



# Initiative #5: Evolving Energy Markets

## INITIATIVE INFORMATION

<b>Business Unit/Division</b>	Power Supply & Strategic Planning BU/Power Management Division						
<b>Initiative Executive Sponsor</b>	Paula Laschober and Robert Cromwell						
<b>Initiative Project Manager</b>	Raman Vishwanathan, Joy Liechty & Sarah Davis						
<b>Legally mandated/Required?</b>	No						
<b>(\$000's)</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>Total</b>
<b>O&amp;M \$ Amount</b>	2,800	2,800	2,800	2,800	2,800	2,800	16,800
<b>CIP \$ Amount</b>	3,100	500					3,600
<b>Total \$ *</b>	5,900	3,300	2,800	2,800	2,800	2,800	20,400
<b>FTEs assigned*</b>	8	8	8	8	8	8	8

\* Please note these are approved budget dollars. No additional budget or FTEs are requested.

## INITIATIVE SUMMARY

- A. Description:** With declining load and fundamental changes to energy supply and wholesale power markets, City Light has been assessing how it manages its power supply portfolio, including both owned and contracted resources. This initiative strives to undertake a well-structured and comprehensive assessment of the current portfolio while exploring/identifying all available opportunities for cost savings or incremental revenue.

City Light has a highly valuable resource portfolio which is net surplus on an expected basis in an average water year, with considerable flexibility and desirable environmental attributes. However, low wholesale energy prices have resulted in long-term declining net wholesale revenues for City Light. We will evaluate whether revised approaches to power marketing and risk management could deliver additional value from the intrinsic flexibility and environmental quality of City Light’s resource portfolio.

Rapid growth in renewable wind and solar generation in the West coupled with unprecedented surplus in natural gas inventory has plunged energy prices to historic lows. This trend is expected to continue or remain steady, at the new lows, for the foreseeable future. Efforts to mitigate climate change through the California carbon cap and trade program, and carbon legislation also being considered in Washington and

other states has the potential to recognize the value of clean hydro energy; but have not substantially changed prices to date. In addition to seeking opportunities for generating incremental revenues, this initiative is also aimed at equipping City Light's wholesale operations team with new tools and expertise to successfully navigate anticipated changes in regional energy markets.

NOTE: The bulk of this initiatives initial spend, and approved hiring will occur in 2018

- B. Context:** City Light has been an active part of energy trading since the late 1990's. The Power Marketing and Risk Management groups have adapted to changes in the industry since then. The Evolving Energy Markets initiative is a continuation of these groups executing in the whole sale power markets to better City Lights position. This initiative is the only Strategic Initiative in the Power Marketing and Risk Management portfolio.

The EIM program will be given 8 new FTE's who will be hired and trained between 2018 and 2020. Of these 8, one will be in Power Management providing EIM analytics and strategy assistance. Two will be in Risk Management to handle the incremental work load from participation in EIM such as daily shadow settlements, meter data validation, settlements reconciliation, dispute resolution with CAISO, daily Profit and Loss, and analytics as needed. The remaining five will be divided between the Balancing Authority: the System Control Center will add four new dispatchers creating an EIM Entity desk, and the final FTE will be allocated to Operational Technology for support of CASIO software. The project work, approximately 35,000 hours, will be completed by a blend of new hires and existing staff based on availability over the same timeline.

- C. Component(s)/Objective(s) of initiative:** As part of this initiative, City Light will:
- Move ahead with participation in the California Independent System Operator (ISO) Energy Imbalance Market (EIM) to monetize currently unrealized short-term market value in hydroelectric resources.
  - Evaluate policies, procedures, metrics, and transactional authority to identify opportunities for prudent flexibility and additional revenue accrual.
  - Propose amendments to risk policies (such as additional long-term transactional authority) to increase net wholesale revenue opportunity.
- D. Business Value:** This initiative seeks to generate new revenue and value from existing hydroelectric resources. In this context it is important to recognize the current and on-going transactional work such as selling frequency response, forward capacity sales, and similar products and services that have and continue to generate greater revenue than simply selling MWhs. Participation in the EIM will allow City Light to more efficiently use generation and transmission assets, buy and sell energy in shorter term increments, and use pricing to match loads and resources across more buyers and sellers than existing markets currently permit. The probability distribution for estimated revenue ranges from \$2.9 million at the first quartile up to \$6.4 million at the third quartile based on 2015 and 2016 prices.

There is a widespread belief that Western energy markets are on the cusp of significant transformation. Both in California and Colorado, organized markets are seeking to expand, and there is a high likelihood of them doing so in the coming years. The EIM presents both a positive revenue opportunity for City Light customers, as well as an opportunity to support environmental policy objectives by aiding the region in variable energy resource (VER) integration. The purchase and integration of VERs such as wind and solar continues to accelerate in the West. These resources provide an increased societal value but are costly to integrate into the grid due to their variability. The EIM was developed in part to provide an efficient market solution for the integration of VERs. In practice, it also provides for a more efficient dispatch of resources across balancing areas and therefore a more cost effective regional generation dispatch solution. An additional benefit of the EIM project is providing for the professional development of the affected employees, in a manner that will make City Light resilient to anticipated market changes in the coming years. By joining the EIM, City Light will have done some of the "hard lifting" in preparing its people and systems for the market evolution we are witnessing today, and which appears to be accelerating.

- E. Opportunity for increased revenues and/or decreased costs: City Light went through multiple revenue studies when determining to join EIM. These studies were performed using 2015 and 2016 prices available to City Light at the time.

The first model City Light ran when deciding to join the California Energy Imbalance Market was a benefits modeling study from E3. E3 to date has provided the benefits for all previous market entries, and continues to be the firm of choice for entities currently deciding on participating. The results of the E3 study indicated a revenue range of \$8-23 million per year for City Light.

For the second model, a number of improvements on the E3 model were identified by City Light's Risk Oversight Division. In doing its due diligence City Light sought to improve on the E3 model by developing its own time-sequence model using the Mid-C price and introducing a degree of randomness by constraining the amount of generation City Light could bid into the market. This second Risk model produced a range of results, tied largely to the quantity of generation made available by the model. Across the more than 200 scenarios run, the model's results ranged from a negative \$4.4 million to a positive \$14.5 million per year.

The third model ran by City Light was run by the Power Management division for EIM Benefits in 2020. This model was based around specifically dispatching City Light's generation considering physical generator operating restriction and the supply and demand balance of forecasted energy. Power Management estimated revenue of \$7 million, using the AuroraXMP and STOMP models used by Integrated Resource Planning.

With all three of these models completed, City Light chose to use the Risk Oversight Division Enhanced E3 model as the distribution of revenue ranges entering the EIM market. While this model shows scenarios where the minimum estimated results are negative \$4.4 million, and the maximum estimated results were a positive \$14.5 million the cumulative distribution shows a much more realistic picture between the 25th

percentile and the 75th percentile in the model. This model shows a median estimated revenue of \$4.8 million and at the lower bound of the 25th percentile a revenue of \$2.9 million. The 75th percentile or estimated high end revenue is \$6.4 million.

Maximum	\$14.5 million	
4 <sup>th</sup> Quartile	\$6.4 million	High Estimated
Median	\$4.8 million	Average Estimated
1 <sup>st</sup> Quartile	\$2.9 million	Low Estimated
Minimum	-\$4.4 million	

### 2019 - 2024 WHOLESALE REVENUE INITIATIVE MILESTONES AND DELIVERABLES

Milestone	Due Date	Milestone Definition and Comments
<b>Initiative Start</b>	05/2018	Evaluate alternative risk models to update existing approaches.
	06/2018	Request 60 -month transactional authority from the Mayor and City Council.
	8/2018	Review potential modifications to existing risk tolerances and discuss with policymakers the potential risk and rewards of doing so.
	03/2019	Draft revised Risk Policies and Procedures to adjust City Light's current risk tolerance and authorize additional products and transactions.
	06/2019	Present revised Wholesale Energy Risk Management Policy to the Mayor and City Council for review and approval.
<b>Initiative Complete</b>	8/1/2019	

### 2019 - 2024 EIM INITIATIVE MILESTONES AND DELIVERABLES

Milestone	Due Date	Milestone Definition and Comments
<b>Initiative Start</b>	07/2019	Validation of Full Network Model- This milestone is completed upon modeling SCL into the ISO Full Network Model in the EMS in a non-production test environment using the ISO's network and resource modeling process and the complete validation of all SCADA points from SCL; completion of testing of the new Full Network Model; and validation of the Outage and State Estimator applications with the SCL Network Model included.
	09/2019	Connectivity Testing- CAISO makes available the Market Simulation ("MAP Stage") environment for connectivity testing prior to the start of Market Simulation; SCL Network Model and EMS functionality incorporated into CAISO Full Network Model and EMS in the Market

		Simulation Environment; Market Simulation for the 2019 Fall Release is stable such that SCL testing can begin.
	12/2019	Begin Market Simulation- Testing focuses on specific scenarios to ensure SCL and CAISO software applications are performing correctly, and simulated settlements are correct under specific conditions (e.g. manual dispatches, mitigation, contingency events). Scenarios will be specified in the Market Simulation Plan. Transactions use a single recurring Operating Day. Structure Simulation is executed during normal business hours but requires continuous data feeds from SCL to keep the Market solving normally 24x7.
	02/2020	Begin Parallel Operations- Activate Parallel Operations to practice EIM activities with production grade systems, integration, market processes and operating procedures. Confirm compliance with the EIM readiness criteria set forth in the CAISO tariff. Parallel Operations is 24x7 and uses actual Production data (e.g. load forecast, VER forecast).
	04/2020	Go-live- Complete upon the first financially binding production energy imbalance market trade date. The SCL and the ISO may elect to perform a non-binding parallel production prior to the first binding production trade date.
<b>Initiative Complete</b>	4/1/20	

## SOCIAL EQUITY

There are no discrete, geographic impacts to the Evolving Energy Markets Initiative and the EIM project as they will impact all customers equally via our retail rates, with the potential for making retail rates more affordable than they otherwise would be without these efforts. The EIM Project will utilize City Light’s existing contracting and procurement process to obtain operational technology and supporting consulting services; which will include WMBE evaluation criteria, as is our standard practice.

## METRICS FOR SUCCESS AND METHOD FOR MEASUREMENT

This initiative’s success will be measured by whether City Light is successful in revising its approach to wholesale transactions and deliver greater than expected revenue as a result. Success with the EIM project will be based on joining the EIM market on time and within budget, all system and architectural changes are successfully implemented, testing and training have been completed, and SCL passes readiness criteria during parallel operations with the CAISO. Standard project management tools will be utilized for measurement.

## STAKEHOLDER OR CUSTOMER IMPACT

Joining the EIM will position the utility for future success and furthers our four Strategic Plan priorities of Customer Service, Affordability and Rate Stability, Clean Energy and Environmental Stewardship, and continued progress on our Core Business investment.

1. Environmental benefit (Clean Energy and Environmental Stewardship). City Light is very fortunate to have clean, flexible, hydro generation. While we're green on our own, participating in the EIM allows us to use the flexibility of our resources to help other renewable resources stay online, and additionally we have the potential to displace gas and coal-fired generation. The result is an overall reduction in carbon emissions. Thanks to EIM, our clean hydro will now be able to do more good and go further.
2. Customer benefit (Customer Service; Affordability and Rate Stability). Currently, our wholesale revenue is limited to our bilateral market transactions. Joining EIM gives us access to a new revenue stream which can positively impact rate pressure. Participating in an economically dispatched market can also reduce the amount of reserves we have to carry, which can translate into further savings for customers. In addition to financial benefits, EIM enhances system reliability which means better visibility across the grid, with improved transmission planning and congestion management over a larger geographic footprint.
3. Core Business benefit. Training, new tools, building new skill sets, and working together in a more coordinated fashion are a few of the EIM benefits that will foster employee growth and development.