

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: THE NARRAGANSETT ELECTRIC COMPANY :
d/b/a NATIONAL GRID – ELECTRIC AND GAS : DOCKET NO. 4770
DISTRIBUTION RATE FILING :

COMMISSION’S THIRTEENTH SET OF DATA REQUESTS
DIRECTED TO NATIONAL GRID
(Issued May 31, 2018)

- 13-1. Reference is made to National Grid’s response to PUC 9-26 in which the PUC asked National Grid to report achievement of various benefits and savings across different programs. In the response, National Grid reported many benefits and savings across many programs as “not applicable.”

Nameplate Capacity (kW)

- a. For years 2012-2017, please use the actual attributes of RECs retired by the National Grid on behalf of its energy customers, as reported to the PUC for compliance with the Renewable Energy Standard (RES) and Energy Source Disclosure Rules, to calculate the nameplate capacity of generation associated with the RES.

Energy Saved or Generated (kWh)

- b. For years 2012-2017, please provide the kWh saved by National Grid’s Volt/Var Optimization and Conservation Voltage Reduction (VVO/CVR) work. Reference is made to National Grid’s annual Infrastructure, Safety, and Reliability (ISR) Program filings. Please report N/A only for years in which the program did not exist. Please report zero for years in which the program did exist, but savings were not achieved.
- c. For years 2012-2017, please provide the kWh generated by Renewable Energy Growth (REG) Program projects. Reference is made to National Grid’s annual REG Program Factor filings. Please report N/A only for years in which the program did not exist. Please report zero for years in which the program did exist, but generation did not occur.
- d. For years 2012-2017, please provide the estimated kWh generated by Net Metering projects. Reference is made to National Grid’s annual Electric Retail Rate filings. Please report zero for years in which the program did exist, but savings were not achieved.

Avoided Distribution System Demand (kW)

- e. For years 2012-2017, please provide the demand reduction caused by Energy Efficiency. Reference is made to the cost test descriptions in the annual Energy Efficiency Program filings and the demand factor described therein (kW_{Summer}).
- f. For System Reliability Procurement (SRP) please provide the same as in part e.
- g. For VVO/CVR, please provide the same as in part e.

- h. For years 2012-2017, please explain if National Grid can provide the reduction in distribution system demand caused by the REG Program. Reference is made to National Grid's electric demand forecasts filed periodically with the PUC, for example in annual ISR filings.
- i. For Long-Term Contracts, please provide the same as in part h.
- j. For Distributed Generation Contracts, please provide the same as in part h.
- k. For Net Metering, please provide the same as in part h.

Avoided Bulk System Demand (kW)

- l. For years 2012-2017, please provide the demand reduction caused by Energy Efficiency. Reference is made to the cost test descriptions in the annual Energy Efficiency Program filings and the demand factor described therein (kW_{Summer}). Reference is also made to National Grid's practice of bidding Energy Efficiency Programs into the Forward Capacity Market.
- m. For SRP please provide the same as in part l.
- n. For VVO/CVR, please provide the same as in part l.
- o. For years 2012-2017, please explain if National Grid can provide the reduction in bulk system demand caused by the REG Program. Reference is made to National Grid's practice of bidding some REG projects into the ISO-New England Forward Capacity Markets and the National Grid's practice of providing input to, and making use of, ISO-New England's Distributed Generation Forecast.
- p. For Long-Term Contracts, please provide the same as in part o.
- q. For Distributed Generation Contracts, please provide the same as in part o.
- r. For Net Metering, please provide the same as in part o.

Avoided Transmission Peak Demand (kW)

- s. For years 2012-2017, please explain if National Grid can provide the reduction in transmission peak caused by the Energy Efficiency program. If National Grid cannot provide these numbers, please provide the demand factor (kW_{Summer}) used to calculate transmission benefits as provided to the PUC in annual Energy Efficiency Program Plans.
- t. For SRP please provide the same as in part e.
- u. For VVO/CVR, please provide the same as in part e.
- v. For years 2012-2017, please explain if National Grid can provide the reduction in transmission peak caused by the REG Program. With reference to data requested on distribution and bulk system demand, please explain how REG Program projects can reduce distribution and bulk system demand, but not transmission peak demand.
- w. For Long-Term Contracts, please provide the same as in part v.
- x. For Distributed Generation Contracts, please provide the same as in part v.
- y. For Net Metering, please provide the same as in part v.

Avoided Carbon Dioxide Emissions (tons of CO₂)

- z. For years 2012-2017, please provide the emissions reduction caused by SRP. Reference is made to the benefit-cost analyses provided in annual SRP Report filings.
- aa. For years 2012-2017, please provide the emissions reduction caused by REG Program projects. Reference is made to generation data provided above and the bulk system emissions attributes reported by National Grid in its annual Energy Source Disclosure Label filings.
- bb. For Long-Term Contracts, please provide the same as in part aa.
- cc. For Distributed Generation Contracts, please provide the same as in part aa.
- dd. For Net Metering, please provide the same as in part aa.

Net Savings (nominal dollars)

- ee. For years 2012-2017, please provide the net savings (positive or negative) caused by the VVO/CVR program. Reference is made to annual ISR filings and data provided above. Additional reference is made to the costs of this program reported in National Grid's original response the PUC 9-26.
- ff. For years 2012-2017, please provide the net savings (positive or negative) caused by the REG Program. Reference is made to data provided above. Additional reference is made to the costs of this program reported in National Grid's original response the PUC 9-26.
- gg. For Long-Term Contracts, please provide the same as in part ff.
- hh. For Distributed Generation Contracts, please provide the same as in part ff.
- ii. For Net Metering, please provide the same as in part ff.

Company Earnings

- jj. Please confirm that the Net Metering and RES programs have no applicable effect on National Grid's earnings.

Response can be found on Bates page(s) 1-15.

PUC 13-1

Request:

Reference is made to National Grid's response to PUC 9-26 in which the PUC asked National Grid to report achievement of various benefits and savings across different programs. In the response, National Grid reported many benefits and savings across many programs as "not applicable."

Nameplate Capacity (kW)

- a. For years 2012-2017, please use the actual attributes of RECs retired by the National Grid on behalf of its energy customers, as reported to the PUC for compliance with the Renewable Energy Standard (RES) and Energy Source Disclosure Rules, to calculate the nameplate capacity of generation associated with the RES.

Energy Saved or Generated (kWh)

- b. For years 2012-2017, please provide the kWh saved by National Grid's Volt/Var Optimization and Conservation Voltage Reduction (VVO/CVR) work. Reference is made to National Grid's annual Infrastructure, Safety, and Reliability (ISR) Program filings. Please report N/A only for years in which the program did not exist. Please report zero for years in which the program did exist, but savings were not achieved.
- c. For years 2012-2017, please provide the kWh generated by Renewable Energy Growth (REG) Program projects. Reference is made to National Grid's annual REG Program Factor filings. Please report N/A only for years in which the program did not exist. Please report zero for years in which the program did exist, but generation did not occur.
- d. For years 2012-2017, please provide the estimated kWh generated by Net Metering projects. Reference is made to National Grid's annual Electric Retail Rate filings. Please report zero for years in which the program did exist, but savings were not achieved.

Avoided Distribution System Demand (kW)

- e. For years 2012-2017, please provide the demand reduction caused by Energy Efficiency. Reference is made to the cost test descriptions in the annual Energy Efficiency Program filings and the demand factor described therein (kWSummer).
- f. For System Reliability Procurement (SRP) please provide the same as in part e.

- g. For VVO/CVR, please provide the same as in part e.
- h. For years 2012-2017, please explain if National Grid can provide the reduction in distribution system demand caused by the REG Program. Reference is made to National Grid's electric demand forecasts filed periodically with the PUC, for example in annual ISR filings.
- i. For Long-Term Contracts, please provide the same as in part h.
- j. For Distributed Generation Contracts, please provide the same as in part h.
- k. For Net Metering, please provide the same as in part h.

Avoided Bulk System Demand (kW)

- l. For years 2012-2017, please provide the demand reduction caused by Energy Efficiency. Reference is made to the cost test descriptions in the annual Energy Efficiency Program filings and the demand factor described therein (kWSummer). Reference is also made to National Grid's practice of bidding Energy Efficiency Programs into the Forward Capacity Market.
- m. For SRP please provide the same as in part l.
- n. For VVO/CVR, please provide the same as in part l.
- o. For years 2012-2017, please explain if National Grid can provide the reduction in bulk system demand caused by the REG Program. Reference is made to National Grid's practice of bidding some REG projects into the ISO-New England Forward Capacity Markets and the National Grid's practice of providing input to, and making use of, ISO-New England's Distributed Generation Forecast.
- p. For Long-Term Contracts, please provide the same as in part o.
- q. For Distributed Generation Contracts, please provide the same as in part o.
- r. For Net Metering, please provide the same as in part o.

Avoided Transmission Peak Demand (kW)

- s. For years 2012-2017, please explain if National Grid can provide the reduction in transmission peak caused by the Energy Efficiency program. If National Grid cannot provide these numbers, please provide the demand factor (kWSummer) used to calculate transmission benefits as provided to the PUC in annual Energy Efficiency Program Plans.

- t. For SRP please provide the same as in part e.
- u. For VVO/CVR, please provide the same as in part e.
- v. For years 2012-2017, please explain if National Grid can provide the reduction in transmission peak caused by the REG Program. With reference to data requested on distribution and bulk system demand, please explain how REG Program projects can reduce distribution and bulk system demand, but not transmission peak demand.
- w. For Long-Term Contracts, please provide the same as in part v.
- x. For Distributed Generation Contracts, please provide the same as in part v.
- y. For Net Metering, please provide the same as in part v.

Avoided Carbon Dioxide Emissions (tons of CO₂)

- z. For years 2012-2017, please provide the emissions reduction caused by SRP. Reference is made to the benefit-cost analyses provided in annual SRP Report filings.
- aa. For years 2012-2017, please provide the emissions reduction caused by REG Program projects. Reference is made to generation data provided above and the bulk system emissions attributes reported by National Grid in its annual Energy Source Disclosure Label filings.
- bb. For Long-Term Contracts, please provide the same as in part aa.
- cc. For Distributed Generation Contracts, please provide the same as in part aa.
- dd. For Net Metering, please provide the same as in part aa.

Net Savings (nominal dollars)

- ee. For years 2012-2017, please provide the net savings (positive or negative) caused by the VVO/CVR program. Reference is made to annual ISR filings and data provided above. Additional reference is made to the costs of this program reported in National Grid's original response the PUC 9-26.
- ff. For years 2012-2017, please provide the net savings (positive or negative) caused by the REG Program. Reference is made to data provided above. Additional reference is made to the costs of this program reported in National Grid's original response the PUC 9-26.

- gg. For Long-Term Contracts, please provide the same as in part ff.
- hh. For Distributed Generation Contracts, please provide the same as in part ff.
- ii. For Net Metering, please provide the same as in part ff.

Company Earnings

- jj. Please confirm that the Net Metering and RES programs have no applicable effect on National Grid's earnings.

Response:

- a. RECs are equivalent to MWHs, and they are sourced from many different generators with approved NEGIS attributes with different technology types. Without specific generator data from each source, the Company can only provide a raw estimate for these values. A raw estimate would be to use an average capacity factor and back into an estimated nameplate capacity value with no specific supporting data.
- b. Unlike more conventional demand response programs, determining demand and energy reductions for the VVO/CVR project is not straightforward, and any improvement must be estimated from statistical analysis. During calendar year 2016, these two feeders had a VVO/CVR application "uptime" of 49 percent (38F3) and 50 percent (38F5). Using a conservative three percent energy reduction from substation based power measurements, during the time periods when the systems were enabled, an engineering estimate of savings would be 405 MWHrs (38F3) and 441 MWHrs (38F5), for a total 2016 estimated reduction of 846 MWHrs.

In 2017, the remaining five feeders of the pilot area (Putnam Pike and Tower Hill substations) were enabled, and the first year of VVO/CVR "Expansion" work, eight feeders (out of Langworthy Corner, Tiogue Avenue, and Lincoln Avenue Substations) were substantially completed, but not enabled. In calendar year 2017, the Putnam Pike feeders had an "uptime" of 79 percent (38F3), 69 percent (38F5), and 14 percent (38F1). The Tower Hill substation feeders, which are enabled and disabled altogether, had an application "uptime" of seven percent. Using a conservative three percent energy reduction, during the time periods when the systems were enabled, an engineering estimate of savings would be 592 MWHrs (38F3) and 579 MWHrs (38F5), 155 MWHrs (38F1), and 280 MWHrs (Tower Hill) a total 2017 estimated reduction of 1606 MWHrs.

During the second half of 2016 and 2017, the Company was debugging cellular communications issues, as well as upgrading some of the back office systems to support the application. This resulted in significant "downtime" of the application.

- c. See Attachment PUC 13-1.
- d. See Attachment PUC 13-1. As indicated in the Company's response to PUC 9-26, the Company does not have generated information for net metered projects. Using capacity factors from solar (13.8%) and wind (28%) Renewable Energy (RE) Growth Program projects, the Company estimated kWh generated by net metered projects.
- e. See Attachment PUC 13-1. The numbers represent summer kW only, and it is unknown if the demand reductions coincided with system peaks.
- f. See Attachment PUC 13-1. The values represent the residential and commercial summer capacity in kW.
- g. Please see the Company's response to part b.
- h. See Attachment PUC 13-1.
- i. Long term contracts are not connected to the distribution system but have a minimal contribution to reducing the transmission and bulk system loads. See Attachment PUC 13-1.
- j. See Attachment PUC 13-1.
- k. See Attachment PUC 13-1.
- l. See Attachment PUC 13-1. The demand reduction represents summer kW only.
- m. See Attachment PUC 13-1. The demand reduction represents summer kW only.
- n. Please see the Company's response to part b.
- o. The Company cannot provide the reduction in bulk system demand caused by the RE Growth Program. The RE Growth Program does not "reduce bulk system demand" because all RE Growth Program facilities are separately metered from customer load (*i.e.*, they are not netted from the host customer load) and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Installed Capacity Requirement and resulting Forward Capacity Market (FCM) procurements by these facilities, as they are expected to participate in the

FCM as capacity supply. The Company only started bidding Rhode Island RE Growth Program and Rhode Island distributed generation (DG) projects in the FCM last year (after receiving approval from the Public Utilities Commission (PUC) to do so in Docket No. 4676), and they will not begin earning any FCM payments until June 2018.

- p. The Company cannot provide the reduction in bulk system demand caused by Long Term Contracts (LTCs). LTCs do not “reduce bulk system demand” since all LTC facilities are separately metered and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Installed Capacity Requirement and resulting FCM procurements by these facilities, as they are expected to participate in the FCM as capacity supply.
- q. The Company cannot provide the reduction in bulk system demand caused by DG contracts. DG contracts do not “reduce bulk system demand” because all DG contract facilities are separately metered and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Installed Capacity Requirement and resulting FCM procurements by these facilities, as they are expected to participate in the FCM as capacity supply.
- r. See Attachment PUC 13-1.
- s. See Attachment PUC 13-1. The numbers represent summer kW only, and it is unknown if the demand reductions coincided with system peaks.
- t. See Attachment PUC 13-1. The numbers represent summer kW only, and it is unknown if the demand reductions coincided with system peaks.
- u. Please see the Company's response to part b.
- v. The Company cannot provide the reduction in transmission system demand caused by the RE Growth Program. The RE Growth Program does not “reduce transmission system demand” because all RE Growth Program facilities are separately metered from customer load (*i.e.*, they are not netted from the host customer load) and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Regional Network Service charges and resulting FCM procurements by these facilities, as they are expected to participate in the FCM as capacity supply. The Company only started bidding Rhode Island RE Growth Program and Rhode Island DG projects in the FCM last year (after receiving approval from the PUC to do so in Docket No. 4676), and they will not begin earning any FCM payments until June 2018.

- w. The Company cannot provide the reduction in transmission system demand caused by LTCs. LTCs do not “reduce transmission system demand” because all LTC facilities are separately metered and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Regional Network Service charges and resulting FCM procurements by these facilities, as they are expected to participate in the FCM as capacity supply.
- x. The Company cannot provide the reduction in transmission system demand caused by LTCs. LTCs do not “reduce transmission system demand” because all LTC facilities are separately metered and settled with ISO-NE as supply-side generation. ISO-NE treats all facilities that are metered in this way as supply and does not reduce the Regional Network Service charges and resulting FCM procurements by these facilities, as they are expected to participate in the FCM as capacity supply.
- y. See Attachment PUC 13-1.
- z. See Attachment PUC 13-1. The Company applied a coincident factor of 0.43 short-tons/MWh, based on the Company's energy source disclosure labels for Standard Offer Service filed January 11, 2017.
- aa. See Attachment PUC 13-1. The Company applied a emissions factor of 0.43 short-tons/MWh, based on the Company's energy source disclosure labels for Standard Offer Service filed January 11, 2017.
- bb. See Attachment PUC 13-1. The Company applied a emissions factor of 0.43 short-tons/MWh, based on the Company's energy source disclosure labels for Standard Offer Service filed January 11, 2017.
- cc. See Attachment PUC 13-1. The Company applied a emissions factor of 0.43 short-tons/MWh, based on the Company's energy source disclosure labels for Standard Offer Service filed January 11, 2017.
- dd. See Attachment PUC 13-1. The Company applied a emissions factor of 0.43 short-tons/MWh, based on the Company's energy source disclosure labels for Standard Offer Service filed January 11, 2017.
- ee. See Attachment PUC 13-1.
- ff. As the program simply pays money to project owners, the “savings” are a result of the program costs and remuneration to the Company, and result in a negative value.

- gg. As the program simply pays money to project owners, the "savings" are a result of the program costs and remuneration to the Company, and result in a negative value.
- hh. As the program simply pays money to project owners, the "savings" are a result of the program costs and remuneration to the Company, and result in a negative value.
- ii. As the program simply pays money to project owners, the "savings" are a result of the program costs and result in a negative value.
- jj. The costs associated with the net metering program offered pursuant to the Company's Net Metering Provision, RIPUC No. 2178, are recovered through the Renewable Energy Distribution Charge, which is billed to all retail delivery customers. The costs associated with complying with the Renewable Energy Standard (RES) established in R.I. Gen. Laws § 39-26-1 are recovered through the RES charge, which is billed to Standard Offer Service customers. The costs and revenues associated with both net metering and RES are reconcilable, and the Company earns no incentives on either net metering or RES. Consequently, these programs have no effect on earnings of the Company.

2012													
	Nameplate Capacity MW (Generation Only)- Annual	Nameplate Capacity MW (Generation Only)- Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)	
Energy Efficiency			119,666,157		19,947	19,947	19,947	56,243	N/A	N/A	\$49,869,528	\$2,469,411	
System Reliability Procurement			132,000		42	42	42	57	N/A	N/A	\$133,400	\$0	
ISR -- VVO/CVR			N/A							\$0	\$0	\$0	
Renewable Energy Growth	N/A	N/A						-	\$0	N/A	\$0	\$0	
Long-term Contracts	0	0	0	0	0	0	0	-	-\$581,777	N/A	\$581,777	\$0	
DG Contracts	0	0	0	0	0	0	0	-	\$0	N/A	\$0	\$0	
Net Metering	6	6	14,345,400	14,345,400	1,291	1,291	1,291	6,169	-\$329,386	N/A	\$329,386	\$0	
Renewable Energy Standard (RES)	135	135	237,250,000	237,250,000				102,018	-\$12,803,595	N/A	\$12,803,595	\$0	

Notes:

Nameplate capacity estimates for RES assume a 20% average capacity factor (See part a. of response)

kWh savings estimates from VVO/CVR are engineering estimates

kWh generated from REGrowth and Net Metering has been estimated using the assumptions described in part c. of the response.

REGrowth, Long-Term Contracts, and Distributed Generation Contracts do not reduce bulk system demand. All facilities under these programs are separately metered from customer load (i.e., not netted from host customer load) and settled with ISO-NE as supply-side generation.

Avoided bulk system demand and avoided transmission peak demand are not available for SRP. With respect to bulk system peak demand, while the energy efficiency programs are bid into the FCM, this statistic was not tracked for SRP. With respect to avoided transmission peak demand, SRP was a distribution-level pilot and the Company does not have the transmission-level data.

For Net Metering, the avoided transmission, bulk system and distribution numbers are based on a solar resource contributing 21% of nameplate at the peak hour of 5 pm

Program costs for Long-term Contracts represents administrative costs associated with PPA negotiation

For Net Metering and ReGrowth, annual number of kW and participants provided based on date authority to interconnect was given i.e. CY2012

CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

2013												
	Nameplate Capacity MW (Generation Only)- Annual	Nameplate Capacity MW (Generation Only)- Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)
Energy Efficiency		0	157,121,309	276,787,466	1,965,000	26,427	26,427	73847.01536	N/A	N/A	\$ 63,145,737	\$ 2,997,681
System Reliability Procurement		0	790,000	922,000	266	266	266	339.7	N/A	N/A	\$ 672,400	\$ -
ISR -- VVO/CVR		0	N/A	N/A								
FY 14				-						\$56,889	\$ -	\$ 139
FY 13		0		-						-	-	\$ -
		0		-								
Renewable Energy Growth	N/A			-				-	\$ -	N/A	\$ -	\$ -
Long-term Contracts	36	36	81,666,000	81,666,000	0	0	0	35,116	\$ (2,350,442)	N/A	\$ 2,204,145	\$ 146,297
DG Contracts	11	11	4,490,000	4,490,000	0	0	2,347	1,931	\$ (436,266)	N/A	\$ 416,028	\$ 20,238
Net Metering	1	7	1,545,000	15,890,400	250	250	250	664	\$ (51,554)	N/A	\$ 51,554	\$ -
Renewable Energy Standard	171	306	299,828,000	537,078,000				128,926	\$ (18,964,816)	N/A	\$ 18,964,816	\$ -

Notes:

Nameplate capacity estimates for RES assume a 20% average capacity factor (See part a. of response)

kWh savings estimates from VVO/CVR are engineering estimates

kWh generated from REGrowth and Net Metering has been estimated using the assumptions described in part c. of the response.

REGrowth, Long-Term Contracts, and Distributed Generation Contracts do not reduce bulk system demand. All facilities under these programs are separately metered from customer load (i.e., not netted from host customer load) and settled with ISO-NE as supply-side generation.

Avoided bulk system demand and avoided transmission peak demand are not available for SRP. With respect to bulk system peak demand, while the energy efficiency programs are bid into the FCM, this statistic was not tracked for SRP. With respect to avoided transmission peak demand, SRP was a distribution-level pilot and the Company does not have the transmission-level data.

For Net Metering, the avoided transmission, bulk system and distribution numbers are based on a solar resource contributing 21% of nameplate at the peak hour of 5 pm

Program costs for Long-term Contracts represents administrative costs associated with PPA negotiation

For Net Metering and ReGrowth, annual number of kW and participants provided based on date authority to interconnect was given i.e. CY2012

CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

2014												
	Nameplate Capacity MW (Generation Only)- Annual	Nameplate Capacity MW (Generation Only)- Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)
Energy Efficiency		0	268,468,226	545,255,692	1,653,000	38,693	38,693	126,180	N/A	N/A	\$ 85,348,093	\$ 4,223,321
System Reliability Procurement		0	455,000	1,377,000	120	120	120	1058	N/A	N/A	\$ 569,300	\$ -
ISR -- VVO/CVR		0	N/A	-								
FY 15		0		-						\$ 2,014,587	\$ -	\$ 13,947
FY 14		0		-						-	\$ -	\$ 574
FY 13		0		-						-	-	\$ -
		0		-								
Renewable Energy Growth	N/A	N/A		-				-	\$ (77,121)	N/A	\$ 77,121	\$ -
Long-term Contracts	0	36	234,292,000	315,958,000	0	0	0	544,865	\$ (5,400,210)	N/A	\$ 4,642,891	\$ 757,319
DG Contracts	5	16	13,618,000	18,108,000	0	0	1,050	31,670	\$ (2,768,363)	N/A	\$ 2,649,080	\$ 119,283
Net Metering	1	8	790,320	16,680,720	137	137	137	1,838	\$ (125,526)	N/A	\$ 125,526	\$ -
Renewable Energy Standard	197	503	345,628,000	882,706,000				803,786	\$ (17,899,440)	N/A	\$ 17,899,440	\$ -

Notes:

Nameplate capacity estimates for RES assume a 20% average capacity factor (See part a. of response)

kWh savings estimates from VVO/CVR are engineering estimates

kWh generated from REGrowth and Net Metering has been estimated using the assumptions described in part c. of the response.

REGrowth, Long-Term Contracts, and Distributed Generation Contracts do not reduce bulk system demand. All facilities under these programs are separately metered from customer load (i.e., not netted from host customer load) and settled with ISO-NE as supply-side generation.

Avoided bulk system demand and avoided transmission peak demand are not available for SRP. With respect to bulk system peak demand, while the energy efficiency programs are bid into the FCM, this statistic was not tracked for SRP. With respect to avoided transmission peak demand, SRP was a distribution-level pilot and the Company does not have the transmission-level data.

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Program costs for Long-term Contracts represents administrative costs associated with PPA negotiation

For Net Metering and ReGrowth, annual number of kW and participants provided based on date authority to interconnect was given i.e. CY2012

CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

2015												
	Nameplate Capacity MW (Generation Only) Annual	Nameplate Capacity MW (Generation Only) Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)
Energy Efficiency		0	222,822,045	768,077,737	1,738,000	33,335	33,335	104726.3609	N/A	N/A	\$ 87,430,831	\$ 4,533,360
System Reliability Procurement		0	685,000	2,062,000	144	144	144	295	N/A	N/A	\$ 1,029,400	\$ -
ISR -- VVO/CVR		0	N/A	-								
FY 16		0		-						\$ 2,212,462	\$ -	\$ 18,761
FY 15		0		-						-	-	\$ 26,612
FY 14		0		-						-	-	\$ 475
FY 13		0		-						-	-	\$ -
				-								
Renewable Energy Growth	3	3	13250	13,250	0	0	652	6	\$ (675,236)	N/A	\$ 675,133	\$ 103
Long-term Contracts	0	36	238,276,000	554,234,000	0	0	0	102,459	\$ (7,943,616)	N/A	\$ 7,150,901	\$ 792,715
DG Contracts	3	19	4,676,000	22,784,000	0	0	593	2,011	\$ (3,658,188)	N/A	\$ 3,516,629	\$ 141,560
Net Metering	3	11	3,230,700	19,911,420	561	561	561	1,389	\$ (551,915)	N/A	\$ 551,915	\$ -
Renewable Energy Standard	177	680	310,258,000	1,192,964,000				133,411	\$ (13,958,024)	N/A	\$ 13,958,024	\$ -

Notes:

Nameplate capacity estimates for RES assume a 20% average capacity factor (See part a. of response)

kWh savings estimates from VVO/CVR are engineering estimates

kWh generated from REGrowth and Net Metering has been estimated using the assumptions described in part c. of the response.

REGrowth, Long-Term Contracts, and Distributed Generation Contracts do not reduce bulk system demand. All facilities under these programs are separately metered from customer load (i.e., not netted from host customer load) and settled with ISO-NE as supply-side generation.

Avoided bulk system demand and avoided transmission peak demand are not available for SRP. With respect to bulk system peak demand, while the energy efficiency programs are bid into the FCM, this statistic was not tracked for SRP. With respect to avoided transmission peak demand, SRP was a distribution-level pilot and the Company does not have the transmission-level data.

For Net Metering, the avoided transmission, bulk system and distribution numbers are based on a solar resource contributing 21% of nameplate at the peak hour of 5 pm

Program costs for Long-term Contracts represents administrative costs associated with PPA negotiation

For Net Metering and ReGrowth, annual number of kW and participants provided based on date authority to interconnect was given i.e. CY2012

CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

2016												
	Nameplate Capacity MW (Generation Only)- Annual	Nameplate Capacity MW (Generation Only)- Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)
Energy Efficiency		0	214,328,549	982,406,286	1,803,000	30,530	30,530	100734.4181	N/A	N/A	\$ 78,402,087	\$ 4,128,034
System Reliability Procurement		0	550,000	2,612,000	96	96	96	237	N/A	N/A	\$ 989,700	\$ -
ISR -- VVO/CVR		0	846,000	846,000					\$ (1,619,053.5)			
FY 17		0		-						\$ 1,573,303	\$ -	\$ 9,353
FY 16		0		-								\$ 36,364
FY 15		0		-								\$ 24,080
FY 14		0		-								\$ 377
FY 13		0		-								\$ -
		3.104		13,250								
Renewable Energy Growth	12	15	4,807,438	4,820,688	0	0	2,461	2,067	\$ (1,814,611)	N/A	\$ 1,797,768	\$ 16,843
Long-term Contracts	30	66	235,107,000	789,341,000	0	0	0	101,096	\$ (15,466,793)	N/A	\$ 14,654,577	\$ 812,217
DG Contracts	4	23	3,911,000	26,695,000	0	0	840	1,682	\$ (4,397,628)	N/A	\$ 4,228,911	\$ 168,717
Net Metering	13	24	26,500,000	46,411,420	2,809	2,809	2,809	11,395	\$ (1,713,779)	N/A	\$ 1,713,779	\$ -
Renewable Energy Standard	195	875	342,581,000	1,535,545,000				147,310	\$ (8,968,717)	N/A	\$ 8,968,717	\$ -

Notes:

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For Net Metering and ReGrowth, annual number of kW and participants provided based on date authority to interconnect was given i.e. CY2012

CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

2017												
	Nameplate Capacity MW (Generation Only)- Annual	Nameplate Capacity MW (Generation Only)- Cumulative	kWh Saved or Generated, or purchased for RES- Annual	kWh Saved or Generated, or purchased for RES- Cumulative	Avoided Transmission Peak kW	Avoided Bulk System kW	Avoided Distribution System kW	Annual Avoided CO2	Net savings	Program Cost (Capital Investment)	Program Cost (O&M)	Company Earnings (Capital earnings after-tax)
Energy Efficiency		0	232,023,450	1,214,429,736	29,363	29,363	29,363	109,051	N/A	N/A	\$ 94,841,567	\$ 4,829,847
System Reliability Procurement		0	718,000	3,330,000	352	352	352	309	N/A	N/A	\$ 1,349,400	\$ -
ISR -- VVO/CVR		0	1,606,000	2,452,000					\$ (1,486,035.49)			
FY 18		0		-						\$ 1,393,536	\$ 60,000	\$ 12,970
FY 17		0		-						-	-	\$ 17,786
FY 16		0		-						-	-	\$ 34,142
FY 15		0		-						-	-	\$ 21,579
FY 14		0		-						-	-	\$ 274
FY 13		3,104		13,250						-	-	\$ -
		14,824		4,820,688								
Renewable Energy Growth	13	28	20,356,613	25,177,301	0	0	2,751	8,753	\$ (7,161,109)	N/A	\$ 7,040,636	\$ 120,473
Long-term Contracts	3	69	332,488,731	1,121,829,731	0	0	0	142,970	\$ (38,634,542)	N/A	\$ 37,154,188	\$ 1,480,355
DG Contracts	0	23	1,284,500	27,979,500	0	0	0	552	\$ (5,061,822)	N/A	\$ 4,890,691	\$ 171,131
Net Metering	11	35	13,436,200	59,847,620	2,310	2,310	2,310	5,778	\$ (3,149,512)	N/A	\$ 3,149,512	\$ -
Renewable Energy Standard	222	1097	389,292,000	1,924,837,000				167,396	\$ (3,753,535)	N/A	\$ 3,753,535	\$ -

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CO2 impacts from all technologies are estimated assuming a grid emissions rate of 0.43 short tons/MWh, based on National Grid's energy source disclosure labels for Standard Offer Service filed January 11, 2017.

Average LMP for RI per ISO-NE Annual Avg Wholesale Load Cost report (\$/MWh)

Year	Average LMP (\$/MWh)
2012	35.88
2013	56.1
2014	63.33
2015	41.03
2016	28.87
2017	33.78