

# **Industrial and Process Efficiency Program Concurrent Evaluation 2017-2018 Annual Report**

*Report Final*

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## Notice

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# Executive Summary

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The New York State Energy Research and Development Authority (NYSERDA) contracted with Michaels Energy in March 2017 to conduct concurrent evaluation of the Industrial and Process Efficiency (IPE) program. The IPE Program goal is to help manufacturers and data centers increase product output and improve data processing as efficiently as possible. This work encompasses concurrent impact evaluation for projects initiated under the Clean Energy Fund (CEF) Resource Acquisition Transition Chapter1 funding in PON 2456.

The purpose of the concurrent evaluation is to mitigate the risk of significant savings reduction through an independent third-party impact evaluation. The concurrent evaluation engineers work with the IPE program staff and technical reviewers on the largest and most complex projects to ensure projects are well documented with defensible baselines and reasonable energy savings calculations and assumptions. The concurrent evaluation team provides feedback on baseline characterization, metering strategies, and analysis methods through the review of energy savings calculations, engineering analysis (EA) reports, measurement and verification (M&V) plans, and post-installation review (PIR) reports.

Through March 1, 2018 the concurrent evaluation team has reviewed 31 projects in various stages of development. For 22 of these projects, an EA and/or PIR has been reviewed. Projects that have undergone a concurrent evaluation review have shown an estimated increase of about 3.3 million kWh in savings and a reduction of more than 650,000 MMBtu in savings. It is important to note that these estimated savings adjustments occur for a number of reasons. In addition to concurrent evaluation comments and

recommendations, projects undergo scope and specification changes and program staff receive better data and information from customers for estimating savings throughout the development of the project. These factors affect the estimated savings for projects with and without concurrent evaluation.

From March 1, 2017 through March 1, 2018, the concurrent evaluation project sample of original EA reports estimated savings total 23,494,506 kWh and 2,383,834 MMBtu . This represents 18 percent of the 195,469,000 kWh total estimated savings and 83 percent of the 2,937,526 MMBtu total estimated savings for the population of projects from the Industrial and Process Efficiency initiative from March 1, 2016

## Concurrent Evaluation Highlights

### Review of 31 projects

- ✓ 17 original EA reports
- ✓ 11 revised EA reports
- ✓ 11 M&V Plans
- ✓ 4 PIRs

### Adjustments to Estimated Savings for Projects with CE Review:

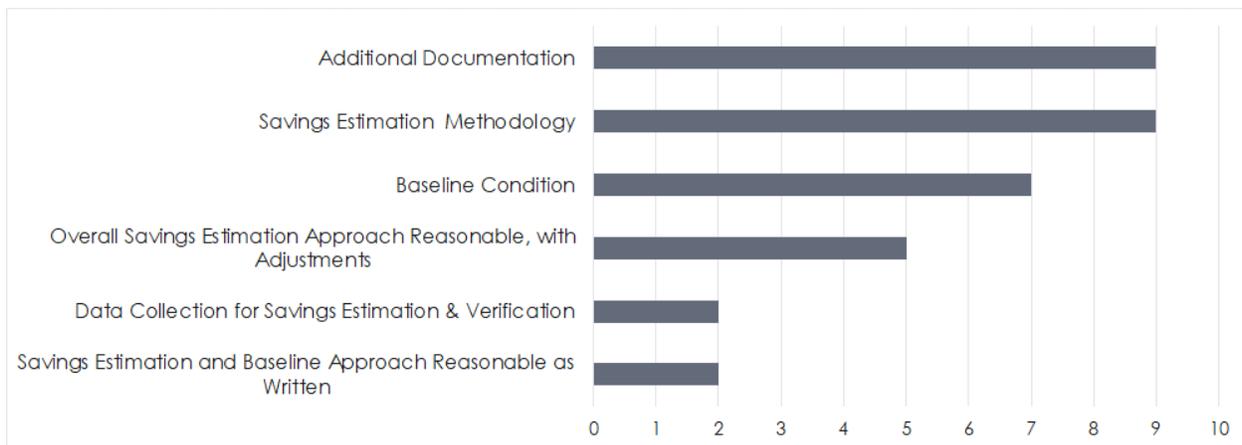
- ✓ An increase of 3,335,219 kWh
- ✓ A decrease of 655,273 MMBtu

through December 31, 2017<sup>1</sup>. The percent of gas savings reviewed is large because the projects receiving concurrent evaluation are typically very large savings projects. In the current CE sample, 13 projects make up 93% of the estimated MMBtu savings. The remaining 88 projects present only 7% of the MMBtu savings.

As of March 1, 2018, no projects reviewed through this concurrent evaluation process have been evaluated by an independent third-party evaluator. NYSERDA will initiate a formal third-party impact evaluation once a sufficient number of projects have reached completion, with enough data to verify savings trends.

As illustrated in Figure 1, the most common concurrent evaluation review recommendations are to provide additional project documentation to support the baseline condition and the savings estimation, and to adjust the savings estimation methodology. The development of the IPE Baseline Guidance document discussed in Section 3 is intended to address these recurring concerns.

**Figure 1. Concurrent Evaluation Review Memo Recommendations Summary**



<sup>1</sup> Clean Energy Fund Quarterly Performance Report through December 2017, Final Report, Table 10, page 20.

# 1 Concurrent Evaluation Process

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## 1.1 Concurrent Evaluation Project Selection Criteria

Concurrent evaluation can be conducted during the application process, as the project progresses, and after the project is completed. Ideally, concurrent evaluation is initiated when project staff is developing the initial Engineering Analysis (EA) Report and Measurement and Verification (M&V) Plan (when applicable).

Projects are selected for concurrent evaluation based on these criteria:

- Data center or process efficiency projects.
- Electric energy efficiency projects saving more than 500,000 kWh annually, and
- Fossil fuel efficiency projects saving more than 20,000 MMBtu annually.
- Requested specifically by NYSERDA program staff.

NYSERDA provides a pre-screened project list about every six weeks. From this list, the concurrent evaluation team selects projects for review that meet the concurrent evaluation criteria. Not all projects meeting the selection criteria are reviewed. Projects that meet the criteria, but are not reviewed, fall into one or more of these scenarios:

- The customer is not willing to initiate a non-disclosure agreement with the concurrent evaluation team.
- The NYSERDA program staff believe that concurrent evaluation would create a barrier for customer participation.
- The NYSERDA program staff believe that the project is too simplistic or routine to warrant concurrent evaluation expense.

## 1.2 Concurrent Evaluation Levels of Review

The concurrent evaluation process consists of three levels of review:

1. Focused baseline and measurement and verification (M&V) plan review (when applicable)
2. Comprehensive pre- and post-installation review without onsite review
3. Comprehensive pre- and post-installation review with onsite review.

The level of review is determined when reviewing the EA report based upon the complexity of the project and level of savings estimation risk. The majority of concurrent evaluations conducted through March 1, 2018 have been a focused baseline and M&V plan review (when applicable).

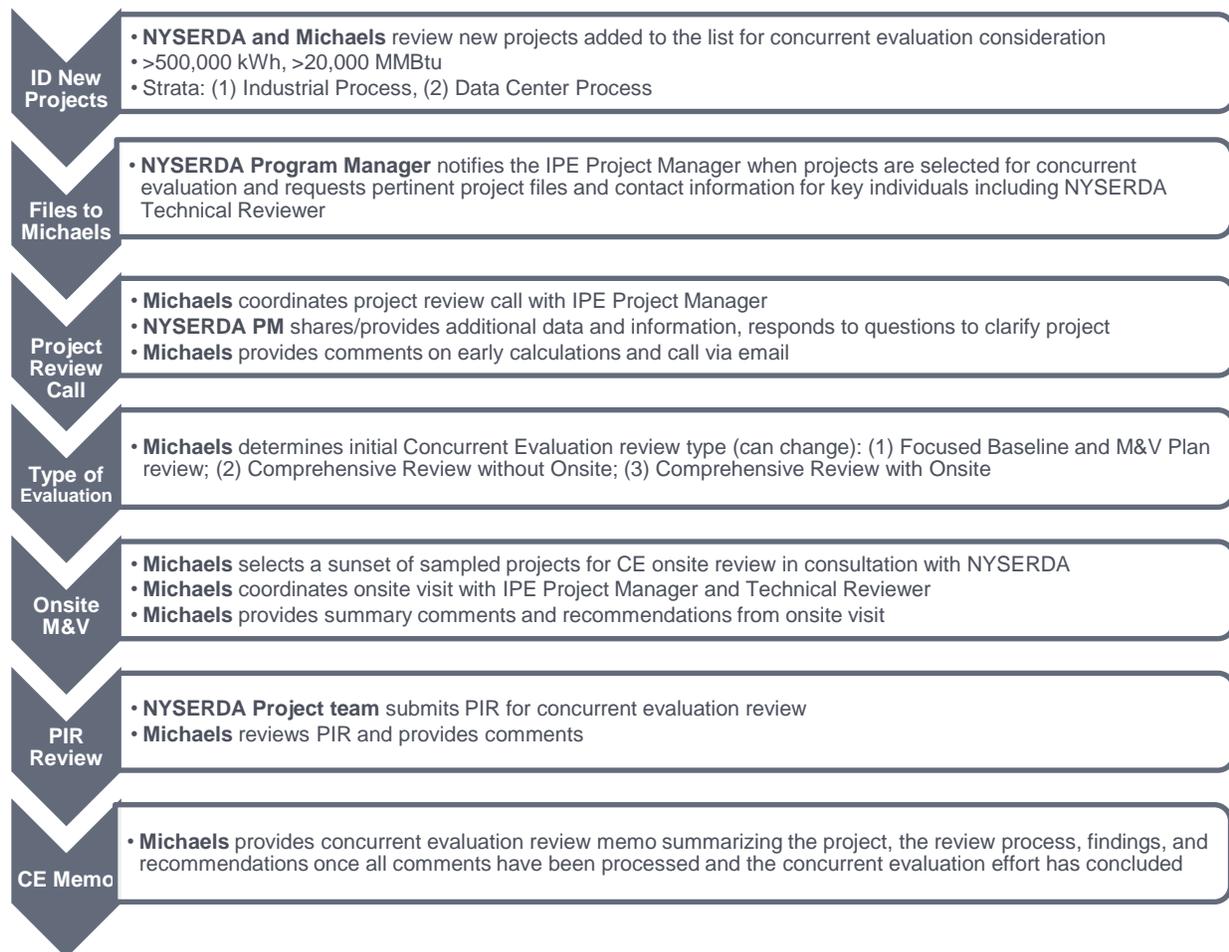
**Table 1. Concurrent Evaluation of IPE Projects by Level of Review as of March 1, 2018**

Level of CE Review	Number of Reviews
Focused baseline and measurement and verification (M&V) plan review	10
Comprehensive pre- and post-installation reviews with onsite review	9
Comprehensive pre- and post-installation reviews without onsite review	2
Level of review to be determined	10
<b>Total Projects Reviewed or in Progress</b>	<b>31</b>

### 1.3 Concurrent Evaluation Process

The concurrent evaluation team works closely with the NYSERDA Evaluation and Program groups to identify projects for concurrent evaluation as well as throughout the concurrent evaluation process. The NYSERDA Program group includes the NYSERDA IPE Program Manager and Project Manager (PM) as well as the Technical Reviewer (TR) for each project. Figure 2 illustrates the concurrent evaluation process.

**Figure 2. Concurrent Evaluation Process**



## 2 Concurrent Evaluation Project Reviews

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### 2.1 Concurrent Evaluation Project Review Summary

As of March 1, 2018, there are 31 IPE projects under various stages of concurrent evaluation review.

**Table 2. Concurrent Evaluation Project Review Stage Summary as of March 1, 2018**

Project ID	Number
Identified for concurrent evaluation and initial project review email to PM and TR	3
Initial project review call completed and concurrent evaluation team awaiting EA/M&V Plan or PIR	6
Pre-installation site visit conducted and concurrent evaluation team awaiting EA/M&V Plan or PIR	3
Concurrent evaluation comments provided on draft EA or PIR	2
Concurrent evaluation memo provided on EA and/or PIR	11
Concurrent evaluation concluded	6
<b>Total</b>	<b>31</b>

### 2.2 Concurrent Evaluation Results

#### 2.2.1 Project Documentation

A recurring finding of the concurrent evaluation effort is a need for better project documentation to support baselines and estimated savings calculations. The development of the shared IPE Baseline Guidance document discussed in Section 3 includes a check list of key decisions and required documentation for baseline determination. This guidance is intended to address this concern and to ensure project documentation is thorough.

#### 2.2.2 Engineering Analysis Report Review

The concurrent evaluation team reviewed 17 original EA reports, 11 revised EA reports, 11 M&V Plans, and four PIRs. Table 3 below provides a summary of the types of concurrent evaluation review recommendations made. Note that most projects reviewed result in more than one concurrent evaluation review recommendation.

**Table 3. Concurrent Evaluation Review of EA, M&V Plan, and PIR Recommendations Summary as of March 1, 2018**

Recommendation Category	Number of Projects
Additional Documentation	9
Baseline Condition	7
Savings Estimation Methodology	8
Data Collection for Savings Estimation & Verification	2

Recommendation Category	Number of Projects
Overall Savings Estimation Approach Reasonable, with Adjustments	5
Savings Estimation and Baseline Approach Reasonable as Written	2

The revised EA reports, in large part, addressed the recommendations of the concurrent evaluation team. Estimated savings adjustments can occur for a number of reasons. In addition to concurrent evaluation comments and recommendations, projects undergo scope and specification changes and program staff receive better data and information from customers for estimating savings throughout the development of the project. These factors affect the estimated savings for projects with and without concurrent evaluation. The estimated savings adjustment totals for projects that have undergone a concurrent evaluation review are:

- An increase of 3,335,219 kWh estimated savings
- A decrease of 655,273 MMBtu estimated savings.

### 2.2.3 Projects with Concurrent Review: Savings Estimate Adjustment Factor

Concurrent evaluation occurs during development of the estimated ex ante savings and ex post savings by the project team. The concurrent evaluation is prior to the third-party independent impact evaluation. Projects that receive a concurrent evaluation review and those that do not undergo scope and specification changes. Also, program staff receive better data and information from customers for estimating savings throughout the development of the project. In addition, projects that are selected for concurrent evaluation receive an independent consultant review that can result in recommendations for a different baseline approach, savings calculations adjustments, or other methods and approaches to the project savings estimates. The concurrent evaluation may or may not effect additional data and information received or changes to project scope.

The concurrent evaluator does not calculate adjusted savings or verified savings due to concurrent evaluation recommendations. Therefore, the kWh and MMBtu estimated impacts and Savings Estimate Adjustment Factor are a ‘best case’ assessment of the impact of the concurrent evaluation process.

The Savings Estimate Adjustment Factor represents the ratio of the Revised Savings Estimate to the Original Estimate..

$$\text{Savings Estimate Adjustment Factor} = \frac{\text{Revised Savings Estimate}}{\text{Original Savings Estimate}}$$

Table 4 presents a summary of the savings estimate adjustment factors for each concurrent evaluation project that has had an original and revised EA report From March 1, 2017 through March 1, 2018. The

concurrent evaluation project sample original EA report estimated savings total 23,494,506 kWh and 2,383,834 MMBtu. This represents 18 percent of the 195,469,000 kWh total estimated savings and 83 percent of the 2,937,526 MMBtu total estimated savings for the population of projects from the Industrial and Process Efficiency initiative from March 1, 2016 through December 31, 2017<sup>2</sup>. The percent of gas savings reviewed is large because these projects are typically large savings projects. In our current sample, 13 projects make up 93 percent of the estimated MMBtu savings. The remaining 88 projects present only 7 percent of the savings.

The overall savings estimate adjustment factor for projects with an original and revised EA report (EAR) that have received concurrent evaluation (CE) is 114 percent for kWh estimated savings and 73 percent for MMBtu estimated savings.

**Table 4. Savings Estimate Adjustment Factors Summary as of March 1, 2018**

Project Status	Estimated Savings per Original EAR Prior to CE Review		Estimated Savings per Revised EAR Prior to CE Review		Savings Estimate Adjustment Factor	
	kWh	MMBtu	kWh	MMBtu	kWh	MMBtu
Projects with CE review and revised EAR	23,494,506	2,383,834	26,829,725	1,728,561	114%	73%
Total all projects with CE review	34,661,323	2,444,949	26,829,725	1,728,561	TBD	TBD

As of March 1, 2018, no projects reviewed through this concurrent evaluation process have been evaluated by an independent third-party evaluator. NYSERDA will initiate a formal third-party impact evaluation once a sufficient number of projects have reached completion, with enough data to verify savings trends.

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<sup>2</sup> Clean Energy Fund Quarterly Performance Report through December 2017, Final Report, Table 10, page 20.

### 3 IPE Baseline Guidance

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The concurrent evaluation team worked with the NYSERDA Evaluation and Program groups to develop an IPE Baseline Guidance document. The objective of this document is to establish guidance for the development of baselines for custom energy efficiency projects.

This document provides the NYSERDA policies and procedures related to baseline determination and is a reference for technical reviewers, project managers and other program staff, and evaluators. It communicates what NYSERDA and third-party evaluators expect in project documentation and what will be considered when evaluating project savings estimates. Following this guidance, or documenting why there was deviation from it, will mitigate the risk of claimed savings reduction through third-party evaluation.

The Baseline Guidance document consolidates and builds upon the NYSERDA Industrial Process Efficiency Baseline Determination Methodology for Program Evaluation<sup>3</sup> and the Baseline Guidance developed by NYSERDA Program Staff, the Industrial Process Efficiency Guidance Document #0001, Developing Defensible Baselines<sup>4</sup>.

The IPE Baseline Guidance document is currently in draft form and under review by NYSERDA staff. Included within this guidance document is a Baseline Determination Check List and Flowchart. The Baseline Determination Flowchart steps program staff through the baseline decision steps while the Baseline Determination Check List identifies the information and data required to support and defend the project selected baseline(s) during an independent third-party evaluation. A justified well-supported baseline also helps improve the technical review and program effectiveness. The Baseline Determination Check List and supporting documentation should allow the reviewer to answer the following questions:

1. What options did the customer consider?
2. Why did they choose the option they did?

The Baseline Determination Flow Chart and Check List are provided in Appendix A.

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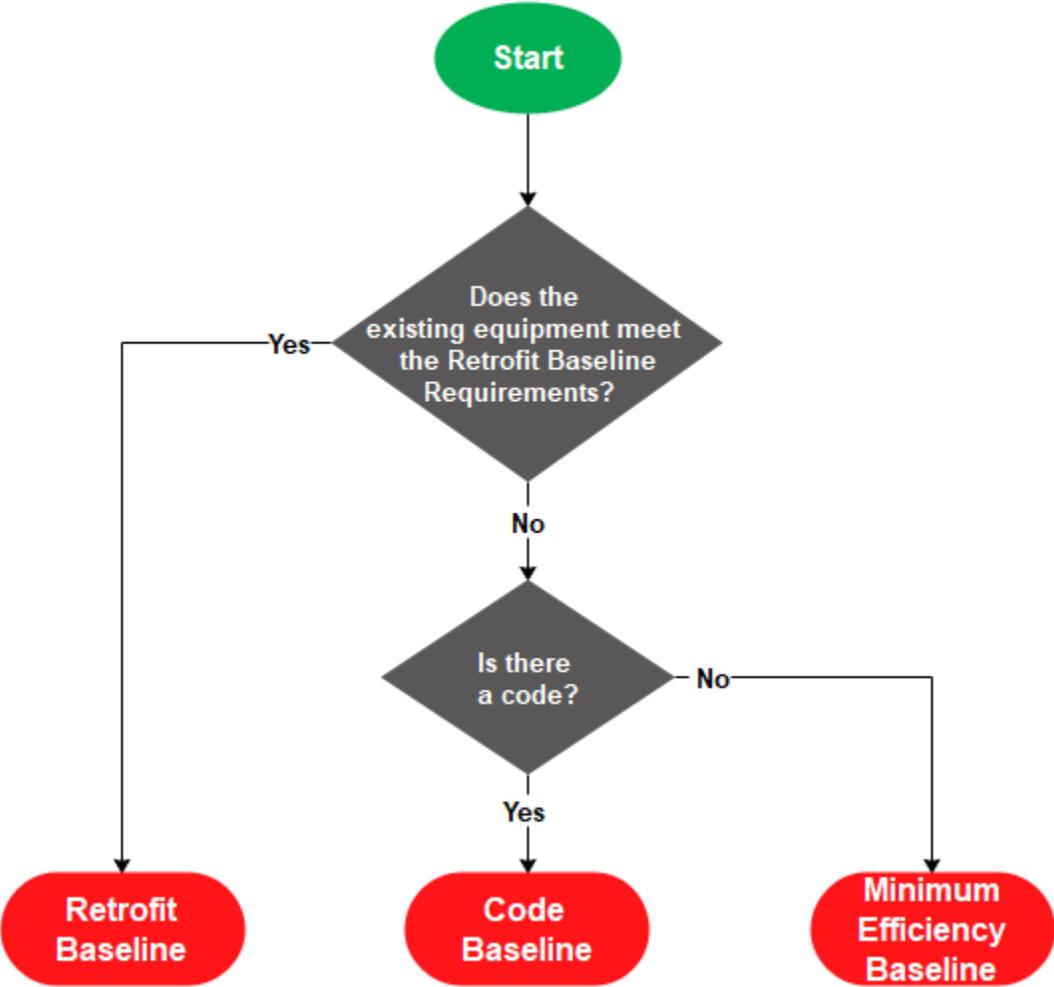
<sup>3</sup> New York State Development Authority (NYSERDA). 2015. "NYSERDA Industrial and Process Efficiency Program Impact Evaluation (2010-2012) Final Report: Appendix C: NYSERDA BASELINE DETERMINATION METHODOLOGY FOR PROGRAM EVALUATION. Prepared by Jon Maxwell, ERS and Megdal & Associates Impact Evaluation Team. <https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Industrial-and-Process-Efficiency-Program-Impact-Evaluation.pdf>

<sup>4</sup> This is an internal NYSERDA document dated October 1, 2014

# Appendix A. Concurrent Evaluation of Industrial Process and Efficiency Program: Baseline Determination Flow Chart and Check List

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Baseline Determination Flow Chart



**Baseline Determination Check List**

**1) Retrofit Baseline: Is existing equipment a valid retrofit baseline?**

a) Condition and Age of Equipment

- i) Is existing equipment in good working order? Yes No
- ii) Can equipment be feasibly repaired? Yes No
- iii) What is equipment's age and remaining life? — —
- iv) Are maintenance records available? Yes No

b) Facility Requirements

- i) Does equipment meet facilities requirements? Yes No
- ii) Can equipment be modified to meet requirements? Yes No

c) Production Capacity

- i) Has production increased due to the project? Yes No
- ii) Record Production and Capacity Values

- (1) Existing Production \_\_\_\_\_
- (2) Expected Production \_\_\_\_\_
- (3) Facility Capacity \_\_\_\_\_
- (4) Excess Capacity at other NY Facility \_\_\_\_\_

- d) Based on collective responses above, does existing equipment meet retrofit criteria?  
Yes No (go to 2)

**2) Code Baseline: Do codes or federal standards provide baseline guidance?**

- a) Yes –Code Baseline: List Code or Federal Standard \_\_\_\_\_
- b) No –Minimum Efficiency Baseline (go to 3)

**3) Minimum Efficiency Baseline: Describe baseline used (options are listed in preferred selection order)**

- a) Minimum efficiency/industry standard  
\_\_\_\_\_  
\_\_\_\_\_
- b) Program defined  
\_\_\_\_\_  
\_\_\_\_\_
- c) Customer identified alternative  
\_\_\_\_\_  
\_\_\_\_\_