

SPO PLANNING ANALYSIS

2015 ENO IRP

Portfolio Composition and Results

MAY 27, 2015



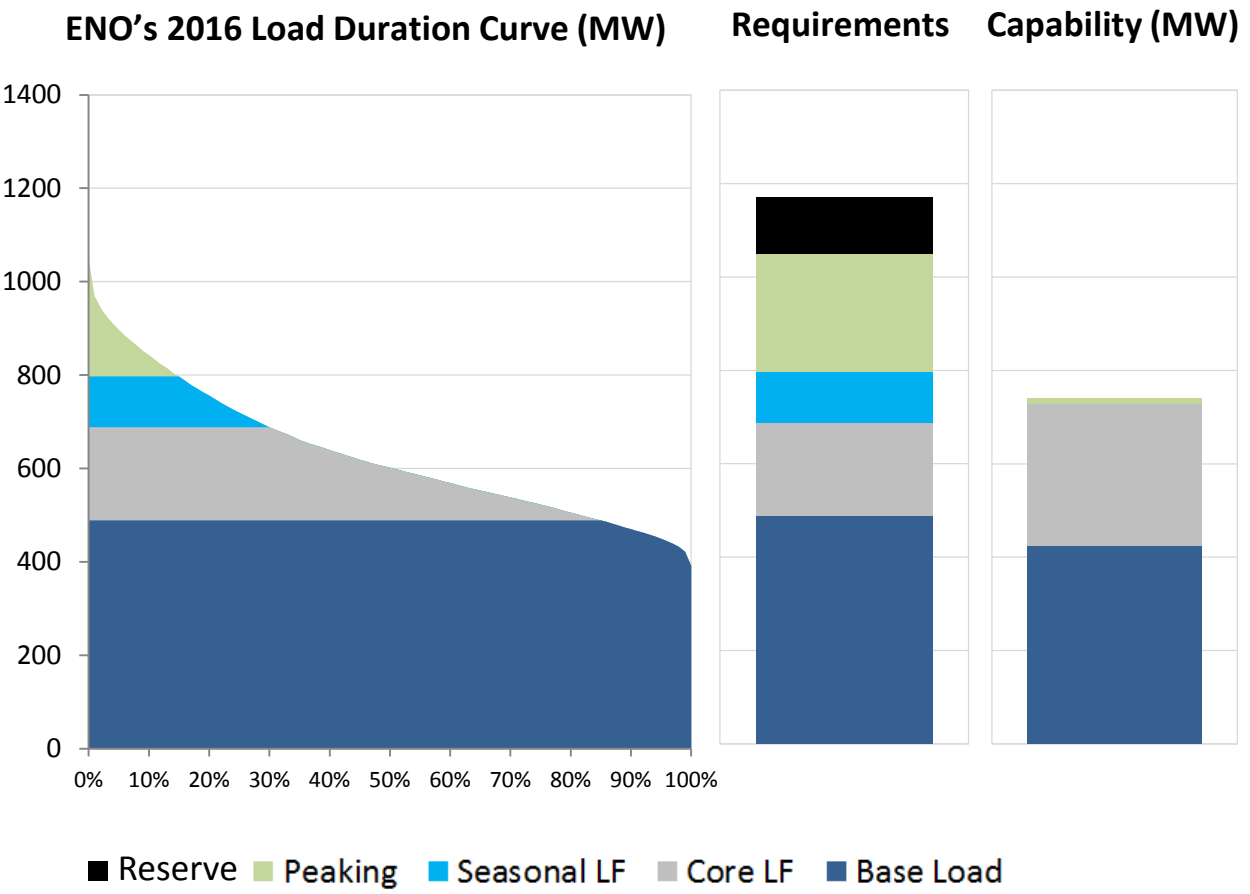
OBJECTIVES

The following topics will be discussed:

- ENO Supply Role Needs and Portfolio Mix
- Scenario Assumptions
- Portfolio Composition
- Portfolio Costs
- Environmental and Commodity Sensitivities

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

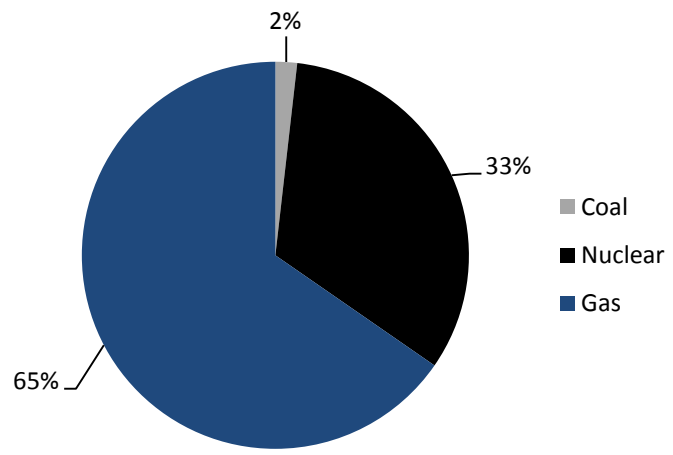


Unit	Fuel	Capability (MW)
Ninemile 6	Gas	112
Union	Gas	204
ANO 1	Nuclear	23
ANO 2	Nuclear	27
Grand Gulf	Nuclear	247
Independence 1	Coal	7
White Bluff 1	Coal	12
White Bluff 2	Coal	13

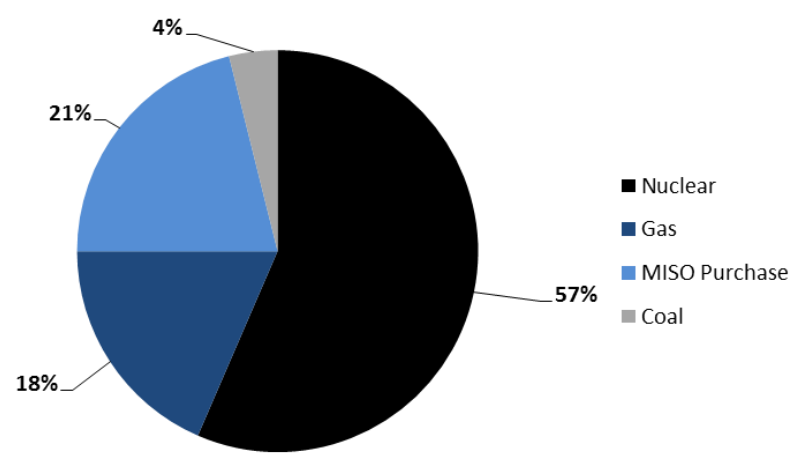
ENO'S CAPACITY & ENERGY MIX

With the planned deactivation of Michoud 2 and 3, nuclear and coal resources provide over 50% of capacity and over 60% of energy needs

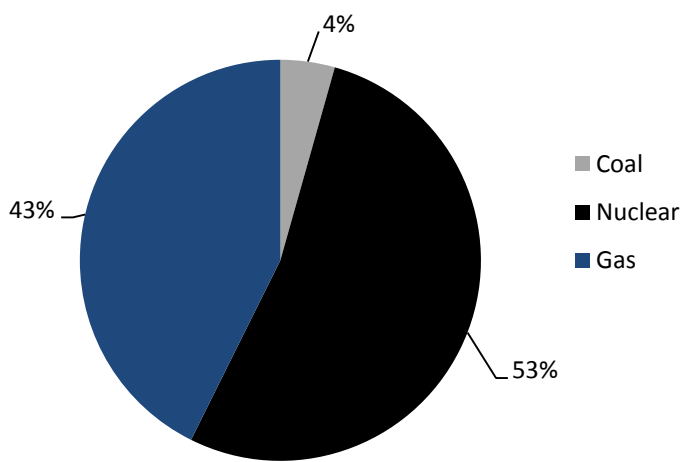
2014 Capacity (MW)



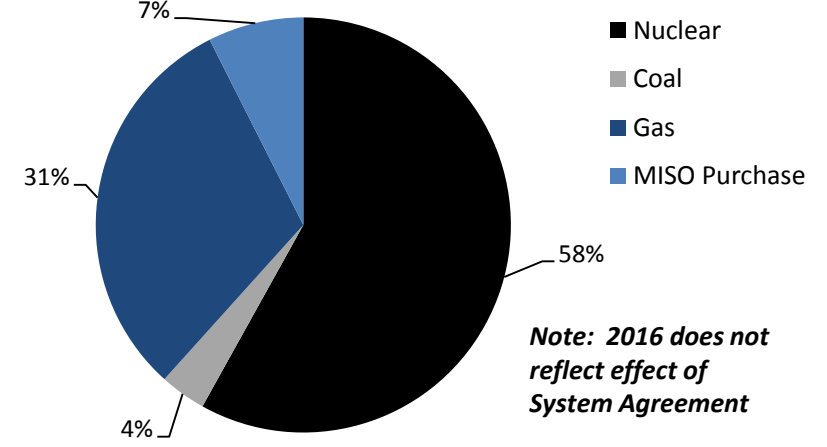
2014 Energy Mix (MWh)



2016 Capacity (MW)



2016 Energy Mix (MWh)



Note: 2016 does not reflect effect of System Agreement

20 YEAR MARKET MODEL INPUTS (2015-2034)

	Industrial Renaissance	Business Boom	Distributed Disruption	Generation Shift
Electricity CAGR (Energy GWh)	~1.0%	~1.0%	~0.4%	~0.8%
Peak Load Growth CAGR	~0.7%	~0.7%	~0.7%	~0.7%
Henry Hub Natural Gas Prices (\$/MMBtu)*	\$4.87 levelized 2014\$	Low Case \$3.84 levelized 2014\$	Same as Reference Case (\$4.87 levelized 2014\$)	High Case (\$8.18 levelized 2014\$)
WTI Crude Oil (\$/Barrel)*	\$73.99 levelized 2013\$	Low Case \$69.00 levelized 2013\$	Medium High (\$109.12 levelized 2013\$)	High Case (\$173.71 levelized 2013\$)
CO₂ (\$/short ton)*	None	Cap and trade starts in 2023 \$6.70 levelized 2013\$	Cap and trade starts in 2023 \$6.70 levelized 2013\$	Cap and trade starts in 2023 \$14.32 levelized 2013\$
Conventional Emissions Allowance Markets	CSAPR & MATS	CSAPR & MATS	CSAPR & MATS	CSAPR & MATS
Delivered Coal Prices – Entergy Owned Plants (Plant Specific Includes Current Contracts) \$/MMBtu*	Reference Case (Vol. Weighted Avg. \$2.81 levelized 2013\$)	Low Case (Vol. Weighted Avg. \$2.43 levelized 2013\$)	Same as Reference Case (Vol. Weighted Avg. \$2.81 levelized 2013\$)	High Case (Vol. Weighted Avg. \$2.53 levelized 2013\$)
Delivered Coal Prices – Non Entergy Plants In Entergy Region	Reference Case (Price Varies by Plant)	Low Case (Price Varies by Plant)	Same as Reference Case	High Case (Price Varies by Plant)
Delivered Coal Prices – Non Entergy Regions	Reference Case (Price Varies by Plant)	Low Case (Price Varies by Plant)	Same as Reference Case	High Case (Price Varies by Plant)
Coal Retirements Capacity (Years)*	Age 60**	Age 70**	Age 60**	Age 50**

*Figures shown are for the period 2015-2034 covering a sub-set of the Eastern Interconnect which is approximately 34% of total U.S. 2011 TWh electricity sales.

Note: Levelized prices refer to the price in 2013 dollars where the NPV of that price grown with inflation over the 2015-2034 period would equal the NPV of levelized nominal prices over the 2015-2034 period when the discount rate is 6.93%. (ENO WACC).

**Entergy owned coal plants assumed to operate beyond the end of the IRP (2034). Some non Entergy plants retire early due to environmental compliance considerations

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.

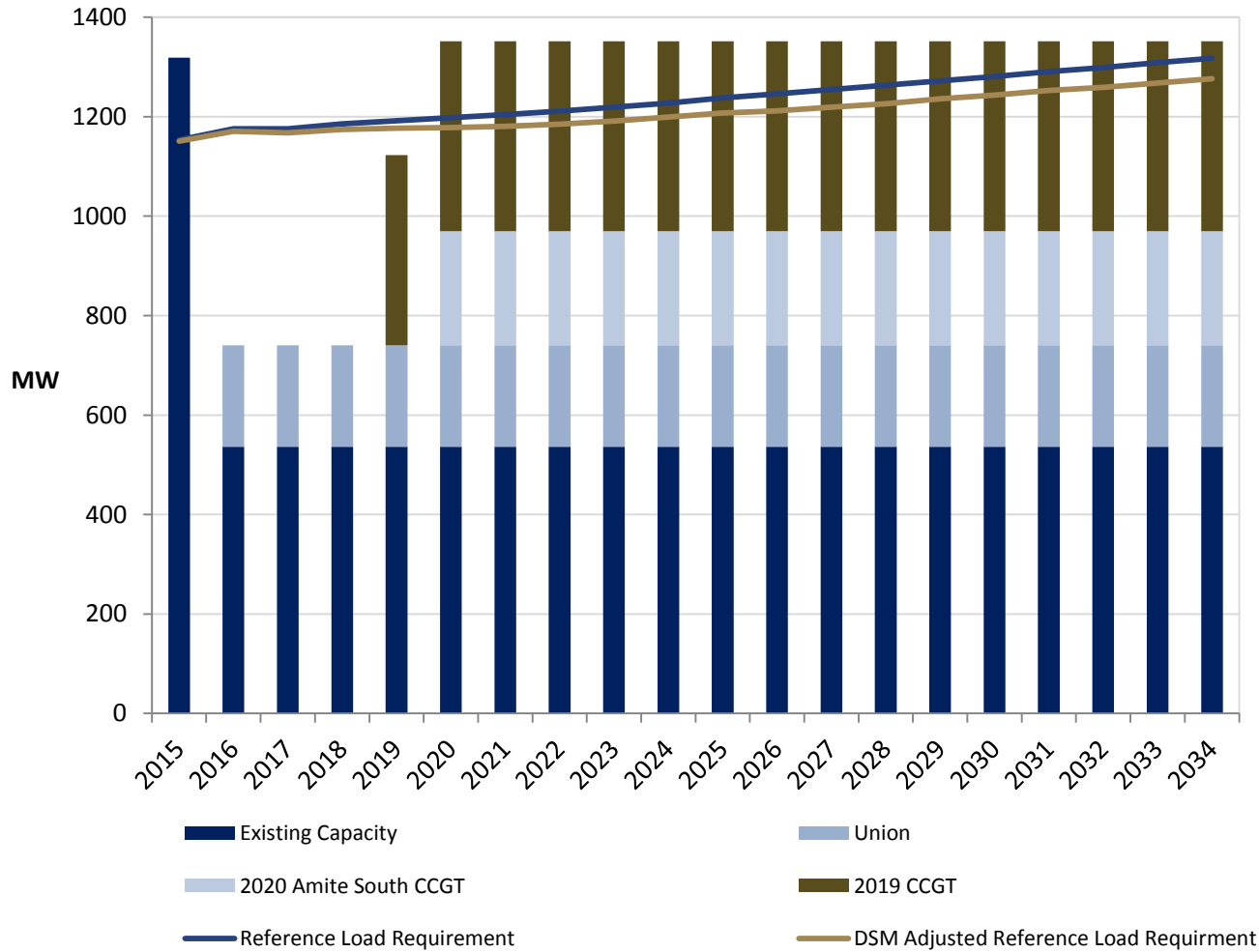
Portfolio Design Mix

	IR Portfolio	BB Portfolio	DD Portfolio	GS Portfolio
DSM	14 Programs	12 Programs	15 Programs	17 Programs
DSM Maximum (MW)	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	

AURORA CAPACITY EXPANSION - SUPPLY SIDE PORTFOLIOS

Industrial Renaissance, Business Boom, and Distributed Disruption Portfolio - CCGT

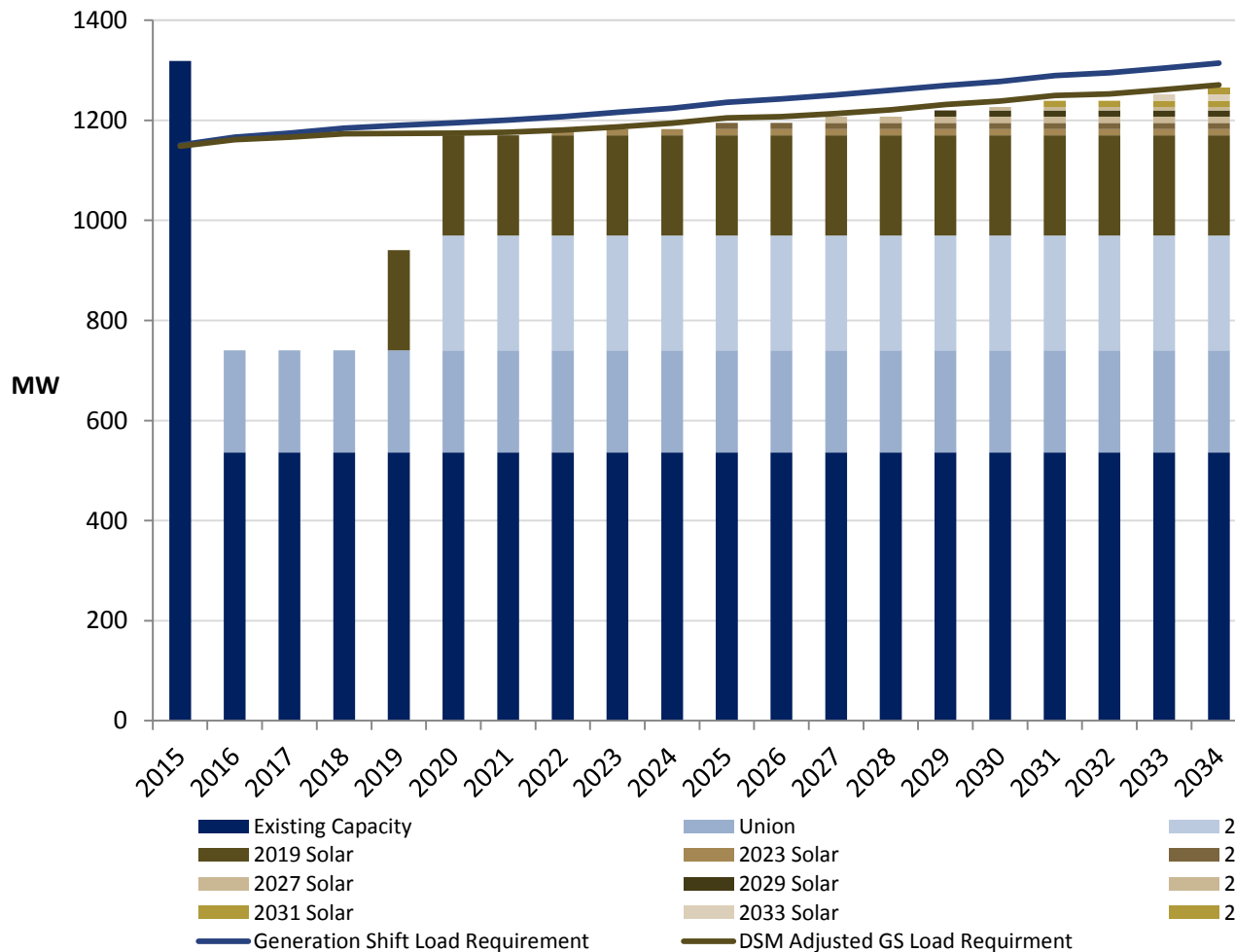


Resource Addition	Capacity (MW)
2019 CCGT	382

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

AURORA CAPACITY EXPANSION - SUPPLY SIDE PORTFOLIOS

Generation Shift Portfolio - Solar



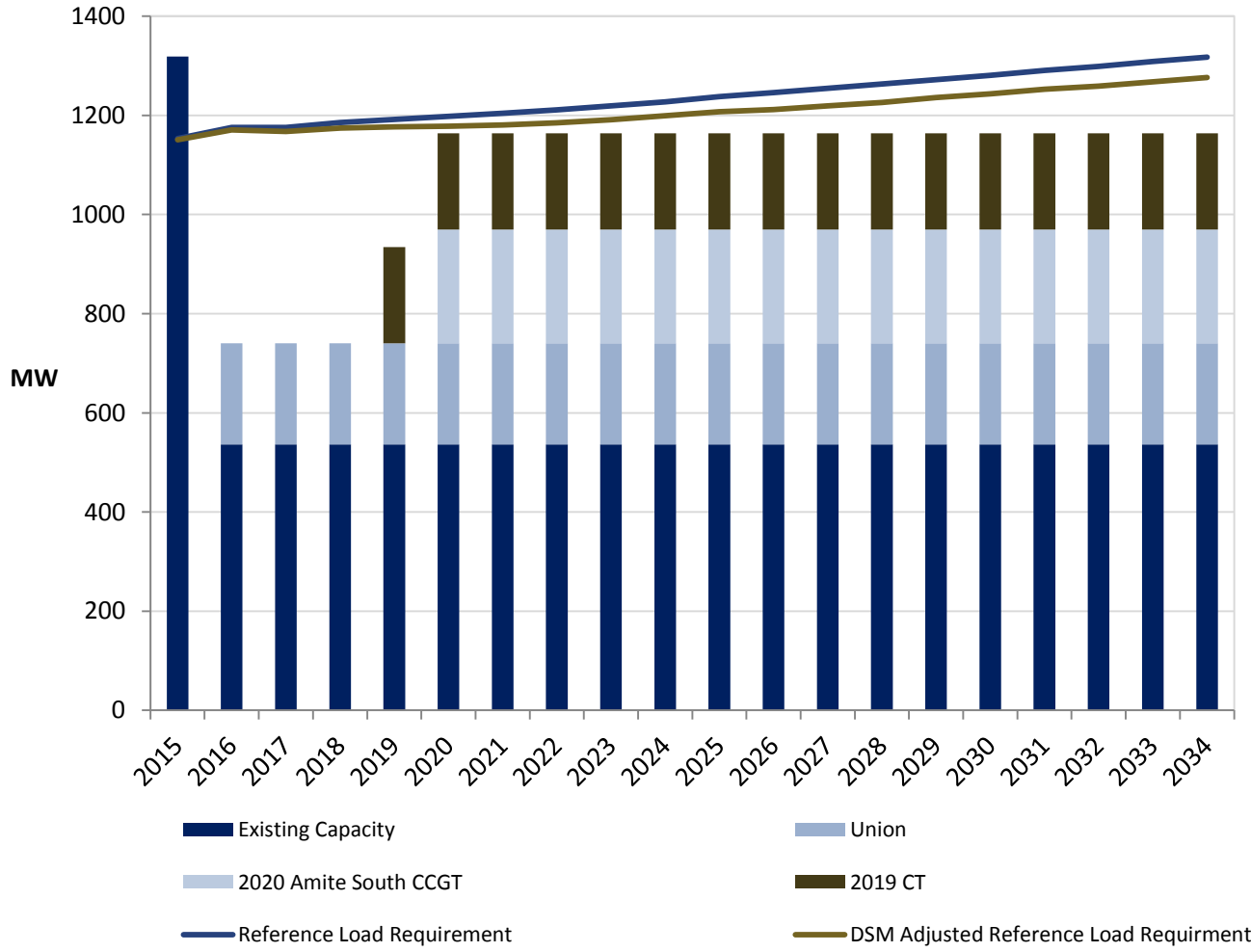
Resource Addition	Capacity (MW)	Effective Capacity (MW)
2019 Solar	800	200
2023 Solar	50	12.5
2025 Solar	50	12.5
2027 Solar	50	12.5
2029 Solar	50	12.5
2030 Wind	50	7
2031 Solar	50	12.5
2033 Solar	50	12.5
2034 Solar	50	12.5

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

Preliminary – Work in Progress

MANUAL PORTFOLIOS - SUPPLY SIDE PORTFOLIOS

Industrial Renaissance – CT Portfolio

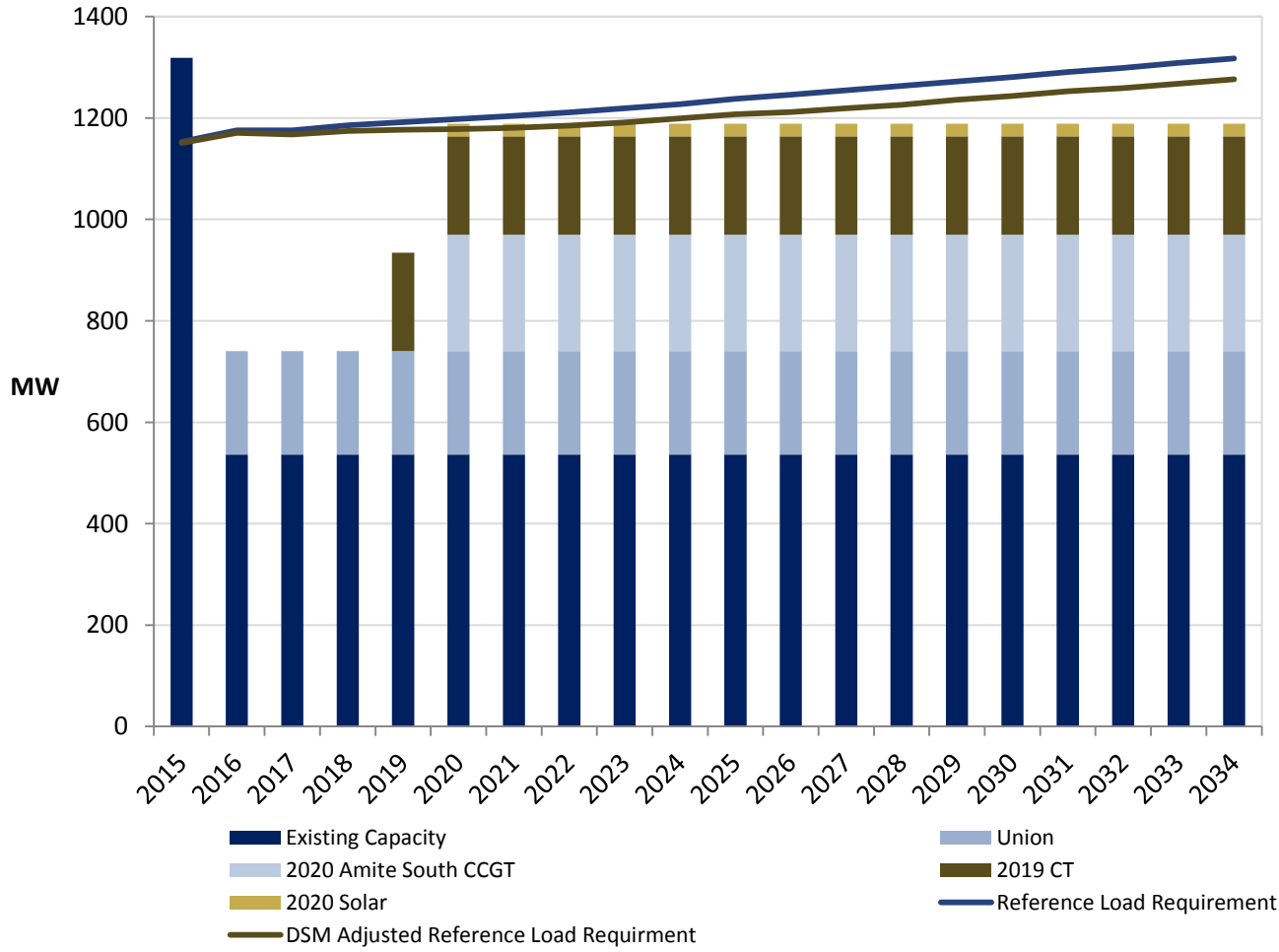


Resource Addition	Capacity (MW)
2019 CT	194

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

MANUAL PORTFOLIOS - SUPPLY SIDE PORTFOLIOS

Industrial Renaissance – CT/Solar Portfolio

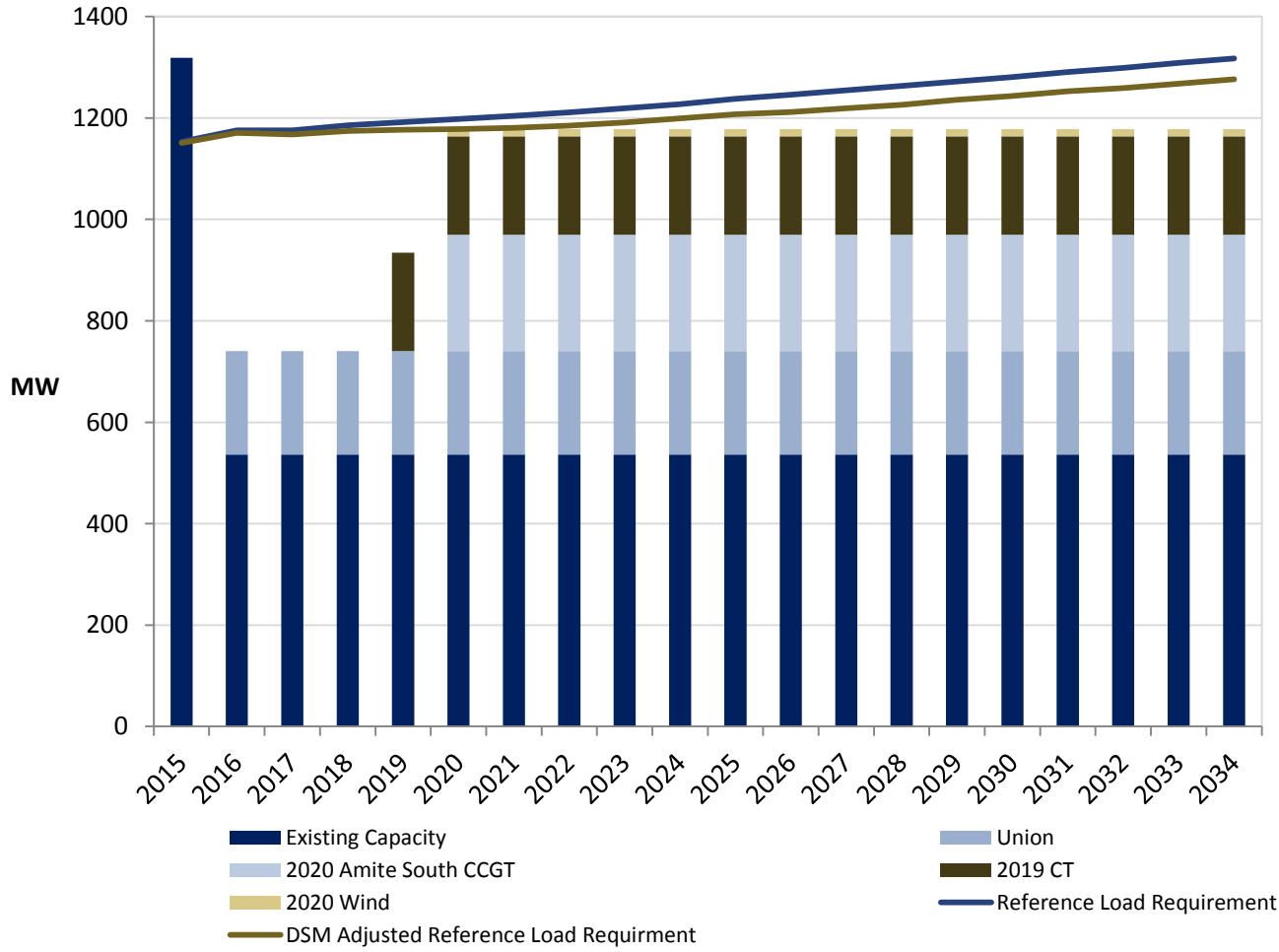


Resource Addition	Capacity (MW)	Effective Capacity (MW)
2019 CT	194	194
2020 Solar	100	25

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MANUAL PORTFOLIOS - SUPPLY SIDE PORTFOLIOS

Industrial Renaissance – CT/Wind Portfolio

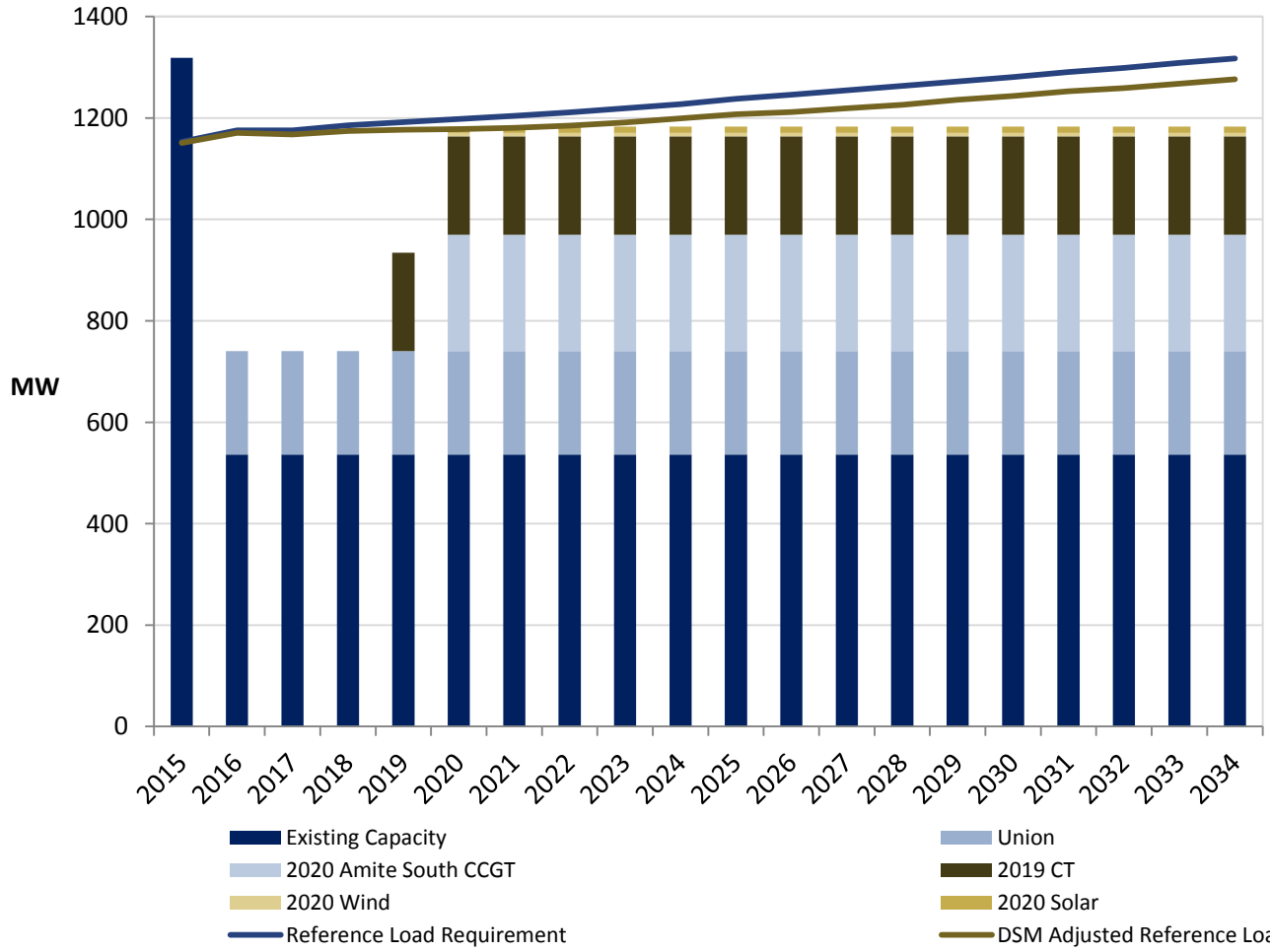


Resource Addition	Capacity (MW)	Effective Capacity (MW)
2019 CT	194	194
2020 Wind	100	14

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

MANUAL PORTFOLIOS - SUPPLY SIDE PORTFOLIOS

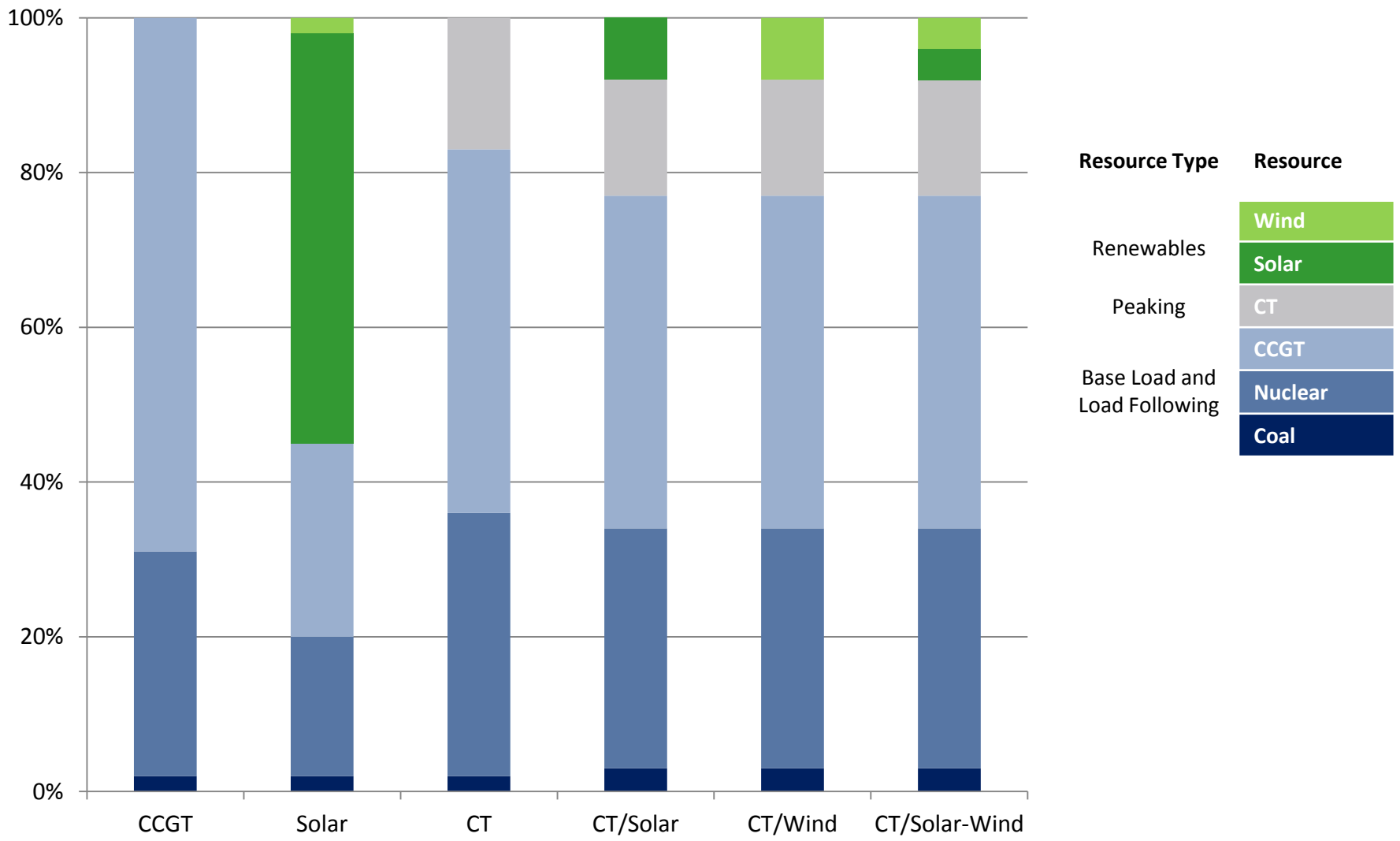
Industrial Renaissance – CT/Wind-Solar Portfolio



Resource Addition	Capacity (MW)	Effective Capacity (MW)
2019 CT	194	194
2020 Wind	50	7
2020 Solar	50	12.5

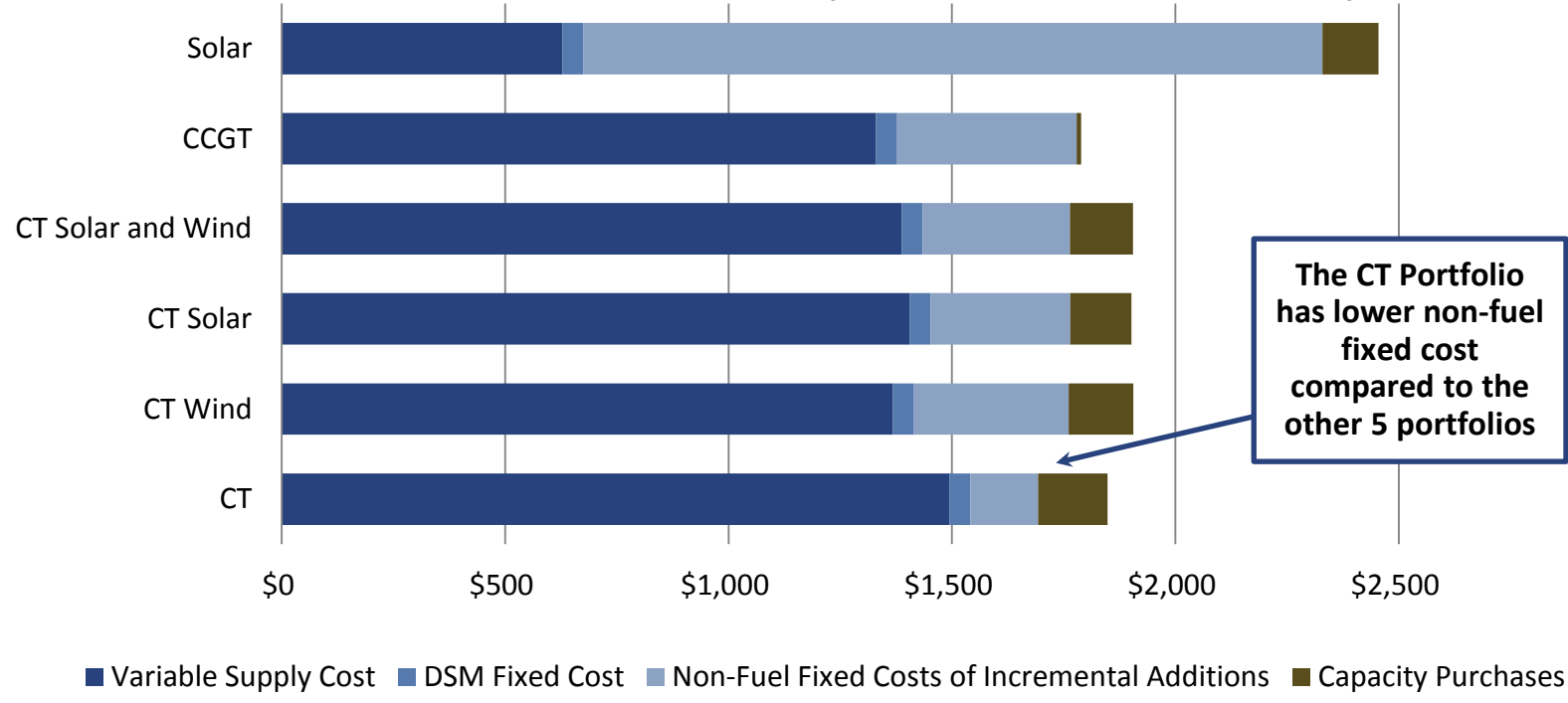
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INSTALLED CAPACITY MIX OF EACH PORTFOLIO IN 2034

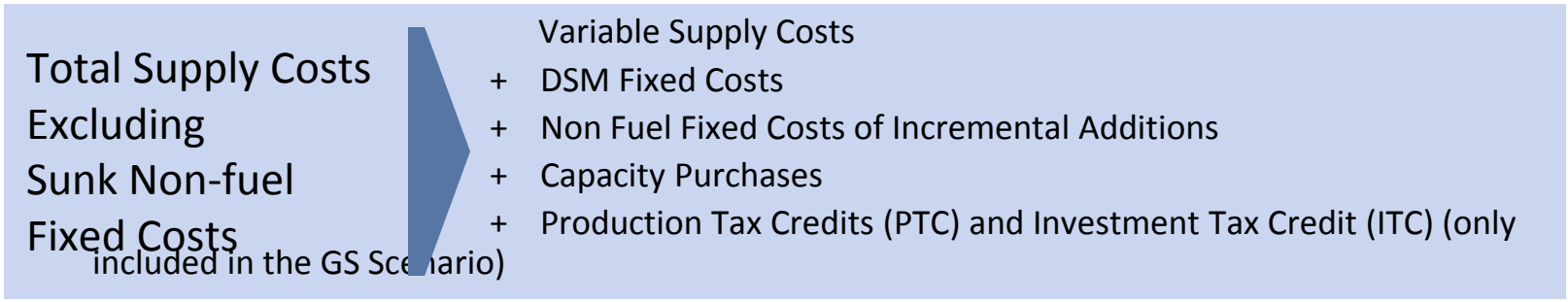


TOTAL SUPPLY COST COMPONENTS EXCLUDING SUNK NON-FUEL FIXED COST

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



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 high, but has more risk because of higher fixed cost being offset by uncertain potential variable cost savings
- The Solar Portfolio is highly ranked in the Generation Shift Scenario due to continuation of ICT subsidiaries, high gas prices, and high CO2 prices, but ranks lowest in each of the other scenarios
- The addition of Wind and/or Solar to the CT Portfolio is only beneficial in the Generation Shift Scenario

Total Cost by Scenario
Levelized Real (\$M)

Portfolios	Ref - IR	BB	DD	GS
CT	\$1,846	\$1,675	\$1,789	\$2,323
CT Wind	\$1,905	\$1,753	\$1,837	\$2,259
CT Solar	\$1,902	\$1,744	\$1,840	\$2,292
CT Solar_Wind	\$1,903	\$1,749	\$1,838	\$2,275
CCGT	\$1,789	\$1,527	\$1,705	\$2,177
Solar	\$2,454	\$2,420	\$2,354	\$2,049

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	1	1	1	2
Solar	6	6	6	1

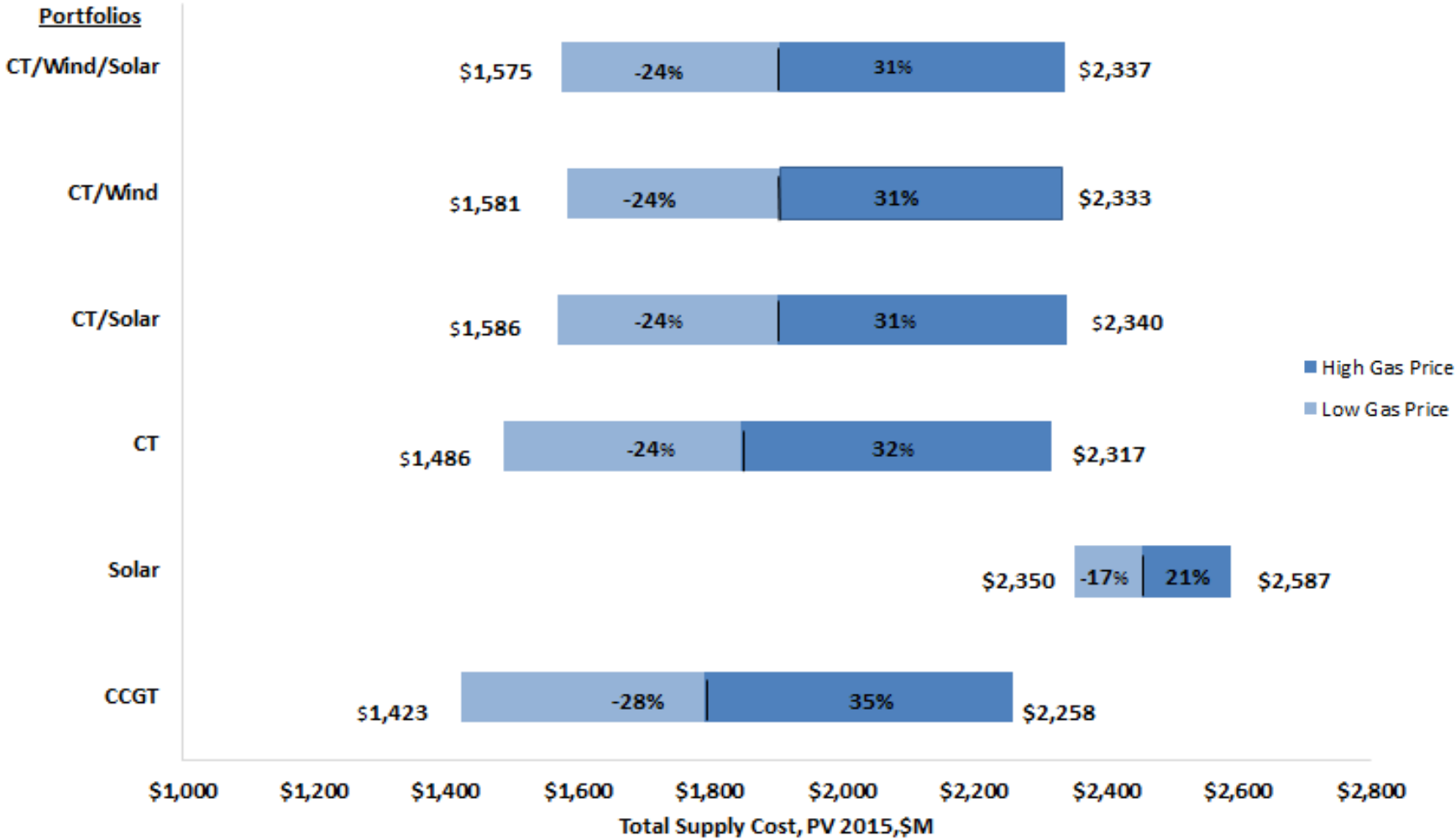
Variance (\$M)
relative to highest ranked portfolio

	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	\$0	\$0	\$0	\$128
Solar	\$665	\$893	\$649	\$0

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

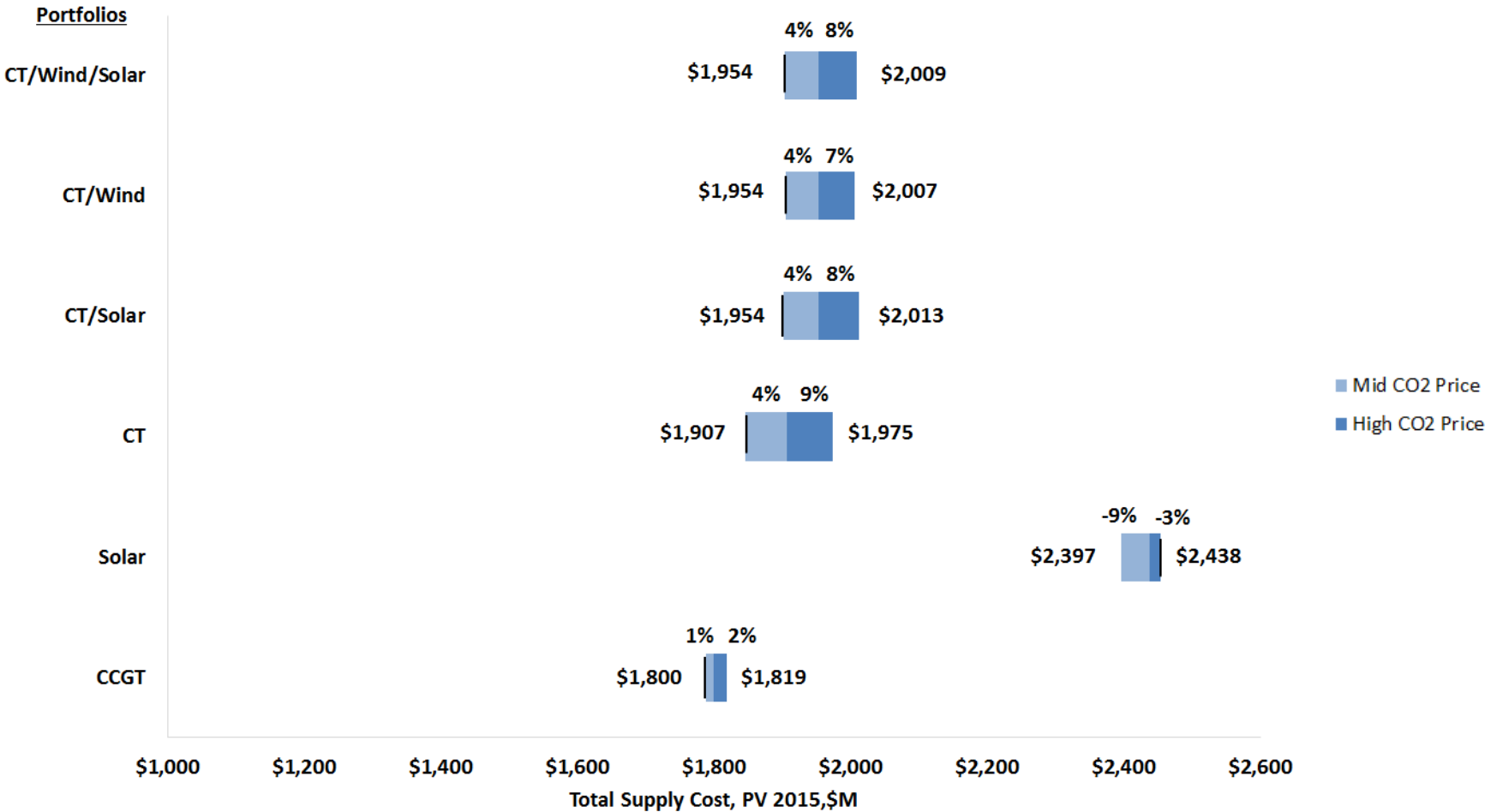
REFERENCE – IR SCENARIO SENSITIVITY: NATURAL GAS (PV \$2015, \$M)

Although the Solar Portfolio is less volatile, it is more costly than the other portfolios. The CCGT and CT Portfolios are similarly affected by changes in gas price assumptions.



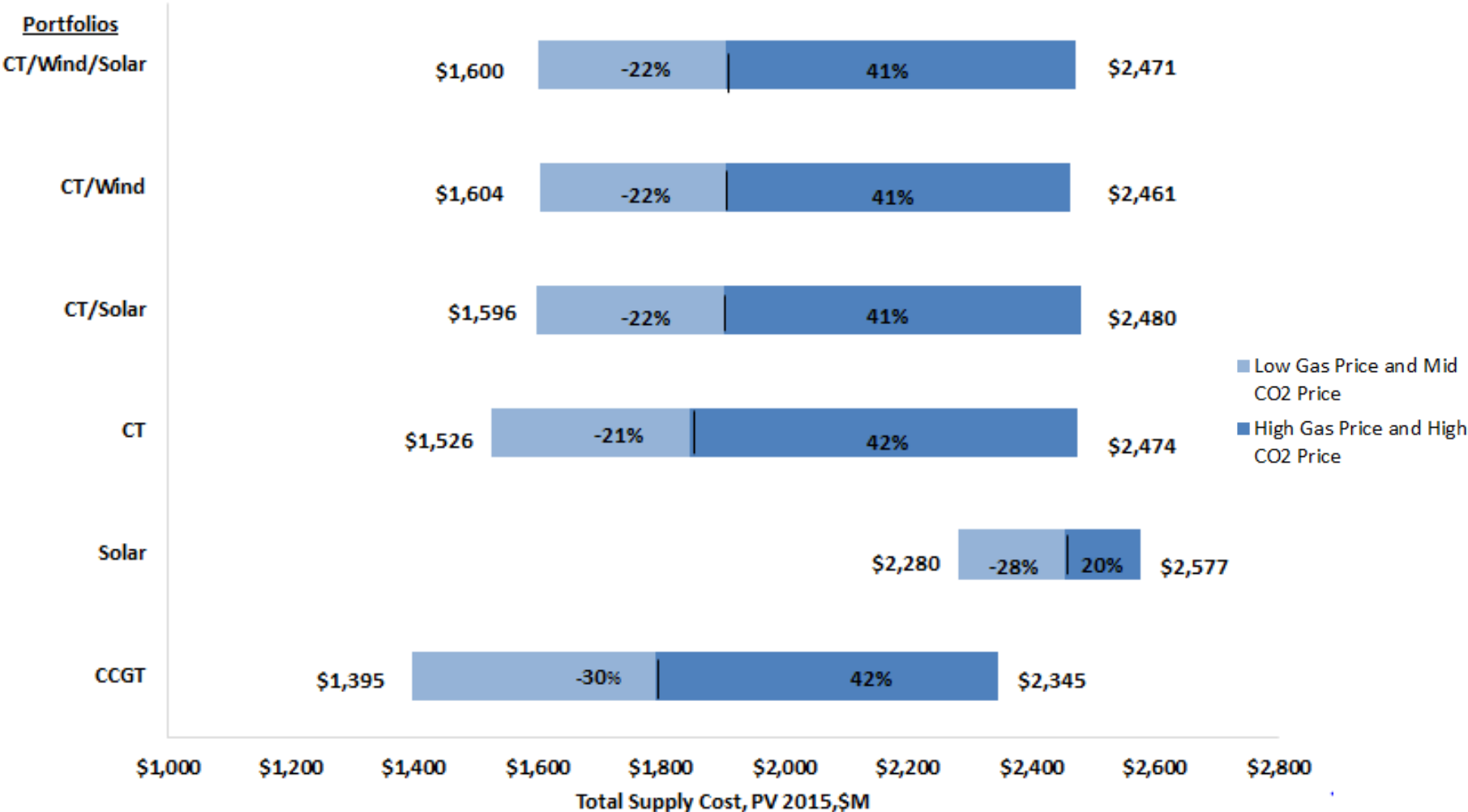
REFERENCE – IR SCENARIO SENSITIVITY: CO₂ (PV \$2015, \$M)

The CCGT Portfolio is relatively less affected by changes in carbon price assumptions; however, ENO existing portfolio is expected to have adequate Base Load and Core Load Following capacity.



REFERENCE - IR SCENARIO SENSITIVITY: NATURAL GAS AND CO₂ (PV \$2015, \$M)

Although the Solar Portfolio is less volatile, it is more costly than the other portfolios. The CCGT and CT Portfolios are similarly affected by changes in gas price assumptions.



NEXT STEPS

The following activities are planned:

- Identify reference portfolio plan and action plan
- Draft IRP Report is due in June 2015