

SPO PLANNING ANALYSIS

**2015 ENO IRP**  
*Preferred Resource Plan*

**JUNE 30, 2015**



## OBJECTIVES

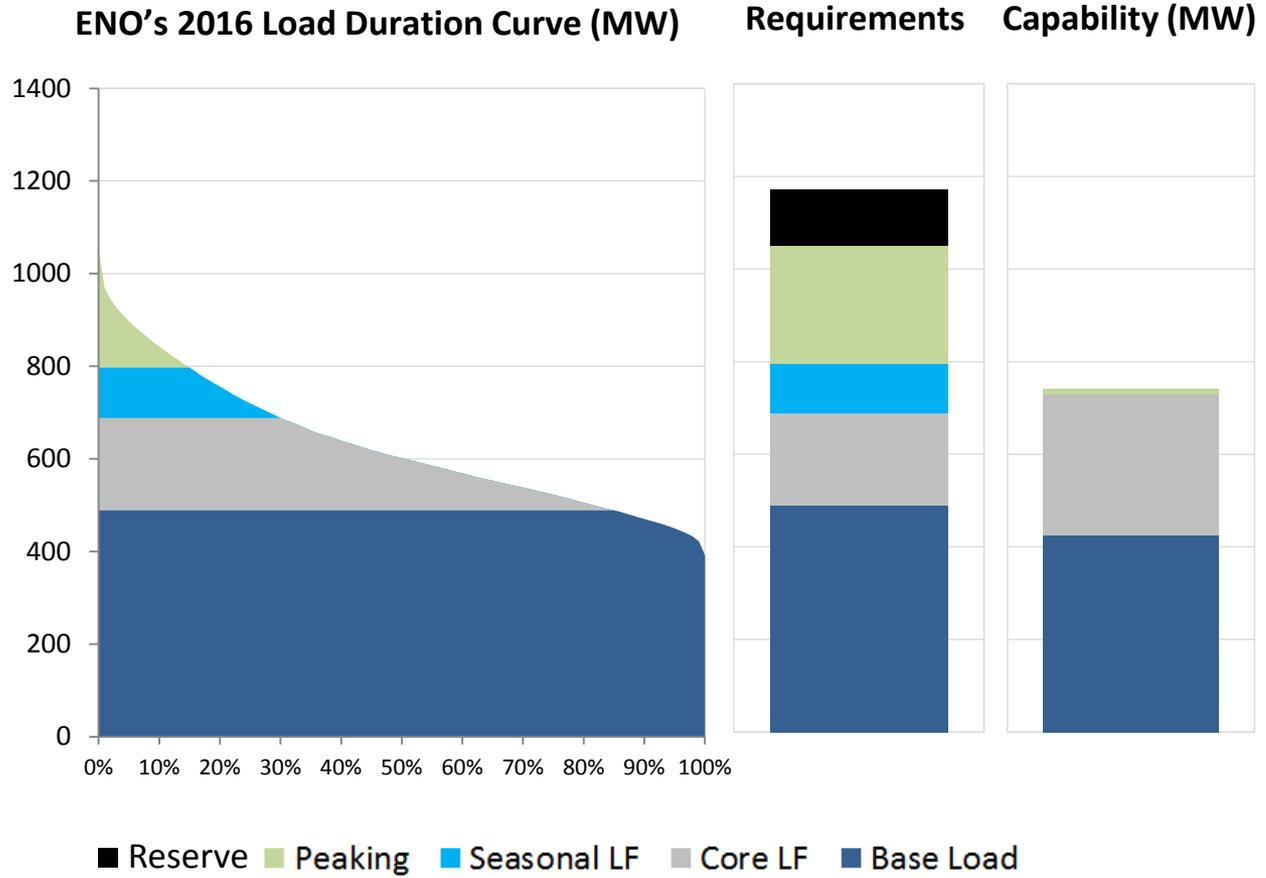
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*The following topics will be discussed:*

- ENO Supply Role Needs and Portfolio Mix
- Portfolio Composition
- Portfolio Evaluation and Costs
- ENO Preferred Portfolio

# ENO PORTFOLIO AND SUPPLY ROLE NEEDS

**ENO's 2016 generation portfolio is projected to have adequate capacity for its Base Load and Core Load Following needs; however, additional peaking capacity is needed**



Unit	Fuel	Capability (MW)
Ninemile 6	Gas	112
Union	Gas	204
ANO 1	Nuclear	23
ANO 2	Nuclear	27
Grand Gulf	Nuclear	247
Independence 1	Coal	7
White Bluff 1	Coal	12
White Bluff 2	Coal	13

Note: Excludes the effect of the Algiers Transfer.

# PORTFOLIO COMPOSITION – DSM PROGRAMS

- The AURORA Capacity Expansion Model was used to develop a DSM portfolio for each of the scenarios.
- The result of this process was an optimal DSM portfolio for each scenario.
- Additional sensitivity analysis of the IR Portfolio further supports the reasonableness of the composition

**DSM Portfolio Design Mix**

	IR Portfolio	BB Portfolio	DD Portfolio	GS Portfolio
<b>DSM</b>	14 Programs	12 Programs	15 Programs	17 Programs
<b>DSM Maximum (MW)</b>	41	26	40	43

**AURORA DSM Portfolios by Scenario**

Industrial Renaissance	Business Boom	Distributed Disruption	Generation Shift
DSM1 - Commercial Prescriptive & Custom DSM4 - RetroCommissioning DSM5 - Commercial New Construction DSM6 - Data Center DSM7 - Machine Drive DSM8 - Process Heating DSM9 - Process Cooling and Refrigeration DSM10 - Facility HVAC DSM11 - Facility Lighting DSM12 - Other Process/Non-Process Use DSM13 - Residential Lighting & Appliances DSM15 - ENERGY STAR Air Conditioning	DSM4 - RetroCommissioning DSM5 - Commercial New Construction DSM6 - Data Center DSM7 - Machine Drive DSM8 - Process Heating DSM9 - Process Cooling and Refrigeration DSM10 - Facility HVAC DSM11 - Facility Lighting DSM12 - Other Process/Non-Process Use DSM13 - Residential Lighting & Appliances DSM15 - ENERGY STAR Air Conditioning	DSM1 - Commercial Prescriptive & Custom DSM4 - RetroCommissioning DSM5 - Commercial New Construction DSM6 - Data Center DSM7 - Machine Drive DSM8 - Process Heating DSM9 - Process Cooling and Refrigeration DSM10 - Facility HVAC DSM11 - Facility Lighting DSM12 - Other Process/Non-Process Use DSM13 - Residential Lighting & Appliances DSM15 - ENERGY STAR Air Conditioning	DSM1 - Commercial Prescriptive & Custom DSM4 - RetroCommissioning DSM5 - Commercial New Construction DSM6 - Data Center DSM7 - Machine Drive DSM8 - Process Heating DSM9 - Process Cooling and Refrigeration DSM10 - Facility HVAC DSM11 - Facility Lighting DSM12 - Other Process/Non-Process Use DSM13 - Residential Lighting & Appliances DSM15 - ENERGY STAR Air Conditioning DSM16 - Home Energy Use Benchmarking DSM18 - Efficient New Homes DSM19 - Multifamily DSM20 - Water Heating DSM21 - Pool Pump
DSM18 - Efficient New Homes DSM19 - Multifamily	DSM19 - Multifamily	DSM18 - Efficient New Homes DSM19 - Multifamily DSM20 - Water Heating	

## PORTFOLIO COMPOSITION – SUPPLY SIDE RESOURCES

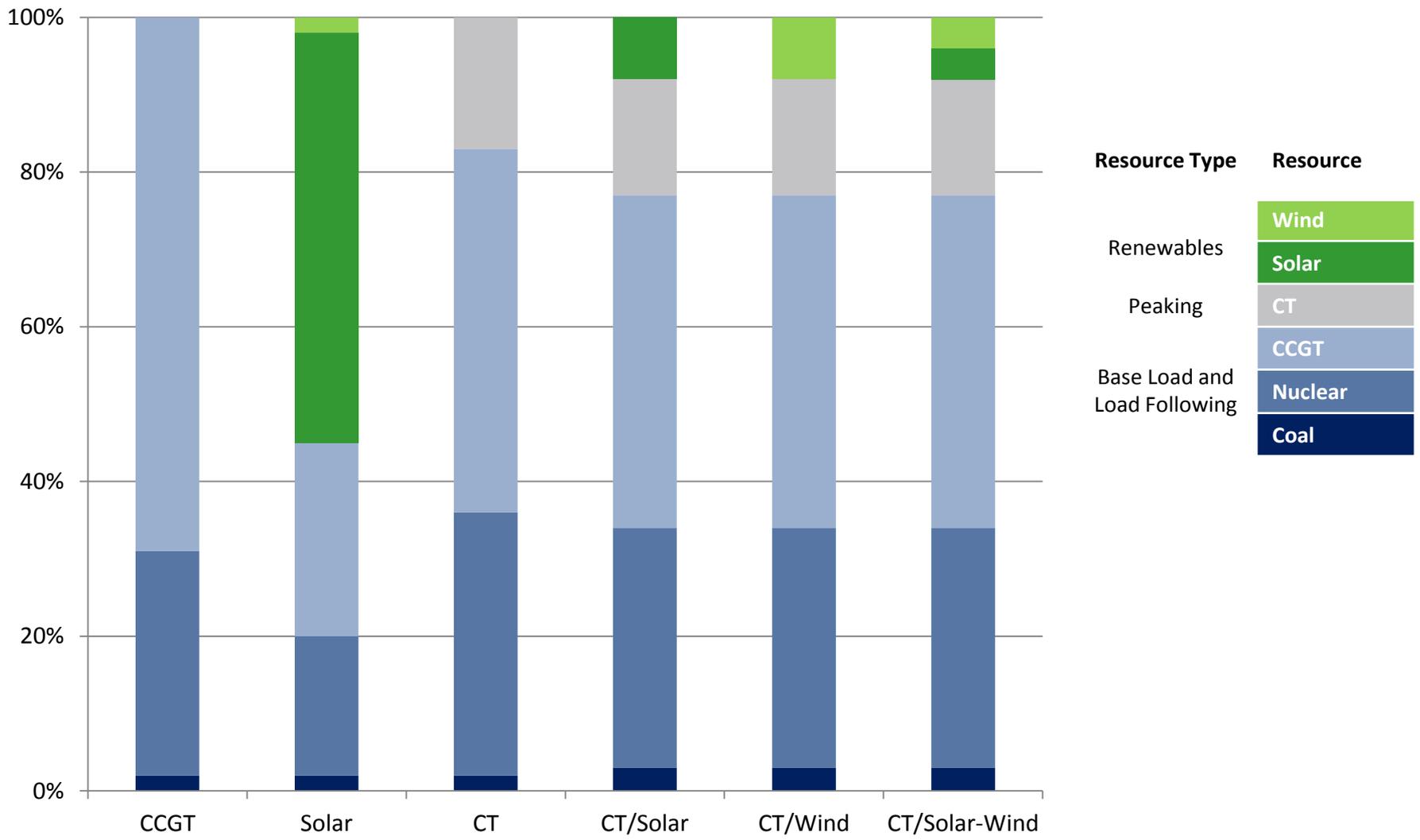
*The IRP informs future planning and procurement activities. In order to determine ENO’s Preferred Resource Plan, six portfolios were created and modeled in AURORA.*

- The AURORA Capacity Expansion Model was used to develop a portfolio for each of the scenarios.
- Four additional portfolios were designed to meet ENO’s planning objectives based on ENO’s identified resource needs.

AURORA Capacity Expansion Portfolio Design Mix				
	IR CCGT Portfolio	BB CCGT Portfolio	DD CCGT Portfolio	GS Solar Portfolio
DSM Programs	14 Programs	12 Programs	15 Programs	17 Programs
CCGTs (MW)	382	382	382	0
CTs (MW)	0	0	0	0
Solar (MW)	0	0	0	1,150
Wind (MW)	0	0	0	50

Alternative Portfolio Design Mix – Installed Capacity				
	CT Portfolio	CT/Solar Portfolio	CT/Wind Portfolio	CT/ Wind/ Solar
DSM Programs	14 Programs	14 Programs	14 Programs	14 Programs
CCGTs (MW)	0	0	0	0
CTs (MW)	194	194	194	194
Solar (MW)	0	100	0	50
Wind (MW)	0	0	100	50

# INSTALLED CAPACITY MIX OF EACH PORTFOLIO IN 2034



# PORTFOLIO TOTAL SUPPLY COSTS

*The CT Portfolio performs well in most scenarios, has lower risk, and complements ENO's existing portfolio*

- The CCGT Portfolio ranks highest in three out of four scenarios, but is associate with higher risk because of reliance on uncertain potential variable cost savings to offset certain higher fixed cost
- The Solar Portfolio ranks lowest in three out of four scenarios and only ranks high in the Generation Shift Scenario due to aggressive assumptions that ITC and PTC subsidies will continue, high gas prices, and CO<sub>2</sub> will become regulated and the price for compliance will be high
- The addition of Wind and/or Solar to the CT Portfolio is only beneficial in one out of four scenarios (i.e. the Generation Shift Scenario)

**Portfolios**

**Total Cost by Scenario**  
Levelized Real (\$M)

	Ref - IR	BB	DD	GS
CT	\$1,893	\$1,687	\$1,837	\$2,374
CT Wind	\$1,952	\$1,765	\$1,885	\$2,310
CT Solar	\$1,949	\$1,756	\$1,889	\$2,343
CT Solar_Wind	\$1,951	\$1,760	\$1,887	\$2,326
CCGT	<b>\$1,836</b>	<b>\$1,538</b>	<b>\$1,754</b>	\$2,228
Solar	\$2,501	\$2,432	\$2,403	<b>\$2,100</b>

**Ranking by Scenario**

	Ref - IR	BB	DD	GS
CT	2	2	2	6
CT Wind	5	5	3	3
CT Solar	3	3	5	5
CT Solar_Wind	4	4	4	4
CCGT	<b>1</b>	<b>1</b>	<b>1</b>	2
Solar	6	6	6	<b>1</b>

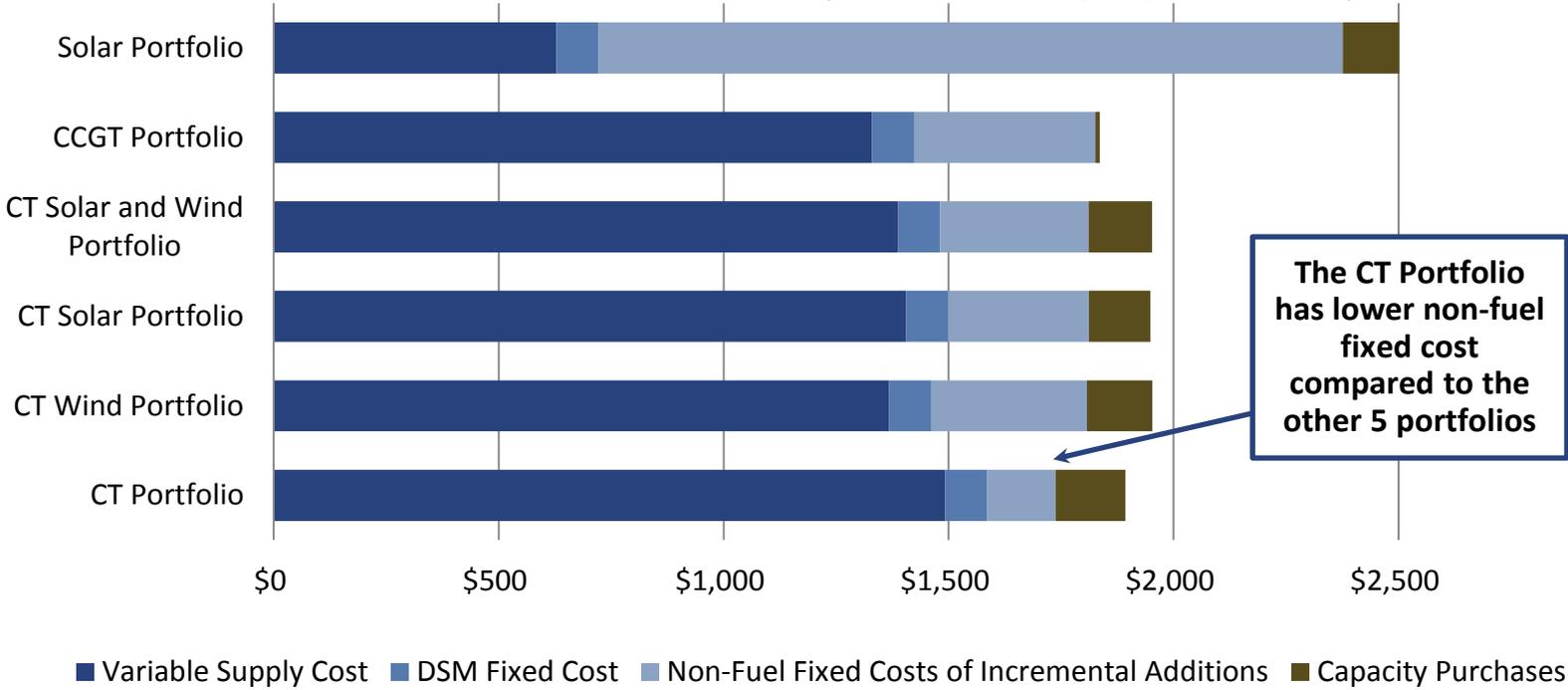
**Variance (\$M)**  
relative to highest ranked portfolio

	Ref - IR	BB	DD	GS
CT	\$57	\$148	\$84	\$275
CT Wind	\$116	\$226	\$132	\$210
CT Solar	\$113	\$217	\$135	\$243
CT Solar_Wind	\$114	\$222	\$133	\$226
CCGT	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	\$128
Solar	\$665	\$893	\$649	<b>\$0</b>

*Although the CCGT and Solar Portfolios rank higher on a total cost basis, the CT Portfolio presents less risk while providing good economic performance.*

# TOTAL SUPPLY COST COMPONENTS EXCLUDING SUNK NON-FUEL FIXED COST

**Total Supply Costs Excluding Sunk Non-Fuel Fixed Cost  
Industrial Renaissance Scenario (Levelized Real, PV, 2015\$ M\$)**



The CT Portfolio has lower non-fuel fixed cost compared to the other 5 portfolios

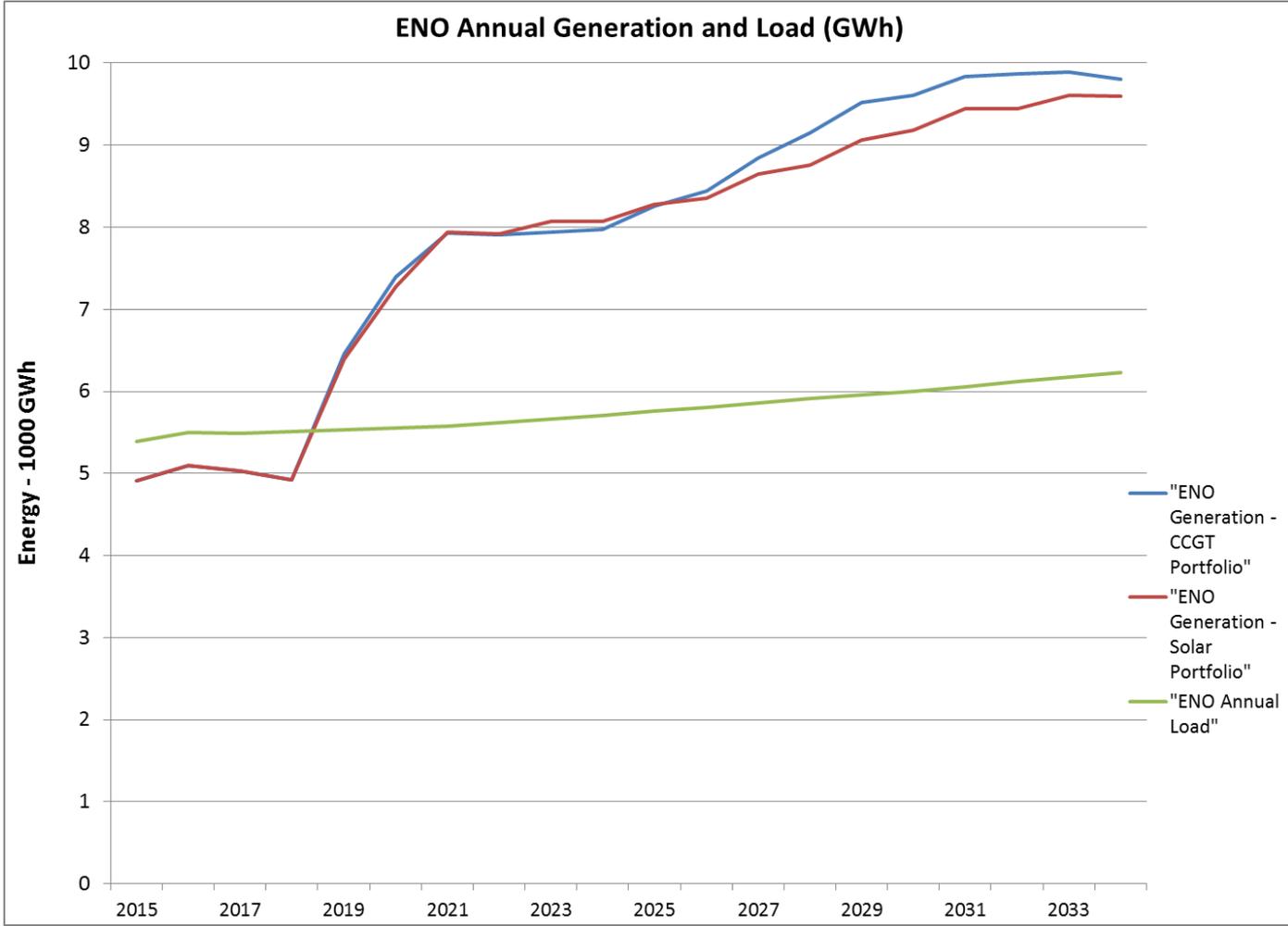
Total Supply Costs Excluding Sunk Non-fuel Fixed Costs



- Variable Supply Costs
- + DSM Fixed Costs
- + Non Fuel Fixed Costs of Incremental Additions
- + Capacity Purchases
- + Production Tax Credits (PTC) and Investment Tax Credit (ITC) (only included in the GS Scenario)

# AURORA'S SOLAR AND CCGT PORTFOLIOS' ANNUAL GENERATION

*The CCGT and Solar Portfolios result in an excess of energy generation in comparison to ENO's load requirements, which exposes ENO to a volatile energy market.*

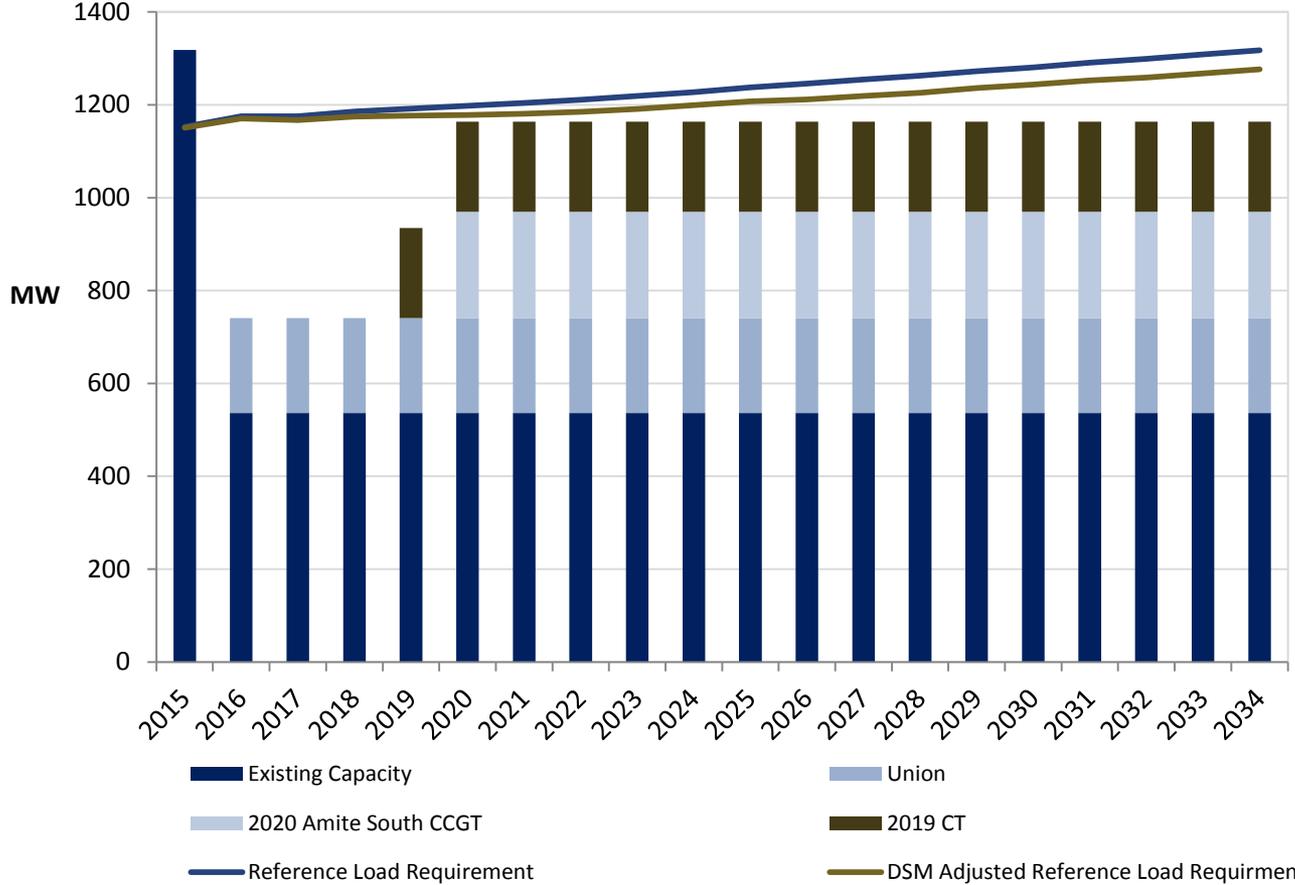


Note: Excludes the effect of the Algiers Transfer.

# ENO PREFERRED PORTFOLIO

*The CT Portfolio was selected as the Preferred Portfolio as it is consistent with ENO’s resource needs while providing good economic performance and mitigating exposure to unnecessary risk.*

**Industrial Renaissance – CT Portfolio**



Resource Addition	Capacity (MW)
2019 CT	194

\*Resources listed in blue are existing and planned resources. Resources additions listed in brown are the resources to be evaluated in the IRP.

## ENO'S PREFERRED PORTFOLIO

Load & Capability 2015—2034 (All values in MW)																				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
<b>Requirements</b>																				
Peak Load	1,029	1,050	1,049	1,059	1,064	1,070	1,075	1,081	1,088	1,096	1,105	1,112	1,120	1,128	1,136	1,143	1,152	1,160	1,168	1,176
Reserve Margin (12%)	124	126	126	127	128	128	129	130	131	132	133	133	134	135	136	137	138	139	1401	141
Total Requirements	1,153	1,176	1,175	1,186	1,192	1,198	1,204	1,211	1,219	1,227	1,238	1,246	1,254	1,263	1,272	1,281	1,291	1,299	1,308	1,318
<b>Resources</b>																				
Existing Resources																				
Owned Resources	1,318	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
PPA Contracts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMRs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Identified Planned Resources																				
Union	-	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204
Amite South CCGT	-	-	-	-	-	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Other Planned Resources																				
DSM	2	5	9	12	17	23	27	29	31	32	34	38	40	42	40	42	42	45	46	46
CT	-	-	-	-	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
Market Purchases	-	430	426	433	240	12	14	18	24	32	40	44	51	58	68	75	85	90	99	108
Total Resources	1,320	1,176	1,175	1,186	1,192	1,198	1,204	1,211	1,219	1,227	1,238	1,246	1,254	1,263	1,272	1,281	1,291	1,299	1,308	1,318

<sup>[1]</sup> Union plant acquisition is completed pending all regulatory approvals.

<sup>[2]</sup> ENO share of the Amite South RFP is estimated at 229 MW in the IRP. As a result, actual capacity may exceed 560 MW.

<sup>[3]</sup> Demand Side Management (DSM) total is grossed up for Planning Reserve Margin (12%) and transmission losses (2.4%).

Note: Excludes the effect of the Algiers Transfer.

## NEXT STEPS

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*The following activities are planned:*

- Final IRP Report is due in October 2015