

## Final Ex Ante Review Findings

**Table 1-1: Project Information**

<b>IOU</b>	PG&E
<b>Application ID</b>	NC0127306
<b>Application Date</b>	10/31/2013
<b>Program ID</b>	PGE21042
<b>Program Name</b>	Nonresidential New Construction Program (Savings By Design)
<b>Program Year</b>	2013
<b>CPUC Project ID</b>	X435
<b>IOU Ex Ante Savings Date</b>	11/21/2013
<b>Measure Name</b>	New Construction Plastic Recycler
<b>Project Description</b>	Installation of a new construction plastic extrusion line with a high efficiency extruder
<b>Date of CPUC Staff Review(s)</b>	11/26/2013 & 12/16/2014
<b>Primary Reviewer / Firm</b>	Joseph Ball/Itron
<b>Review Supervisor / Firm</b>	Keith Rothenberg/Energy Metrics
<b>CPUC Staff Project Manager</b>	██████████ / California Public Utilities Commission, Energy Division
<b>CPUC Staff Policy Authorization (as needed)</b>	
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk
<b>CPUC Staff Recommendation</b>	The project is accepted as a New Construction project type with an EUL of 20 years. CPUC staff approve adjusted ex ante savings for this project at the following levels: 3,063,222 kWh and 320 kW. The IOU is required to perform the actions described below.

## **Measure Description**

This project proposes the installation of a new recycled plastic processing line with a high efficiency tangential cutter-compact extruder. The new unit can accept feed material with a higher moisture content than the baseline unit is capable of, thus eliminating the additional processes of grinding the feed material and sending it through hot air dryers and then an agglomerator/densifier that would otherwise be necessary before the material could be fed into an extruder, and this results in significant energy savings. Moisture is introduced upstream during a wash cycle which leaves the recycled plastic feed material with 100% residual moisture content. A screw press then removes 90% of water, and the material can be fed directly into the high efficiency extruder at that point.

The proposed equipment production capacity is comparable to two processing lines with the baseline equipment. The baseline equipment identified by the customer consists of used equipment that is available to them from a sister company. Furthermore, this equipment is still being produced and is commercially available from the manufacturer. The customer estimates the annual operating hours at 8,585 hours/year and the projected production rate at [REDACTED] lbs./hr.

## **Summary of Review**

### **Prior CPUC Staff Key Findings**

During the Phase I ex ante review, CPUC staff agreed with the IOU's ISP baseline claim, and accepted the use of two machines (including a five year old machine that had been in operation at the sister company location) as a valid ISP baseline. The new [REDACTED] square foot facility will divert discarded plastic in landfills and creates high quality raw plastic resins that are sold to manufacturers who in turn make recycled products.

The IOU was requesting CPUC staff expedite the ex ante review, because the customer had equipment ordering and lead-time constraints. Simultaneously, CPUC staff needed evidence that other ancillary baseline equipment (dry grinder, hot air dryers, and agglomerator) be clearly included in incremental costs and analysis; and subsequently the IOU provided the missing documentation. CPUC staff learned that the new recycling machine comes from Europe and is a new closed-loop system compared to American models available on the market today, such as the baseline unit, which require several components and additional processing steps .

The baseline process was further explained by the IOU during this parallel review. CPUC staff discovered that the proposed baseline equipment had been removed at the sister company and when queried about obtaining available monitored data for the Davis-Standard (baseline) equipment, the reviewer responded that unfortunately there was not any data available. By the end of 2013 the sister company had already installed the new Erema equipment, which manufactures recycled & reusable plastic shopping bags and sells them to the grocery store and

retail markets. At that same time, the sister company planned on re-selling this recycling machine, since it is only 5 years old and is still available for purchase new today.

**Post Install M&V**

The final IR package included the required two week minimum post-install power monitoring. The production rate of 1,893 lbs. /hr. was lower than the capacity of two Davis standard machines, so no adjustment to the baseline usage was necessary. The IOU appropriately adjusted the baseline model from using an estimated load factor of 70% down to a measured value of 37%. The revised IOU estimate of annual energy savings are 3,126,000 kWh and a peak demand reduction of 339 kW. The adjusted IOU incentive is \$256,569 and is capped at 50% of the claimed incremental measure costs of \$513,137.45, which, as discussed further below, is likely overstated since it excludes other economic considerations for installing matching baseline equipment to produce 1,893 lbs./hr. of plastic resins with the reduced moisture content of the new Erema machines.

Annual operating hours of 8,585, which the sister company provided, were used to estimate energy usage in PA estimates. This operation is assumed to include maintenance downtimes and plant holiday schedules. The M&V data analysis assumed 8,760 hours of operation based on the two weeks of power data. Assuming equipment downtime and similar holiday schedule and applying the 8,585 operating hours, energy savings are reduced to 3,063,222 kWh.

CPUC staff noted an error in the peak kW analysis using the monitored power data, where the average 2pm-5pm was taken, but the weekend hours had not been removed. When removing the weekend readings, peak kW reduction is 320 kW.

**Project Economics & Baseline Costs Re-Visited**

The IOU appropriately claimed ISP as the correct baseline, however using M&V data from a sister location may be invalid. The used equipment is an invalid baseline.

CPUC Staff found that the economic analysis of the proposed project and potential alternatives did not include all the possible incremental measure costs. As a result, the simple payback with the EE financial incentive was less than one year. There remains a need to understand the comprehensive baseline costs associated with purchasing two of the baseline units, such as incremental costs that include facility space, ownership or rental issues, additional labor required to run baseline equipment, and greater maintenance costs.

If this site is indeed sampled as an ex post evaluation point, then a detailed net-to-gross survey must be undertaken that questions all economic aspects and the various options the customer had in selecting equipment, including but not limited to facility area required (as owned or rented), additional staff labor to move the by-products along to the various processing equipment that two baseline machines would create, and other considerations. CPUC staff is concerned that true

incremental costs might begin to approach \$0 for this project, making this customer a free-rider candidate.

**CPUC Grants a One-Time Exception for this Project**

CPUC staff grant a one-time exception for this project, because our initial showstopper review overlooked these additional baseline cost issues the customer actually faced during project decision making. For future recycling machine projects that enter the IOU project pipeline, the IOU shall conduct a low-rigor ISP baseline study with special emphasis on a more complete accounting of all incremental project costs.

**Review Conclusion**

CPUC staff approve the final estimated ex ante savings for this project at the following levels: 3,063,222 kWh and 320 kW. The IOU is required to perform the actions described below.

**Summary of CPUC Staff Required Action by the IOU**

CPUC staff require that the IOU undertake the recommended steps and submit the following information:

- 1) Provide CPUC staff a list of all recycling machine projects in the IOU's current pipeline of energy efficiency projects.
- 2) For the final savings claim for this project, the IOU is required to upload to the CMPA the final claim ID numbers, the quarter claimed, and any further IOU revisions to the documentation not previously provided.
- 3) CPUC staff notes that the simple payback with incentive is under 1 year at 0.9 years; however, it does not include all incremental measure costs. This customer will need further screening for free-ridership on other new construction projects like this one. The CPUC continues to remind the IOUs to insure appropriate usage of ratepayer funds.

**For all future projects (submitted after receipt of this review) Commission staff require that the IOU:**

- 1) Determine both the new construction (NC) and retrofit market industry standard practice (ISP) for Plastics Recycling Machines, since it appears that available equipment choices are limited. Any remaining projects in the pipeline, (either NC or retrofit), shall be placed on hold until the IOUs complete a low-rigor ISP study to assess and determine proper NC baseline. CPUC staff requests that the IOUs provide the proposed list of interviewees along with the proposed questions prior to undertaking the ISP study. Once CPUC staff reviews and approves the ISP assessment and baselines, projects in the pipeline may be released and shall be assessed against the updated ISP baselines.

- 2) In the future, as part of screening for free ridership, the IOU shall conduct a more thorough and complete examination of the financial drivers of custom projects. CPUC staff expects to see complete financial and free ridership assessments of future custom projects as part of the initial project documentation.

**Table 1-2 Review Findings**

Reviewed Parameter	Analysis
<p><b>Project Baseline Type</b> (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures, Major Renovation) Note: For early retirement projects only, include RUL through EUL baseline)</p>	IOU Proposal: New Construction
	CPUC Staff Assessment: New Construction
	CPUC Staff Recommendation: None
<p><b>Project Baseline Technology</b> (in situ equipment, Title 24 (specify year), other code or other efficiency level (specify), industry standard practice - ISP)</p>	IOU Proposal: ISP
	CPUC Staff Assessment: Accept the use of 5 year old in situ equipment still available on market in 2014.
	CPUC Staff Recommendation: The IOU should conduct a low-rigor ISP study for the next project that comes through their pipeline.
<p><b>Project Cost Basis</b> (Full Incremental, or Both. Note: For early retirement projects, include RUL through EUL cost basis treatment)</p>	IOU Proposal: Incremental cost
	CPUC Staff Assessment: Incremental cost; IOU documented the total baseline equipment cost to include the dry grinder, hot air dryers, and agglomerator. Other baseline costs were not taken into consideration; a few are listed in section below.
	CPUC Staff recommendation: For future NC projects using this type of equipment, the IOU must account for other economic factors, such as additional floor space (rented/owned), higher labor costs to operate multiple machines (versus one), additional maintenance costs for the multiple pieces of equipment, and other non-energy factors. IMC costs might reduce significantly, making this project an easy decision for any plastics recycling company.
<p><b>RUL</b> (required for early retirement projects only, otherwise N/A)</p>	IOU Proposal: N/A
	CPUC Staff Assessment: N/A
	CPUC Staff recommendation: N/A

*Final Ex Ante Review Findings*

<b>Reviewed Parameter</b>	<b>Analysis</b>
<b>EUL (for each measure)</b>	IOU Proposal: 25 years
	CPUC Staff Assessment: 20 years maximum per CPUC policy
	CPUC Staff Recommendation: 20 years
<b>Savings Assumptions</b>	IOU Proposal: kW is linear to production rate; the previous estimate that the equipment operates at 70% of rated power was reduced to the measured value of 37%.
	CPUC Staff Assessment: Post-installation M&V was performed as directed; and parameters trued-up for the model.
	CPUC Staff Recommendation: None
<b>Calculation Methods/Tool review</b>	IOU Proposal: Adjust kW and operating hours were adjusted based on post-installation M&V. 70% of rated kW of equipment operating 8585 hours/year were trued up after post-install M&V to 37% load factor and 8760 operating hours.
	CPUC Staff Assessment: Production, average kW, and kWh were values revised. Peak kW reduction also reviewed; however, they included weekend hours. Hours of operation of 8,585 should be applied.
	CPUC Staff Recommendation: Peak demand reduction is 320 kW; annual operating hours are 8,585.
<b>Pre- or Post-Installation M&amp;V Plan</b>	IOU Proposal: Post-installation M&V added after initial EAR and conducted.
	CPUC Staff Assessment: True-up completed satisfactorily
	CPUC Staff Recommendation: None
<b>Net-to-Gross Review</b>	IOU Proposal: Not provided
	CPUC Staff Assessment: Because the simple payback of this project is under one year and that not all incremental costs were taken into account, the IOU shall screen this customer on future EE projects.
	CPUC Staff Recommendation: Screen customer on future EE projects.

**Table 1-3 Energy Savings Summary, Project Costs & Incentive**

Description	IOU Ex Ante Claim	CPUC Staff Recommendations
<b>First Year kWh Savings</b>	3,126,000	3,063,222
<b>First Year Peak kW Savings</b>	339	320
<b>First Year Therms Savings</b>	N/A	N/A
<b>kWh Savings (RUL Period)</b>	N/A	N/A
<b>Peak kW Savings (RUL Period)</b>	N/A	N/A
<b>Therms Impact (RUL Period)</b>	N/A	N/A
<b>kWh Savings (RUL thru EUL Period)</b>	3,126,000	3,063,222
<b>Peak kW Savings (RUL thru EUL Period)</b>	339	320
<b>Therms Savings (RUL thru EUL Period)</b>	N/A	N/A
<b>Annual Non-IOU Fuel Impact (RUL Period)</b>	N/A	N/A
<b>Annual Non-IOU Fuel Impact (RUL thru EUL Period)</b>	N/A	N/A
<b>Project Costs for Baseline #1 (RUL or EUL)</b>	\$513,138	Accept
<b>Project Costs for Baseline #2 (EUL minus RUL period)</b>	N/A	N/A
<b>Project Incentive Amount</b>	\$256,569	Accept