

Final Ex Ante Review Findings

Table 1-1: Project Information

PA	PGE
Application ID	NC0122746/47/48
Application Date	11/28/2012
Program ID	PGE21031
Program Name	Agricultural Calculated Incentives
Program Year	2012
CPUC Project ID	X258
PA Ex Ante Savings Date	Not provided (final modeling 9/8/2014)
Measure Name	Greenhouse Energy Efficiency Measures
Project Description	Implementation of energy efficiency measures in a new construction greenhouse
Date of CPUC Staff Review	5/9/2014 & 12/3/2014
Primary Reviewer / Firm	Betsy Ricker, Paolo Pecora/ERS
Review Supervisor / Firm	Joseph Ball & Leonel Campoy/Itron
CPUC Staff Project Manager	[REDACTED]
CPUC Staff Policy Authorization (as needed)	TBD
Type of Review (Desk, On-site, Full M&V, Tool)	Desk
CPUC Staff Recommendation	<p>Energy savings are approved for these three applications at the combined therm savings of 165,662; however, the project incremental costs need to be revised to exclude measures that were removed from the project.</p> <p>Secondly, the IOU is required to provide CPUC staff a list of all greenhouse projects currently in the pipeline. And, until an updated low-rigor new construction baseline study is completed by the IOUs, ALL greenhouse projects will be placed on hold.</p> <p>Effective immediately movable bench measures are not considered energy</p>

	efficiency and will be set to industry standard practice (ISP) until a new minimum baseline efficiency is determined through updated ISP research.
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Measure Description

This project, which involved three IOU applications, implemented a combination of the following five energy efficiency measures among several new greenhouses built at a single location:

- EEM1: Glazing, Roof, Double Polycarbonate – Install double-layer polycarbonate material on the greenhouse roof.
- EEM2: Glazing, Wall, Combination – Install double-layer polycarbonate on gable ends and on first 3 feet of greenhouse walls.
- EEM3: Heat Curtains, Single – Install a single-layer heat curtain for heat retention.
- EEM5: Movable Benches – Install movable benches to increase greenhouse production per square foot.
- EEM6: Boiler, High Efficiency – Install a high efficiency boiler.

The estimated annual energy savings were calculated using a building energy simulation tool. The model baselines were derived from a 2006 greenhouse baseline study performed by the Green Building Studio for PG&E.¹ Prior to the CPUC Staff’s Phase I EAR disposition, a sixth measure, *EEM4: Under-bench Heating – Install a central boiler with an under-bench heat distribution system*, was included in the project. However, this measure was found to be standard practice and PG&E removed it in their submittal to CPUC Staff.

Summary of Review

CPUC Staff undertook two reviews prior to this final disposition. Summaries of the prior ex ante reviews are provided below. In addition, CPUC Staff conducted a net-to-gross (NTG)

¹ “Greenhouse Baseline Study Final Report,” Green Building Studio, 2006, and Addendum to “Greenhouse Baseline Study Final Report”, 2008.

assessment and customer interview as described in the Phase I EAR disposition. A summary of the NTG assessment and findings are provided below as well.

Phase I Ex Ante Review Summary

CPUC Staff reviewed the following documents as part of the Phase I review:

- Response to EEGA request:
 - *EnergyEfficiencyOIR-Post-2008_DR_ED_308_EEGA_2549.doc*
- Phase 3 & 4 greenhouse applications, reports, and analysis file:
 - *123111 XXXXXX Nursery Phase 3 Application.pdf*
 - *123112 XXXXXX Nursery Phase 4 Application.pdf*
 - *123111 XXXXXX Nursery Phase 3 OA Report (Final 12-03-12).pdf*
 - *123112 XXXXXX Nursery Phase 4 OA Report (Final 12-03-12).pdf*
 - *XXXXXX (CNC 111847) GH Tool Template (04-18-12).xls*
- Phase 5-12B greenhouse application and analysis file:
 - *123113 XXXXXX Nursery Phase 5-12B Application.pdf*
 - *123113 (XXXXXX Range 12B) GH Tool (version 02-27-13).xls*
- Responses to preliminary CPUC Staff data request:
 - *RE X258 PGE NC0122746 47 48 New construction greenhouses.msg*
- PGE greenhouse baseline study:
 - *PGEGreenhouseBaselineStudy.pdf*
 - *920 2-09 4 Addendum No 1 Greenhouse Baseline Study.pdf*
- PGE post-inspection report:
 - *118847 (XXXXXX Phase 1 Greenhouse) Post-field Report.xls*
- Heat curtain specifications:
 - *Heat Curtain Spec.pdf*
- Responses to additional CPUC Staff requests:
 - *PGE Response_NC0122746_47_48.doc*

During the review, CPUC Staff received an energy simulation package that included the tools necessary to replicate the PG&E savings models. However, file errors prevented CPUC Staff from successfully replicating the results, and consequently, CPUC Staff was only able to review the input values.

Summary of Energy Savings Calculation Review

- **Thermal Curtains** - CPUC staff's previous experience with thermal curtain measures suggests that these technologies are typically installed in greenhouses for two purposes: shading and heat retention. If not required for shading, installing

thermal curtains serve primarily as heat retention devices and are a viable energy efficiency action. However, if the curtains are installed primarily for shading to ensure crop production, the installation may not represent an energy efficiency action. PG&E provided information to indicate that the facility utilizes shade cloths in some of their other greenhouses and could have installed similar systems in the greenhouses covered under these three applications. In addition, CPUC Staff's interview with the customer revealed that they did not require heat curtains for their greenhouses and could have built the greenhouses without them, but at the expense of higher heating costs. Based on the information provided by PG&E and collected during CPUC Staff's interview with the site, thermal curtains are a viable energy efficiency measure for this site.

- **Underbench Heating** - CPUC staff reviewed the findings of the 06-08 CPUC Ag-Food program evaluation and found that, in greenhouses that install heat curtains as an add-on measure, radiant heating via hot water distribution pipes was found in more greenhouses than unit heaters. The prevalence of hot water heating in the projects sampled in the 06-08 evaluation appears to be consistent with the findings in PG&E's 2006 Greenhouse Baseline Study, which included feedback from vendors and greenhouse owners that indicated a trend toward the installation of under-bench heating in greenhouses (10 of the 22 greenhouses included in the study utilized under-bench heating). Six years have elapsed since the 2006 Greenhouse Baseline Study, and given the data gathered in the 06-08 CPUC Ag-Food program evaluation, it appears that radiant heating with a standard efficiency central boiler may have advanced toward standard practice in new construction greenhouses. This is reflected in the DEER baseline models, which have been updated to permit either unit heaters or radiant heating as the baseline heating system type in greenhouses. In order to determine which of these two baseline heating system types is more appropriate for a given application, standard practice for a given crop or greenhouse location is considered. In the case of this project, discussions with the site contact indicated that for their crop type, under-bench heating is most appropriate because the focus is on heating the roots of the plants. The site contact indicated that, because of this, all of their existing greenhouses have under-bench heating. In reviewing the customer's standard practice, and considering the two baseline heating system options permitted in the DEER models, this measure should either be removed from consideration, or

the radiant heating system should be specified as the baseline for this measure and the temperature stratification in the baseline greenhouse should be set to 0°F. This impacts the energy savings of both the under-bench and heat curtain energy efficiency measures and PG&E's calculations should be re-run to account for this adjusted baseline.

- **Remaining measures** - CPUC staff's review of the remaining measures suggests that all are viable energy efficiency measures except the EEM 1: Glazing, Roof, Double Polycarbonate, which actually results in an energy penalty compared to the baseline roof glazing system; however, the analysis assumptions may need some adjustment and more detailed review after post-installation savings true-up based on actual greenhouse operations.
- **Differences in greenhouse EUI** - The gas use of the proposed greenhouses is 0.60 therms/sq.ft./yr (greenhouse #3 and #4) and 1.06 therms/sq.ft./yr (greenhouse #12B); the baseline gas use of these greenhouses is estimated to be 1.45 therms/sq.ft./yr (greenhouse #3 and #4) and 2.78 therms/sq.ft./yr (greenhouse #12B). CPUC staff's review indicated that the baseline and proposed gas use of greenhouses #3 and #4 were in-line with the gas use intensities found in the 06-08 CPUC Ag-Food program evaluation and in the 2006 Greenhouse Baseline Study. However, the gas use intensity of greenhouse #12B appears high (even for its smaller size) compared to greenhouses #3 and #4, and the baseline gas use intensity of greenhouse #12B is high compared to the 2006 Greenhouse Baseline Study and the 06-08 CPUC Ag-Food evaluation findings. CPUC staff's interview with the customer indicated that greenhouse #12B includes a laboratory where plantlets are grown in a sanitary operation. This requires a much more controlled environment and higher temperatures as this laboratory essentially acts as an incubator. This operation differs from that of greenhouses #3 and #4, which house more mature plants.

Summary of the NTG Assessment

CPUC Staff conducted a net-to-gross interview with this customer.

HISTORY: The nursery has been in operation for 30 years and has worked with PG&E rebate programs in the past. The customer grows trees and vines for orchard and vineyard farmers.

The project includes three applications that concern a laboratory greenhouse (12b) and two standard greenhouses (greenhouses 3 and 4). The selected equipment is used in all of the customer's greenhouses.

FINANCIAL: The customer does not perform payback estimates in selecting equipment, as the payback period is largely dependent on unknown factors such as the price of gas in the future and the crop demand that derives from the orchard and vineyard industry. The customer guesses that the payback might be 4-5 years for these measures. The customer stated that they would not build a greenhouse without these measures. However, the utility rebate was critical in that the customer could not have financed the project on such a large scale without it, because, in maintaining a required ratio of upfront capital to borrowed capital, the rebate counts as upfront capital. Without the rebate, the customer might have built 50% of the same amount of greenhouse square footage.

NTG: The customer stated that he would have installed these measures without the program incentive, but that the rebate was 50% of the decision in that he would have constructed less square footage (50%) of greenhouse if the rebate was not available due to limited capital. The customer stated that all of these measures are integral to their greenhouse design and are necessary to ensure high quality product. Heat curtains serve not only to save energy, and perform shading functions, but also reduce disease and stress by minimizing fluctuations in greenhouse conditions. Plant quality would suffer without heat curtains. Under bench heating is necessary for the crop type which requires stable conditions at the roots rather than in the foliage, whereas in other applications unit/jet heating might be appropriate for hanging plants.

The NTGR values determined for each measure were:

- 0.29 for the roof and wall glazing,
- 0.30 for heat curtains,
- 0.33 for the underbench heating,
- 0.32 for the moveable benches, and
- 0.30 for the boiler.

All of the above NTGR values point to a high level of freeridership for this project. At present, CPUC Staff cannot declare a project ineligible based on NTG findings alone. However, CPUC Staff admonishes PG&E that financial incentives for this and similar

greenhouse new construction projects are not a good use of ratepayer funding and CPUC Staff will reflect so in future ESPI ex ante scores.

Phase I EAR Review Conclusion

Energy savings are not approved pending updates to the baseline heating system type and heat curtain energy savings calculations. In addition, based on the NTG results for this site and the customer's statements regarding their typical practice in greenhouse construction, CPUC Staff considers providing incentives for this project as imprudent use of ratepayer funds and recommends that PG&E implement a process to better screen potential free-riders.

Requested Actions by the PA

In order to complete an ex ante review, the CPUC Staff requests that the PA perform the following activities after project implementation, IR report submitted, and PA savings true-up:

- Provide information that documents the date of construction of each of the three greenhouses.
- Submit data detailing and substantiating project incremental costs, including itemized invoices showing equipment and labor costs, and estimates of baseline equipment and labor estimates.
- Provide photos or accurate elevation drawings of the installation & locations of the movable benches.
- Present photos detailing the make and model of the installed boiler.
- Verify and document the heating and cooling setpoint temperatures and schedules for each of the three greenhouses (greenhouse #3, #4, and #12B) and the heat curtain control type and schedule of operation for each greenhouse (including shading schedules if the heat curtains are used for shading as well as heat retention). Update the energy analyses with this information and submit revised savings calculations for CPUC Staff review prior to freezing the ex ante savings.

Phase II EAR Review Summary

CPUC Staff reviewed the following documents as part of the Phase II review of this project:

- 123111 [REDACTED] Ph3 Post Install Report.xls
- 123112 [REDACTED] Ph4 Post Install Report.xls

- 123113 [REDACTED] 12B Post Install Report.xls
- Emailing ACCLIMATION pdf.zip

Phase II EAR Review Conclusion

The CPUC Staff's Phase II EAR disposition found the information provided in the PA's response to the Phase I EAR to be insufficient. The Phase II disposition found that the following items necessary for CPUC staff review were either missing or could not be found in the data submittals:

- Baseline and final project simulation files. While an earlier request was followed up with a data submittal containing Green Building Studio program files, those submitted did not appear to coincide with information provided in the post-installation summary files 123111 [REDACTED] Ph3 Post Install Report.xls, 123111 [REDACTED] Ph4 Post Install Report.xls and 123113 [REDACTED] 12B Post Install Report.xls.

Phase II EAR Requested Actions by the PA

Project energy savings were not approved during the Phase II ex ante review and the following additional information was requested from the PA:

1. Baseline and measure Green Building Studio energy simulation files. Files are to include .inp, .bdl, .sim and .xlsm files associated with each simulation.
2. Files provided are to be clearly identified as to their use in developing post evaluation savings. That is, files representing baseline simulations are to be provided for each project phase (3, 4 and 12B) with either file names or directory names that clearly identify which baseline file is referenced. Additional simulation files not specifically used in baseline evaluations are not to be included. Additionally, this is to be repeated for files used to represent the greenhouses with measures installed. The simulation files associated with the combination of measures would represent the minimum submittal. Those associated with individual measures are not mandatory. In either case, the installed simulation files are to be clearly identified as to their content and project phase by either file name or directory name. Additional simulation files not specifically used in installed measure evaluations are not to be included.
3. Provide a document that identifies the nature of each simulation file provided. A description of the file nature includes the simulation type - baseline or measure, whether

or not the measure file is for a specific measure or all measures combined, and which greenhouse phase is being addressed - Phases 3, 4 or 12B.

4. Incremental cost details. Additional documentation of incremental costs provided in post-installation summary files is to be provided. The extensive invoices currently provided are not adequate as those documents could not be used to identify which greenhouse or measure was addressed. Submitted invoices and check confirmations are to be limited to those only associated with incremental measure costs. Specific calculations, including baseline costs, are also to be provided. This is to include the source of baseline costs where appropriate for incremental cost determination - the cost of a standard efficiency baseline boiler in comparison to the high efficiency boiler installed as an example. A preliminary review of costs indicated that at least some provided were full measure costs rather than incremental costs. An example is the under-bench heating system. The cost for this measure should have been the same for the baseline and the installed case with a zero incremental cost.

Final EAR Review Summary

CPUC Staff reviewed the following documents as part of the Final EAR review of this project:

- NC0122747 Analysis Files.zip (Phase 4 greenhouse models)
- NC0122748 Analysis Files.zip (Phase 3 greenhouse models)
- NC0122746 Analysis Files.zip (Greenhouse #12 models)
- NC0122746-47-48 Supporting Files.zip (Supporting information for project included source data for incremental costs and post-installation project reports)
- EEGA2549 Greenhouses PG&E Response Sheet.xlsx (Responses to evaluator inquiries)
- NC0122746-47-48 Post Analysis Files Notes.docx (Guide to greenhouse model folders)

The CPUC Staff reviewed the submitted documentation and finds that it is consistent with the claimed energy savings. However, the assumptions remain inconsistent with DEER modeling assumptions. Given the amount of time and effort already expended on this project, CPUC Staff will approve the submitted savings claim, but require that PG&E revise the baselines for all future projects to be consistent with DEER assumptions. To that effect, CPUC Staff requires that PG&E update their baseline study and hold all further new construction greenhouse projects in the pipeline.

The submitted incremental costs for each greenhouse contain measures that were removed in prior submittals. The post-installation report spreadsheets continue to show the incremental cost for the roof glazing measure and underbench heating measures, both of which were removed

from the CNC Project 123111 and 123112 (the two identical [REDACTED] greenhouses) files. In addition, the incremental cost for the underbench heating measure is still included in the smaller greenhouse (CNC Project 123113); this needs to be removed. And the incremental cost for the smaller greenhouse (CNC Project 123113) needs to be doubled to account for the two greenhouses with this design that are included under that application. The incremental project costs should be updated as shown in the CPUC Staff Recommendations in Table 1-2.

Review Conclusion

Energy savings are approved for these three applications at the combined therm savings of 165,662; however, the project incremental costs need to be revised to exclude measures that were removed from the project.

Secondly, the IOU is required to provide CPUC staff a list of all greenhouse projects currently in the pipeline. **And, until an updated low-rigor new construction baseline study is completed by the IOUs, ALL greenhouse projects will be placed on hold.**

Effective retroactively movable bench measures are not considered energy efficiency and will be set to industry standard practice (ISP) until a new minimum baseline efficiency is determined through updated ISP research.

For this project, moveable bench measures were accepted by CPUC staff as a one-time only compromise.

Summary of CPUC Staff Required Action by the PA

For this project:

1. Revise final incremental costs to exclude measures that were removed, and upload the revised documentation to the corresponding project folder on the CMPA by January 16, 2015.
2. Provide the results of any post-installation measured data used to calibrate the energy model.
3. Upload to this project's folder in the CMPA a document file with the information of this project's claim ID and the quarter in which this project is claimed.

For all future projects (submitted after receipt of this review):

1. Submit a list of all new construction greenhouse projects currently in the pipeline along with their project status, proposed measures, and estimated savings by January 16, 2015.
2. CPUC Staff will not consider moveable benches as an energy efficiency measure in any remaining projects, either ongoing or future,

3. CPUC Staff considers underbench heating a baseline practice in accordance with the DEER greenhouse building energy simulation models, as required by DEER.
4. The CPUC staff requires that PG&E update the new construction baseline greenhouse study and submit it for to CPUC Staff for review and approval. The current baseline was established using research that was finalized in 2006. The CPUC staff's review of more recent greenhouse construction suggests that standard practice has shifted and that updated market research is needed to ensure that greenhouse baselines are accurately handled.
5. CPUC staff requires that PG&E review and report on the consistency of their greenhouse simulation tool with DEER modeling assumptions. Until the revised baseline study and tool review are completed for CPUC Staff review and approval, all further new construction greenhouse project shall be held pending approval of the revised baselines.
6. With regard to CPUC-identified free-ridership, the IOU must either 1) disallow EE funding for projects like these, or 2) influence such a customer to move into higher levels of energy efficiency.

Table 1-2 Review Findings

Reviewed Parameter	Analysis
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures) Note: For early retirement projects only, include RUL through EUL baseline)	PA Proposal: New Construction
	CPUC Staff Assessment: All three applications (and greenhouses) are being constructed from the ground up. A new construction baseline is appropriate.
	CPUC Staff Recommendation: New Construction
Project Baseline Technology (in situ equipment, Title 24 (specify year), other code or other efficiency level (specify), industry	PA Proposal: Industry standard practice (ISP) based on the 2006 Greenhouse Baseline Study
	CPUC Staff Assessment: Industry standard practice baselines are appropriate for these greenhouses, although updates need to be made to the baseline heating system type to ensure consistency with DEER models and to establish that a regressive baseline is not applied to this application.

Reviewed Parameter	Analysis										
standard practice - ISP)	CPUC Staff Recommendation: The under-bench heating system measure was removed from the project in the PA’s latest data submission. CPUC Staff recommend that underbench heating systems be considered baseline for all future new construction greenhouse projects and that the PA’s greenhouse baseline be revisited to ensure consistency with the latest DEER baselines.										
Project Cost Basis (Full Incremental, or Both. Note: For early retirement projects, include RUL through EUL cost basis treatment)	PA Proposal: Incremental costs based on typical glazing and equipment costs from PGE tools.										
	CPUC Staff Assessment: The typical costs shown in PGE’s tools appear to be appropriate for the baseline equipment, but additional, detailed invoices are needed to substantiate the itemized cost of the proposed equipment.										
	CPUC Staff Recommendation: The project incremental costs need to be revised to exclude measures that were removed from the project.										
RUL (required for early retirement projects only, otherwise N/A)	PA Proposal: N/A										
	CPUC Staff Assessment: N/A										
	CPUC Staff recommendation: N/A										
EUL (for each measure)	PA Proposal: Not provided										
	CPUC Staff Assessment: The CPUC Energy Efficiency Policy Manual recommends an Effective Useful Life (EUL) of five (5) years for heat curtains and twenty (20) years for high efficiency boilers. The document does not specify an EUL for the underbench heating system or movable benches, therefore, an EUL of fifteen (15) years is recommended based on the ‘SPC - Custom Other’ measure category in the CPUC Energy Efficiency Policy Manual.										
	CPUC Staff Recommendation: The EUL for the project is equal to the EUL of the shortest measure. The recommended EUL is 5 years.										
Savings Assumptions	PA Proposal: In the Phase I EAR, the PA proposal included the following assumptions in their analysis:										
	<table border="1"> <thead> <tr> <th></th> <th>PA Base Case</th> <th>PA Proposed Case</th> </tr> </thead> <tbody> <tr> <td>EEM1: Glazing, Roof, Double Polycarbonate – Install double-layer polycarbonate material on the greenhouse roof.</td> <td>Double polyethylene</td> <td>Double polycarbonate</td> </tr> <tr> <td>EEM2: Glazing, Wall, Combination – Install</td> <td>Single polycarbonate</td> <td>Double polycarbonate</td> </tr> </tbody> </table>			PA Base Case	PA Proposed Case	EEM1: Glazing, Roof, Double Polycarbonate – Install double-layer polycarbonate material on the greenhouse roof.	Double polyethylene	Double polycarbonate	EEM2: Glazing, Wall, Combination – Install	Single polycarbonate	Double polycarbonate
		PA Base Case	PA Proposed Case								
EEM1: Glazing, Roof, Double Polycarbonate – Install double-layer polycarbonate material on the greenhouse roof.	Double polyethylene	Double polycarbonate									
EEM2: Glazing, Wall, Combination – Install	Single polycarbonate	Double polycarbonate									

Reviewed Parameter	Analysis		
	double-layer polycarbonate on gable ends and on first 3 ft of greenhouse walls.		
	EEM3: Heat Curtains, Single – Install a single-layer heat curtain for heat retention.	No heat curtains; 6°F temperature offset to simulate temperature stratification	With heat curtains; 23% reduction in roof glazing conductance with heat curtains deployed and 4°F temperature offset to simulate temperature stratification
	EEM4: Under-bench Heating – Install a central boiler with an under-bench heat distribution system.	6°F temperature offset to simulate temperature stratification in greenhouse due to unit heater system type	0°F temperature offset to simulate direct heating of plants via underbench system
	EEM5: Movable Benches – Install movable benches to increase the production per sq ft. in the greenhouse.	Fixed benches w/25% floor area	Movable benches requiring less floor area to grow the same amount of product
	EEM6: Boiler, High Efficiency – Install a high efficiency boiler.	80% efficient boiler	90% efficient boiler
<p>CPUC Staff Assessment: CPUC Staff agreed with the PA’s assumptions, but recommended that the following inputs be adjusted and that key inputs be verified and savings tried-up after the greenhouses have been constructed and their operation has stabilized.</p>			
		CPUC Staff Recommended Base Case	CPUC Staff Recommended Proposed Case
	EEM3: Heat Curtains, Single – Install a single-layer heat curtain for heat retention.	No heat curtains; 0°F temperature offset to simulate temperature stratification	With heat curtains; 23% reduction in roof glazing conductance with heat curtains deployed and 0°F temperature offset to simulate temperature stratification
	EEM4: Under-bench Heating – Install a central boiler with an under-bench heat distribution system.	0°F temperature offset to simulate temperature stratification in greenhouse due to radiant heating system	0°F temperature offset to simulate direct heating of plants via underbench system

Reviewed Parameter	Analysis
	<p>The CPUC Staff’s final review of the project confirmed that the above model adjustments were implemented and the PA’s energy savings were updated accordingly.</p> <p>CPUC Staff Recommendation: PA assumptions are reasonable.</p>
<p>Calculation Methods/Tool review</p>	<p>PA Proposal: eQuest energy simulation with Excel front end</p>
	<p>CPUC Staff Assessment: Given the provided *.sim, *.inp, *.pd2, and *.bdd files, CPUC Staff was able to verify that the inputs and outputs from the simulations were consistent with the implemented measures and supporting data provided by the PA.</p>
	<p>CPUC Staff Recommendation: Simulation tool is appropriate for calculating savings.</p>
<p>Pre- or Post-Installation M&V Plan</p>	<p>PA Proposal: No information provided.</p>
	<p>CPUC Staff Assessment: The magnitude of claimed savings across the three projects included in this review warrants some level of post-installation true-up to verify the accuracy of savings claims.</p>
	<p>CPUC Staff Recommendation: CPUC Staff recommends that post-installation greenhouse temperature data and boiler energy use information be collected to calibrate energy models and true-up energy savings.</p>
<p>Net-to-Gross Review</p>	<p>PA Proposal: Not provided</p>
	<p>CPUC Staff Assessment: The overall NTG scores are as follows:</p>

Reviewed Parameter	Analysis
	<ul style="list-style-type: none">- Roof/wall glazing 0.29- Heat Curtains 0.30- Underbench heating: 0.33- Moveable benches: 0.32- Boiler: 0.32 <p>CPUC Staff Recommendation: All of the measures included in this project had NTG scores equal to or less than 0.33, indicating a high level of free ridership. CPUC Staff considers providing incentives for this project as imprudent use of ratepayer funds and recommends that PG&E implement a process to better screen potential free-riders.</p>

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

Description	PA Ex Ante Claim	CPUC Staff Recommendations
First Year kWh Savings	0.0	0.0
First Year Peak kW Savings	0.0	0.0
First Year Therms Savings	165,662	165,662
kWh Savings (RUL Period)	N/A	N/A
Peak kW Savings (RUL Period)	N/A	N/A
Therms Impact (RUL Period)	N/A	N/A
kWh Savings (RUL thru EUL Period)	0.0	0.0
Peak kW Savings (RUL thru EUL Period)	0.0	0.0
Therms Savings (RUL thru EUL Period)	165,662	165,662
Annual Non-PA Fuel Impact (RUL Period)	N/A	N/A
Annual Non-PA Fuel Impact (RUL thru EUL Period)	N/A	N/A
Project Costs for Baseline #1 (RUL or EUL)	\$2,829,184	\$2,018,898
Project Costs for Baseline #2 (EUL minus RUL period)	NA	NA
Project Incentive Amount	\$165,662	CPUC Staff considers awarding financial incentives to this freerider project a poor use of ratepayer funding.