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MEMORANDUM

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**TO:** Jeremy Newberger and Courtney Lane, National Grid  
**FROM:** Carrie Koenig and Pam Rathbun, Tetra Tech  
**SUBJECT:** 2013-2014 Rhode Island C&I Natural Gas Free Ridership and Spillover Study  
**DATE:** August 26, 2015

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This memorandum summarizes National Grid's results from the 2014 C&I Natural Gas Programs Free-ridership and Spillover Study for Rhode Island. The results from 2014 are combined with the gas results from 2013<sup>1</sup> to provide more robust net-to-gross (NTG) figures. This memorandum supplements the report from the 2013 study<sup>2</sup>.

### Introduction

Using the same C&I self-report methodology utilized for the 2013 electric and gas study, Tetra Tech conducted telephone interviews with National Grid's participating C&I gas customers in April and May 2015 to collect free-ridership and spillover information. This study utilized the same participant survey used for the 2013 electric and gas free-ridership and spillover study, modified slightly to remove financing and marketing questions that were specific to the 2013 study. Unlike the 2013 electric and gas study, Tetra Tech did not conduct any vendor surveys.

Upon completion of the data collection, free-ridership and spillover rates were calculated and applied to the program's savings at the program and measure levels. These results were then combined with the 2013 results to increase the measure and program coverage.

### Methodology

The data for this study consisted of participants where incentives were paid over a seven-month period from June 2014 through December 2014. The sample focused on recent participants where the decision maker was more likely to still be with the company and recall the participation decision.

The participant information was aggregated to the measure category level for purposes of selecting a representative sample by program. Each program participant sample frame consists of unique

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<sup>1</sup> The years 2013 and 2014 represent the year of participation.

<sup>2</sup> 2013 Commercial and Industrial Programs Free-ridership and Spillover Study Final Report. September 30, 2014

natural gas *accounts*<sup>3</sup>, not unique customer names. The same customer name, or business identity, can have multiple accounts in multiple locations, but program technical support and incentives are provided on behalf of an individual account. For purposes of this study, we defined a participant or customer as a unique account number by program. Each account with more than two measure types was only asked about two measure types, prioritized by the largest savings or unique measure types.

For sampling and subsequent reporting, the evaluation utilized the same measure categories as used in the previous report. These categories can be found in Table 1 below.

**Table 1. Measure Types by Program**

Program	Measure Type
Commercial New Construction – Custom	HVAC – Plant, Other, Water Heating
Commercial New Construction – Prescriptive	Food Service, HVAC, Water Heating
Large Commercial Retrofit - Custom	Controls, HVAC – Distribution, Insulation, Other
Large Commercial Retrofit – Prescriptive	Controls, Insulation, Other, Water Heating
Small Business program	Controls, Insulation, Water Heating

Using the C&I self-report methodology, the team analyzed the data to determine a NTG ratio by measure type and program. The data was combined with the 2013 gas results and reported together resulting in a blended rate. Combining the results increases the sample sizes which results in more robust program-level data. Weights for the 2014 gas study were computed independently from the 2013 study to account for the disproportional sampling that may have conducted. Once weights were calculated, the gas records from the 2013 study were combined with the 2014 gas data and reported together. Because the 2014 gas study was only collecting data from participants, only free-ridership and participant like spillover rates were calculated.

### Summary of Results

**Error! Reference source not found.** summarizes the 2013, 2014, and combined free-ridership and spillover estimates for gas measures offered through the programs. The free-ridership rate for gas measures installed through these programs decreased from 2013 (23.2 percent) to 2014 (15.0 percent). The participant “like” spillover rate also decreased from 2013 to 2014 (0.4 percent to 0.1 percent respectively). Nonparticipant spillover was not applicable to the 2014 study.

Significance testing was conducted on the NTG scores between 2013 and 2014. Results for the Retrofit and Small Business programs between 2013 and 2014 were not statistically significant (see Table 3 below); however the results for New Construction were statistically significant at the 95% confidence level. This was driven by the custom subcomponent under New Construction (see Table 4 below).

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<sup>3</sup> Each account could include multiple applications for efficiency projects. For example, if one account has five HVAC applications and one VSD application, this account would show up twice in the sample frame; once for HVAC (aggregating all the HVAC applications) and once for VSD.

**Table 2. 2013 and 2014 Summary of Free-Ridership, Spillover, and Net-to-gross Rates**

Survey Year	Free-ridership rate	Participant like spillover rate	Nonparticipant like spillover rate	Net-to-Gross
2013	23.2%	0.4%	0.3%	77.5%
2014	15.0%	0.1%	NA	85.1%
2013 and 2014 combined	19.1%	0.3%	0.1%	81.2%

**Table 3. 2013 and 2014 Summary of Net-to-gross Rates by Program**

Survey Year	New Construction	Retrofit	Small Business	Net-to-Gross
2013	74.9%	77.8%	97.0%	77.5%
2014	93.6%	80.8%	96.6%	85.1%
2013 and 2014 combined	86.1%	79.1%	96.7%	81.2%

**Table 4. 2013 and 2014 Summary of Net-to-gross Rates for New Construction**

Survey Year	New Construction - Custom	Surveyed	New Construction - Prescriptive	Surveyed
2013	78.1%	11	63.2%	24
2014	99.9%	6	62.4%	23
2013 and 2014 combined	91.4%	17	62.8%	47

## Detailed Program Results

The following tables are the detailed results from the 2014 and 2013/2014 combined studies.

### 2014 Survey Results

Table 5 presents National Grid's free-ridership, spillover, and net-to-gross rates for each gas measure type by program. The overall net-to-gross rate is 85.1 percent. Commercial New Construction Custom had the highest net-to-gross rate at the program level at 99.9 percent. The lowest was Commercial New Construction Prescriptive (62.4 percent).

The Commercial New Construction Custom program's water heating and other measure types, along with Small Business's insulation, had the lowest free-ridership rate at 0.0 percent. This was followed by the controls measure type for the Small Business program at 0.2 percent. The highest free-ridership rate appears with the food service measure type under the Commercial New Construction Prescriptive program (45.9 percent), followed by insulation under the Large Commercial Retrofit Custom program (45.3 percent). The only participant "like" spillover rate was within water heating equipment for the Small Business program (2.5 percent).

**Table 5. 2014 Results at the Program and Measure Level**

Program	Measure Type	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipating "Like" Spillover Rate	Net-to-Gross Rate
Commercial New Construction - Custom	HVAC - Plant	3	19,114	4	20,876	91.6%	3.1%	NA	0.0%	NA	NA	96.9%
	Other	1	210,121	3	434,629	48.3%	0.0%	NA	0.0%	NA	NA	100.0%
	Water Heating	2	20,160	3	20,866	96.6%	0.0%	NA	0.0%	NA	NA	100.0%
	<b>Total</b>	<b>6</b>	<b>249,395</b>	<b>10</b>	<b>476,371</b>	<b>52.4%</b>	<b>0.1%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>NA</b>	<b>99.9%</b>
Commercial New Construction - Prescriptive	Food Service	5	7,933	11	11,152	71.1%	45.9%	NA	0.0%	NA	NA	54.1%
	HVAC	14	37,010	35	81,003	45.7%	37.0%	NA	0.0%	NA	NA	63.0%
	Water Heating	4	778	20	4,547	17.1%	26.3%	NA	0.0%	NA	NA	73.7%
	<b>Total</b>	<b>23</b>	<b>45,721</b>	<b>66</b>	<b>96,702</b>	<b>47.3%</b>	<b>37.6%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>NA</b>	<b>62.4%</b>
Large Commercial Retrofit - Custom	Controls	6	58,886	21	115,905	50.8%	5.1%	NA	0.0%	NA	NA	94.9%
	HVAC - Distribution	9	227,069	26	531,734	42.7%	28.5%	NA	0.0%	NA	NA	71.5%
	Insulation	4	96,493	8	191,580	50.4%	45.3%	NA	0.0%	NA	NA	54.7%
	Other	6	418,230	19	456,818	91.6%	1.2%	NA	0.0%	NA	NA	98.8%
	<b>Total</b>	<b>25</b>	<b>800,678</b>	<b>74</b>	<b>1,296,037</b>	<b>61.8%</b>	<b>19.2%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>NA</b>	<b>80.8%</b>
Large Commercial Retrofit - Prescriptive	Controls	3	1,222	15	11,767	10.4%	19.9%	NA	0.0%	NA	NA	80.1%
	Water Heating	4	1,182	16	6,053	19.5%	15.5%	NA	0.0%	NA	NA	84.5%
	<b>Total</b>	<b>7</b>	<b>2,404</b>	<b>31</b>	<b>17,820</b>	<b>13.5%</b>	<b>18.4%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>NA</b>	<b>81.6%</b>
Small Business program	Controls	23	6,618	37	15,593	42.4%	0.2%	NA	0.0%	NA	NA	99.8%
	Insulation	1	2,532	2	2,627	96.4%	0.0%	NA	0.0%	NA	NA	100.0%
	Water Heating	48	13,554	230	52,388	25.9%	7.0%	5.2%	2.5%	3.5%	NA	95.4%
	<b>Total</b>	<b>72</b>	<b>22,704</b>	<b>269</b>	<b>70,608</b>	<b>32.2%</b>	<b>5.3%</b>	<b>4.7%</b>	<b>1.8%</b>	<b>2.3%</b>	<b>NA</b>	<b>96.6%</b>
<b>Total</b>		<b>133</b>	<b>1,120,902</b>	<b>450</b>	<b>1,957,538</b>	<b>57.3%</b>	<b>15.0%</b>	<b>4.2%</b>	<b>0.1%</b>	<b>1.2%</b>	<b>NA</b>	<b>85.1%</b>

Looking at results at the measure level, Table 6 shows food service and insulation had the highest free-ridership rates (45.9 percent and 44.7 percent respectively). The lowest was the other measure type category (0.6 percent), followed by HVAC – Plant (3.1 percent).

The highest net-to-gross rate was other (99.4 percent), followed by HVAC – Plant (96.9 percent). The lowest net-to-gross was food service, which also had the highest free-ridership rate as mentioned above.

**Table 6. 2014 Results at the Measure Level**

Measure Type	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipating "Like" Spillover Rate	Net-to-Gross Rate
Controls	32	66,726	73	143,265	46.6%	5.8%	NA	0.0%	NA	NA	94.2%
Food Service	5	7,933	11	11,152	71.1%	45.9%	NA	0.0%	NA	NA	54.1%
HVAC	14	37,010	35	81,003	45.7%	37.0%	NA	0.0%	NA	NA	63.0%
HVAC - Distribution	9	227,069	26	531,734	42.7%	28.5%	NA	0.0%	NA	NA	71.5%
HVAC - Plant	3	19,114	4	20,876	91.6%	3.1%	NA	0.0%	NA	NA	96.9%
Insulation	5	99,025	10	194,207	51.0%	44.7%	NA	0.0%	NA	NA	55.3%
Other	7	628,351	22	891,447	70.5%	0.6%	NA	0.0%	NA	NA	99.4%
Water Heating	58	35,674	269	83,854	42.5%	7.0%	5.2%	1.5%	2.9%	NA	94.6%
<b>Total</b>	<b>133</b>	<b>1,120,902</b>	<b>450</b>	<b>1,957,538</b>	<b>57.3%</b>	<b>15.0%</b>	<b>4.2%</b>	<b>0.1%</b>	<b>1.2%</b>	<b>NA</b>	<b>85.1%</b>

At the overall program level, 2014 results in Table 7 show the Retrofit program had the highest free-ridership rate at 19.2 percent and the lowest net-to-gross rate of 80.8 percent. New Construction was next at 6.4 percent free-ridership and a net-to-gross rate of 93.6 percent, followed by Small Business at 5.3 percent free-ridership and a net-to-gross rate of 96.6 percent.

**Table 7. 2014 Results at the Program Level**

Program	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipating "Like" Spillover Rate	Net-to-Gross Rate
New Construction	29	295,116	76	573,073	51.5%	6.4%	NA	0.1%	NA	NA	93.6%
Retrofit	32	803,082	105	1,313,857	61.1%	19.2%	NA	0.0%	NA	NA	80.8%
Small Business	72	22,704	269	70,608	32.2%	5.3%	4.7%	1.8%	2.3%	NA	96.6%
<b>Total</b>	<b>133</b>	<b>1,120,902</b>	<b>450</b>	<b>1,957,538</b>	<b>57.3%</b>	<b>15.0%</b>	<b>4.2%</b>	<b>0.1%</b>	<b>1.2%</b>	<b>NA</b>	<b>85.1%</b>

2013 and 2014 Survey Results Combined

Looking at the combined results of 2013 and 2014, Table 8 shows the program with the highest net-to-gross rate is Small Business at 96.7 percent, followed by Large Commercial Retrofit Prescriptive at 94.2 percent. The lowest net-to-gross rate was Commercial New Construction Prescriptive (62.8 percent).

Looking at free-ridership, the combined results show the Prescriptive Commercial New Construction had the highest rate at 42.3 percent. The water heating measure type under that program had the highest free-ridership rate (53.8 percent). The lowest free-ridership rate was the Small Business program (4.7 percent).

**Table 8. 2013 and 2014 Combined Results at the Program and Measure Level**

Program	Measure Type	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipant "Like" Spillover Rate	Net-to-Gross Rate
Commercial New Construction - Custom	HVAC - Plant	11	115,682	28	201,603	57.4%	20.2%	NA	0.0%	NA	1.3%	81.1%
	Other	3	216,328	8	525,522	41.2%	3.0%	NA	0.0%	NA	0.0%	97.0%
	Water Heating	3	21,680	15	50,554	42.9%	25.7%	NA	0.0%	NA	0.0%	74.3%
	<b>Total</b>	<b>17</b>	<b>353,690</b>	<b>51</b>	<b>777,679</b>	<b>45.5%</b>	<b>8.9%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>0.3%</b>	<b>91.4%</b>
Commercial New Construction - Prescriptive	Food Service	6	8,239	24	21,364	38.6%	38.9%	NA	0.0%	NA	0.0%	61.1%
	HVAC	30	50,898	110	141,325	36.0%	41.6%	NA	6.3%	NA	0.0%	64.7%
	Water Heating	11	2,290	55	14,406	15.9%	53.8%	NA	0.0%	NA	0.0%	46.2%
	<b>Total</b>	<b>47</b>	<b>61,427</b>	<b>189</b>	<b>177,096</b>	<b>34.7%</b>	<b>42.3%</b>	<b>NA</b>	<b>5.1%</b>	<b>NA</b>	<b>0.0%</b>	<b>62.8%</b>
Large Commercial Retrofit - Custom	Controls	9	71,265	47	281,119	25.4%	47.5%	NA	0.0%	NA	0.8%	53.3%
	HVAC - Distribution	23	389,851	68	1,352,214	28.8%	27.1%	NA	0.0%	NA	0.0%	72.9%
	Insulation	8	147,903	26	322,642	45.8%	28.1%	NA	0.0%	NA	0.1%	72.0%
	Other	7	450,431	35	674,760	66.8%	0.8%	NA	0.0%	NA	0.0%	99.2%
	<b>Total</b>	<b>47</b>	<b>1,059,450</b>	<b>176</b>	<b>2,630,735</b>	<b>40.3%</b>	<b>22.6%</b>	<b>NA</b>	<b>0.0%</b>	<b>NA</b>	<b>0.1%</b>	<b>77.5%</b>
Large Commercial Retrofit - Prescriptive	Controls	5	1,778	33	15,718	11.3%	19.3%	NA	0.0%	NA	0.3%	81.1%
	Insulation	3	16,520	10	57,195	28.9%	6.4%	NA	0.0%	NA	0.2%	93.8%
	Other	1	2,313	6	136,981	1.7%	0.0%	NA	0.0%	NA	0.0%	100.0%
	Water Heating	18	8,490	355	83,570	10.2%	12.6%	12.5%	0.0%	0.0%	0.0%	87.4%
	<b>Total</b>	<b>27</b>	<b>29,101</b>	<b>404</b>	<b>293,465</b>	<b>9.9%</b>	<b>5.9%</b>	<b>7.2%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.1%</b>	<b>94.2%</b>
Small Business program	Controls	35	9,467	78	25,543	37.1%	3.3%	NA	0.0%	NA	0.5%	97.2%
	Insulation	1	2,532	2	2,627	96.4%	0.0%	NA	0.0%	NA	0.0%	100.0%
	Water Heating	61	23,832	299	70,568	33.8%	5.5%	4.3%	1.8%	2.5%	0.0%	96.4%
	<b>Total</b>	<b>97</b>	<b>35,831</b>	<b>379</b>	<b>98,738</b>	<b>36.3%</b>	<b>4.7%</b>	<b>3.1%</b>	<b>1.3%</b>	<b>1.6%</b>	<b>0.1%</b>	<b>96.7%</b>
<b>Total</b>		<b>235</b>	<b>1,539,499</b>	<b>1,199</b>	<b>3,977,712</b>	<b>38.7%</b>	<b>19.1%</b>	<b>3.8%</b>	<b>0.3%</b>	<b>0.5%</b>	<b>0.1%</b>	<b>81.2%</b>

Table 9 shows the combined 2013/2014 results at the measure level. The highest free-ridership rates were found for two measure types, controls and HVAC (42.6 percent and 41.6 percent, respectively). The lowest was the other measure type at 1.6 percent.

**Table 9. 2013 and 2014 Combined Results at the Measure Level**

Measure Type	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipating "Like" Spillover Rate	Net-to-Gross Rate
Controls	49	82,510	158	322,380	25.6%	42.6%	NA	0.0%	NA	0.7%	58.1%
Food Service	6	8,239	24	21,364	38.6%	38.9%	NA	0.0%	NA	0.0%	61.1%
HVAC	30	50,898	110	141,325	36.0%	41.6%	NA	6.3%	NA	0.0%	64.7%
HVAC - Distribution	23	389,851	68	1,352,214	28.8%	27.1%	NA	0.0%	NA	0.0%	72.9%
HVAC - Plant	11	115,682	28	201,603	57.4%	20.2%	NA	0.0%	NA	1.3%	81.1%
Insulation	12	166,955	38	382,464	43.7%	24.6%	NA	0.0%	NA	0.1%	75.5%
Other	11	669,072	49	1,337,263	50.0%	1.6%	NA	0.0%	NA	0.0%	98.4%
Water Heating	93	56,292	724	219,342	25.7%	16.0%	5.8%	0.6%	1.2%	0.0%	84.6%
<b>Total</b>	<b>235</b>	<b>1,539,499</b>	<b>1,199</b>	<b>3,977,956</b>	<b>38.7%</b>	<b>19.1%</b>	<b>3.8%</b>	<b>0.3%</b>	<b>0.5%</b>	<b>0.1%</b>	<b>81.2%</b>

Combined results at the program level (Table 10) provides an overall net-to-gross rating of 81.2 percent. The highest net-to-gross rating is for the Small Business program (96.7 percent) followed by New Construction (86.1 percent) and Retrofit (79.1 percent) programs. The Retrofit program was the only program without participant like spillover.

**Table 10. 2013 and 2014 Combined Results at the Program Level**

Program	Surveyed	Surveyed Savings	Population	Population Savings	Percent of Total Savings Surveyed	Free-ridership Rate	90% Margin Error (±)	Participant "Like" Spillover Rate	90% Margin Error (±)	Nonparticipating "Like" Spillover Rate	Net-to-Gross Rate
New Construction	64	415,117	240	954,775	43.5%	15.1%	6.3%	1.0%	1.7%	0.3%	86.1%
Retrofit	74	1,088,551	580	2,924,200	37.2%	21.0%	7.3%	0.0%	0.0%	0.1%	79.1%
Small Business	97	35,831	379	98,738	36.3%	4.7%	3.1%	1.3%	1.6%	0.1%	96.7%
<b>Total</b>	<b>235</b>	<b>1,539,499</b>	<b>1,199</b>	<b>3,977,712</b>	<b>38.7%</b>	<b>19.1%</b>	<b>3.8%</b>	<b>0.3%</b>	<b>0.5%</b>	<b>0.1%</b>	<b>81.2%</b>

### Unlike Spillover Results for 2014

The evaluation team included questions to address “unlike” spillover—energy efficient equipment installed by a participant due to program influences that is not identical to the equipment they received through the program.

One Small Business participant reported they have installed hundreds of LED lights, including “state of the art flat panels in the kitchen” outside of a National Grid program and stated National Grid’s programs were influential in the installation. The LEDs were 4 watt bulbs equivalent to a 60 watt incandescent bulb.