



national fuel

December 27, 2011

Hon. Jaelyn A. Brillling
Secretary
NYS Public Service Commission
Three Empire State Plaza
Albany, NY 12223

Re: Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.
Case 07-G-0141 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service –
Conservation Incentive Program.

Dear Secretary Brillling:

Pursuant to the New York State Public Service Commission (“Commission”) Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule in Case 07-G-0141, issued and effective October 25, 2011, National Fuel Gas Distribution Corporation hereby submits its implementation plan consistent with ordering paragraph 3 of the Commission Order.

If you have any questions, please contact the undersigned at (716) 857-7805.

Respectfully submitted,

Eric H. Meinel
General Manager, Rates & Regulatory Affairs

Attachment

NEW YORK STATE
PUBLIC SERVICE COMMISSION

Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.

Case 07-G-0141 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service – Conservation Incentive Program

NATIONAL FUEL GAS DISTRIBUTION CORPORATION
CONSERVATION INCENTIVE PROGRAM
IMPLEMENTATION PLAN

Eric H. Meinl
General Manager, Rates & Regulatory Affairs
National Fuel Gas Distribution Corporation
6363 Main Street
Williamsville, NY 14221
716/857-7805
meinle@natfuel.com

December 27, 2011

TABLE OF CONTENTS

I.	Background	1
	a. Introduction	1
	b. Overview of Distribution’s CIP	2
	i. Procedural Background	2
	ii. Overview of CIP Components	3
	iii. General Structure of Distribution’s Energy Efficiency Initiatives	4
II.	Residential Rebates	6
	a. Program Overview	6
	i. Description	6
	ii. Program Goals	6
	b. Budgets, Energy Savings & Customer Participation Estimates	6
	c. Target Market	8
	d. Eligible Efficiency Measures	8
	e. Customer Outreach and Education	9
	f. Roles and Responsibilities	9
	g. Procedures for Customer Enrollment	10
	h. Contact Information for Customer Inquiries and Complaints	10
	i. Trade Ally Training	11
	j. Quality Assurance	11
	k. Coordination with order New York Energy Efficiency Programs and Program Administrators	12
	l. Evaluation Plans	13
	i. Overview	13
	ii. Process Evaluation	13
	iii. Impact Evaluation	15
	m. Benefit and Cost Ratios	16
	n. Savings Assumptions	17
III.	NRCIP	17
	a. Program Overview	17
	i. Description	17
	ii. Program Goals	18
	b. Budgets, Energy Savings, & Customer Participation Estimates	18
	c. Target Market	24
	d. Eligible Efficiency Measures	24
	e. Customer Outreach and Education	26
	f. Roles and Responsibilities	26
	g. Procedures for Customer Enrollment	26
	h. Contact Information for Customer Inquiries and Complaints	28
	i. Trade Ally Training	28
	j. Quality Assurance	29

k.	Coordination with Other New York Energy Efficiency Programs and Program Administrators	30
l.	Evaluation Plans	31
i.	Overview	31
ii.	Process Evaluation	31
iii.	Impact Evaluation	32
m.	Benefit Cost Ratios	33
n.	Savings Assumptions	33
IV.	LIURP	34
a.	Program Overview	34
i.	Description	34
ii.	Program Goal	34
b.	Budgets, Energy Savings, & Customer Participation Estimates	34
c.	Target Market	35
d.	Eligible Efficiency Measures	36
e.	Customer Outreach and Education	36
f.	Roles and Responsibilities	36
g.	Procedures for Customer Enrollment	38
h.	Contact Information for Customer Inquiries and Complaints	41
i.	Contractor Training Plan	42
j.	Quality Assurance	42
k.	Coordination with Other New York Energy Efficiency Program and Program Administrators	42
l.	Evaluation Plans	42
i.	Overview	42
ii.	Process Evaluation	43
iii.	Impact Evaluation	44
m.	Benefit Cost Ratios	45
n.	Savings Assumptions	46
V.	Outreach and Education Evaluation Activity for Program Years 1-4	46
a.	Overview	46
b.	Process Evaluation	46
c.	Impact Evaluation	48

Appendix 1

NEW YORK STATE
PUBLIC SERVICE COMMISSION

Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.

Case 07-G-0141 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service – Conservation Incentive Program

NATIONAL FUEL GAS DISTRIBUTION CORPORATION
CONSERVATION INCENTIVE PROGRAM
IMPLEMENTATION PLAN

I. Background

a. Introduction

On July 6, 2011 Department of Public Service Staff (“Staff”) issued its Energy Efficiency Portfolio Standard (“EEPS”) Program Review White Paper (“White Paper”), providing a number of conclusions and recommendations for continuing energy efficiency initiatives established in the Commission’s EEPS proceeding.¹ Staff recommends that EEPS programs are effective and should continue with modifications.

Included in the White Paper was a recommendation that the Commission consider whether National Fuel Gas Distribution Corporation’s (“Distribution” or “the Company”) Conservation Incentive Program (“CIP”) should in whole or in part be incorporated within the EEPS portfolio upon expiration of the currently authorized term.² White Paper at 48. In comments filed with the Commission on August 22, 2011 Distribution agreed with Staff’s recommendation that the CIP should be incorporated within the EEPS portfolio.

¹ Case 07-M-0548, Proceeding on Motion of the Commission Regarding and Energy Efficiency Portfolio Standard.

² The current term expires on November 30, 2011.

On October 25, 2011 the Commission issued its Order in this proceeding, among other things, accepting the recommendation that the CIP should be incorporated within the EEPS portfolio.³

Included in the 2011 EEPS Order was a requirement that Distribution file with the Commission an Implementation Plan. This filing is made in compliance with that requirement.

b. Overview of Distribution's CIP

i. Procedural Background

On September 20, 2007 the Commission issued its Order Adopting Conservation Incentive Program ("CIP Order")⁴ for National Fuel Gas Distribution Corporation ("Distribution" or "Company"). The CIP program preceded the energy efficiency programs established for other natural gas utilities in New York as required in the EEPS proceeding.

On October 19, 2009 the Commission issued its Order Approving the Continuation of National Fuel Gas Distribution Corporation's Conservation Incentive Program with Modifications ("2009 CIP Order").⁵

On June 28, 2010, the Company filed a request with the Commission for continuation of the CIP. On November 22, 2010 the Commission issued its Order Approving the Continuation

³ Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.

Case 07-G-0141 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service – Conservation Incentive Program. Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule; Issued and Effective October 25, 2011; ("2011 EEPS Order").

⁴ Case 07-G-0141 - Proceeding on the Motion of the Commission as to the Rates, Rules, and Regulations of National Fuel Gas Distribution Corporation for Gas Service, Order Adopting Conservation Incentive Program, issued and effective September 20, 2007.

⁵ Case 07-G-0141 – Proceeding on the Motion of the Commission as to the Rates, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service, Order Approving the Continuation of National Fuel Gas Distribution Corporation's Conservation Incentive Program with Modifications, issued and effective October 19, 2009.

of National Fuel Gas Distribution Corporation’s Conservation Incentive Program with Modifications (“2010 CIP Order”).⁶

ii. Overview of CIP Components

CIP included the following programs: (1) residential natural gas appliance rebates; (2) a non residential equipment replacement program (“NRCIP”); (3) the Low Income Usage Reduction Program (“LIURP”); and (4) an outreach and education component. Upon approval of CIP, Distribution partnered with NYSERDA for the administration of LIURP (through the existing EmPower New York program) and the NRCIP.

The table below summarizes the spending level approved in each of the Commission’s CIP Orders.

	2007 CIP Order (two-year approval)		2009 CIP Order	2010 CIP Order	2011 EEPS Order
	2008	2009	2010	2011	2012-2015
Low Income Usage Reduction Program	\$2,940,000	\$2,940,000	\$2,940,000	\$3,040,000	\$3,559,295
Residential Rebate Program	\$3,400,000	\$3,400,000	\$3,400,000	\$3,500,000	\$3,559,295
Small Volume Non-Residential Rebate Program	\$1,520,000	\$1,520,000	\$1,520,000	\$1,520,000	\$1,515,810
Outreach and Education	\$2,940,000	\$2,940,000	\$1,940,000	\$1,500,000	\$ 903,600
E M & V	-	-	\$ 490,000	\$ 480,000	\$ 502,000
Total	\$10,800,000	\$10,800,000	\$10,290,000	\$10,040,000	\$10,040,000

⁶ Case 07-G-0141 - Proceeding on the Motion of the Commission as to the Rates, Rules, and Regulations of National Fuel Gas Distribution Corporation for Gas Service, Order Approving the Continuation of National Fuel Gas Distribution Corporation’s Conservation Incentive Program with Modifications, issued and effective November 22, 2010.

The 2011 EEPS Order further identified total program costs for the Distribution's CIP by allocating E M & V and O&E to the three programs as summarized in Table 2 below.

Table 2: CIPs Budget Approved in 2011 EEPS Order				
	Program Budget	E M & V	O & E	Total
Low Income Usage Reduction Program	\$3,559,295	\$203,184	\$301,200	\$ 4,063,679
Residential Rebate Program	\$3,559,295	\$203,184	\$301,200	\$ 4,063,679
Small Volume Non-Residential Rebate Program	\$1,515,810	\$ 95,632	\$301,200	\$ 1,912,642
Total	\$8,634,400	\$502,000	\$903,600	\$10,040,000

The Commission increased program budgets for the LIURP and residential rebate programs and essentially left the NRCIP program funding intact. The total E M & V budget was increased slightly. The budget for O & E was reduced by the Commission. The O & E budget reduction recognized the maturity of Distribution's CIP. Distribution's CIP has been in place for four years. The O & E efforts of the Company have established a consistent theme for energy efficiency savings for its customers. The O & E implementation plan that will be further explained in this filing builds upon the programs and tactics established during the first four years of the CIP.

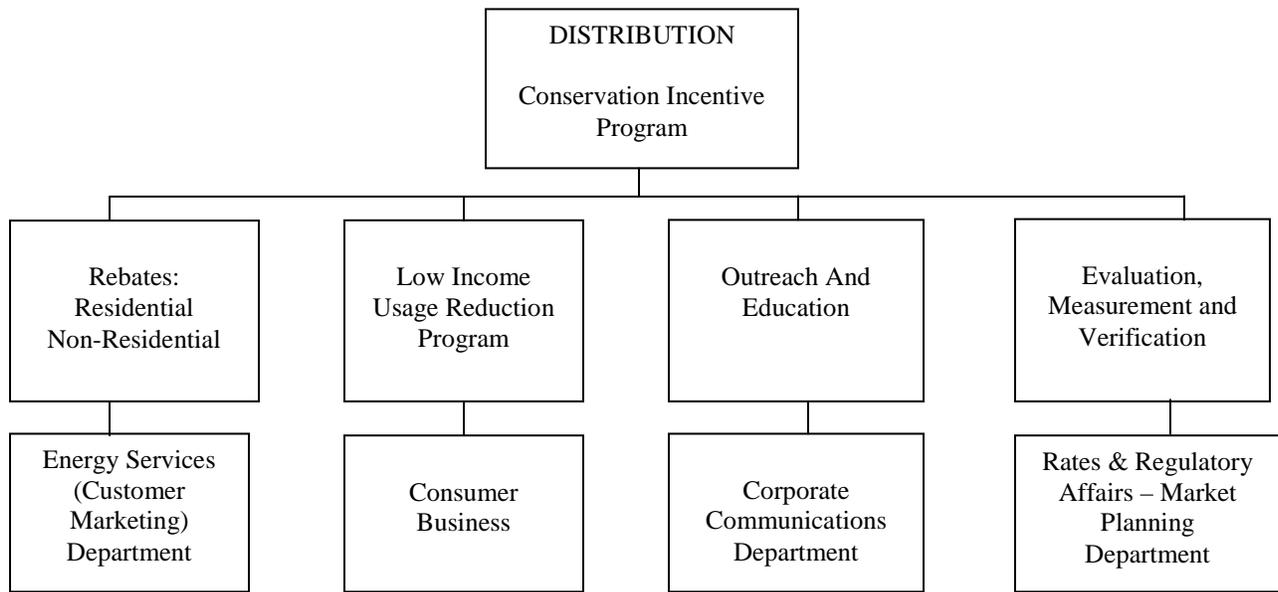
The following sections of this implementation plan present the implementation plan for each program element: 1) Residential Rebates, 2) NRCIP, and 3) LIURP.

iii. General Structure of Distribution's Energy Efficiency Initiatives

The Company has integrated its energy efficiency program function within existing business departments of the Company. The Company has not created a separate energy efficiency department, instead it has included energy efficiency initiatives in existing departments best prepared to provide such services. The integration of energy efficiency within existing business areas is the best and most economical way to deliver a consistent energy

efficiency message to customers and to directly assess the impact of energy efficiency efforts on the operations and planning efforts of the utility. Customers value utilities providing energy efficiency services.^{7 8} By integrating energy efficiency initiatives within the appropriate business departments a consistent and thorough energy efficiency message and associated services can be effectively provided to customers. Toward that end, CIP management has been integrated into the specific Company departments highlighted on Figure 1.

Figure 1: Summary of Company Departments Directly Involved in CIP



⁷ “The utility is seen as housing “the experts” and people look to the utilities for direction and advice”; Slide 65; On-Bill and Off-Bill Financing Options, *Results from Focus Group Research Conducted among Consumers, Small Businesses, and Residential Landlords on Behalf of the New York State Public Service Commission*; April 2009.

⁸ Distribution’s customer tracking survey’s which, among other things, measured the effectiveness of the Distribution’s customer education and outreach efforts, reported that 83-89% of the customers found it very to somewhat important that “National Fuel provides natural gas prices you can expect and how you can be energy efficient.”

II. Residential Rebates

a. Program Overview

i. Description

The 2011 EEPS Order continued the existing residential rebate program. The residential program is an equipment replacement program, modeled after a Vermont Gas Systems program, which was cited by the ACEEE, as one of the nation's exemplary natural gas energy efficiency programs. Distribution's program offers equipment replacement rebate incentives for single family and multi-family dwellings, to encourage them to install high efficiency space heating and water heating appliances. These appliances are by far the largest two users of natural gas in residential buildings, and are therefore most likely to show the largest savings to our customers when they upgrade their appliances. Distribution set minimum efficiency levels for each appliance type based on federal Energy Star and New York State Energy Smart guidelines.

ii. Program Goals

The goal of this program is to encourage the installation of high efficiency appliances by customers. The installation of high efficiency appliances was identified by Staff in its fast track⁹ proposal as offering one of the greatest potentials for cost effective natural gas energy efficiency initiatives.

b. Budgets, Energy Savings, & Customer Participation Estimates

The overall residential rebate program identified by budget category is provided in Table 3.

⁹ Case 07-M-0548, Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard; New York State Department of Public Service, Staff Preliminary Proposal for Energy Efficiency Program Design and Delivery; August 28, 2007, p. 101.

	2012	2013	2014	2015
ANNUAL				
Customer Incentives	\$3,359,108	\$3,359,108	\$ 3,359,108	\$ 3,359,108
Program Administration	\$ 200,187	\$ 200,187	\$ 200,187	\$ 200,187
Outreach and Education	\$ 301,200	\$ 301,200	\$ 301,200	\$ 301,200
E, M, & V	\$ 203,184	\$ 203,184	\$ 203,184	\$ 203,184
TOTAL ANNUAL	\$4,063,679	\$4,063,679	\$ 4,063,679	\$ 4,063,679
CUMULATIVE				
Customer Incentives	\$3,359,108	\$6,718,215	\$10,077,323	\$13,436,430
Program Administration	\$ 200,187	\$ 400,375	\$ 600,562	\$ 800,750
Outreach and Education	\$ 301,200	\$ 602,400	\$ 903,600	\$ 1,204,800
E, M, & V	\$ 203,184	\$ 406,368	\$ 609,552	\$ 812,736
TOTAL CUMULATIVE	\$4,063,679	\$8,127,358	\$12,191,037	\$16,254,716

Table 4 provides the CIPS residential rebate program targets. Rebate targets and associated savings and rebate budget were estimated based on the most current 12 month CIP residential rebate activity (12 months ended September 2011) scaled to the available 2012-2015 budgets authorized in the 2011 EEPS Order.

	# Rebates	Rebate	Total Rebate	Annual Savings	Total Annual Savings
2012					
I. Space Heating					
Boiler - Hot Water	813	\$ 350.00	\$ 284,399.60	21.37	17,364.63
Boiler – Steam	20	\$ 200.00	\$ 4,068.84	17.26	357.14
Furnace >= 90% with ECM	4,032	\$ 350.00	\$ 1,411,227.57	18.85	76,004.69
Furnace >= 90%	5,620	\$ 250.00	\$ 1,404,884.98	18.85	105,928.33
II. Indirect Water Heating	190	\$ 250.00	\$ 47,569.47	5.73	1,090.29
III. Programmable Thermostat	8,285	\$ 24.98	\$ 206,957.08	7.82	64,787.65
Total	18,960		\$ 3,359,107.54		265,526.73
2013					
I. Space Heating					
Boiler - Hot Water	813	\$ 350.00	\$ 284,399.60	21.37	17,364.63
Boiler – Steam	20	\$ 200.00	\$ 4,068.84	17.26	357.14
Furnace >= 90% with ECM	4,032	\$ 350.00	\$ 1,411,227.57	18.85	76,004.69
Furnace >= 90%	5,620	\$ 250.00	\$ 1,404,884.98	18.85	105,928.33
II. Indirect Water Heating	190	\$ 250.00	\$ 47,569.47	5.73	1,090.29
III. Programmable Thermostat	8,285	\$ 24.98	\$ 206,957.08	7.82	64,787.65
Total	18,960		\$ 3,359,107.54		265,526.73

	# Rebates	Rebate	Total Rebate	Annual Savings	Total Annual Savings
2014					
I. Space Heating					
Boiler - Hot Water	813	\$ 350.00	\$ 284,399.60	21.37	17,364.63
Boiler – Steam	20	\$ 200.00	\$ 4,068.84	17.26	357.14
Furnace >= 90% with ECM	4,032	\$ 350.00	\$ 1,411,227.57	18.85	76,004.69
Furnace >= 90%	5,620	\$ 250.00	\$ 1,404,884.98	18.85	105,928.33
II. Indirect Water Heating					
	190	\$ 250.00	\$ 47,569.47	5.73	1,090.29
III. Programmable Thermostat					
	8,285	\$ 24.98	\$ 206,957.08	7.82	64,787.65
Total	18,960		\$ 3,359,107.54		265,526.73
2015					
I. Space Heating					
Boiler - Hot Water	813	\$ 350.00	\$ 284,399.60	21.37	17,364.63
Boiler – Steam	20	\$ 200.00	\$ 4,068.84	17.26	357.14
Furnace >= 90% with ECM	4,032	\$ 350.00	\$ 1,411,227.57	18.85	76,004.69
Furnace >= 90%	5,620	\$ 250.00	\$ 1,404,884.98	18.85	105,928.33
II. Indirect Water Heating					
	190	\$ 250.00	\$ 47,569.47	5.73	1,090.29
III. Programmable Thermostat					
	8,285	\$ 24.98	\$ 206,957.08	7.82	64,787.65
Total	18,960		\$ 3,359,107.54		265,526.73
2012-2015					
I. Space Heating					
Boiler - Hot Water	3,250	\$ 350.00	\$ 1,137,598.42	21.37	69,458.51
Boiler – Steam	81	\$ 200.00	\$ 16,275.34	17.26	1,404.56
Furnace >= 90% with ECM	16,128	\$ 350.00	\$ 5,644,910.29	18.85	304,018.74
Furnace >= 90%	22,478	\$ 250.00	\$ 5,619,539.91	18.85	423,713.31
II. Indirect Water Heating					
	761	\$ 250.00	\$ 190,277.88	5.73	4,361.17
III. Programmable Thermostat					
	33,139	\$ 24.98	\$ 827,828.34	7.82	259,150.62
Total	75,839		\$13,436,430.17		1,062,106.90

c. Target Market

Distribution's program offers equipment replacement rebate incentives for single family and multi-family residential dwellings, to encourage them to install high efficiency space heating and water heating appliances. Available for existing homes only, not new construction.

d. Eligible Efficiency Measures

Rebates were available for qualifying natural gas equipment, beginning with installations made on or after November 1, 2007.

For Year 5 of the CIP, beginning 1/1/2012, rebates are available on the purchase of the following items:

Table 5: Residential Rebate Summary		
	Required Minimum Efficiency	Rebate Amount
Space Heating		
Hot Air Furnace	90% AFUE ¹⁰	\$250
Hot Air Furnace with ECM	90% AFUE	\$350
Hot Water Boiler	85% AFUE	\$350
Steam Boiler	81% AFUE	\$200
Programmable Thermostat	Energy Star –Rated	\$25
Water Heating		
Indirect Water Heater	N/A	\$250

e. Customer Outreach and Education

Please refer to the Outreach and Education Implementation Plan filed with the Commission by Distribution on November 23, 2011.¹¹

f. Roles and Responsibilities

The general roles and responsibilities of the departments of the Company directly involved in CIPs have been provided in Section I b. iii of this report and Figure 1. The Company’s Energy Services department is responsible for the overall program administration of the residential rebate program. Outreach and education initiatives related to the residential rebate program are administered by the Company’s Corporate Communications department.

The Company contracted with Energy Federation Inc. (“EFI”) to administer the rebate processing. EFI has more than 15 years experience in administering energy efficiency programs for utilities nationwide.

¹⁰ Annual Fuel Utilization Efficiency (“AFUE”) is the most widely used measure of a furnace’s heating efficiency. It measures the amount of heat actually delivered to a house compared to the amount of fuel that must supply the furnace.

¹¹ <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B85529E6-D51D-4248-BB96-8006ED15193C}>.

g. Procedures for Customer Enrollment

Rebates were processed beginning on December 1, 2007. The following documentation was needed in order to complete the application for a rebate:

Purchased Item	Required Documentation
Furnaces, Boilers, Water Heaters, and Programmable Thermostats	Paid invoice or receipt(s) indicating the retailer/contractor name, business address, phone and Federal ID (tax) number. Itemized description of each product, including: 1. Manufacturer, and complete model number. 2. EF for natural gas water heaters. 3. AFUE (efficiency) rating for natural gas furnace or boiler. 4. Energy Star rating for Programmable Thermostats. Product installation date.

h. Contact Information for Customer Inquiries and Complaints

EFI serves as the primary contact point for any customer inquiries or complaints. They maintain a Call Center and 800 phone number to allow customers to contact them directly with respect to these type of issues. Many of the inquiries and complaints are handled directly by EFI, but they also work closely with Distribution if there is an issue which requires Distribution's direction, judgment or interpretation of the CIP policies and procedures. This communication is done mainly through e-mails and occasional phone calls, and occurs on an ad hoc basis, as needed, which can be as often as on a daily basis.

Customers that have submitted a rebate application and have questions about that application call 1-877-285-7824. Customers that have a question, problem or request pertaining to Distribution call the Company's Customer Response Center in Buffalo area: 716-686-6123; all other areas: 1-800-365-3234.

i. Trade Ally Training

Distribution typically holds an annual training session with the trade allies involved in the Residential CIP, which consists primarily of heating & cooling contractors and plumbing contractors. Due to the mature nature of the CIP, high level of awareness and use of the CIP by the contractors, and the relative stability of the program design over the past few years, this training has largely been a “refresher session” in which Distribution reviews the eligibility guidelines, program application forms and associated procedures, and answers any questions the contractors may have. Distribution plans to do this again in 2012.

j. Quality Assurance

Distribution has put in place a comprehensive QA plan. This plan is implemented primarily by EFI through several mechanisms to assure that rebates are only given out to qualified customers. EFI screens all applications against a Distribution database to ensure that the applicant is a Distribution customer. They also review the appliance spec sheets and compare the equipment make/model data against an appliance database to ensure it meets the required energy efficiency level, and review the contractor invoice to ensure the equipment was installed by a licensed contractor. Any flaws found in the application are turned back to the customer for additional information or clarification, and then are either approved or rejected based on the data provided.

EFI also coordinates the process of conducting two additional quality control aspects of the program. First, they work with Conservation Services Group (“CSG”) to conduct random monthly on-site inspections of equipment installations to verify that the equipment receiving a rebate was actually installed. As of September 30, 2011, 2,875 of these inspections have been completed, which represents approximately a 5% sample of the total rebate population of 64,583

rebates, and no fraudulent claims have been discovered. Second, EFI has conducted a phone survey to a random sample of 1,720 customers (approximately 4% of the 39,684 customers receiving a rebate through June 2011), to gain their insight into issues such as program awareness source, impact of the rebate on the purchase decision and satisfaction with the rebate process. Regarding program awareness, the top 3 sources of program information to rebate customers were contractors (65%), Distribution bill inserts (14%) and friends/word of mouth (11%). A total of 86% of rebate participants indicated the rebate was important in influencing them to make their equipment upgrade decision. Finally, 95% of rebate customers were satisfied with the overall rebate program process.

k. Coordination with Other New York Energy Efficiency Programs and Program Administrators

Distribution is the primary gas utility in western New York, with only NYSEG offering natural gas service to a small portion of the northern region of western New York. Only two electric utilities, National Grid and NYSEG, offer electric service for most of western New York. Also, Distribution is the only remaining gas-only utility in New York state. Therefore, there has been no real confusion among our customers as to who to contact for natural gas appliance rebates. Through the Outreach and Education component of Distribution's CIP, the Company has been able to make its customers very aware of our rebates over the past four years. Furthermore, since Distribution doesn't offer any electric appliance rebates, there is no real confusion in this area either. If customers do inquire about electric rebates while contacting us about our gas rebates, either EFI or Distribution's Call Center staff advise the customers to contact their appropriate electric utility.

1. Evaluation Plans

i. Overview

The Company's program for 2012-2015 is a continuation of its existing program. The Company will utilize evaluation results and recommendations of its existing program as a starting point for future evaluation efforts. The Company will participate in statewide studies where appropriate as described in greater detail in the following sections.

ii. Process Evaluation

The Company will receive a draft Process Evaluation report from its evaluation contractor¹² in December 2011. The process evaluation activities will proceed as follows.

Cadmus' process evaluation will examine whether the program operates efficiently and effectively, relying on interviews with program and implementation staff at Distribution, Energy Federation Incorporated ("EFI"), and CSG to collect information on the following topics:

- Program structure:
 - Logic model
 - Objectives
 - Changes
- Outreach and marketing;
- Participant experience and satisfaction;
- Communication between Distribution, EFI, and CSG;
- Data collection and reporting;
- Quality assurance;
- Implementation barriers; and
- Program strengths and areas for improvement.

¹² The Cadmus Group, Inc./Energy Services; 720 SW Washington Street, Suite 400; Portland, OR 97205.

Cadmus will conduct in-depth interviews in person and by the telephone, using a structured interview guide, and obtaining follow-up information and clarifications via telephone or e-mail, as necessary.

Surveys will also address participating trade allies (retailers and contractors) and participating customers. Topics covered during surveys with 15 trade allies include:

- Program awareness;
- Program delivery and implementation;
- Coordination with program staff;
- Reasons for participation;
- Marketing to customers;
- Reasons for customer participation;
- Market barriers and barriers to participation;
- Satisfaction; and
- Identification of potential areas for improvements.

Topics covered during the 70 participant surveys include:

- How customers learned of the program;
- Reasons for participation;
- Value of the program;
- Program delivery;
- Interaction with trade allies;
- Satisfaction levels; and
- Suggestions for program improvements.

iii. Impact Evaluation

The 2011 EEPS Order charged the EAG to explore the possibility of joint studies by two or more groups where evaluation of similar programs and measures will prove more costs effective and potentially more rigorous. The Company will explore participating in statewide impact studies of the residential market place where such studies are determined to be cost effective. Statewide evaluation activities are currently being conducted by the evaluation advisory group established by the Commission. The Company anticipates participating in a number of statewide residential customer studies currently being reviewed by the evaluation advisory group.

Distribution has prepared a pre/post billing analysis of customer consumption for determining savings associated with the program. The proposed pre-post analysis is one of several statistical techniques for determining the savings of energy-efficiency programs. This method involves using monthly—or interval—consumption data to measure program impacts. Cadmus has conducted an assessment of Distribution's pre post billing analysis. Cadmus' assessment of Distribution's proposed pre/post measurement technique considered, at a minimum, the following: Whether the technique provides the necessary levels of statistical reliability to generate accurate estimates of savings and whether the analysis is consistent with the approach outlined in Distribution's evaluation, measurement, and verification plan. Whether the method follows accepted industry standards and is consistent with the evaluation guidelines of the Commission Staff. Whether the data used in the analysis provide the necessary levels of integrity. What methods are available to improve effectiveness and reliability.

Distribution included a copy of the results of the Cadmus pre post billing analysis in Appendix I of its quarterly CIP status report filed with the Commission on November 15, 2011.¹³

For Years 1 through 4 of the Company’s CIP, the outreach and education initiative was a separately budgeted program element. In compliance with the 2011 EEPS Order, beginning in year 5 the outreach and education budget was rolled into each of the other three specific CIP initiatives: residential rebates, small non residential CIP, and LIURP. Section V. of this report provides a summary of the Years 1 – 4 outreach and education program. Since Year 5 is largely a continuation of the existing CIP, the Company will be using information for the Years 1 through 4 outreach and education evaluation efforts to guide its activity for residential rebate outreach and education evaluations in Year 5 and beyond.

m. Benefit and Cost Ratios

The following tables summarize the expected benefits, costs, and benefit/cost ratios for the program.

Table 7: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions			
Residential Rebate Program			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	1.72	\$ 26,565,158	\$15,449,167
2013	1.72	\$ 26,565,158	\$15,449,167
2014	1.72	\$ 26,565,158	\$ 15,449,167
2015	1.72	\$ 26,565,158	\$15,449,167
2012-2015	1.72	\$106,260,634	\$61,796,669

¹³ <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={CDD359CA-F0DD-4161-A273-11E5C8111FF7}>.

Table 8: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions w/Carbon Adder			
Residential Rebate Program			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	1.87	\$ 28,896,251	\$15,449,167
2013	1.87	\$ 28,896,251	\$15,449,167
2014	1.87	\$ 28,896,251	\$15,449,167
2015	1.87	\$ 28,896,251	\$15,449,167
2012-2015	1.87	\$115,585,004	\$61,796,669

n. Savings Assumptions

Savings assumptions were developed using the current Tec Market manuals summarized in Appendix I.

III. NRCIP

a. Program Overview

i. Description

The small non-residential program is also an equipment replacement program, modeled after a Vermont Gas Systems program, which was cited by the ACEEE, as one of the nation's exemplary natural gas energy efficiency programs. Distribution's proposed program will offer equipment replacement rebate incentives to customers using less than 12,000 Mcf, to encourage them to install high efficiency space heating, water heating and process heating equipment. However, customers will also be eligible to receive rebates for non-equipment replacement changes made to heating, water heating and process heating equipment, such as adding insulation to a process heating oven, or updating controls to a space heating boiler. These custom incentives are set on a case-by-case basis, based upon the estimated resulting gas energy savings. A technical engineering analysis must first be performed to confirm energy savings. The rebate amount will be \$15/Mcf multiplied by the estimated annual savings with a cap of \$25,000. The

Company has contracted with NYSERDA to administer the day-to-day project management of this program.

ii. Program Goals

The goal of the small non-residential rebate program is to provide cost effective incentives to small non-residential customers to utilize natural gas efficiently in their business operations.

b. Budgets, Energy Savings, & Customer Participation Estimates

The overall NRCIP cost identified by budget category is provided in Table 9.

	2012	2013	2014	2015
Annual				
Program Direct Customer Benefits	\$ 1,379,387	\$ 1,379,387	\$ 1,379,387	\$1,379,387
NYSERDA Fee	\$ 121,265	\$ 121,265	\$ 121,265	\$ 121,265
NYSERDA State Assessment	\$ 15,158	\$ 15,158	\$ 15,158	\$ 15,158
E, M & V	\$ 301,200	\$ 301,200	\$ 301,200	\$ 301,200
O & E	\$ 95,632	\$ 95,632	\$ 95,632	\$ 95,632
Total	\$ 1,912,642	\$ 1,912,642	\$ 1,912,642	\$1,912,642
Cumulative				
Program Direct Customer Benefits	\$ 1,379,387	\$ 2,758,774	\$ 4,138,161	\$5,517,548
NYSERDA Fee	\$ 121,265	\$ 242,530	\$ 363,794	\$ 485,059
NYSERDA State Assessment	\$ 15,158	\$ 30,316	\$ 45,474	\$ 60,632
E, M & V	\$ 301,200	\$ 602,400	\$ 903,600	\$1,204,800
O & E	\$ 95,632	\$ 191,264	\$ 286,896	\$ 382,528
Total	\$ 1,912,642	\$ 3,825,284	\$ 5,737,926	\$7,650,568

Tables 10.1 through 10.5 provide the NRCIP targets for 2012 through 2015. Rebate targets, associated savings, and rebate budgets were established based on total NRCIP activity for program years 1 through 4 scaled to available 2012-2015 budgets authorized in the 2011 EEPS Order.

Table 10.1 : NRCIP Rebate Program Targets 2012

Equipment	# Rebates	Per Participant Rebate	Total Rebates	Annual Per Participant Savings	Annual Total Savings
FIXED Rebates					
I. Space Heating					
Boiler - Hot Water	100	\$ 2,269.61	\$227,122.04	190.09	19,022.11
Boiler - Steam	5	\$ 2,010.40	\$ 9,861.90	40.21	197.24
Unit Heater	40	\$ 1,573.17	\$ 63,280.22	632.71	25,450.69
Furnace	277	\$ 972.13	\$268,955.67	103.19	28,548.56
Subtotal	422		\$569,219.83		73,218.60
II. Water Heating					
Water Heater - Storage Tank	19	\$ 157.89	\$ 2,943.27	2.73	50.82
Water Heater - Tankless	23	\$ 426.09	\$ 9,614.67	20.32	458.56
Subtotal	41		\$ 12,557.94		509.38
III. Cooking	7	\$ 1,035.71	\$ 7,112.89	49.19	337.79
IV. Programmable Thermostat	206	\$ 91.60	\$ 18,871.24	64.84	13,357.98
Total all Equipment	676		\$607,761.91		87,423.76
CUSTOMIZED Rebates					
Equipment					
I. Space Heating					
Boiler - Hot Water	31	\$13,204.80	\$414,562.45	642.78	20,180.02
Boiler - Steam	-	\$ 0.00	\$ 0.00	-	-
Unit Heater	2	\$10,687.50	\$ 20,970.77	10,687.50	20,970.77
Furnace	-	\$ 0.00	\$ 0.00	-	-
Other	11	\$12,291.34	\$132,647.88	539.47	5,821.96
Subtotal	44		\$568,181.10		46,972.75
II. Water Heating					
Water Heater - Storage Tank	4	\$ 4,578.25	\$ 17,966.68	244.28	958.62
Water Heater - Tankless	-	\$ 0.00	\$ 0.00	-	-
Subtotal	4		\$ 17,966.68		958.62
III. Process Heating	2	\$25,000.00	\$ 49,054.44	1,217.02	2,388.01
IV. Programmable Thermostat	-	\$ 0.00	\$ 0.00	-	-
Total all Equipment	50		\$ 635,202.21		50,319.38
Technical Assessment Cost			\$ 136,422.89		
Total NRCIP	726		\$1,379,387.01		137,743.14

Table 10.2: NRCIP Rebate Program Targets 2013

Equipment	# Rebates	Per Participant Rebate	Total Rebates	Annual Per Participant Savings	Annual Total Savings
Fixed Rebates					
I. Space Heating					
Boiler - Hot Water	100	\$2,269.61	\$227,122.04	190.09	19,022.11
Boiler - Steam	5	\$2,010.40	\$ 9,861.90	40.21	197.24
Unit Heater	40	\$1,573.17	\$ 63,280.22	632.71	25,450.69
Furnace	277	\$ 972.13	\$268,955.67	103.19	28,548.56
Subtotal	422		\$569,219.83		73,218.60
II. Water Heating					
Water Heater - Storage Tank	19	\$ 157.89	\$ 2,943.27	2.73	50.82
Water Heater - Tankless	23	\$ 426.09	\$ 9,614.67	20.32	458.56
Subtotal	41		\$ 12,557.94		509.38
III. Cooking	7	\$1,035.71	\$ 7,112.89	49.19	337.79
IV. Programmable Thermostat	206	\$ 91.60	\$ 18,871.24	64.84	13,357.98
Total all Equipment	676		\$607,761.91		87,423.76
CUSTOMIZED Rebates					
Equipment					
I. Space Heating					
Boiler - Hot Water	31	\$13,204.80	\$ 414,562.45	642.78	20,180.02
Boiler - Steam	-	\$ 0.00	\$ 0.00	-	-
Unit Heater	2	\$10,687.50	\$ 20,970.77	10,687.50	20,970.77
Furnace	-	\$ 0.00	\$ 0.00	-	-
Other	11	\$12,291.34	\$ 132,647.88	539.47	5,821.96
Subtotal	44		\$ 568,181.10		46,972.75
II. Water Heating					
Water Heater - Storage Tank	4	\$ 4,578.25	\$ 17,966.68	244.28	958.62
Water Heater - Tankless	-	\$ 0.00	\$ 0.00	-	-
Subtotal	4		\$ 17,966.68		958.62
III. Process Heating	2	\$25,000.00	\$ 49,054.44	1,217.02	2,388.01
IV. Programmable Thermostat	-	\$ 0.00	\$ 0.00	-	-
Total all Equipment	50		\$ 635,202.21		50,319.38
Technical Assessment Cost			\$ 136,422.89		
Total NRCIP	726		\$1,379,387.01		137,743.14

Table 10.3: NRCIP Rebate Program Targets 2014

Equipment	# Rebates	Per Participant Rebate	Total Rebates	Annual Per Participant Savings	Annual Total Savings
FIXED Rebates					
I. Space Heating					
Boiler - Hot Water	100	\$2,269.61	\$227,122.04	190.09	19,022.11
Boiler - Steam	5	\$2,010.40	\$ 9,861.90	40.21	197.24
Unit Heater	40	\$1,573.17	\$ 63,280.22	632.71	25,450.69
Furnace	277	\$ 972.13	\$268,955.67	103.19	28,548.56
Subtotal	422		\$569,219.83		73,218.60
II. Water Heating					
Water Heater - Storage Tank	19	\$ 157.89	\$ 2,943.27	2.73	50.82
Water Heater - Tankless	23	\$ 426.09	\$ 9,614.67	20.32	458.56
Subtotal	41		\$ 12,557.94		509.38
III. Cooking	7	\$ 1,035.71	\$ 7,112.89	49.19	337.79
IV. Programmable Thermostat	206	\$ 91.60	\$ 18,871.24	64.84	13,357.98
Total all Equipment	676		\$607,761.91		87,423.76
CUSTOMIZED Rebates					
Equipment					
I. Space Heating					
Boiler - Hot Water	31	\$13,204.80	\$414,562.45	642.78	20,180.02
Boiler - Steam	-	\$ 0.00	\$ 0.00	-	-
Unit Heater	2	\$10,687.50	\$ 20,970.77	10,687.50	20,970.77
Furnace	-	\$ 0.00	\$ 0.00	-	-
Other	11	\$12,291.34	\$132,647.88	539.47	5,821.96
Subtotal	44		\$568,181.10		46,972.75
II. Water Heating					
Water Heater - Storage Tank	4	\$ 4,578.25	\$ 17,966.68	244.28	958.62
Water Heater - Tankless	-	\$ 0.00	\$ 0.00	-	-
Subtotal	4		\$ 17,966.68		958.62
III. Process Heating	2	\$25,000.00	\$ 49,054.44	1,217.02	2,388.01
IV. Programmable Thermostat	-	\$ 0.00	\$ 0.00	-	-
Total all Equipment	50		\$ 635,202.21		50,319.38
Technical Assessment Cost			\$ 136,422.89		
Total NRCIP	726		\$1,379,387.01		137,743.14

Table 10.4: NRCIP Rebate Program Targets 2015

Equipment	# Rebates	Per Participant Rebate	Total Rebates	Annual Per Participant Savings	Annual Total Savings
FIXED Rebates					
I. Space Heating					
Boiler - Hot Water	100	\$2,269.61	\$227,122.04	190.09	19,022.11
Boiler - Steam	5	\$2,010.40	\$ 9,861.90	40.21	197.24
Unit Heater	40	\$1,573.17	\$ 63,280.22	632.71	25,450.69
Furnace	277	\$ 972.13	\$268,955.67	103.19	28,548.56
Subtotal	422		\$569,219.83		73,218.60
II. Water Heating					
Water Heater - Storage Tank	19	\$ 157.89	\$ 2,943.27	2.73	50.82
Water Heater - Tankless	23	\$426.09	\$9,614.67	20.32	458.56
Subtotal	41		\$12,557.94		509.38
III. Cooking	7	\$1,035.71	\$7,112.89	49.19	337.79
IV. Programmable Thermostat	206	\$91.60	\$18,871.24	64.84	13,357.98
Total all Equipment	676		\$607,761.91		87,423.76
CUSTOMIZED Rebates					
Equipment					
I. Space Heating					
Boiler - Hot Water	31	\$13,204.80	\$414,562.45	642.78	20,180.02
Boiler - Steam	-	\$ 0.00	\$ 0.00	-	-
Unit Heater	2	\$10,687.50	\$ 20,970.77	10,687.50	20,970.77
Furnace	-	\$ 0.00	\$ 0.00	-	-
Other	11	\$12,291.34	\$132,647.88	539.47	5,821.96
Subtotal	44		\$568,181.10		46,972.75
II. Water Heating					
Water Heater - Storage Tank	4	\$ 4,578.25	\$ 17,966.68	244.28	958.62
Water Heater - Tankless	-	\$ 0.00	\$ 0.00	-	-
Subtotal	4		\$ 17,966.68		958.62
III. Process Heating	2	\$25,000.00	\$ 49,054.44	1,217.02	2,388.01
IV. Programmable Thermostat	-	\$ 0.00	\$ 0.00	-	-
Total all Equipment	50		\$ 635,202.21		50,319.38
Technical Assessment Cost			\$ 136,422.89		
Total NRCIP	726		\$1,379,387.01		137,743.14

Table 10.5: NRCIP Rebate Program Targets 2012 - 2015

Equipment	# Rebates	Per Participant Rebate	Total Rebates	Annual Per Participant Savings	Annual Total Savings
FIXED Rebates					
I. Space Heating					
Boiler - Hot Water	400	\$2,269.61	\$ 908,488.17	190.09	76,088.45
Boiler - Steam	20	\$2,010.40	\$ 39,447.62	40.21	788.95
Unit Heater	161	\$1,573.17	\$ 253,120.89	632.71	101,802.75
Furnace	1,107	\$972.13	\$1,075,822.66	103.19	114,194.25
Subtotal	1,687		\$2,276,879.34		292,874.41
II. Water Heating					
Water Heater - Storage Tank	75	\$ 157.89	\$ 11,773.06	2.73	203.28
Water Heater - Tankless	90	\$ 426.09	\$ 38,458.68	20.32	1,834.24
Subtotal	165		\$ 50,231.74		2,037.53
III. Cooking	27	\$1,035.71	\$ 28,451.57	49.19	1,351.16
IV. Programmable Thermostat	824	\$ 91.60	\$ 75,484.97	64.84	53,431.94
Total all Equipment	2,704		\$2,431,047.62		349,695.03
CUSTOMIZED Rebates					
Equipment					
I. Space Heating					
Boiler - Hot Water	126	\$13,204.80	\$1,658,249.80	642.78	80,720.10
Boiler - Steam	-	\$0.00	\$0.00	-	-
Unit Heater	8	\$10,687.50	\$83,883.09	10,687.50	83,883.09
Furnace	-	\$ 0.00	\$ 0.00	-	-
Other	43	\$12,291.34	\$ 530,591.51	539.47	23,287.83
Subtotal	177		\$2,272,724.39		187,891.01
II. Water Heating					
Water Heater - Storage Tank	16	\$4,578.25	\$ 71,866.71	244.28	3,834.49
Water Heater - Tankless	-	\$ 0.00	\$ 0.00	-	-
Subtotal	16		\$ 71,866.71		3,834.49
III. Process Heating	8	\$25,000.00	\$ 196,217.75	1,217.02	9,552.04
IV. Programmable Thermostat	-	\$ 0.00	\$ 0.00	-	-
Total all Equipment	200		\$2,540,808.85		201,277.54
Technical Assessment Cost			\$ 545,691.56		
Total NRCIP	2,904		\$5,517,548.04		550,972.57

c. Target Market

Distribution’s program will offer equipment replacement rebate incentives to non-residential customers using less than 12,000 Mcf annually.

d. Eligible Efficiency Measures

Rebates are available for small, non-residential customers whose facilities use less than 12,000 Mcf (thousand cubic feet) of natural gas per year for upgrading to more energy-efficient equipment.

Customers may choose from one of two rebate options:

- (1) Fixed (Pre-Qualified) Rebate – Fixed rebates available on pre-qualified equipment.

Equipment		Minimum Required Efficiency		Rebate Amount	
		(<300 kBtuh)	(300-499 kBtuh)	(500-1,000 kBtuh)	(>1,000 Btuh)
Hot air furnace	90% AFUE	\$ 500	N/A	N/A	N/A
Hot water boiler	85% AFUE	\$ 600	\$ 750	\$1,500	\$2,500
	90% AFUE	\$1,000	\$1,500	\$2,500	\$3,500
Steam boiler	81% AFUE	\$ 600	(\$2/kBtuh) \$600-\$1,000	(\$2/kBtuh) \$1,000-\$2,000	(\$2/kBtuh) \$2,000+

Equipment		Minimum Required Efficiency	Rebate Amount
Space Heating			
Unit Heater		90% AFUE	\$1,000
Low Intensity Infrared Heater		N/A	\$ 500
Programmable Thermostat		Energy Star®-rated	\$ 25
Water Heating			
Storage Tank Water Heater		0.61 EF	\$ 150
Tankless Water Heater		0.78 EF	\$ 350
Cooking			
Fryer		Energy Star®-rated	\$ 750
Broiler		30% AFUE	\$ 500
Convection Oven		40% AFUE	\$ 500
Combination Oven		40% AFUE	\$ 750
Steamer		Energy Star®-rated	\$ 750
Griddle		45% AFUE	\$ 500

- (2) Customized (Performance-Based) Rebate – Rebates are determined on a case-by-case basis, based on the results of an energy-use analysis.

Customized rebates can be as much as \$15 per Mcf multiplied by the gas savings (Mcf), up to \$25,000. This may result in a larger rebate than if the customer were to receive a fixed rebate.

Distribution is considering altering our small non-residential pre-qualified rebates slightly to keep them in line with the changes NYSERDA is likely to make to their similar gas rebates.

These changes would be relatively minimal, and could involve the following:

1. slight increases to current rebate levels for hot air furnaces and unit heaters;
2. slight changes to efficiency levels for hot water boilers, steam boilers and unit heaters;
3. new potential rebates for space heating-related measures such as vent dampers, pipe insulation and duct insulation;
4. elimination of rebates for programmable thermostats, storage tank water heaters and tankless water heaters;
5. increased and expanded levels of rebates for cooking equipment; and/or

In addition, for both fixed and customized rebates, the Company is increasing the rebate cap amount per customer from \$25,000 to \$30,000.

Distribution has not made a final decision on which of the above changes we will adopt. The Company is waiting for confirmation from NYSERDA of the final approved list of rebates they will be implementing as of January 1, 2012. Once we receive this information, we will choose which of the changes to adopt. Distribution are tentatively planning on implementing these changes as of April 1, 2012. This date would give us adequate lead time to modify our forms, brochures and web site, as well as communicate these changes to our customers and trade allies.

e. Customer Outreach and Education

Please refer to the Outreach and Education Implementation Plan filed with the Commission by Distribution on November 23, 2011.¹⁴

f. Roles and Responsibilities

The general roles and responsibilities of the departments of the Company directly involved in the CIP have been provided in Section I. b. iii of this report and Figure 1. The Company's Energy Services department is responsible for the overall program administration of NRCIP. Outreach and education initiatives related to NRCIP are administered by the Company's Corporate Communications department.

NYSERDA will monitor program progress and expenditure levels to ensure that program objectives are met within budget allocations. NYSERDA will discuss by teleconference as needed with NYSERDA's TA Contractors, to ensure that contractors understand and are following program procedures, and to elicit feedback regarding the program. NYSERDA will conduct periodic reviews of the database to ensure quality of data entry and will provide Distribution with project data obtained on the application. NYSERDA will promote Distribution programs in any upcoming energy efficiency workshops /seminars/conferences provided in Distribution service territory. At Distribution's request, NYSERDA shall permit Distribution personnel to monitor and participate in these administrative tasks.

g. Procedures for Customer Enrollment

- NYSERDA Application In-Take and Review:
 - Upon receipt of a completed Application (includes application and Technical Engineering Study) NYSERDA assigns the gas

¹⁴ <http://documents.dps.state.ny.us/public/Common/ViewDoc.aspx?DocRefId={B85529E6-D51D-4248-BB96-8006ED15193C}>.

- energy project and send a copy of the Application to a NYSERDA TA Contractor.
 - NYSERDA will enter data into the Buildings Portal Database to track the energy project.
- NYSERDA's TA Contractor will perform the following:
 - Will review the Application for completeness and eligibility and will review the engineering study for technical merit.
 - Will contact customer and/or contractor to conduct a pre-installation site visit to verify existing conditions.
 - Will provide NYSERDA with written correspondence on the Application summarizing the gas energy project and provide NYSERDA with a recommendation of the potential gas energy savings and financial incentive.
 - Will provide NYSERDA with a scope of work and budget to complete all phases related to the gas project.
- NYSERDA offers Purchase Order:
 - NYSERDA will review the TA Contractor's recommendation and, if approved, will request Distribution to send correspondence via an approval memorandum to the customer. In the alternative, NYSERDA may itself send such correspondence on letterhead supplied to NYSERDA by Distribution.
 - NYSERDA will develop a Purchase Order to contractually secure the financial incentives available for the gas energy project and offer a Purchase Order to the customer for their approval and signature.
 - NYSERDA will review the scope of work and budget and modify the existing TA Contractor's contract.
 - NYSERDA will update the data of the project in the Buildings Portal database.
- Customer completes Construction:
 - NYSERDA's TA Contractor will conduct a post-installation site-inspection of the energy project to verify that the energy project is completed and the same equipment and efficiency ratings that was specified in the Application was installed.
 - NYSERDA's TA Contractor will provide NYSERDA with correspondence in writing with a recommendation of the potential gas energy savings and financial incentives and notify any changes to the project.
 - NYSERDA will request Distribution to provide the customer with correspondence in writing indicating the amount of financial incentive that the customer can invoice. In the alternative, NYSERDA may send such correspondence on letterhead supplied to NYSERDA by Distribution.

- NYSERDA will update the data of the project in the Buildings Portal database.
- Invoice Processing:
 - NYSERDA will review all invoices for accuracy, and if acceptable NYSERDA will process the invoice for payment following NYSERDA prompt payment policy.

h. Contact Information for Customer Inquiries and Complaints

NYSERDA serves as the primary contact point for any customer inquiries or complaints. They maintain a Call Center and 800 phone number to allow customers to contact them directly with respect to these type of issues. Many of the inquiries and complaints are handled directly by NYSERDA, but they also work closely with Distribution if there is an issue which requires Distribution's direction, judgment or interpretation of the CIP policies and procedures. This communication is done mainly through e-mails and occasional phone calls, and occurs on an ad hoc basis, as needed, which is usually on a weekly basis.

Customers that have submitted a rebate application and have questions about that application call 1-866-697-3732 to learn more about the basics of NRCIP. Customers that have a question, problem or request pertaining to Distribution call the Company's Customer Response Center in Buffalo area: 716-686-6123; all other areas: 1-800-365-3234.

i. Trade Ally Training

Distribution typically holds an annual training session with the trade allies involved in the Small Non-Residential CIP, which consists primarily of heating & cooling contractors, mechanical contractors and energy services companies ("ESCOS"). Due to the changing nature of the small non-residential CIP, relatively low level of awareness and use of the CIP by the contractors, and the changing nature of the program design over the past few years, this training has largely been focused on educating the trade allies on the two types of rebates, fixed and

customized, and reviewing in detail the program application forms and associated procedures, and answering any questions the contractors may have. Distribution plans to do this again in 2012. This will be even more important in 2012 due to three reasons. First, as mentioned earlier, Distribution is considering altering our small non-residential fixed rebates slightly to keep them in line with the changes NYSERDA is likely to make to their similar gas rebates. Second, NYSERDA is now required to process all their funding through the new NY Consolidated Funding Application (“CFA”), which involves a much longer and more detailed set of questions than they used to be required for customers to receive a rebate. Third, Distribution plans on engaging a CIP outreach coordinator to be the main point of contact for smaller commercial customers seeking information and assistance in navigating through the rebate program. This person/entity would be responsible for acting as the main liaison for the small non-residential rebate program; providing guidance and hands-on expertise working with commercial businesses to create greater awareness and increased acceptance of the non-residential rebate program. These three new changes would need to be communicated to the various trade allies to assist them in promoting the CIP to our customers and increasing it’s acceptance and usage.

j. Quality Assurance

Distribution has put in place a comprehensive QA plan. This plan is implemented primarily by NYSERDA through several mechanisms to assure that rebates are only given out to qualified customers. For pre-qualified rebates, NYSERDA coordinates the application review process with several Technical Assessment (“TA”) contractors they have retained. These TAs are engineering firms who review the equipment spec sheets to ensure it meets the required energy efficiency level, and review the contractor invoice to ensure the equipment was installed

by a licensed contractor. Any flaws found in the application are turned back to the customer for additional information or clarification, and then are either approved or rejected based on the data provided. NYSERDA also coordinates with these TAs to perform a random, on-site inspection of approximately 5% of the rebate population to confirm that the equipment stated on the application was actually installed. This is done to help ensure that no fraudulent applications are processed.

For performance-based rebates, NYSERDA uses these same TAs to do a more detailed review of the application. First, the TA visits the customer's site to confirm what equipment is currently installed. They then review the customer's estimated energy savings analysis for the proposed new equipment to be installed, based on their application, to confirm that the assumptions and calculations used to estimate the energy savings are accurate. They also review the customer's estimated project cost data to ensure this is reasonable as well. The TAs then review the equipment spec sheets make/model data to ensure it meets the required energy efficiency level. Any flaws or missing information found in the application are turned back to the customer for additional information or clarification, and then are either approved or rejected based on the data provided. If approved, the TA informs the customer of the final rebate amount based on their technical review. Finally, after the new equipment has been installed, the TAs make another on-site visit to confirm the equipment stated on the application was actually installed

- k. Coordination with Other New York Energy Efficiency Programs and Program Administrators

Distribution has contracted with NYSERDA to administer NRCIP. This contractual relationship provides NYSERDA with the opportunity to coordinate NRCIP with additional

services (including electric efficiency initiatives) available to the customer through additional measures included in NYSERDA's overall portfolio of energy efficiency programs.

I. Evaluation Plans

i. Overview

The Company's program for 2012-2015 is a continuation of its existing program. The Company will utilize evaluation results and recommendations of its existing program as a starting point for future evaluation efforts. The Company will participate in statewide studies where appropriate as described in greater detail in the following sections.

ii. Process Evaluation

The Company will receive a draft Process Evaluation report from its evaluation contractor¹⁵ in December 2011. The process evaluation activities will proceed as follows.

Cadmus' process evaluation will examine whether the program operates efficiently and effectively, primarily relying on interviews with program and implementation staff at Distribution, NYSERDA, and two TA contractors, collecting information about the following topics:

- Program structure:
 - Logic model
 - Objectives
 - Changes
- Outreach and marketing;
- Participant experience and satisfaction;
- Communication between Distribution, NYSERDA, and the technical assistance contractors;

¹⁵ The Cadmus Group, Inc./Energy Services; 720 SW Washington Street, Suite 400; Portland, OR 97205.

- Data collection and reporting;
- Quality assurance;
- Implementation barriers; and
- Program strengths and areas for improvement.

Cadmus will conduct in-depth interviews in person and by telephone, using structured interview guides, and obtained follow-up information and clarification via telephone or e-mail, as necessary.

iii. Impact Evaluation

The 2011 EEPS Order charged the EAG to explore the possibility of joint studies by two or more groups where evaluation of similar programs and measures will prove more costs effective and potentially more rigorous.

The Company will explore participating in statewide impact studies of the small commercial market place where such studies are determined to be cost effective. Since the program is administered by NYSERDA the Company believes that there should be a reasonable opportunity to join in statewide studies for this program. If there is no opportunity to participate in statewide studies of the impact of this program the Company will develop an individual impact analysis proposal for this program.

For Years 1 through 4 of the Company's CIP, the outreach and education initiative was a separately budgeted program element. In compliance with the 2011 EEPS Order, beginning in year 5 the outreach and education budget was rolled into each of the other three specific CIP initiatives: residential rebates, small non residential CIP, and LIURP. Section V. of this report provides a summary of the Years 1 – 4 outreach and education program. Since Year 5 is largely a continuation of the existing CIP, the Company will be using information for the Years 1

through 4 outreach and education evaluation efforts to guide its activity for NRCIP rebate outreach and education evaluations in Year 5 and beyond.

m. Benefit Cost Ratios

Table 13: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions			
NRCIP			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	2.50	\$14,950,770	\$ 5,985,132
2013	2.50	\$14,950,770	\$ 5,985,132
2014	2.50	\$14,950,770	\$ 5,985,132
2015	2.50	\$14,950,770	\$ 5,985,132
2012-2015	2.50	\$59,803,081	\$23,940,526

Table 14: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions w/Carbon Adder			
NRCIP			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	2.72	\$16,262,700	\$ 5,985,132
2013	2.72	\$16,262,700	\$ 5,985,132
2014	2.72	\$16,262,700	\$ 5,985,132
2015	2.72	\$16,262,700	\$ 5,985,132
2012-2015	2.72	\$65,050,801	\$23,940,526

n. Savings Assumptions

The savings assumptions for the NRCIP were derived from savings assumptions included in NYSERDA reports to the Company. NYSERDA utilizes estimated savings from its deemed savings database. NYSERDA is in the process of incorporating into its savings assumptions the currently effective Tec Market Manual. Once NYSERDA has completed this process and updated its savings assumptions for its programs the Company will update the savings assumptions used in this report.

IV. LIURP

a. Program Overview

i. Description

LIURP is a weatherization program for low-income customers. Participants receive a heating system check, an energy audit, weatherization measures, infiltration reduction, natural gas usage reduction measures and consumer education. The program design is consistent with, and is being administered as part of, NYSERDA's EmPower New York_{sm} ("EmPower) program, and contractors will follow procedures and guidelines developed for that program. Households receiving gas efficiency services paid for by Distribution will be evaluated for electric reduction measures to be paid for by NYSERDA with System Benefits Charge ("SBC") funds.

ii. Program Goal

Conserve energy, reduce residential energy bills, and improve the health, safety, and comfort levels for participating households. Also reduce the incidence and risk of pay delinquencies and the costs associated with uncollectible accounts, late payment collections, and termination of service expenses. Measures installed will be cost effective and pay for themselves through energy savings in a specified time frame.

b. Budgets, Energy Savings, & Customer Participation Estimates

The overall LIURP identified by budget category is provided in Table 15.

	2012	2013	2014	2015
Annual				
Program Direct Customer Benefits	\$ 3,076,558	\$3,076,558	\$ 3,076,558	\$ 3,076,558
NYSERDA Fee	\$ 284,744	\$ 284,744	\$ 284,744	\$ 284,744
NYSERDA State Assessment	\$ 35,593	\$ 35,593	\$ 35,593	\$ 35,593
NYSERDA Contractor	\$ 110,000	\$ 110,000	\$ 110,000	\$ 110,000
NYSERDA QA	\$ 52,400	\$ 52,400	\$ 52,400	\$ 52,400
NYSERDA Funding	\$ 3,559,295	\$3,559,295	\$ 3,559,295	\$ 3,559,295
E, M & V	\$ 203,184	\$ 203,184	\$ 203,184	\$ 203,184
O & E	\$ 301,200	\$ 301,200	\$ 301,200	\$ 301,200
Total	\$4 ,063,679	\$4,063,679	\$ 4,063,679	\$ 4,063,679
Cumulative				
Program Direct Customer Benefits	\$ 3,076,558	\$6,153,117	\$ 9,229,675	\$12,306,234
NYSERDA Fee	\$ 284,744	\$ 569,487	\$ 854,231	\$ 1,138,974
NYSERDA State Assessment	\$ 35,593	\$ 71,186	\$ 106,779	\$ 142,372
NYSERDA Contractor	\$ 110,000	\$ 220,000	\$ 330,000	\$ 440,000
NYSERDA QA	\$ 52,400	\$ 104,800	\$ 157,200	\$ 209,600
NYSERDA Funding	\$ 3,559,295	\$7,118,590	\$10,677,885	\$14,237,180
E, M & V	\$ 203,184	\$ 403,368	\$ 609,552	\$ 812,736
O & E	\$ 301,200	\$ 602,400	\$ 903,600	\$ 1,204,800
Total	\$ 4,063,679	\$8,127,358	\$12,191,037	\$16,254,716

Table 16 provides LIURP targets for 2012 through 2015. LIURP customer benefits and associated savings were established based on LIURP activity for Program Years 1 through 4 scaled to available 2012-2015 budgets authorized in the 2011 EEPS Order.

	2012	2013	2014	2015	2012-2015
Program Direct Customer Benefits	\$3,076,558	\$3,076,558	\$3,076,558	\$3,076,558	\$12,306,234
Estimated Cost Per Participant	\$ 3,294	\$ 3,294	\$ 3,294	\$ 3,294	\$ 3,294
Estimated Number of Participants	934	934	934	934	3,736
Estimated Savings Per Participant	40	40	40	40	40
Targeted Total Savings	37,815	37,815	37,815	37,815	151,259

c. Target Market

Customers meeting the following criteria will be eligible to participate in the Company's LIURP:

- Preferred status to participants in Low Income Customer Affordability Assistance Program (“LICAAP”).
- Income less than or equal to 60% New York State median income (HEAP eligible).
- Active account and residency in the premises for at least one year prior to weatherization.
- High consumption - minimum of 132 Mcf (start with 180 – 200+ Mcf or thousand cubic feet) per year.
- Owners and tenants eligible.
- Must be a single-family dwelling or two units if each has its own meter and both meet eligibility requirements.

d. Eligible Efficiency Measures

Participants receive a heating system check, an energy audit, weatherization measures, infiltration reduction, natural gas usage reduction measures and consumer education.

e. Customer Outreach and Education

Please refer to the Outreach and Education Implementation Plan filed with the Commission by Distribution on November 23, 2011.¹⁶

f. Roles and Responsibilities

The general roles and responsibilities of the departments of the Company directly involved in CIPs have been provided in Section I. B .iii of this report and Figure 1. The Company’s Consumer Business department is responsible for the overall program administration of LIURP. Outreach and education initiatives related to LIURP are administered by the Company’s Corporate Communications department.

¹⁶ <http://documents.dps.state.ny.us/public/Common/ViewDoc.aspx?DocRefId={B85529E6-D51D-4248-BB96-8006ED15193C}>

NYSERDA will reassess and enhance program procedures on an ongoing basis, ensuring that practices are consistent with standards of the Building Performance Institute (“BPI”) and best practices as followed by contactors participating in EmPower. Forms, guidelines, software, and other materials will be modified as needed. NYSERDA program staff will consult with Counsel and Contract Management as needed to ensure that the program is implemented correctly.

NYSERDA will monitor program progress and expenditure levels to ensure that program objectives are met within budget allocations. NYSERDA will conduct weekly meetings with the Program Implementer, and maintain daily contact as needed, to ensure that the program is progressing as required.

NYSERDA will conduct weekly and monthly meetings with the QA Contractor, and maintain daily contact as needed, to ensure that QA procedures are being followed in accordance with the contract, and that QA issues are being resolved.

NYSERDA and NYSERDA Program Implementer will meet with contractors on a regular basis, both on-site and by teleconference, to ensure that contractors understand and are following program procedures, and to elicit feedback regarding the program.

NYSERDA will conduct an annual review of pricing to ensure that fees are appropriate, and provide financial support to the New York State Weatherization Directors Association for their bulk purchase bidding procedure. NYSERDA will ensure that appliance pricing is consistent with this bid.

NYSERDA will conduct periodic reviews of the database to ensure quality of data entry.

NYSERDA will develop and process incentives for contractors who participate in the program and become BPI accredited. These incentives will consist of 75% reimbursement of BPI contractor fees for training, accreditation and quality assurance.

NYSERDA will collaborate with the Weatherization Assistance Program to ensure consistency between programs and to maximize opportunities for collaboration, thereby allowing for enhanced work scopes.

NYSERDA will modify energy efficiency and financial management workshops currently provided in Distribution service territory to include information related to Distribution's low income programs.

At Distribution's request, NYSERDA shall permit Company personnel to monitor and participate in these administrative tasks.

NYSERDA will use its best efforts to accommodate an interface platform with Distribution's customer information systems to assure the proper transfer of customer information necessary to perform the obligations hereunder.

- g. Procedures for Customer Enrollment
 - Distribution generated referrals from:
 - LICAAP
 - HEAP status/consumption report
 - CAC/Outside Agencies/Other
 - Distribution screens for:
 - 12-month consumption history. Must be more than 132 Mcf (Ideally, 180-200+ Mcf initially).
 - NYSERDA Program Implementer Screen for eligibility:
 - NYSERDA Program Implementer is sending a cover letter from Distribution with a LIURP/EmPower application to each potential participant. A second application will be sent if the first is not returned within a reasonable time frame.
 - Upon receipt of completed application NYSERDA Program Implementer will examine potential for natural gas energy

efficiency services funded through Distribution, and determine eligibility for electric reduction services funded through the SBC and available to low-income electricity customers of National Grid and New York State Electric & Gas Corporation.

- If the customer is a tenant, NYSERDA Program Implementer will send a letter (on Distribution letterhead) to landlord outlining requirements and soliciting landlord participation. Upon receipt of satisfactory landlord agreement, the customer may be accepted for energy services.
 - If the customer resides in a multi-family home (three units or greater), the customer will be ineligible for gas efficiency measures.
- If not eligible, NYSERDA Program Implementer will:
 - Send a “no further services” letter to the customer (printed on Distribution letterhead).
 - If referral was from Distribution or an outside agency, inform referring office/agency reason(s) why customer not eligible.
 - If above criteria are met for eligibility, NYSERDA Program Implementer performs the following:
 - Assigns the customer to a participating contractor. Assignments will be made on the basis of current backlog, contractor availability, and past performance.
 - Sends a letter, on Distribution letterhead, to the customer informing them of their acceptance and providing contact information for the assigned contractor.
 - When the customer is eligible for weatherization, NYSERDA Program Implementer will:
 - Enter relevant customer data into the EmPower database, including county designations and other information required by Distribution.
 - Enter weatherization-approved status.
 - System to accept periodic information verifying that the customer is still eligible and that service has not been shut off for non-payment, no pending close orders, no active shut off notices, and account is still active. Until automated, Honeywell will need to accept e-mail notifying an account is no longer eligible.
 - Once work is in progress:
 - Distribution has access to the EmPower database. Distribution has access to screens/reports to identify, among other things, placed jobs that have yet to be picked up by contractors and the status of any placed jobs. Distribution has the ability to retrieve customer

- energy services record and to obtain an electronic report of jobs with information required by Distribution, such as first name, last name, address, city, state, postal code, contractor, home phone number, account number, meter number, mailing address, mailing city, mailing zip, and sent to contractor date.
- NYSERDA Program Implementer is administering customer interactions/document procurements (letters sent to Distribution's customers on Distribution letterhead), including:
 - Customer Acceptance Letter
 - CIP/EmPower Audit Forms
 - Landlord/Tenant Agreements
 - Distribution LIURP Eligibility Affidavit/Information Waiver
 - Distribution Work Proposal Agreement
 - Customer Agreement
 - Distribution Safety Check List
 - Certificate of Completion NYSERDA Program Implementer Contractor duties:
 - Within two weeks of receiving job, contractor calls customer to set up initial appointment.
 - Contractor goes to property and performs a comprehensive home assessment, including:
 - Heating system inspection and combustion efficiency test.
 - Blower door test for air leakage.
 - Inspection and measurement for insulation.
 - Health and safety checks, such as ambient CO testing and gas leak checks.
 - Energy education.
 - Instrumented audit and documentation on EmPower forms.
 - Discussion of work scope with appropriate household member.
 - If household is eligible for SBC-funded measures, installation of minor electric reduction measures, such as compact fluorescent light bulbs and evaluation of electric appliances.
 - If furnace problems are identified, contractor follows appropriate emergency and referral procedures outlined in Section 5 of the EmPower Guidelines and Procedures Manual.
 - If issues or problems are identified which preclude successful installation of measures, such as severe structural damage or serious code violations related to the work, contractor will notify the EmPower Program Implementer and further work will be cancelled until conditions are corrected.
 - NYSERDA Program Implementer will send letter (on Distribution letterhead) to customers explaining why work was cancelled and offering a timeline by which work may be resumed if conditions are corrected.

- Contractor develops work scopes and proceeds with work according to EmPower Guidelines and Procedures Manual.
 - If customer does not respond to contractor calls or letters, contractor advises NYSERDA Program Implementer. (Contractor may be reimbursed for services rendered such as customer education, etc. despite the weatherization job not being completed. Reason why job may not have been completed could include customer not getting back to contractor, etc.).
 - Once a job is completed, contractor sends all completed forms and invoice to the Program Implementer for processing.
 - Jobs to be completed within 60 days from referral.
- Invoice processing:
 - Invoices submitted must follow Invoicing Requirements listed on Section 15.3 of the EmPower Guidelines and Procedures Manual.
 - Honeywell reviews all forms and verifies invoice for accuracy. (Use a standard invoice for all contractors).
 - If any discrepancies are found with invoice, NYSERDA Program Implementer contacts contractor.
 - If any forms not returned or incomplete, NYSERDA Program Implementer contacts the contractor.
 - Honeywell provides the third-party QA Contractor with information for QA inspections.
 - If the invoice is ok, NYSERDA Program Implementer recommends approval of the invoice, enters the final approved costs into the CRIS database, and locks the costs in place.
 - NYSERDA approves and processes contractor and vendor invoices, arranges payment, and resolves payment issues.
- NYSERDA tracks program expenditures and maintains payment records. Accounts payable forms and invoices maintained for six years.
 - Job completion processing:
 - NYSERDA Program Implementer maintains a file of the following household data:
 - Customer application.
 - Energy usage.
 - Audit forms and work scope write-up.
 - Certificate of Completion.
 - Required permissions.

h. Contact Information for Customer Inquiries and Complaints

Distribution Customer Response Center: 1-800-365-3234.

i. Contractor Training Plan

NYSERDA Empower programs require contractors to obtain BPI certification.

NYSERDA coordinates regional contractor training once a year. NYSERDA also conducts periodic teleconferences with contractors.

j. Quality Assurance

NYSERDA QA Contractor (currently CSG Services) will perform independent third-party QA field inspections on approximately 20% of completed jobs and phone QA interviews on an additional 15% of completed jobs. QA will be completed within one month of completion of work.

k. Coordination with Other New York Energy Efficiency Programs and Program Administrators

Distribution has contracted with NYSERDA to administer LIURP. This contractual relationship provides NYSERDA with the opportunity to coordinate LIURP with additional services (including electric efficiency initiatives) available to the customer through additional measures included in NYSERDA's overall portfolio of energy efficiency programs.

l. Evaluation Plans

i. Overview

The Company's program for 2012-2015 is a continuation of its existing program. The Company will utilize evaluation results and recommendations of its existing program as a starting point for future evaluation efforts. The Company will participate in statewide studies where appropriate as described in greater detail in the following sections.

ii. Process Evaluation

The Company will receive a draft Process Evaluation report from its evaluation contractor¹⁷ in December 2012. The process evaluation activities will proceed as follows.

Cadmus' process evaluation will examine whether the program operates efficiently and effectively, relying primarily on interviews with program and implementation staff. Cadmus will conduct interviews with program staff at Distribution and NYSERDA to collect information addressing the following topics:

- Program structure:
 - Logic model
 - Objectives
 - Changes
- Outreach and marketing
- Participant experience and satisfaction
- Communication between Distribution, NYSERDA, Honeywell, and CSG
- Data collection and reporting
- Quality assurance
- Implementation barriers
- Program strengths and areas for improvement

Cadmus will conduct in-depth interviews in person and by telephone, using a structured interview guide, and obtained follow-up information and clarifications via telephone or e-mail, as necessary.

¹⁷ The Cadmus Group, Inc./Energy Services; 720 SW Washington Street, Suite 400; Portland, OR 97205.

iii. Impact Evaluation

The 2011 EEPS Order charged the EAG to explore the possibility of joint studies by two or more groups where evaluation of similar programs and measures will prove more costs effective and potentially more rigorous. The Company will explore participating in statewide impact studies of the residential market place where such studies are determined to be cost effective. Statewide evaluation activities are currently being conducted by the evaluation advisory group established by the Commission. The Company anticipates participating in a number of statewide residential customer studies currently being reviewed by the evaluation advisory group. The Company anticipates that such statewide studies may prove useful in understanding the requirements of low income customers. Since the Company's LIURP is administered by NYSERDA and included in NYSERDA's statewide Empower program, the Company believes that coordination with NYSERDA in low income evaluation activities may be feasible. The Company will work with Cadmus to develop an impact plan for its LIURP program including the possibility to participate in cost effective joint evaluation studies.

Distribution has prepared a pre/post billing analysis of customer consumption for determining savings associated with LIURP. The proposed pre-post analysis is one of several statistical techniques for determining the savings of energy-efficiency programs. This method involves using monthly—or interval—consumption data to measure program impacts. Cadmus has conducted an assessment of Distribution's pre post billing analysis. Cadmus' assessment of Distribution's proposed pre/post measurement technique considered, at a minimum, the following: Whether the technique provides the necessary levels of statistical reliability to generate accurate estimates of savings and whether the analysis is consistent with the approach outlined in Distribution's evaluation, measurement, and verification plan. Whether the method

follows accepted industry standards and is consistent with the evaluation guidelines of the PSC Staff. Whether the data used in the analysis provide the necessary levels of integrity. What methods are available to improve effectiveness and reliability.

Distribution included a copy of the results of the Cadmus pre post billing analysis in Appendix I of its quarterly CIP status report filed with the Commission on November 15, 2011.¹⁸

For years 1 through 4 of the Company’s CIP, the outreach and education initiative was a separately budgeted program element. In compliance with the 2011 EEPS Order, beginning in year 5 the outreach and education budget was rolled into each of the other three specific CIP initiatives: residential rebates, small non residential CIP, and LIURP. Section V. of this report provides a summary of the year 1 – 4 outreach and education program. Since year 5 is largely a continuation of the existing CIP, the Company will be using information for the years 1 through 4 outreach and education evaluation efforts to guide its activity for residential rebate outreach and education evaluations in year 5 and beyond.

m. Benefit Cost Ratios

Table 17: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions			
LIURP			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	1.25	\$ 5,072,441	\$ 4,063,679
2013	1.25	\$ 5,072,441	\$ 4,063,679
2014	1.25	\$ 5,072,441	\$ 4,063,679
2015	1.25	\$ 5,072,441	\$ 4,063,679
2012-2015	1.25	\$ 20,289,764	\$ 16,254,716

¹⁸ <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={CDD359CA-F0DD-4161-A273-11E5C8111FF7}>.

Table 18: Summary of Benefits and Costs Total Resource Cost Test after Net to Gross Assumptions w/Carbon Adder			
LIURP			
Program Year	TRC Benefit / Cost	Total NPV Benefits	Total NPV Costs
2012	1.36	\$ 5,517,548	\$ 4,063,679
2013	1.36	\$ 5,517,548	\$ 4,063,679
2014	1.36	\$ 5,517,548	\$ 4,063,679
2015	1.36	\$ 5,517,548	\$ 4,063,679
2012-2015	1.36	\$ 22,070,191	\$ 16,254,716

n. Savings Assumptions

The savings assumptions for LIURP were derived from savings assumptions included in NYSERDA reports to the Company. The savings assumptions are consistent with savings calculations used in NYSERDA's State-wide Empower program.

V. Outreach and Education Evaluation Activity For Program Years 1-4

a. Overview

For Program Years 1 through 4 the outreach and education initiatives of the Company were treated as a standalone program within the CIP. The 2011 EEPS Order established outreach and education elements within each of the three customer program categories. The Company's program for 2012-2015 is a continuation of these existing programs. The Company will utilize evaluation results and recommendations of its existing program as a starting point for future evaluation efforts. The evaluation of the outreach and education effort is summarized below.

b. Process Evaluation

The Company will receive a draft Process Evaluation report from its evaluation contractor¹⁹ in December 2012. The process evaluation activities will proceed as follows.

¹⁹ The Cadmus Group, Inc./Energy Services; 720 SW Washington Street, Suite 400; Portland, OR 97205.

For the process evaluation, Cadmus will examine whether the program operates efficiently and effectively, primarily relying on interviews with program staff, implementation staff, and trade allies. Main Outreach and Education Program components examined in this process evaluation will include:

- Savings card;
- CIP kit distributions; and
- NEED Energy Detectives Program.

During interviews with program staff at Distribution and implementation staff for the NEED Energy Detectives Program, the following topics will be examined:

- Program structure:
 - Logic model
 - Objectives
 - Changes
- Participant experience and satisfaction;
- Communication;
- Implementation barriers; and
- Program strengths and areas for improvements.

Cadmus conducted in-depth interviews in person and by telephone using a structured interview guide, and obtained follow-up information and clarifications via telephone or e-mail, as necessary.

Cadmus also conducted trade ally interviews with five contractors and retailers participating in the program's Savings Card promotion. Through these interviews, Cadmus sought to answer the following questions:

- Why do trade allies participate?

- How do trade allies decide what discount to offer?
 - Why are customers using the Savings Cards?
- c. Impact Evaluation

Additional data collection activities are underway, which will inform the Outreach and Education program's impact evaluation. These include a NEED Energy Detectives participant survey, and a CIP kit recipient survey.

National Energy Education Development ("NEED") is a non-profit association based in Washington, D.C. that promotes energy awareness through various networks. In 2007, Distribution began the NEED Student Energy Detectives Program. Distribution works with local fifth- through twelfth-grade teachers, providing them with classroom materials to conduct energy-related science experiments and educate students about energy efficiency. Teachers are also provided with energy-conservation kits, which students can take home to make their homes more energy efficient.

Cadmus will evaluate this program by surveying students. Surveys will be distributed and collected by teachers then returned to Distribution for analysis. Surveys will collect information from students about: their understanding of energy and energy efficiency prior to participating in the program; their homes, including the primary fuel for space and water heating; changes they have undertaken as a result of participating in Student Energy Detectives, such as installing a faucet aerator or altering their thermostat settings; and their understanding of energy and energy efficiency after participating in the program.

As part of its effort to promote strong participation in the CIP, Distribution gives away energy-savings kits at community outreach events. These kits include simple measures customers

can install in their homes such as faucet aerators, weather stripping, draft sealers, and window insulation kits.

Each energy-savings kit will include a one-page questionnaire that collects information from the recipient about: what kit measures they installed; Baseline information related to kit measures, such as the primary space and water heating fuel used in the home; awareness of the CIP; and information about appliances and equipment used in the home, such as the age of the furnace.

Distribution also promotes conservation efforts with the CIP Savings Card. This card reminds customers that Distribution offers rebates for high-efficiency equipment, and also provides customers additional discounts for using the card at Energy Partner businesses, such as: furnace cleaning and tune up; natural gas furnaces, boilers, and water heaters; service calls; Weatherization products; duct cleaning; furnace filters.

This program has been particularly successful in developing relationships with trade allies. In the first year of this promotion, 20 contractors registered as Energy Partners, and there are currently nearly 60 contractors registered as Energy Partners. In exchange for promotion of their companies, Energy Partners promote the CIP to customers and encourage them to install high efficiency equipment.

Because the CIP Savings Card is prompting customers to install additional measures such as insulation, savings are attributable to this outreach effort. As a first step to quantifying any savings associated with Savings Card-related weatherization measures, duct cleaning, furnace filters, and furnace cleanings and tune ups, Cadmus proposes conducting interviews with a sample of Energy Partners to determine: to what extent the discounts are unique to the Savings Card promotion (are the discounts typically offered by Energy Partner contractors regardless of

the Savings Card); whether contractors have experienced increased sales of these additional measures since becoming an Energy Partner; and if sales of these additional measures have increased, which measures customers are most commonly installing.

After this research is compiled and analyzed, Distribution will determine the next steps to quantify savings associated with the Savings Card.

National Fuel Gas Distribution Corporation
New York Division

Calculation of Heating System Savings Based on TecMarket Manual					
	Kbtuh _{in /1}	AFUE _{base}	AFUE _{ee /1}	EFLH _{heat}	Kbtuh _{in} x (1 - AFUE _{base} /AFUE _{ee}) x EFLH _{heat} /100
Furnace	75.20	0.78	0.94	1473	188.54
Boiler Water	110.17	0.8	0.92	1473	213.72
Boiler Steam	177.74	0.75	0.80	1473	172.58

/1 Based on summary of installed measures under NFGDC CIP.

Thermostat					
	Kbtuh _{in}	EFLH _{heat}	ESF _{heat}	Estimated Annual Participants	Weighted Savings
Furnace	75.20	1473	0.068	9,652	69.34
Boiler Water	110.17	1473	0.068	813	8.55
Boiler Steam	177.74	1473	0.068	20	0.35
				10,485	78.24

National Fuel Gas Distribution Corporation
New York Division

Calculation of Indirect Water Heater Savings Based on TecMarket Manual

Gallons Per Day (GPD)			
Average Household Size	2.42		Buffalo Metro Data from AHS: Buffalo Study
Gallons per Person Day	22.80		
Total Gallons Per Day		55.18	
x Days in the Year		365	
Gallons Per Year			20,139
BTU/Gallon F	8.3		
BTU/F Year			167,156
Water Main Temp (Buffalo)	54.3		
Average Set Temperature	130		
Temp Differential F		75.7	
BTU Per Year			12,653,686
BTU/Therm	100,000		
Therm Usage			127
Base EF			
Efficiency Level	0.62		
Volume	30		
Factor	-0.0019		
EF Base	0.563		
1/ EF Base		1.7762	
Energy Efficient EF			
Efficiency Level	0.65		
		1.5385	
Indirect Water Heaters			
Therm Usage			127
EC base	0.65	1.538462	
EC ee	0.92	1.09	
Savings Indirect Water Heater			57.33

New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs

Residential, Multi-Family, and Commercial/Industrial Measures

October 15, 2010

Prepared for

New York Department of Public Service
3 Empire State Plaza, 8th Floor
Albany, New York 12223

Prepared by:

New York Evaluation Advisory Contractor Team
Pete Jacobs, Brian Evans, Nick Hall, Paul Horowitz,
Rick Ridge, Gil Peach, Ralph Prah

TecMarket Works

165 West Netherwood Road, Suite A
Oregon, WI 53575
Phone: (608) 835-8855
Fax: (608) 835-9490
mail@TecMarket.net



Setback Thermostat

Description of Measure

Programmable setback thermostats applied to single family and multi-family residential air conditioners, heat pumps, boilers, furnaces and electric resistance baseboard heating systems.

Method for Calculating Energy Savings

$$\Delta \text{kWh} = \text{units} \times \left[\frac{\text{ton}}{\text{unit}} \times \frac{12}{\text{SEER}} \times \text{EFLH}_{\text{cool}} \times \text{ESF}_{\text{cool}} + \frac{\text{kBtuh}_{\text{out}}}{\text{unit}} \times \frac{\text{EFLH}_{\text{heat}}}{\text{HSPF}} \times \text{ESF}_{\text{heat}} \right]$$

$$\Delta \text{therms} = \text{units} \times \frac{\text{kBtuh}_{\text{in}}}{\text{unit}} \times \frac{\text{EFLH}_{\text{heat}}}{100} \times \text{ESF}_{\text{heat}}$$

where:

ΔkWh	= gross annual energy savings
Δtherms	= gross annual gas savings
units	= the number of air conditioning units installed under the program
tons/unit	= tons of air conditioning per unit, based on nameplate data
SEER	= seasonal average energy efficiency ratio (Btu/watt-hour)
12	= conversion factor (kBtuh/ton)
ESF	= energy savings factor
$\text{kBtuh}_{\text{out}}/\text{unit}$	= the nominal rating of the heating output capacity of the heat pump in kBtu/hr (including supplemental heaters)
HSPF	= heating seasonal performance factor (Btu/watt-hr), a measure of the seasonal average efficiency of the heat pump in the heating mode
$\text{EFLH}_{\text{heat}}$	= heating equivalent full-load hours
$\text{EFLH}_{\text{cool}}$	= cooling equivalent full-load hours

The ***nominal rating of the cooling capacity of the air conditioner or heat pump*** should set equal to the rated capacity of all cooling equipment controlled by a setback thermostat in the home. The energy savings should be calculated per residence rather than per thermostat.

The ***nominal rating of the heating capacity of the heat pump*** should set equal to the rated capacity of all heating equipment controlled by a setback thermostat in the home. The energy savings should be calculated per residence rather than per thermostat.

Cooling equivalent full-load hours (EFLH) are defined as the ratio of the annual building cooling energy to the nameplate capacity:

$$\text{EFLH}_{\text{cool}} = \frac{\text{Annual kWh}_{\text{cooling}}}{\text{kW}_{\text{peak, cooling}}}$$

Heating equivalent load hours are defined as the ratio of the annual building heating energy to the nameplate capacity:

$$\text{EFLH}_{\text{heat}} = \frac{\text{Annual Heating Energy (Btu)}}{\text{Nameplate capacity (Btu/hr)}}$$

Nameplate capacity for heat pumps should include the full heating capacity of the heat pump system, including backup electric resistance heaters. Cooling and heating EFLH data by location, building type and vintage are tabulated in Appendix G.

Baseline Efficiencies from which Savings are Calculated

The baseline efficiency for air conditioners and heat pumps should be set according to the sections on air conditioner and heat pump efficiency above. Electric resistance heating systems should use an HSPF = 3.413, which is equivalent to a coefficient of performance of 1.0.

Studies of residential heating thermostat setpoint behavior indicate some amount of manual setback adjustment in homes without programmable thermostats. This behavior is accounted for in the prototypical building simulation model used to calculate heating equivalent full load hours, as described in Appendix A. An assumption of 3°F of night time setback behavior is embedded in the models.

Efficiency from which Incentives are Calculated

The **Energy Savings Factor** for heating (ESF_{heat}) is the ratio of the energy savings resulting from installation of a programmable setback thermostat to the annual heating energy. The heating energy savings factor assumption is taken from a study of programmable thermostat savings in Massachusetts conducted by RLW Analytics. The study estimated an energy savings of 6.8% of the annual heating energy consumption for programmable setback thermostats in residential applications.

The cooling energy savings factor (ESF_{cool}) is the ratio of the energy savings resulting from installation of a programmable setback thermostat to the annual cooling energy. The cooling energy savings factor assumption is taken from the Energy Star website. The Energy Star calculator estimates an energy savings of 3% of the annual cooling energy consumption per degree of setback for programmable setback thermostats in residential applications. Assuming an average of 3 degrees of setback, the recommended value for the cooling energy savings factor is 9%.

Operating Hours

Cooling and heating equivalent full load hours calculated from building energy simulation models are described in Appendix A and summarized in Appendix G.

Non-Electric Benefits - Annual Fossil Fuel Savings

N/A

Summary of Variables and Data Sources

Variable	Value	Notes
tons		From application or use 3 as default. Use 0 if no central cooling
SEER _{base}	10	
EFLH _{cool}		Vintage weighted average by city.
ESF _{cool}	0.09	
If heat pump:		
kBtu _h /unit _{out}		From application or use 70 kBtu/hr as default
HSPF _{base}	6.8	
if furnace		
kBtu _h /unit		From application or use 90 kBtu/hr as a default. Use wt average of furnace and boiler if system type unknown.
if boiler		
kBtu _h /unit		From application or use 110 kBtu/hr as default. Use wt average of furnace and boiler if system type unknown.
If resistance heater		
kBtu _h /unit		From application or use 12 kBtu/hr (3.5 kW) as default
HSPF _{base}	3.413	Equivalent to COP = 1
EFLH _{heat}		Vintage weighted average by city.
ESF _{heat}	0.068	

Notes & References

1. For examples of studies on residential thermostat setpoint behavior, see the literature review conducted for the California Energy Commission project “Residential Thermostats: Comfort Controls in California Homes,” CEC-500-03-026, available at <http://comfortcontrols.lbl.gov/pdf/tstats-lit-review.pdf>.
2. Baseline thermostat setback assumptions taken from: Conner, C.C. and Lucas, R.L. 1990. *Thermostat Related Behavior and Internal Temperatures Based on Measured Data in Residences*. PNL-7465, Pacific Northwest Laboratory. Richland, WA.
3. The RLW study on thermostat energy savings can be found at http://www.cee1.org/eval/db_pdf/933.pdf

4. Programmable thermostat savings for the cooling season taken from the Energy Star website: www.energystar.gov
5. Electric resistance systems generally require line voltage thermostats capable of controlling the rated current of the baseboard unit. Programmable line voltage thermostats are not common, but are available. Thermostats controlling heat pumps should have a heat pump recovery mode to minimize operation of electric resistance heaters during the temperature recovery period.

Revision Number

0

High Efficiency Gas Furnaces

Description of Measure

This section covers high efficiency condensing gas furnaces with an AFUE > 92% in single family and multi-family applications.

Method for Calculating Energy Savings

$$\Delta \text{therms} = \text{units} \times \frac{\text{kBtuh}_{\text{in}}}{\text{unit}} \times \left(1 - \frac{\text{AFUE}_{\text{base}}}{\text{AFUE}_{\text{ee}}} \right) \times \frac{\text{EFLH}_{\text{heat}}}{100}$$

where:

Δtherms	= gross annual gas savings
units	= number of units installed
$\text{kBtuh}_{\text{in}}/\text{unit}$	= the nominal heating input capacity in kBtu/hr
AFUE	= Average fuel utilization efficiency (0-100)
$\text{EFLH}_{\text{heat}}$	= heating equivalent full-load hours (relative to nameplate)

The *heating input capacity* is the nameplate rated input in kBtu/hr.

Heating equivalent load hours are defined as the ratio of the annual building heating energy to the nameplate capacity:

$$\text{EFLH}_{\text{heat}} = \frac{\text{Annual Heating Energy (Btu)}}{\text{Nameplate capacity (Btu/hr)}}$$

Heating equivalent full-load hours for single family and multi-family residential buildings were calculated from a DOE-2.2 simulation of prototypical residential buildings. The prototype building characteristics are described in Appendix A. The heating EFLH as a function of building type, vintage and city are shown in Appendix G.

The *average seasonal efficiency* of the furnace is the ratio of the heating output to the fuel input (in consistent units) over a heating season. This factor accounts for combustion efficiency, standby losses, cycling losses, and other sources of inefficiency within the furnace itself. The *AFUE* is an estimate of the seasonal heating energy efficiency for an average US city calculated according to a standard US DOE method and reported by the furnace manufacturer. Programs should use the manufacturers' rated AFUE until data can be developed that are more appropriate for NY climates.

Baseline Efficiencies from which Savings are Calculated

The baseline efficiency $AFUE_{base}$ for new construction and replace on failure:

Minimum AFUE for new gas furnaces per NAECA is 78%. Common practice generally leads code, but there are no New York specific baseline data on baseline furnace efficiency available at this time.

Compliance Efficiency from which Incentives are Calculated

The measure efficiency $AFUE_{ce}$ is as follows:

ACEEE recommends two tiers: > 92% and > 95% AFUE.

Operating Hours

Heating equivalent full load hours calculated from building energy simulation models are described in Appendix A and summarized in Appendix G.

Non-Gas Benefits - Annual Electric Savings

EC motors included with high efficiency gas furnaces may provide electricity savings benefits. However, studies in Wisconsin indicate that homeowners are more likely to operate their furnace fans continuously after installing a furnace with an EC motor, potentially reducing or eliminating these savings.

Summary of Variables and Data Sources

Variable	Value	Notes
$kBtu_{in}/unit$		From application
$AFUE_{base}$	0.8	Hot water boiler
	0.75	Steam boiler
	0.78	Furnace
$AFUE_{ee}$		From application
$EFLH_{heat}$		Lookup by vintage and city. Variability exceeds 5% across upstate (Albany, Binghamton, Buffalo, Massena and Syracuse) and NGrid (Albany, Massena and Syracuse) cities. City specific lookup must be used.

Notes & References

1. For more information on EC motor savings and occupant behavior see: Pigg, Scot. "Variable Speed Furnaces Come of Age," Wisconsin Perspective, November/December 2004. Energy Center of Wisconsin, Madison, WI. www.ecw.org/download.php?producturl=/prod/articles/art1_furn.pdf

Revision Number

1

Indirect Water Heaters

Indirect water heaters are tank-type water heaters that are indirectly heated by hot water from a boiler rather than direct input from electric elements or gas burners. A heat exchanger separates the potable water in the water heater from the boiler water. The baseline assumption for indirect water heaters is a standard efficiency tank type water heater or an indirect system with a standard efficiency boiler.

Method for Calculating Energy Savings

$$\Delta\text{therm} = \text{units} \times \left[\frac{\text{GPD} \times 365 \times 8.3 \times \overline{\Delta T}_w}{100,000} \times \left[\frac{1}{E_{c,\text{base}}} - \frac{1}{E_{c,\text{ee}}} \right] + \left(\frac{UA_{\text{base}}}{E_{c,\text{base}}} - \frac{UA_{\text{ee}}}{E_{c,\text{ee}}} \right) \times \Delta T_s \right]$$

$$UA_{\text{base}} = \frac{\frac{1}{EF_{\text{base}}} - \frac{1}{RE_{\text{base}}}}{67.5 \times \left(0.000584 - \frac{1}{RE_{\text{base}} \times Cap_{\text{base}}} \right)}$$

$$EF_{\text{base}} = 0.62 - 0.0019V_{\text{base}}$$

where:

Δtherm	= gross annual gas savings
units	= number of high efficiency water heaters installed under the program
UA_{base}	= overall heat loss coefficient of base tank type water heater (Btu/hr-°F)
UA_{ee}	= overall heat loss coefficient of indirect water heater storage tank (Btu/hr-°F)
ΔT_s	= temperature difference between the stored hot water and the surrounding air (°F)
GPD	= average daily water consumption (gallons/day)
$\overline{\Delta T}_w$	= average difference between the cold inlet temperature and the hot water delivery temperature (°F)
EF_{base}	= baseline storage water heater energy factor
$E_{c,\text{ee}}$	= energy efficient indirect water heater boiler combustion efficiency
$E_{c,\text{base}}$	= baseline water heater efficiency (= RE_{base} if tank type baseline; $E_{c,\text{base}}$ if indirect baseline)
RE_{base}	= tank type water heater recovery efficiency
Cap_{base}	= tank type water heater capacity (Btu/hr)
V_{base}	= tank type water heater capacity (gallons)
8.3	= conversion factor (Btu/gallon-°F)

100,000 = conversion factor (Btu/therm)
365 = conversion factor (days/yr)

The *ambient temperature difference* between the water heat setpoint and the ambient room temperature is used to calculate the standby losses. Water heaters are generally located in conditioned or partially conditioned spaces to avoid freezing. A room temperature of 70°F is the default value.

The *water temperature difference* between the water heat setpoint and cold water mains temperature is used to calculate the hot water load. If the water heater has sufficient capacity to meet the load, hot water will be delivered at the water heater setpoint temperature. Water heater setpoint for residential buildings is usually in the range of 120°F to 140°F. The water heater setpoint should be consistent with temperature assumed in the water use data.

Cold water entering temperatures vary according to climate, and are approximately equal to the annual average outdoor temperature plus 6°F. Water temperature is usually monitored by the water utility, and is available on request. Cold water entering temperatures based on the annual outdoor temperature are shown below.

City	Annual average outdoor temperature (°F)	T mains (°F)
Albany	48.2	54.2
Binghamton	46.9	52.9
Buffalo	48.3	54.3
Massena	44.7	50.7
Syracuse	48.6	54.6
Upstate average	47.3	53.3
NYC	56.5	62.5

Hot water use varies by family size. Estimates of hot water use per person as a function of number of people in the home is shown below.

Number of people	Gal/person-day	Gal/day-household
1	29.4	29
2	22.8	46
3	20.6	62
4	19.5	78
5	18.9	94
6	18.5	111

The *energy factor* is used to calculate seasonal water heater efficiency. The energy factor is reported by manufacturers according to a standard test procedure. The energy factor takes into account the efficiency of the heat source (electricity or gas) and the effectiveness of the tank insulation in reducing standby losses.

Tank overall heat loss coefficient (UA) is used to calculate the summer peak savings, which are assumed to be caused by reductions in standby losses. The UA is calculated from the energy factor, recovery efficiency, and heater electric element or gas burner capacity:

$$UA = \frac{\frac{1}{EF} - \frac{1}{RE}}{67.5 \times \left(0.000584 - \frac{1}{RE \times Cap} \right)}$$

RE_{base} = recovery efficiency
Cap_{base} = water heater capacity (Btu/hr)

Standard assumptions for recovery efficiency and input capacity for small non-condensing water heaters²⁵ are:

Water Heater Type	Recovery efficiency	Capacity (Btu/hr)
Electric	0.97	15,400
Gas	0.75	40,000

Tank overall heat loss coefficient (UA) for larger multi-family water heaters is calculated from the standby loss specification.

$$UA = SL/70 \text{ (Btu/hr-deg F)}$$

where:

SL = standby loss (Btu/hr)
70 = temperature difference associated with standby loss specification

UA values for indirect water heater tanks are estimated from the tank physical size and insulation type and thickness.

$$UA_{base} = \frac{2\pi k_{side} H}{\ln\left(\frac{r_2}{r_1}\right)} + \frac{\pi r_1^2 k_{bot}}{th_{bot}} + \frac{\pi r_1^2 k_{top}}{th_{top}}$$

where:

k_{side} = thermal conductivity of tank sidewall insulation (Btu/hr-ft-°F)
k_{bot} = thermal conductivity of tank bottom insulation (Btu/hr-ft-°F)
k_{top} = thermal conductivity of tank top insulation (Btu/hr-ft-°F)
k_{wrap} = thermal conductivity of tank wrap (Btu/hr-ft-°F)

²⁵ Values applicable to non-condensing water heaters with EF ≤ 0.68.

- r₁ = radius of bare tank (ft)
- r₂ = radius of tank plus existing insulation (ft)
- r₃ = radius of tank plus existing insulation plus additional insulation (ft)
- H = height of tank (ft)
- th_{bot} = thickness of insulation on tank bottom (ft)
- th_{top} = thickness of insulation on tank top (ft)
- th_{wrap} = thickness of tank wrap (ft)

UA values for typical indirect water heater tanks are shown below.

Volume (gal)	H (bare tank) inches	Diameter (bare tank) inches	Insulation	UA (Btu/hr-degF)
40	44	17	1 in foam	4.1
			2 in foam	2.1
80	44	24	1 in foam	6.1
			2 in foam	3.1
120	65	24	1 in foam	8.4
			2 in foam	5.4

The *coincidence factor* is used to account for the fact that not all water heaters in all buildings in the population are operating at full nameplate capacity at the time of the system peak. The coincidence factor is defined as the average fraction of installed capacity of a population of water heaters that are operating at the time of system peak.

The recommended value for the coincidence factor is shown below.

Parameter	Recommended Values
Coincidence factor	0.8

Baseline Efficiencies from which Savings are Calculated

The baseline energy factor (EF_{base}) is as follows:

New construction and replace on failure: The efficient water heater is assumed to replace a standard efficiency tank-type water heater. Energy Factors (EF) according to NAECA for storage water heaters are calculated as a function of storage volume:

Electric water heaters: EF = 0.93-0.00132V

Gas water heaters: EF = 0.62-0.0019V

where V is tank volume in gallons.

Compliance Efficiency from which Incentives are Calculated

Indirect water heater must be combined with an efficient space heating boiler meeting program specifications.

Operating Hours

Water heater assumed to be available at all hours.

Non-Electric Benefits - Annual Fossil Fuel Savings

Reduction in standby heat losses will have some impact on space heating and cooling when the water heater is located in conditioned space. These are considered small and not included in these calculations.

Summary of Variables and Data Sources

Variable	Value	Notes
UA _{base}		Calc from baseline water heater EF or standby loss.
UA _{ee}		Calc from lookup table based on tank volume and insulation thickness
delta T _s	Tset - Tamb	
GPD		Default to 78 gpd for single family residential, otherwise from application
delta T _w	Tset - Tmain	
Ec _{base}	0.97 (elec)	
	0.75 (gas)	
Ec _{ee}		From application
V		From application
T _{set}	130	
T _{amb}	65	
T _{mains}		Avg T _{mains} based on upstate or downstate
Capacity (Q)	40,000	See table for storage type gas water heaters above
EF _{base}		Calc from tank volume
RE _{base}		0.75
V _{base}		Same as V
SL _{base}	380 Btu/hr	Based on 120 gal tank with 2 in foam insulation

Notes & References

Revision Number

0

APPENDIX G. HEATING AND COOLING EQUIVALENT FULL-LOAD HOURS

Cooling equivalent full load hours for residential buildings were calculated from a DOE-2.2 simulation of prototypical residential buildings. The prototype building characteristics are described in Appendix A. Residential prototypes for three different classes of building vintage were developed:

1. Old, poorly insulated buildings constructed before 1979, before the NY State Energy Code went into effect. This vintage is referred to as the “old” vintage.
2. Existing, average insulated buildings conforming to 1980s era building codes. This vintage is referred to as the “average” vintage.
3. New construction conforming to the 2007 Energy Conservation Code of New York State for residential buildings. This vintage is referred to as the “new” vintage.

The cooling EFLH are shown below:

Single Family Detached Cooling Equivalent full load hours by Vintage and City

City	Old	Average	New
Albany	322	310	279
Binghamton	199	197	158
Buffalo	334	322	276
Massena	258	250	210
Poughkeepsie	496	470	464
NYC	670	630	649
Syracuse	310	296	268

Multifamily Low-Rise Cooling Equivalent full load hours by Vintage and City

City	Old	Average	New
Albany	286	295	279
Binghamton	217	219	210
Buffalo	270	274	256
Massena	230	228	218
NYC	507	550	562
Poughkeepsie	397	423	421
Syracuse	265	284	297

Multifamily High-Rise Cooling EFLH

System	Albany	Binghamton	Buffalo	Massena	NYC	Poughkeepsie	Syracuse
Fan coil	594	479	572	532	793	626	592

Heating equivalent full load hours for residential buildings were calculated from a DOE-2.2 simulation of prototypical residential buildings. The prototype building characteristics are described in Appendix A. The heating EFLH are shown below:

Single Family Detached Heating Equivalent full load hours by Vintage and City

City	Old	Average	New
Albany	1,469	1,379	1,304
Binghamton	1,531	1,450	1,357
Buffalo	1,530	1,473	1,366
Massena	1,586	1,496	1,422
NYC	1,030	934	861
Poughkeepsie	1,250	1,157	1,083
Syracuse	1,466	1,391	1,298

Multifamily Low-Rise Heating Equivalent full load hours by Vintage and City

City	Old	Average	New
Albany	1,030	1,012	729
Binghamton	1,320	1,245	899
Buffalo	1,219	1,215	883
Massena	1,306	1,326	964
NYC	757	723	503
Poughkeepsie	894	868	616
Syracuse	1,175	1,206	845

Multifamily High-Rise Heating EFLH

System	Albany	Binghamton	Buffalo	Massena	NYC	Poughkeepsie	Syracuse
FC	786	1006	966	1016	526	656	889