MEMORANDUM

TO: **UTILITIES ADVISORY COMMISSION**

FROM: **UTILITIES DEPARTMENT**

DATE: **December 6, 2017**

6

SUBJECT: **Renewable and Carbon Neutral Portfolio Strategy Discussion**

REQUEST

Staff seeks Utilities Advisory Commission (UAC) feedback on potential changes to the City's Renewable Portfolio Standard (RPS) policy and Carbon Neutral Plan as part of the development of the City's Electric Integrated Resource Plan (EIRP), which will be created in compliance with Senate Bill (SB) 350. There is no recommended action.

EXECUTIVE SUMMARY

Staff is in the process of revamping the City's Long-term Electric Acquisition Plan (LEAP), which articulates the City's strategy for procuring and managing its energy supply. This process will culminate in late 2018 with the adoption of the EIRP, as required by SB 350. The EIRP will include updates to the City's RPS policy (to bring it into line with the 50% by 2030 RPS mandate established by SB 350) and Carbon Neutral Plan. This report presents discussion of a variety of potential changes to these procurement guidelines, including: setting more aggressive RPS target levels and dates; clarifying what to do when the City has excess generation; swapping the City's contracted renewable resources for less costly ones; pursuing diversity in generation technologies and contract terms; and establishing carve-outs for different resource types.

BACKGROUND

Palo Alto approved its first Renewable Portfolio Standard (RPS) target – supplying at least 10% of the City's electric needs with renewable energy by 2008 – in October 2002[1]. In March 2007, after executing a series of low-cost power purchase agreements (PPAs) for renewable resources, the City extended this target to 33% by 2015. And in March 2013, the Council approved the Carbon Neutral Electric Supply Plan (Attachment A), ensuring that *all* of the City's electricity supplies would come from either renewable energy resources (including unbundled renewable energy certificates, or RECs) or large hydro resources.

The state also approved its first RPS target in 2002 (20% by 2017, via SB 1078[2]), although at that point the law did not apply to municipal utilities. In April 2011, SB X1-2[3] was signed into law,

[1] This original RPS target was one component of the City's first Long-term Electric Acquisition Plan (LEAP), which was developed in order to address a large shortfall in the City's electric supply portfolio that began in 2005, resulting from the renewal of its Western Base Resource contract at a much lower output volume.

[2] http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF

making a number of significant changes to the existing RPS mandate. First, it raised the state RPS requirements to 25% of retail sales by the end of 2016 and 33% by the end of 2020. Second, it established "portfolio balance requirements," which divided up eligible renewable energy products (including unbundled renewable energy certificates, or RECs) into three distinct "portfolio content categories" and established minimum and maximum procurement requirements for each category within the overall RPS procurement requirement. And third, it formally extended the state RPS requirements to municipal utilities such as the City of Palo Alto.

Finally, in October 2015, SB 350[4] ("The Clean Energy and Pollution Reduction Act of 2015") was signed into law, which, among other things, raised the RPS requirements for all utilities and load-serving entities in California to the following levels:

a. 33% of retail sales by the end of 2020;
b. 40% of retail sales by the end of 2024;
c. 45% of retail sales by the end of 2027; and
d. 50% of retail sales by the end of 2030 (and for all time periods thereafter).

The California Energy Commission has just begun the process of adopting regulations to enforce the SB 350 RPS mandate. Once it completes this process, the City will need to update its official Renewable Energy Resources Procurement Plan to be consistent with these regulations.

DISCUSSION

Palo Alto's RPS Procurement Results

To-date, the City has executed 12 PPAs for new renewable resources that are currently delivering energy to Palo Alto. The currently operating resources include two wind projects, five landfill-gas-to-energy (LFGTE) projects, and five solar PV projects. The City has also executed an additional PPA for a solar project that is under development and expected to begin operating 2021, at about the same time that one of the older wind contracts will be expiring. The City has also executed PPAs for three other resources but subsequently terminated those agreements after the suppliers ran into problems developing the projects and requested unacceptable contractual concessions. Summary information for all 13 currently contracted RPS resources is provided in Table 1.

[3] http://www.energy.ca.gov/portfolio/documents/sbx1_2_bill_20110412_chaptered.pdf
[4] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

Table 1 – Palo Alto's Existing Renewable Energy Contracts

Project	Supplier	Technology	Date Contract Executed	Actual or Estimated Online Date	Contract Expiration Date*	Annual Energy (GWh)
High Winds	Avangrid	Wind	Nov. 2004	Dec. 2004	Jun. 2028	48.2
Shiloh I	Avangrid	Wind	Oct. 2005	Jun. 2006	Dec. 2021	64.5
Santa Cruz	Ameresco	Landfill Gas	Nov. 2004	Feb. 2006	Feb. 2026	9.9
Ox Mountain	Ameresco	Landfill Gas	Jan. 2005	Apr. 2009	Mar. 2029	43.9
Keller Canyon	Ameresco	Landfill Gas	Aug. 2005	Aug. 2009	Jul. 2029	14.9
Johnson Canyon	Ameresco	Landfill Gas	Aug. 2009	May 2013	May 2033	10.4
San Joaquin	Ameresco	Landfill Gas	May 2010	Apr. 2014	Apr. 2034	30.3
EE Kettleman Land	Clēnera	Solar PV	Nov. 2012	Jul. 2015	Aug. 2040*	53.5
Hayworth Solar	sPower	Solar PV	Jun. 2014	Dec. 2015	Dec. 2042*	63.7
Frontier Solar	Clēnera	Solar PV	Jul. 2013	Aug. 2016	Aug. 2046	52.5
Elevation Solar C	sPower	Solar PV	Jul. 2013	Dec. 2016	Dec. 2041*	100.8
Western Antelope Blue Sky Ranch B	sPower	Solar PV	Jul. 2013	Dec. 2016	Dec. 2041*	50.4
Subtotal – Operating						**543.0**
Wilsona Solar	Hecate	Solar PV	Mar. 2016	Jun. 2021	May 2046*	52.5
Subtotal – Under Development						**52.5**
Total – All Executed Contracts						**595.5**

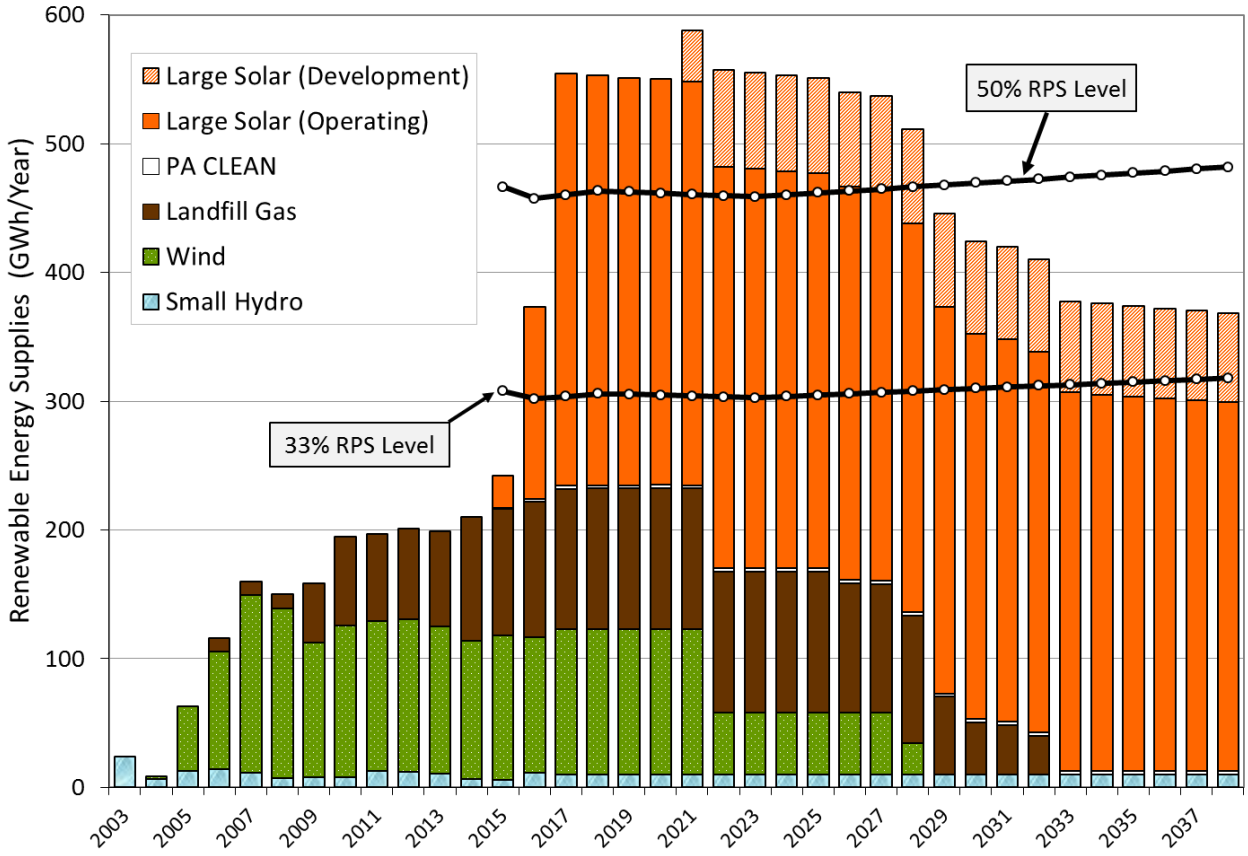
* Indicates contract includes extension term options beyond listed expiration date

In addition, through its contract with the Western Area Power Administration and through its ownership share of the Calaveras Hydroelectric Project, the City receives a small amount of energy from "small" hydroelectric projects that qualify under the state's RPS standard. These small hydroelectric resources that can be counted towards the City's RPS requirements together account for about 1% of the City's sales in normal water years.

Lastly, Palo Alto CLEAN, a local solar PV feed-in tariff program, was launched in March 2012 (Staff Report 2548, Resolution 9235). Under the current program design approved in February 2017 (Staff Report 7604, Resolution 9665), the Palo Alto CLEAN program is expected to provide approximately 0.5% of Palo Alto's annual electric energy needs by the end of 2018.

Combined, all of these renewable energy facilities under contract allowed the City to achieve an RPS level of 41% in 2016, and are expected to yield an RPS level of 58% in 2017 (when all five currently operating solar projects will have been operating for the entire year). Figure 1 below shows actual renewable energy deliveries through 2016 and estimated deliveries beyond, along with how these annual supply totals compare to the 33% and 50% RPS levels. Thus, although the City's official RPS target currently trails that of the state for the first time, its actual renewable energy procurements to-date far exceed the requirements established in SB 350.

Figure 1 – Palo Alto's Committed Renewable Resources



Potential Renewables and Carbon Neutral Policy Changes

In addition to the need to bring the City's RPS policy into line with the state's RPS requirements under SB 350, the development of the EIRP presents an opportunity to consider additional potential changes to this policy, as well as the Carbon Neutral Plan. The RPS policy was slightly modified by Council in 2012 (Staff Report 2710, Resolution 9241) and is presented in its current form below. The Carbon Neutral Plan is shown in Attachment A.

LEAP Strategy #3 – Renewable Portfolio Standard

Reduce the carbon intensity of the electric portfolio by acquiring renewable energy supplies by:

a. Pursuing a minimum level of renewable purchases of at least 33% of retail sales by 2015 with the following attributes:
   i. The contracts for investment in renewable resources shall not exceed 30 years in term.
   ii. Pursue only renewable resources deemed to be eligible by the California Energy Commission (CEC).
   iii. Evaluate use of Renewable Energy Certificates (RECs) to meet RPS.

b. Ensuring that the retail rate impact for renewable purchases does not exceed 0.5 ¢/kWh on average; and

c. Performing an ongoing evaluation of the Palo Alto Clean Local Energy Accessible Now (CLEAN) program.

Some potential changes to these two policies are discussed below.

More Aggressive RPS Target

Because the City's ultimate RPS target has, traditionally, been either higher than the state's target level or had an earlier deadline for achieving the same level, the most obvious potential RPS policy change to consider is making the City's RPS target more aggressive than the state's again. And given that staff projects that the City will achieve an RPS level of approximately 58% in 2017 – *13 years ahead of the SB 350 mandate for achieving a 50% RPS level* – and that staff believes it is extremely unlikely that the City's RPS level will fall below 50% for at least the next several years thereafter, it would be reasonable to adopt an RPS policy with an earlier deadline for achieving the 50% level (e.g., 50% by the end of 2017).

But on the question of whether to adopt a *higher* RPS target – e.g., 60% by 2030 – staff feels strongly that such a discussion needs to be held in conjunction with the larger discussion about whether to renew the City's Western Base Resource contract for an additional 30 years, and if not (or if at a lower level), what alternative set of resources to replace this contract with.[5] Because in the City's current electric supply portfolio, large hydro resources provide about 50% of the City's supply needs; this means that there is not sufficient space in the portfolio to accommodate an RPS target of greater than 50%, except in dry years. Adopting an RPS target of greater than 50%, therefore, would imply that Council wants staff to sell off a portion of the large hydro output on an ongoing basis – a position that is inconsistent with the City's risk management guidelines.

In addition, the SB 350 RPS mandate language, which requires utilities to achieve a 50% RPS level by 2030, includes an exception for utilities like Palo Alto that sometimes receive more than 50% of their generation from hydroelectric resources. This language, which Palo Alto lobbied for, specifically allows utilities in this situation to achieve an RPS level of *less than 50%* without being penalized as long the remainder of their electricity supplies come from hydroelectric resources. In the event that the City establishes an RPS target for itself of greater than 50%, the state may determine that this exception to the SB 350 RPS mandate is no longer applicable to Palo Alto.

Policy on Banking RECs

Closely related to the issue of the City's ultimate RPS target level (and the interaction between this target level and the large hydro portion of the supply portfolio) is the subject of how to handle excess generation supplies in wet hydro years. Under a 50% RPS, in a normal hydro year

[5] Staff plans to present to the UAC an initial round of analysis on the question of what the City's long-term electric supply portfolio should comprise in early 2018, with additional analysis and discussion on this topic to be had as the deadlines for deciding whether to renew the City's Western Base Resource contract (and if so, at what level) beyond 2025 approach.

the City should have virtually no excess generation (on an annual basis) to deal with. In a dry hydro year, the City will need to make market purchases to close its deficit position, and the Carbon Neutral Plan (Attachment B) instructs staff to purchase unbundled RECs to match up with these market purchases. In a *wet* hydro year, however, the City will have excess generation to dispose of, and it will need to make a choice between selling off renewable generation (maximizing sales revenue but resulting in an RPS level of less than 50%) or hydro generation (to maintain at least a 50% RPS level).

The City's current policy on this issue leans toward selling hydro generation instead of renewables, but it lacks clarity. Under the Carbon Neutral Plan[6], Staff is directed to "bank" (i.e., retain for future use) as many RECs as possible to minimize REC purchases in subsequent (dry) years. However, the policy does not address what to do when the City has reached the limit of the number of RECs it can bank (e.g., back-to-back wet years) and must choose between selling them and retaining them. Although when Council last reviewed the RPS policy in 2012, it specified that the 33% RPS target should be interpreted as a "floor" rather than a "ceiling," which implies that the City's policy is to maximize its RPS level, choosing to sell excess hydro generation rather than renewables when such situations arise.

Policy on RPS "Bucket" Swapping

The state's RPS legislation establishes three different categories, or buckets, of renewable energy products (energy and RECs), as well as minimum/maximum procurement requirements for each bucket. The first product (Bucket 1), the most valuable one, encompasses all renewable energy that is delivered into the California grid as it is generated. Load-serving entities (LSEs) like Palo Alto are required to meet at least 75% of their RPS requirement with Bucket 1 renewables. 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 type 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 (i.e., "unbundled RECs"). Table 2 below describes the legislative procurement requirements for each category, as well as the associated market price for each type of REC (independent from the cost of the underlying energy associated with each product).

Table 2 – RPS Bucket Requirements and Market Prices

REC Category	RPS Procurement Requirements	Current Market Price
Bucket 1	Minimum 75% of RPS Target	$15/REC

[6] Section 3(d) of the Carbon Neutral Plan says: "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." According to the TCR EPS protocol, RECs can be applied to a given year if they are: (a) generated in that given year, (b) generated in the last six months of the preceding year, or (c) generated in the first three months of the subsequent year. Thus, in a very wet year like 2017, RECs can only be "banked" forward to 2018, and only those from the second half of 2017 can be banked. Meanwhile, for compliance with the state's RPS mandate, RECs can be banked forward essentially indefinitely.

Bucket 2	Maximum 25% of RPS Target	$6.50/REC
Bucket 3	Maximum 10% of RPS Target	$1/REC

Currently, all of the City's contracted renewable energy supplies fall into the Bucket 1 category. (Although occasionally the City procures Bucket 3 RECs on a short-term basis to satisfy the Carbon Neutral Plan.) Given the $14/REC premium that Bucket 1 resources have over Bucket 3 resources, the City therefore has an opportunity to bring in additional revenue by selling some of its Bucket 1 resources (energy from renewable resources bundled with the associated RECs) and replacing them with Bucket 3 resources (unbundled RECs). Staff estimates this financial opportunity to be approximately $450,000 per year at current market prices and generation levels.

When the City last updated its RPS policy in 2012, staff presented this financial opportunity but recommended against pursuing it. This recommendation, which was ultimately approved by Council, was based on the idea that the City has long championed an approach of going above and beyond the minimum requirements of state law on environmental matters, and that this type of management of the City's contracted renewable energy supplies would contradict this approach, and could result in fewer renewable energy projects being constructed in the state.

Policy on Carve-outs

Another policy update to consider is a "carve-out" in the RPS target for renewable resources with certain characteristics. Under this approach, the City might require that a certain portion of its RPS target be satisfied with a certain type of technology (e.g., geothermal resources), or by local resources. Aside from the RPS Bucket requirements, no carve-outs currently exist in either the state's or the City's RPS policy.

Although this topic has not been formally addressed in any of the City's prior RPS policy discussions, it has always been staff's approach to evaluate renewable energy supply proposals in an objective, non-biased manner. Staff's practice in purchasing renewable energy supplies has always been to establish objective metrics (e.g., cost or rate impact, portfolio fit) prior to reviewing proposals, and then evaluate the proposals against those metrics. By casting a net as wide as possible and considering all possible eligible proposals, this ensures that the City gets the best possible contract at the least possible cost.

Pursuit of Resource Diversification

Closely related to the above carve-out discussion, but slightly less extreme, is a potential policy update to explicitly seek to diversify the City's resource supply portfolio. Obviously at present the City's supply portfolio is heavily weighted toward in-state large hydroelectric resources and, secondarily, solar PV resources. As noted above, when staff evaluates renewable energy supply proposals, it typically does so in a highly objective way – which usually results in the selection of the proposal with the lowest levelized cost. However, a possible modification to the City's procurement strategies could be to proactively seek out diversification of the City's supply resources – whether that involves diversification of generation technology, location, contract

term length, supplier, or some other characteristic. Such a policy could help provide a hedge against various types of cost uncertainties – such as a large shift in market prices of all renewables (or of a specific type of resource), a large shift in transmission costs, or regulatory penalties imposed on intermittent resources.

NEXT STEPS

Staff will incorporate the UAC's input on potential updates to the City's RPS policy and Carbon Neutral Plan and share with the Council for their input as well.

RESOURCE IMPACT

There is no direct resource impact as a result of this report. Adoption of some of the modifications to the City's RPS policy and Carbon Neutral Plan discussed in this report may ultimately have a direct impact on resources. However, any procurement decisions that result from such policy changes will be considered at a later date, and will be brought to the UAC and City Council for approval prior to implementation so policymakers can consider the resource impact of each one.

POLICY IMPLICATIONS

There is no direct policy impact associated with this report, but any changes made through EIRP will affect policy related to electric portfolio management. However, staff will ensure that the EIRP is consistent with the City's sustainability goals as established in its Sustainability and Climate Action Plan.

ENVIRONMENTAL REVIEW

The UAC's discussion of the City's RPS policy and Carbon Neutral Plan does not meet the definition of a project under Public Resources Code 21065 and therefore California Environmental Quality Act (CEQA) review is not required.

ATTACHMENT

A. Carbon Neutral Plan

PREPARED BY: **JIM STACK,** Senior Resource Planner

REVIEWED BY: **JONATHAN ABENDSCHEIN,** Assistant Director, Resource Management

APPROVED BY:

ED SHIKADA
General Manager of Utilities

City of Palo Alto Utilities
Electric Supply Portfolio Carbon Neutral Plan
Adopted by Council on March 4, 2013 (Staff Report 3550, Resolution 9322)

1. Carbon Neutral Definition

A carbon neutral electric supply portfolio will demonstrate annual net zero greenhouse gas (GHG) emissions, measured at the Citygate[1], in accordance with The Climate Registry's Electric Power Sector protocol for GHG emissions measurement and reporting.

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% of retail sales by 2015 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.

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 RPS-eligible, un-bundled RECs as needed to achieve carbon neutrality based on actual load and resources;

[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 of the output of the locally sited fossil gas fired combustions units (COBUG), while not measured at Citygate, will be neutralized.

iii. Neutralize anthropogenic GHG emissions associated with renewable resources with 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 unbundled-RECs, which may or may not be RPS-eligible.

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 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.

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 PaloAlto**Green** program according to Council direction.	By December 2013