MEMORANDUM

TO: **UTILITIES ADVISORY COMMISSION**

FROM: **UTILITIES DEPARTMENT**

DATE: **June 6, 2012**

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SUBJECT: **Power Purchase Agreement for Brannon Solar Project Output**

REQUEST

Staff recommends that the Utilities Advisory Commission (UAC) recommend that the City Council:

1. Approve a Power Purchase Agreement with Brannon Solar LLC, a California limited liability company, for the acquisition of up to 52,000 Megawatt-hours (MWh) per year of energy over twenty-five years at a cost not to exceed $94 million; and

2. Waive the application of the investment-grade credit rating requirement of Section 2.30.340(d) of the Palo Alto Municipal Code, which applies to energy companies that do business with the City, as the Brannon Solar LLC through its parent company, Trina Solar Limited, will provide a letter of credit for $400,000 as a development and performance assurance deposit.

EXECUTIVE SUMMARY

As part of ongoing efforts to procure renewable resources to meet the City's Renewable Portfolio Standard (RPS) of at least 33% of sales from qualifying renewable resources by 2015, staff issued a request for proposals (RFP) in the fall of 2011 and evaluated the proposals based on price, value, viability and compatibility with the City's needs. The Brannon Solar proposal had the best score as well as the lowest price.

The Brannon Solar project would provide about five percent of the City's annual energy needs. It would be built on former agricultural land leased from the Westlands Water District in Fresno County, CA. The Brannon Solar project is proposed by Brannon Solar LLC, a limited liability company formed by the San Jose based development office of Trina Solar Limited, a vertically integrated Chinese solar panel manufacturer.

The price for the Brannon Solar project over the 25-year term of the agreement is $72.00/MWh, which is less than the last four renewable energy projects that were approved by the Council.

BACKGROUND

Per the Council-approved Long-term Electric Acquisition Plan (LEAP) Objectives, Strategies and Implementation Plan, updated in April 2012 (Staff Report 2710), the City's current RPS target is to procure at least 33% of its retail sales volume from qualifying renewable resources by 2015, and to continue procuring renewable resources as long as the cumulative rate impact of all of the City's renewable resources is not more than 0.5 cents per kilowatt-hour (¢/kWh).

Current Status of Renewable Resources in Electric Portfolio

The City has executed five Power Purchase Agreements (PPAs) for energy generated from new renewable resources which are currently delivering energy to Palo Alto. An additional three PPAs and a Northern California Power Agency (NCPA) Third Phase Agreement have been executed for four projects that are under construction. Basic information for all nine committed RPS resources is shown in Table 1 below.

Table 1 – Existing Renewable Energy Contracts

Project	Supplier	Technology	Date Contract Executed	Actual or Estimated Online Date	Annual Energy (GWh)
High Winds	Iberdrola	Wind	Nov. 2004	Dec. 2004	48.9
Shiloh	Iberdrola	Wind	Oct. 2005	Jun. 2006	71.4
Santa Cruz	Ameresco	Landfill Gas	Nov. 2004	Feb. 2006	11.2
Half Moon Bay	Ameresco	Landfill Gas	Jan. 2005	Apr. 2009	40.7
Keller Canyon	Ameresco	Landfill Gas	Aug. 2005	Aug. 2009	11.8
Subtotal – Operating					**184.0**
Johnson Canyon	Ameresco	Landfill Gas	Aug. 2009	Nov. 2012	10.4
Crazy Horse	Ameresco	Landfill Gas	May 2010	Sep. 2013	21.6
San Joaquin	Ameresco	Landfill Gas	May 2010	Apr. 2013	30.3
Western Geo	Ram	Geothermal	Apr. 2011	Jun. 2014	33.1
Subtotal – Under Construction					**95.4**
Total – All Executed Contracts					**279.4**

In addition, through its contract with the Western Area Power Administration, the City receives hydroelectric energy that includes a small amount of energy from "small" hydroelectric projects that qualify under the state's standard for renewable energy. The City also receives a share of the New Spicer Meadow qualifying small hydroelectric output as part of the Calaveras Hydroelectric Project. These resources count towards meeting the City's RPS and together account for about 1% of the City's sales in normal water years.

Lastly, Palo Alto Clean Local Energy Accessible Now (CLEAN), a local solar photovoltaic (PV) feed-in tariff program, was approved by Council on March 5, 2012, and was initiated on April 2, 2012 (Staff Report 2548). The Palo Alto CLEAN program may provide up to 1.9% of Palo Alto's electric energy needs by 2015. Together, when all of the committed facilities reach commercial operating status,

and assuming Palo Alto CLEAN provides 1.9% of the City's total energy supply, the City's RPS will be about 29.8 % of Palo Alto's total energy supply needs by 2015 as shown in Figure 1 below.

Figure 1 – Palo Alto's Renewable Resources

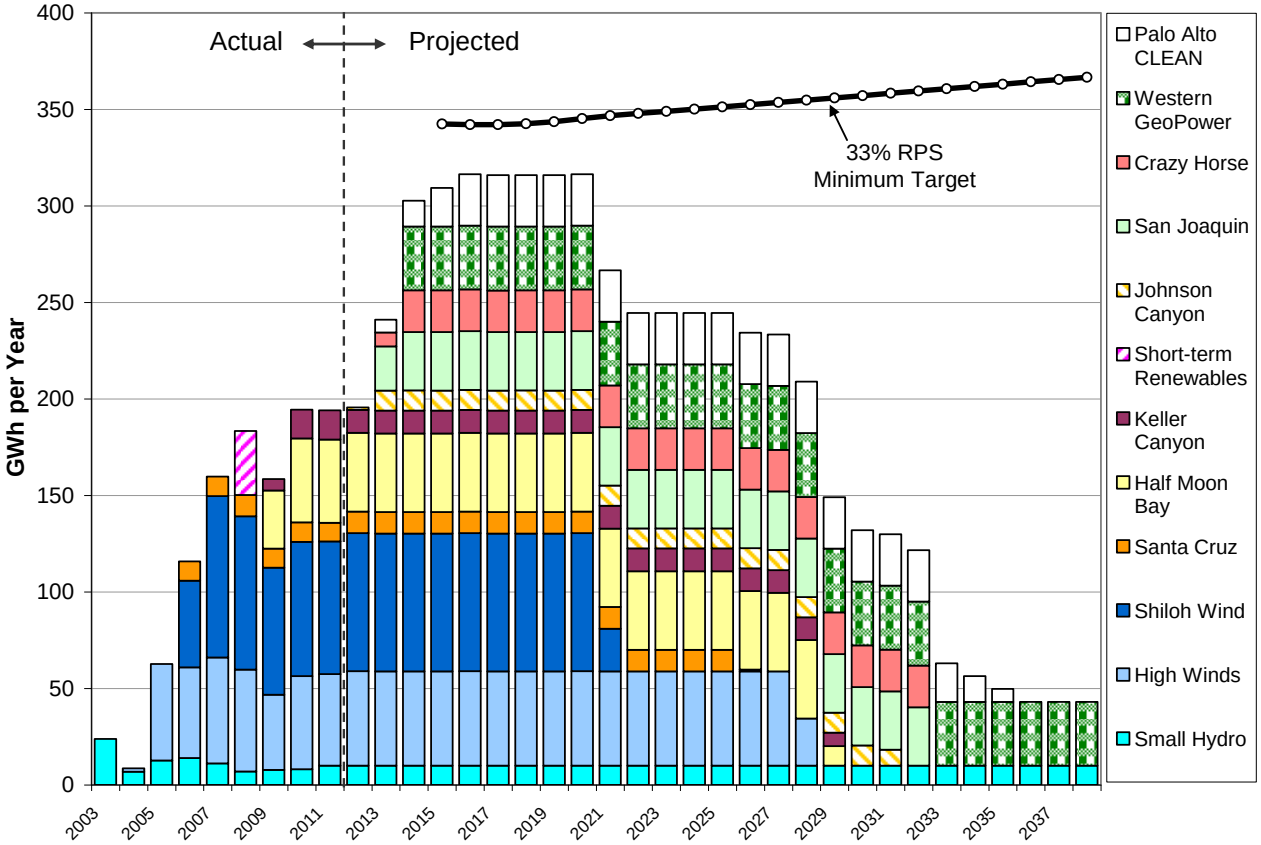


Figure 1 shows actual deliveries through 2011 and estimated deliveries after 2011.

<u>"Green Premium" Calculation</u>

To conform to the rate impact limitation of 0.5 ¢/kWh on average, staff compares the total cost of each renewable resource to the wholesale market price of non-renewable energy at the time that the contract for the resource is executed. The limit is converted into an annual premium "budget" for qualifying renewables. For example, for 2015, the annual premium is calculated by multiplying the annual energy sales (approximately 1,038,000 megawatt-hours per year (MWh/year)) by the premium (0.5 ¢/kWh, or $5/MWh) to get a green premium budget of approximately $5.2 million/year.

For each resource the levelized[1] cost impact ($/year) is calculated based on the renewable energy cost plus transmission charges, minus any system or local capacity value provided, and minus the wholesale market price quote for non-renewable energy (or "brown power") plus transmission

[1] Levelizing is a process of taking nominal cash flows, discounting them to present value, summing the present values, and amortizing the present value into uniform annual payments like a mortgage. The discounting and the amortizing are both performed with the user's discount rate or time value of money.

charges [Green Premium = (PPA cost + transmission charges) – (brown power cost + transmission charges)].

Table 2 below shows the amount of the green premium budget that has been used up with the committed RPS resources. As shown, the contracts that were executed in 2004 and 2005 were priced very near the brown energy market price. Prices for the last four contracts were significantly higher than the brown energy market price. As shown in Table 2, for the nine existing renewable contracts, the total green premium that is expected to be paid annually once all projects are generating (expected in 2014) is $3.0 million, which corresponds to a rate impact of about 0.29 ¢/kWh. This means that there is still room (up to $2.19 million per year) to acquire additional renewable energy within the 0.5 ¢/kWh rate impact limit.

Table 2 – Green Premium for Existing Renewable Energy Contracts

	Date Contract Executed	Annual Energy (GWh)	Levelized Project Cost ($/MWh)	Adjusted * Brown Market Cost ($/MWh)	Green Premium ($/MWh)	Green Premium ($1000/yr)
Small Hydro	N/A	10.0	N/A	N/A	0	0
High Winds	Nov. 2004	48.9	57.6	55.0	2.6	125
Shiloh Wind	Oct. 2005	71.4	63.0	69.5	(6.5)	(464)
Santa Cruz	Nov. 2004	11.2	62.3	59.3	3.0	33
Ox Mountain	Jan. 2005	40.7	59.0	67.5	(8.5)	(348)
Keller Canyon	Aug. 2005	11.8	70.8	83.9	(13.0)	(154)
Johnson Canyon	Aug. 2009	10.4	123.6	67.3	56.3	586
San Joaquin	May 2010	30.3	118.1	75.6	42.4	1,286
Crazy Horse	May 2010	21.6	107.6	69.3	38.3	826
Western Geo	Apr. 2011	33.1	113.0	79.5	33.5	1,107
Total - All Committed Contracts		**289.4**				**2,998**

* Brown Market Costs are levelized across the project's contract period, and adjusted for the comparison project's monthly and daily delivery profile, local and system capacity value, transmission costs and losses.

DISCUSSION

The Market for Renewable Resources in California

With the arrival of RPS goals for investor owned utilities (IOUs) and publicly owned utilities (POUs) plus the likelihood of still higher RPS goals hinted by the Governor, the developers of renewable power have been bullish on the pricing prospects for their products. However, low cost solar panels and low cost natural gas have disrupted some of that bullishness, at least temporarily. Long run hints at even higher RPS requirements, California in-state renewable energy quotas, elimination of out of state biogas counting for RPS, and carbon cap-and-trade mechanisms continue to drive the bullishness of renewable energy project developers in the longer term.

In the meantime, the California Public Utilities Commission's (CPUC) "Market Price Referent" (MPR) has lost some of its impact on renewable energy prices. The MPR is published by the CPUC periodically and establishes benchmark prices above which renewable projects proposed to IOUs would face additional CPUC scrutiny. For 25-year base-load energy contracts with delivery starting in 2014 the current levelized MPR is $100.81/MWh.

Results of Palo Alto's Renewable Resource Request for Proposals (Fall 2011 RFP)

The City seeks new renewable supplies through several activities. The most successful method to date has been to issue RFPs for renewable power, the most recent of which was released last Fall.

The City issued an RFP for renewable energy resources in September 2011 and received 64 proposals on October 25, 2011. The 64 proposals represented a total capacity of 1,200 MW and 3,400 gigawatt-hours per year (GWh/year) of energy from a variety of technologies. The 64 projects proposed included 46 solar PV projects, 9 wind projects, 4 landfill-gas-to-energy projects, 3 biomass/biogas projects, one geothermal project and one small hydro project.

The proposals were evaluated for responsiveness to the RFP, price and value, project/contract viability, and compatibility with Palo Alto's electric portfolio. The Brannon Solar proposal scored the best at meeting the price value criteria and the overall criteria.

In evaluating the price and value of different offers staff takes into account:

- The daily and seasonal shape of the energy output;
- The location of the output;
- The structure of the output in terms of meeting legislated criteria (i.e., satisfying limitations on the use of the three types, or "buckets," of renewable resources defined by the state's RPS law);
- The likely capacity value of the output;
- The likely interconnection cost to get the output onto the grid;
- The proposed start date; and
- The green premium, which is calculated for each proposal as the proposal cost minus the cost of buying the equivalent amount of non-renewable resource output.

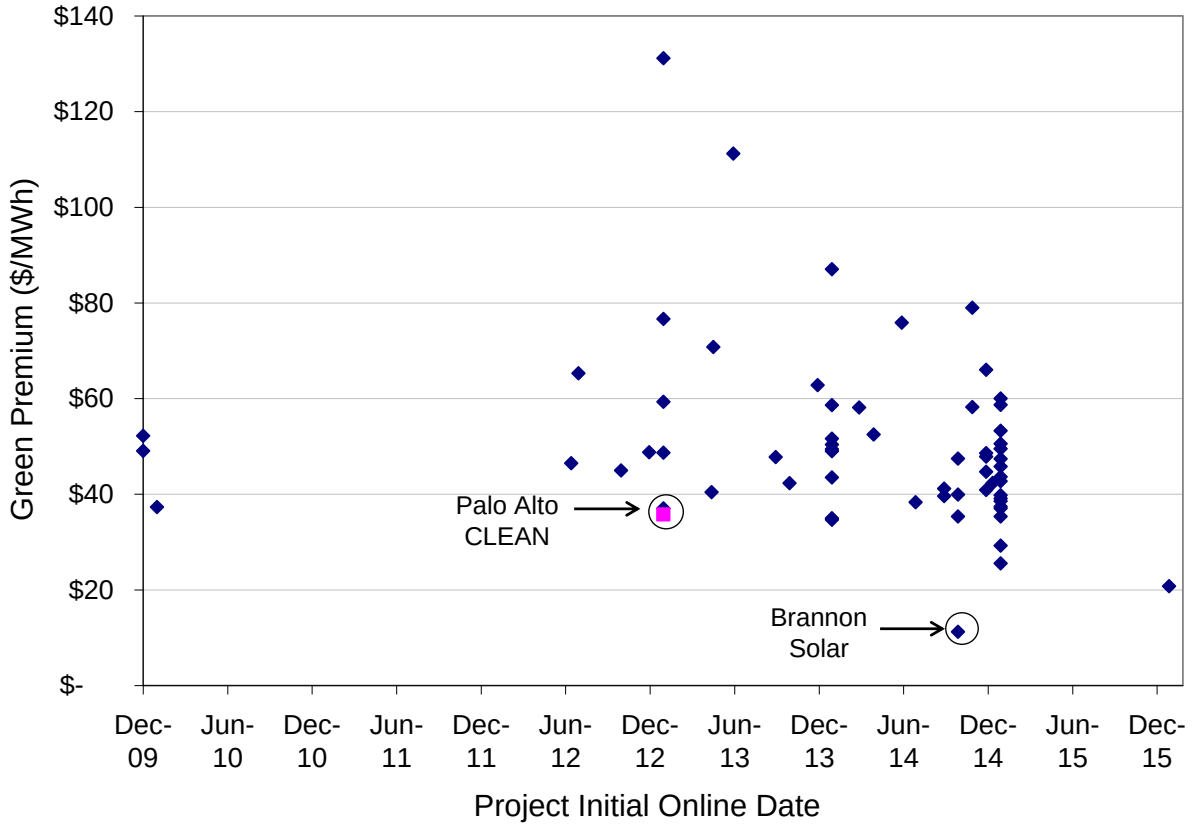
Further, the viability of each proposed project was evaluated in terms of accomplished and remaining development steps along with the financial standing and development experience of the project developer.

Staff found that all projects on the short list of most attractive projects, were in the planning permitting and development process and still had significant milestones to accomplish before reaching commercial operation. Staff contracted with Navigant Consulting to perform an evaluation of the viability of the top scoring proposals and they found that the Brannon Solar proposal had reasonable viability. Navigant noted that Brannon Solar proposed to utilize panels from Trina Solar, which are considered to be among the highest quality panels in the solar industry.

The City also engaged Navigant Consulting to assess market timing of renewable resource procurement in the context of the current RFP. Navigant's assessment is that this is a relatively favorable time to buy. They felt utilities' renewables demand was likely to surge between now and 2020 causing California renewable resource prices to rise.

The Brannon Solar proposal had the lowest green premium ($11.2/MWh, based on brown market prices as of April 11, 2012) among the 64 proposals. Figure 2 is a scatter plot of green premiums vs. project start date for the proposals received from the RFP. The green-premium associated with the Council-approved Palo Alto CLEAN program is provided for illustrative purposes.

Figure 2 – Green Premiums and Project Start Dates of RFP Proposals



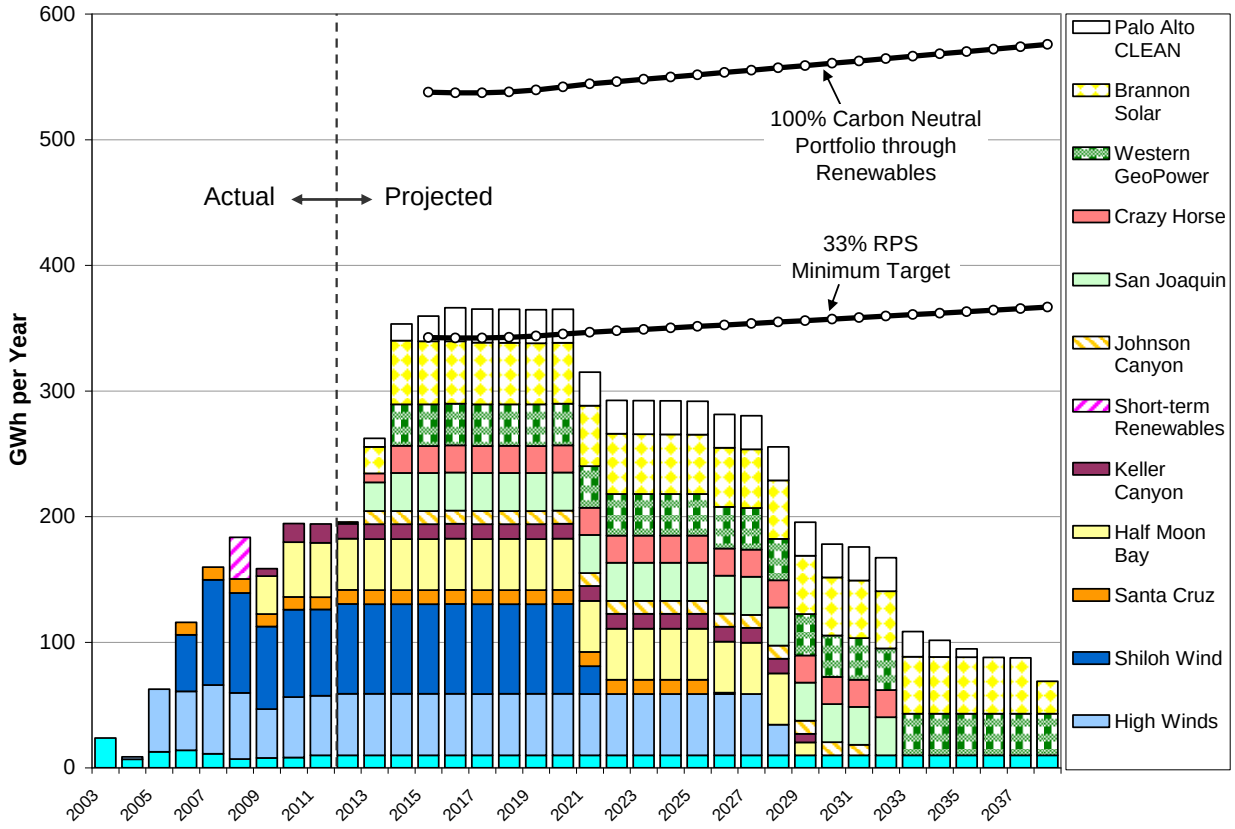
<u>Comparison of Greenhouse Gas Emissions of Various Qualifying Renewables</u>

Staff also asked Navigant Consulting to evaluate the relative greenhouse gas emissions from various qualifying renewable energy sources including: wind, solar, landfill gas, and other bio-energy sources. Navigant found that, ignoring differences in the embodied energy required to manufacture and install the different energy conversion devices associated with the different sources, wind-powered and solar-powered sources produce approximately zero net greenhouse gas emissions.

Palo Alto's Renewable Resource Portfolio with the Brannon Solar Project

The City has made commitments to renewable resources projected to provide 27.9% of its energy from qualified renewable resources by 2015 not including any output associated with the Palo Alto CLEAN program. If the Brannon Solar PPA is added, Palo Alto's renewable resources would increase to about 32.7% of total sales in 2015, or about 0.3% short of the 33% minimum RPS target. If the City procures 4 MW of local solar installations per year for four years through the CLEAN program in addition to the Brannon Solar project, renewable resources would provide 34.6% of total sales in 2015 and 35.3% of total sales in 2016. Figure 3 illustrates the renewable resources already in the portfolio plus the Brannon Solar project and the anticipated CLEAN Program participation. Also shown is a reference line indicating the level of renewables that would produce a carbon neutral electric portfolio. This reference line indicates there is substantial space in the portfolio available to accommodate the output from additional renewable projects.

Figure 3 – Palo Alto's Renewable Resources with Brannon Solar



The Brannon Solar PV Project Proposal

The price for the Brannon Solar project PPA is $72.00/MWh over the entire 25-yer term of the contract. The panels proposed for the Brannon Solar project will likely incur import tariffs recently imposed by the U.S. Commerce Department. The developer has indicated that the tariffs will not increase the PPA price or the cost to the City.

Table 3 shows a summary of renewable energy supplies available assuming all contracted projects are built and that 12 MW (3 times the first year limit) of Palo Alto CLEAN resources are built by 2015. As shown in the table, the annual green premium for 50.7 GWh/year of the Brannon Solar project is $532,000. If Council approves the Brannon Solar PPA there would still be approximately $600,000 per year of remaining green premium even with the Palo Alto CLEAN subscribed at 12 MW. This indicates that more renewable resources (from Palo Alto CLEAN, external RFPs, NCPA, or other venues) can be pursued within the 0.5 ¢/kWh rate impact limit.

Table 3 – Summary of Current Renewable Energy Supplies and Brannon Solar

	Delivery Begins	Annual Generation (GWh)	Levelized Price ($/MWh)	Adjusted Brown Market Price ($/MWh)	Green Premium ($/MWh)	Total Annual Green Premium ($1000)
Small Hydro	Before 2000	10.0	N/A	N/A	0	0
High Winds	Dec. 2004	48.9	57.6	55.0	2.6	125
Shiloh Wind	Jun. 2006	71.4	63.0	69.5	(6.5)	(464)
Santa Cruz	Feb. 2006	11.2	62.3	59.3	3.0	33
Ox Mountain	Apr. 2009	40.7	59.0	67.5	(8.5)	(348)
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Western Geo	Jun. 2014	33.1	113.0	79.5	33.5	1,107
Total Committed Projects		**289**	**Total Committed Green Premium**			**2,998**
PA CLEAN	2013-2015	**20.0**	**140.0**	**86.7**	**53.3**	**1,065**
Brannon Solar	Aug. 2014	**50.7**	**72.0**	**62.6**	**9.4**	**477**
Total with Brannon & CLEAN		**360**	**Total Green Premium with Brannon & CLEAN**			**4,540***

*Annual green premium associated with a rate impact of 0.5 ¢/kWh is equal to $5.2 million

<u>The Brannon Solar PV Contract Structure and Associated Risks</u>

Like all of Palo Alto's other renewable PPAs, the Brannon Solar agreement is structured so that the City only pays for metered output from the project after the output has been delivered each month. This structure minimizes the City's exposure to operational, maintenance and counterparty default risks in these contracts. If, however, the project output is reduced or stops and the City decides to procure replacement volumes, there is a risk that the market price for the replacement volumes is more expensive.

The pricing is known and fixed for the 25-year term of the contract at $72.00/MWh. While the price is known, the value of each MWh of output fluctuates with market conditions. Thus the City has price risk in that the fixed price paid for the contract may, over the life of the contract, be

more or less attractive compared to future alternatives that may become available from other providers for the remaining term of the contract.

Since the City has experienced renewable project commitments that either do not materialize or are delayed, for the Brannon Solar PPA, the City is negotiating the inclusion of development and performance assurance deposits in the PPA. A development deposit of $400,000 (in the form of a letter of credit) would be available to the City, and withheld from the developer, if the project misses the commercial operation timing milestone. The development deposit provides an incentive to the developer to complete the project on time. It also provides compensation to the City should the project be late or not materialize. After the start of commercial operations, the developer would provide a $400,000 performance deposit (in the form of a letter of credit), which will be available to the City, and withheld from the operator, if certain performance measures are not met. The performance deposit provides an added incentive for the operator to maintain the project output and provides compensation to the City should performance be less than expected.

Creditworthiness Review

The Brannon Solar agreement is with a small Limited Liability Company (LLC). Brannon Solar LLC is supported by its parent company, Trina Solar Limited (TSL), a New York Stock Exchange traded company. TSL has solar PV panel making operations around the globe and is venturing into the project development business. This type of vertically integrated operation appears to be bringing economies to the project development business. Due to the recent turmoil in the solar PV panel manufacturing industry, TSL bonds issued in China have been trading at high yields, indicating a credit rating of below investment grade. As a result, TSL has agreed to provide letters of credit for $400,000 each to the City as development and performance assurance deposits.

The Energy Risk Manager assessed the expected default frequency (EDF) of TSL using Moody's credit measure tool which extracts credit signals by combining information from the equity markets with the company debt structure as reported on the financial statements. This analysis yielded an EDF of 15 percent, meaning that there is an estimated one in six chance of default by TSL in the next year. Energy deliveries will be provided by a specific generator, at a specific location, with an expected low operating cost. This is in contrast to market energy contracts, whose deliveries are often backed by the financial strength or collateral of companies rather than by a physical asset.

The risks to the City of entering into the proposed Brannon Solar PPA are that the supplier will default or not perform according to the terms of the contract. If this occurs, the City would be forced to buy renewable energy from another supplier, or on the short-term markets, if required to meet its RPS obligations under State law or to meet the City's RPS goals. These risks are minimized by the following terms of the proposed PPA:

- The City is not at risk for paying for output that is not delivered. The City will make no payments under the PPA until and unless energy from the project is delivered to the City and the City will only pay for energy after it is delivered.

- The supplier's $400,000 letter of credit for a development deposit provides some degree of certainty that the project will actually be built. If it does not, then the City will access the $400,000 to cover the risk of buying replacement renewable energy supplies and to help offset the cost of negotiating the contract and issuing a new RFP for replacement supplies.
- Once the project becomes operational, the balance of the development deposit is returned to Brannon Solar. Also, at that time, a new performance assurance deposit of $400,000 development deposit will be made by Brannon Solar and can be used by the City to cover operational and performance risk. Staff believes this amount is sufficient to cover these risks since, once a solar project is constructed, its operating costs are much lower than its operating revenue so project owners tend to keep the project operating.

Under the terms of the proposed PPA, if the project does not come to fruition in a timely manner, or if supplier defaults at any time during the term of the agreement, the City can access the $400,000 letter of credit. For these reasons, staff recommends that the Council waive the investment-grade credit requirement for public agency contracts required under Section 2.20.340 (d) of the Palo Alto Municipal Code. This conforms to Council action on prior renewable resource contracts with similar characteristics (CMR:461:04, CMR:100:05, CMR:350:05, CMR:343:09, and CMR:226:10). This waiver is intended to benefit only renewable energy companies providing energy, which is paid for by the City only after its delivery under power purchase agreements.

NEXT STEPS

The PPA with Brannon Solar is still being reviewed by staff and by the City Attorney's office. Staff plans to complete negotiations and review of the PPA and to seek a Finance Committee recommendation for Council approval in June. If recommended by the Finance Committee, Council approval of the PPA will be sought in July.

RESOURCE IMPACT

The cost of renewable energy supplies from a Brannon Solar PPA is expected to be up to $92.0 million over the 25-year term of the agreement. The annual expected cost is up to $4.2 million which includes a green premium over the cost of brown power of $0.5 million per year. Approval of the Brannon Solar PPA would result in a retail rate impact from all renewable resources, including Brannon Solar and the Palo Alto CLEAN program of up to 0.44 ¢/kWh, beginning no earlier than 2014. The expected future cost for procuring renewable resources to meet the City's RPS goal is already included in the current five-year financial forecast.

PREPARED BY: **TOM KABAT**, Senior Resource Originator

REVIEWED BY: **JANE RATCHYE,** Assistant Director, Resource Management

APPROVED BY: **VALERIE O. FONG**
Director of Utilities