculated for the portfolio under each of the six accounting methodologies are presented in Table 2 below.

Table 2: Annual Net CO2 Emissions and Emissions Intensity for the Electric Portfolio in 2018 under Six Accounting Methodologies, with the Purchase of 3,638 Unbundled RECs

	Unbundled RECs + Market Power = Carbon Neutral			***Unbundled RECs Don't Neutralize Market Power CO_2***		
	Method	**Net Emissions (mT)**	**Emissions Intensity (lb/MWh)**	***Method***	**Net Emissions (mT)**	**Emissions Intensity (lb/MWh)**
Annual Accounting	***A***	0	0	***B***	1,557	3.8
Hourly Accounting (Average Emissions Factors)	***C***	16,118	39.2	***D***	17,675	43.0
Hourly Accounting (Marginal Emissions Factors)	***E***	(2,038)	(5.1)	***F***	(526)	(1.3)

[5] AB 1110 (2016) requires that every load-serving entity (LSE) include an annual average carbon emissions intensity factor associated with its electricity supplies on its Power Content Label, starting with the 2019 PCL (which will be published in 2020). For details on the CEC's proposed accounting methodology, see the latest draft regulations and rulemaking documents here: https://www.energy.ca.gov/power_source_disclosure/16-OIR-05/.

The UAC expressed a clear preference for an hourly accounting approach using average emissions factors (Method C or Method D), but asked to see more detail on the costs of taking such an approach. The cost of abating these "residual emissions" shown for each accounting methodology, of course, depends on the mechanism used to abate them. The mechanisms that the City could potentially use to abate the residual emissions, and their current approximate costs per metric tonne of CO2 abated, include:

- Unbundled RECs ($3.50/mT CO2)
- Carbon Offsets ($14/mT CO2)
- Carbon Allowances ($18/mT CO2)
- Bundled (Bucket 1) RECs ($44/mT CO2)
- Rebalancing the Portfolio (Difficult to quantify)

Based on these current market prices, the cost of cleaning up the portfolio's residual emissions for 2018—under an annual accounting approach and under an hourly accounting approach using average emissions factors—is shown in Table 3 below. (As Table 2 indicates, under the annual accounting approach the portfolio had 1,557 mT of residual emissions to abate in 2018, while under the hourly accounting approach it had 17,675 mT of residual emissions. Although it should be reiterated that 2018 was a drier than average year, and in a normal year the portfolio would not have any residual emissions under any of the accounting approaches described above.)

Table 3: Residual Emissions Abatement Costs for 2018 with Annual or Hourly Accounting

	Annual Accounting	Hourly Accounting (Average Emissions Factors)
Unbundled RECs	$5,500	$62,000
Carbon Offsets	$21,800	$247,000
Carbon Allowances	$28,000	$318,000
Bundled (Bucket 1) RECs	$68,500	$778,000

Given the significant difference in CO2 abatement cost for the various mechanisms discussed above, it is worthwhile to consider their relative environmental impacts. First off, however, it should be noted that according to all industry accounting protocols (other than the CEC's PCL accounting standard), "a REC is a multi-attribute commodity that embodies all of the non-energy benefits associated with the generation of renewable energy. A REC can be separated from the underlying electricity and applied to other electricity use to substantiate renewable electricity use and ownership."[6] So although it would be very difficult to determine what generating resource reduced its output as a result of that renewable energy generator being on

[6] "Renewable Energy Certificates, Carbon Offsets, and Carbon Claims: Best Practices and Frequently Asked Questions," Center for Resource Solutions, April 2012. Accessed May 12, 2019. https://resource-solutions.org/wp-content/uploads/2015/08/RECsOffsetsQA.pdf.

the grid, all RECs legally embody the avoided Scope 2 emissions associated with renewable energy (i.e., the carbon attribute).

The obvious intent with each of these abatement tools is to have a direct impact on mitigating carbon emissions—to provide some "additionality," in the parlance of environmental product markets. Carbon offsets, if they are approved by a reputable certification body (e.g., The Gold Standard or the Climate Action Reserve), are essentially guaranteed to satisfy this additionality test. Priced at about $1.50 per MWh (or $3.50 per mT CO2), do unbundled RECs pass the additionality test? To answer this, one would have to know whether the expectation of this additional (small) source of revenue directly contributed to the deployment of an individual renewable energy project. In most cases, of course, this is very hard to know.

One way to be sure of a REC's direct impact would be to enter into a long-term contract to purchase RECs from a specific project that has yet to be financed or built. By getting involved in a project early in its development cycle, you can be relatively certain of your impact on its deployment. However, given the City's varying need for unbundled RECs under its current strategy, it could be difficult to find such an arrangement. Although if the City opts to follow a Minimal Compliance RPS strategy, it could be certain that it would need at least a minimum level of unbundled RECs every year (equal to 10% of its total RPS procurement requirement).

Combined Effects of RPS Compliance Strategy and Carbon Accounting Methodology Changes

Putting it all together, the combination of potential changes to the City's RPS procurement strategy and its carbon accounting methodology have wide ranging implications for the City's total electric supply costs, as well as for how carbon-intensive and how "green" the portfolio would appear to customers. Table 4 below addresses the latter effects, showing how carbon-intensive the portfolio would appear on customers' PCLs for 2020 as well as what RPS level the City would report for that year.

Table 4: PCL Emissions Intensities and RPS Levels in 2020 under Various RPS Compliance Strategies (and Expected Hydro Conditions)

	Minimal Compliance	Sell Excess Supplies	Current Portfolio	Carbon Neutral Every Hour
PCL Emissions Intensity (lb CO2/MWh)	237	104	(148)	0
RPS Level (%)	21.6%	33.0%	60.7%	44.4%

For example, if the City pursues a Minimal Compliance strategy, the portfolio would have to report a carbon intensity of 237 lb CO2/MWh on its PCL for 2020 (which would still be well below the statewide average intensity, which is likely to be about 500 lb CO2/MWh in 2020), and its RPS level would fall to 21.6% (compared to 60.7% for the portfolio in its current state).[7]

[7] Although the state RPS mandate calls for utilities to achieve a 33% RPS level in 2020, the City could rely on its

In terms of supply cost implications, the two types of potential policy changes—in RPS compliance strategy and carbon accounting methodology—interact with each other in significant ways. For example, as illustrated in Figure 2 above, switching to a Minimal Compliance RPS procurement strategy could result in supply cost savings on the order of $5 million per year. However, this approach would also result in the City selling off large quantities of RPS resources (e.g., 373,000 MWh of sales in 2020) and making generic market power purchases to make up the difference. These market power purchases would be assigned an emissions intensity of 0.428 metric tonnes of CO2 per MWh (the state's standard multiplier for generic market power), resulting in a significant volume of residual emissions to be cleaned up. Due to the large disparity in the prices of unbundled RECs and carbon offsets, the difference in the cost of abating these residual emissions for these two approaches would be over $1 million per year (for the Minimal RPS Compliance strategy in 2020).

Table 5 below presents the net supply cost impact for the portfolio in 2020 for various combinations of RPS compliance strategy and carbon accounting methodology. (Note that for the "Current Portfolio (Dry Year)" scenario, the supply cost impact simply reflects the cost of abating the residual emissions that the portfolio would experience that year, not the supply cost impact of the additional market power purchases that would be required due to the hydrological conditions.) It should be noted that the results shown below could change quite significantly starting in 2025, depending on how much of the City's current Western Base Resource contract volume it chooses to retain when the new contract term begins.

Table 5: Net Supply Cost Impact in 2020 of Changes in RPS Compliance Strategy and Carbon Accounting Methodology (in $000)

		RPS Compliance Strategy				
		Minimal Compliance	**Sell Excess Supplies**	**Current Portfolio (Expected)**	**Current Portfolio (Dry Year)**	**Carbon Neutral Every Hour**
Carbon Accounting Methodology	**Annual Accounting (Unbundled RECs)**	$ (7,070)	$ (4,720)	--	$ 160	$ 1,260
	Annual Accounting (Carbon Offsets)	$ (6,040)	$ (4,270)	--	$ 630	$ 1,260
	Hourly Accounting (Unbundled RECs)	$ (7,010)	$ (4,670)	--	$ 220	$ 1,260
	Hourly Accounting (Carbon Offsets)	$ (5,810)	$ (4,050)	--	$ 860	$ 1,260

"banked" or excess RECs from the 2010-2019 period to comply with this requirement while maintaining an effective RPS level for 2020 of less than 33%.

CONCLUSION

In previous meetings, the UAC expressed a preference for following a minimal compliance RPS procurement strategy (December 2017) and for adopting a carbon accounting methodology that uses hourly average emissions factors (May 2019). 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 abate the residual emissions associated with the portfolio's reliance on wholesale market power purchases. If the City were to opt to use carbon offsets to abate these residual emissions, the cost savings from switching RPS compliance strategies would fall significantly.

Ultimately, staff is interested in UAC feedback on this question of which RPS compliance strategy to pursue. One possible option to consider is having multiple rate options for people with different cost and/or portfolio content preferences (e.g., a low-cost, minimum RPS compliance option, an option like the current portfolio, and a more expensive, carbon neutral every hour option) instead of imposing a single portfolio approach on everyone in Palo Alto. However, it should be noted that implementing this approach would require a significant amount of time and staff resources.

Staff concurs with the UAC's preference for adopting a carbon accounting methodology that uses hourly average emissions factors. And given the cost disparity between unbundled RECs and carbon offsets, staff feels that any environmental benefit associated with offsets is not justified by its greater cost and thus the City should continue to rely on unbundled RECs to maintain a carbon neutral electric supply.

NEXT STEPS

Staff intends to return to the UAC in the coming months to request formal UAC action on these items. After that, staff will take the UAC recommendation to the Finance Committee and the City Council. The City's carbon accounting methodology is codified in the Council-approved Carbon Neutral Plan (Staff Report 3550, Resolution 9322) and therefore requires Council approval to modify. And although the City's RPS compliance strategy is not currently codified, 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 strategy change.

If the UAC and Council support selling some of the City's excess renewable supplies, staff would then begin soliciting interest from CCAs and others in short- or long-term acquisition of these resources. In order to take advantage of selling opportunities for 2019, staff would need to begin to pursue such transactions within the next couple of months; therefore the City may need to continue banking excess RPS supplies in 2019 and begin selling them in 2020.

Staff will also continue to closely follow (and comment upon) the CEC's AB 1110 rulemaking process. Depending on the 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 a minimal compliance RPS procurement strategy could result in a decrease in supply costs on the order of $7 million per year through 2030. In addition, switching to an hourly carbon accounting methodology, using average hourly emissions intensity factors, could result in an increase in supply costs of approximately $60,000 in an average hydrological year, if the City chooses to recognize the emissions reduction benefits of unbundled RECs. However, if the City were to change to a minimal compliance RPS procurement strategy, cleaning up the residual emissions with offsets rather than RECs would require an additional $1.2 million in annual costs.

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

A. RPS Portfolio Detail and Minimum Compliance Financial Opportunity

PREPARED BY: **JIM STACK,** Senior Resource Planner
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REVIEWED BY: **JONATHAN ABENDSCHEIN,** Assistant Director, Resource Management

APPROVED BY: _____
DEAN BATCHELOR
Director of Utilities

ATTACHMENT A: RPS Portfolio Detail and Minimum Compliance Financial Opportunity

Banked RECs (2011-2018)		
Excess Procurement	MWh	831,965
Historic Carryover	MWh	368,733

	CY:	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Projected Load	MWh	918,878	912,332	905,627	899,248	893,197	887,490	882,089	877,067	872,403	868,132	864,123	860,444
Projected Retail Sales	MWh	886,717	880,401	873,930	867,774	861,935	856,428	851,216	846,370	841,869	837,747	833,879	830,328
Total RPS Requirement	%	31%	33%	35.8%	38.5%	41.3%	44%	47%	50%	52%	54.7%	57.3%	60%
Total RPS Requirement	MWh	274,882	290,532	312,430	334,093	355,548	376,828	400,072	423,185	437,772	457,969	478,091	498,197
Bucket 1 Min	MWh	206,162	217,899	234,323	250,570	266,661	282,621	300,054	317,389	328,329	343,476	358,568	373,648
Bucket 3 Max	MWh	27,488	29,053	31,243	33,409	35,555	37,683	40,007	42,319	43,777	45,797	47,809	49,820
Current Portfolio by Type													
Large Hydro	MWh	545,860	521,523	514,056	485,957	485,957	485,957	478,671	478,671	478,671	478,671	478,671	478,671
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	10,000
Solar	MWh	320,668	320,149	318,574	317,006	390,072	388,045	386,029	384,024	382,030	380,046	378,073	376,111
Wind	MWh	99,958	100,178	100,087	42,708	42,672	42,672	42,672	42,672	42,672	21,336	-	-
Landfill Gas	MWh	103,489	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	534,114	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	213,447	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	320,668	320,149	318,574	317,006	390,072	388,045	386,029	384,024	382,030	380,046	378,073	376,111
RPS Level	**%**	**60.2%**	**60.7%**	**60.9%**	**54.5%**	**63.4%**	**63.5%**	**63.7%**	**62.9%**	**62.9%**	**60.4%**	**53.4%**	**51.1%**
Large Hydro Level	%	61.6%	59.2%	58.8%	56.0%	56.4%	56.7%	56.2%	56.6%	56.9%	57.1%	57.4%	57.6%
Adjusted RPS Requirement	%	31.0%	33.0%	35.8%	38.5%	41.3%	43.3%	43.8%	43.4%	43.1%	42.9%	42.6%	42.4%
Adjusted Bucket 1 Min	MWh	206,162	217,899	234,323	250,570	266,661	277,853	279,409	275,774	272,398	269,307	266,406	263,743
Adjusted Bucket 3 Max	MWh	27,488	29,053	31,243	33,409	35,555	37,047	37,254	36,770	36,320	35,908	35,521	35,166
Banked RECs Applied	MWh	100,058	100,058	100,058	100,058	100,058	100,058	100,058	100,058	100,058	100,058	100,058	100,058
Total RECs Available	MWh	634,173	634,159	632,208	573,261	646,290	644,264	642,248	632,029	629,288	605,968	545,054	524,411
Total RECs to Sell (B0-1)	MWh	386,779	372,680	351,021	272,578	326,297	310,840	306,958	301,100	302,410	282,800	225,367	207,920
Total Bucket 3 to Buy	MWh	27,488	29,053	31,243	33,409	35,555	37,047	37,254	36,770	36,320	35,908	35,521	35,166
Bucket 1 Premium	$/MW	$ 19.00	$ 20.00	$ 18.00	$ 17.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00
Bucket 3 Premium	$/MW	$ 1.25	$ 1.50	$ 1.60	$ 1.70	$ 1.80	$ 1.90	$ 2.00	$ 2.10	$ 2.20	$ 2.30	$ 2.40	$ 2.50
Surplus REC Sales Revenue	$000	$ 6,827	$ 6,873	$ 5,756	$ 4,066	$ 4,652	$ 4,381	$ 4,315	$ 4,229	$ 4,257	$ 3,950	$ 3,038	$ 2,764
Bucket Swapping Revenue	$000	$ 488	$ 537	$ 512	$ 511	$ 505	$ 522	$ 522	$ 511	$ 501	$ 492	$ 483	$ 475
Total Financial Opportunity	**$000**	**$ 7,314**	**$ 7,410**	**$ 6,268**	**$ 4,577**	**$ 5,157**	**$ 4,903**	**$ 4,837**	**$ 4,740**	**$ 4,759**	**$ 4,442**	**$ 3,521**	**$ 3,239**