

Selected Findings from  
Scenario's 1A, 1B and 2C  
Updated to Reflect Revisions  
in ARM and Peak Load  
Calculations

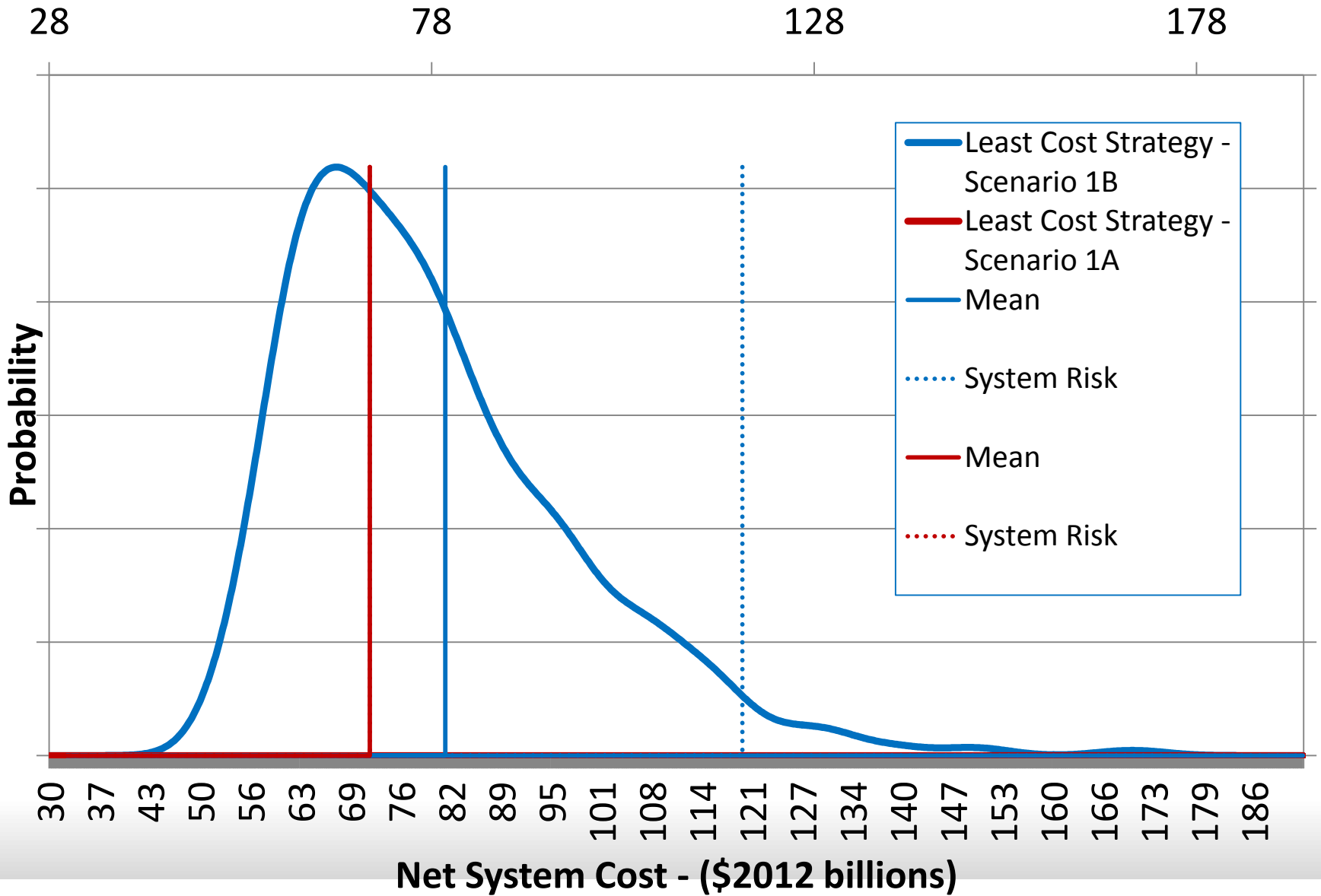
**Systems Analysis Advisory  
Committee Meeting**

**5/21/15**

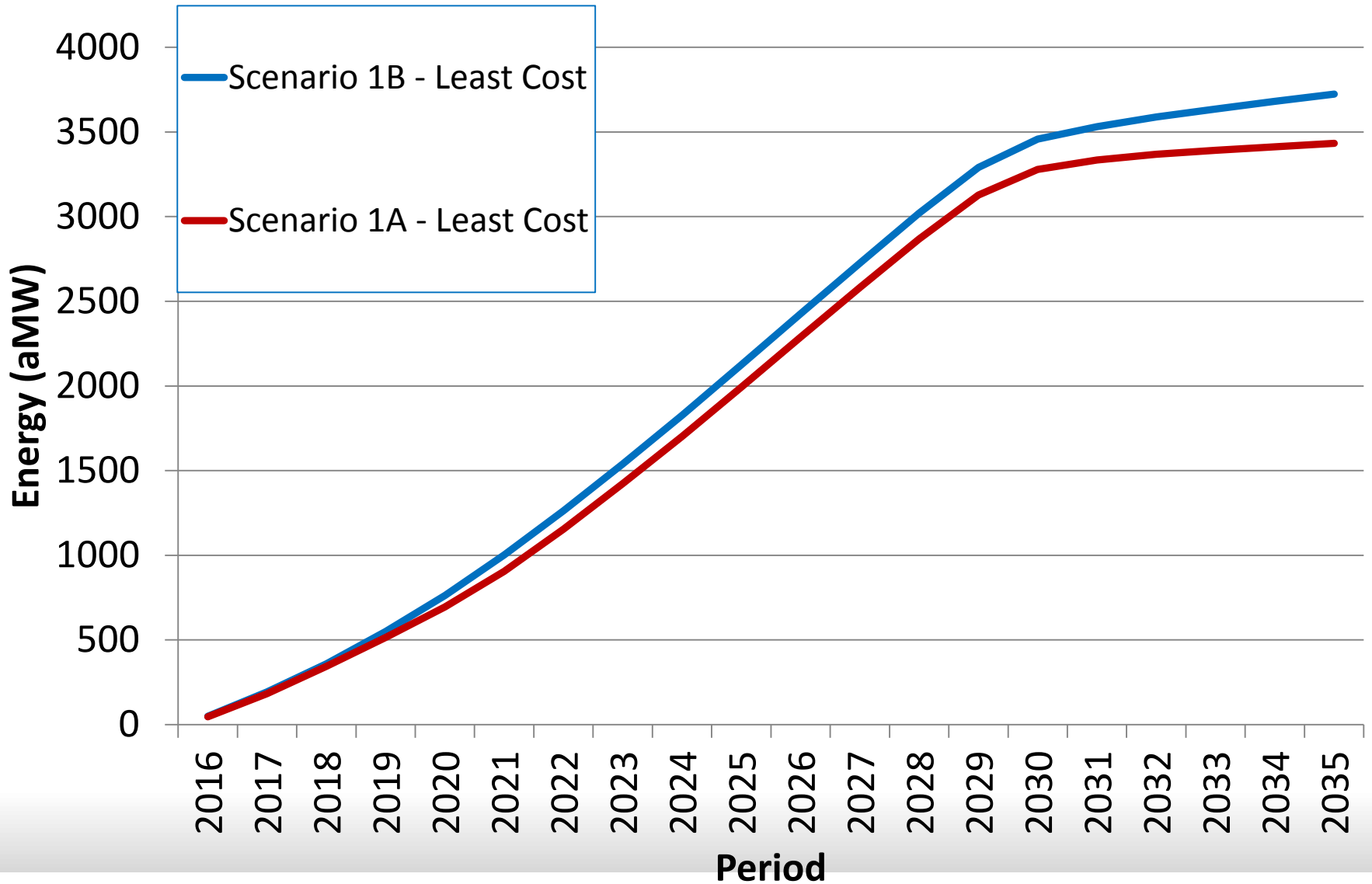
# What We Have Today

- Comparison of the Least Cost *Resource Strategies* across 800 futures for three *Scenarios* (**No Uncertainty (1A), Current Policy (1B) and Carbon Risk (2C)**)
  - Distribution of Net System Cost (\$)
  - Distribution of conservation development (aMW and MW)
  - Distribution of RPS resource development (aMW and MW)
  - Distribution of Thermal Resource development (aMW and MW)
  - CO<sub>2</sub> emissions without carbon risk uncertainty (Scenario 1B) and with carbon risk uncertainty (Scenario 2C) for Total Regional Power System and Plants Affected by EPA's Proposed 111(d) Regulation
  - Opportunity to Review Selected RPM Results for Selected Futures

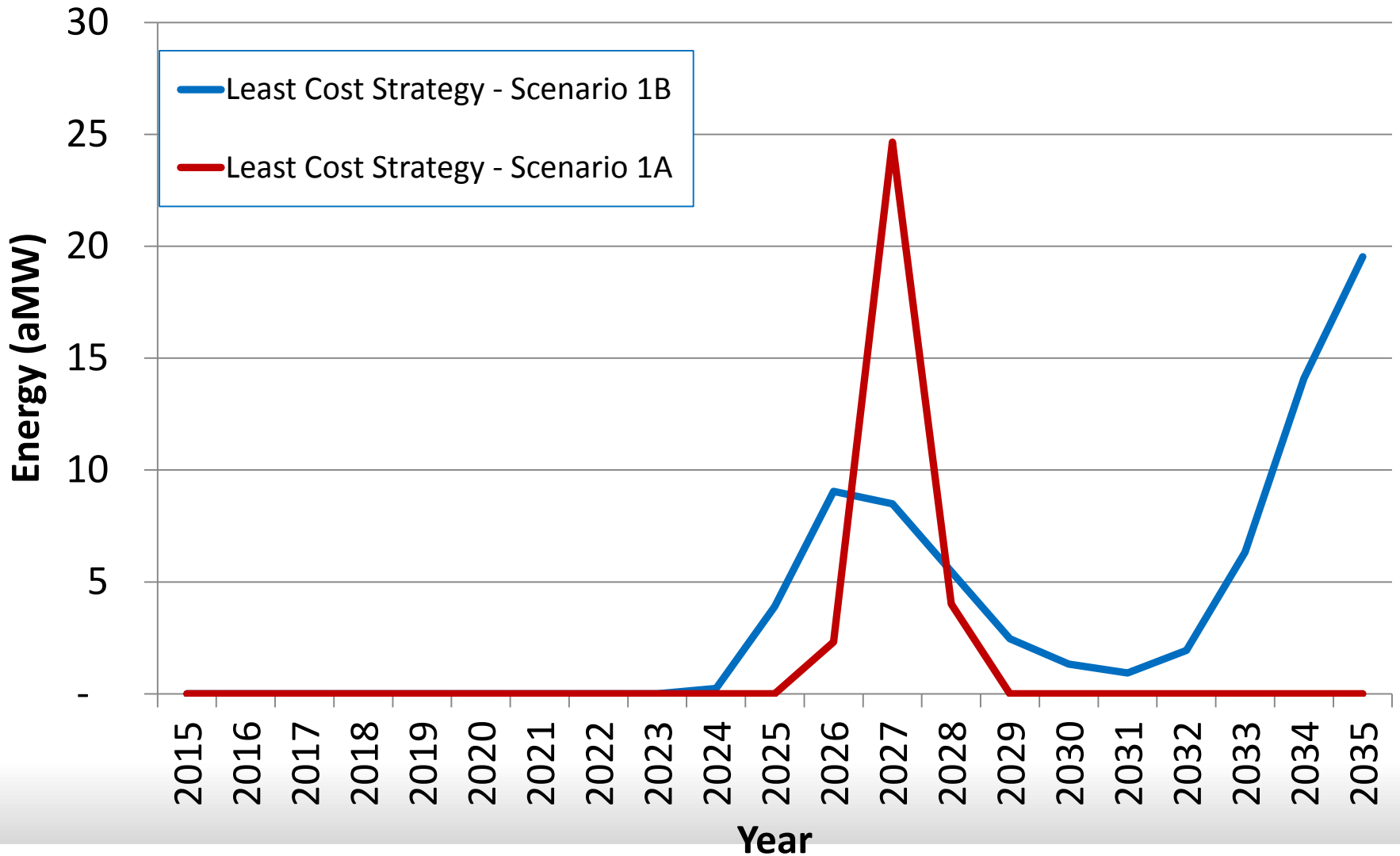
# Least Cost Strategy Comparison Between Scenarios 1A and 1B



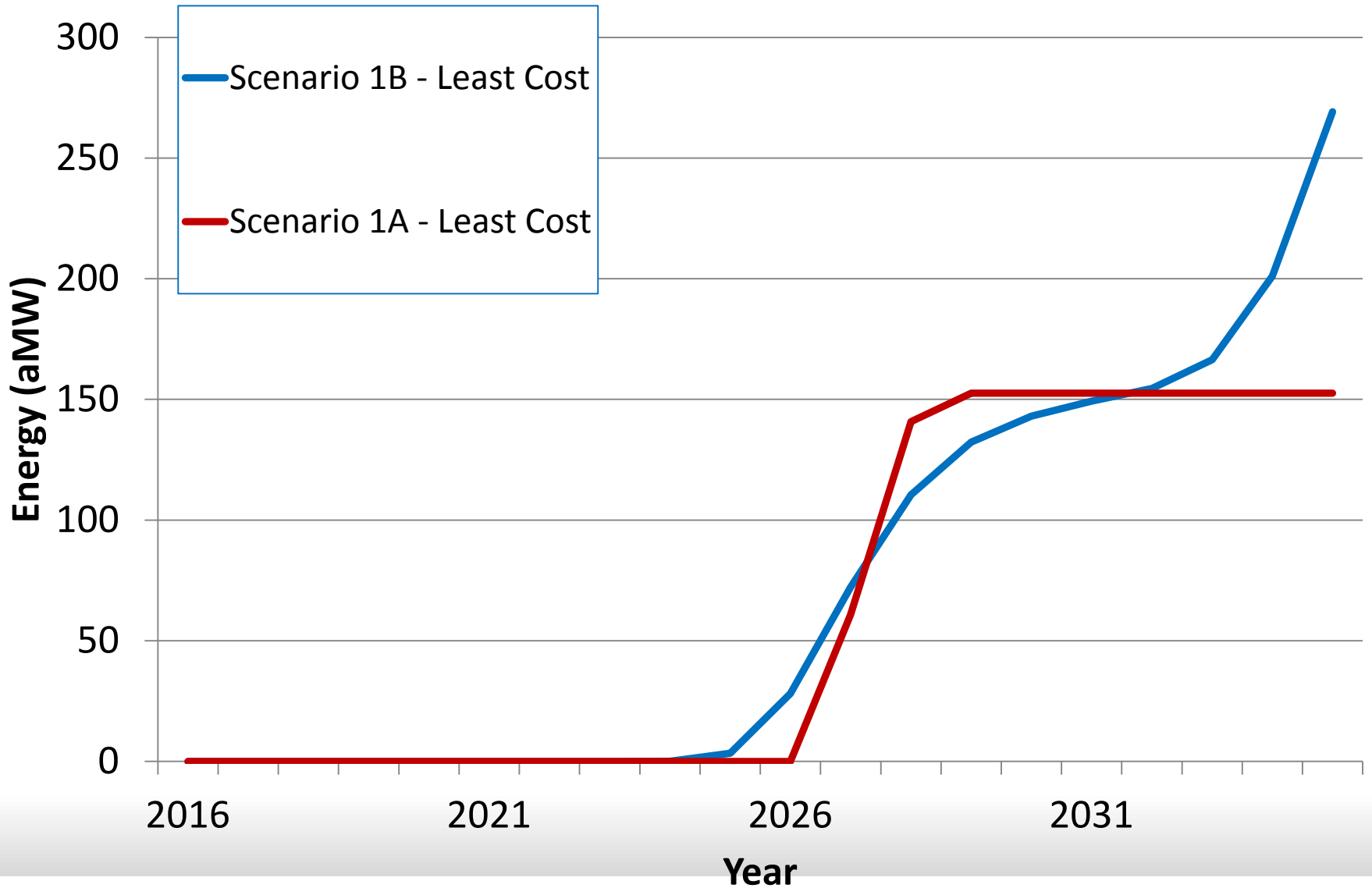
## Average Cumulative Conservation Build – Energy Scenarios 1A and 1B



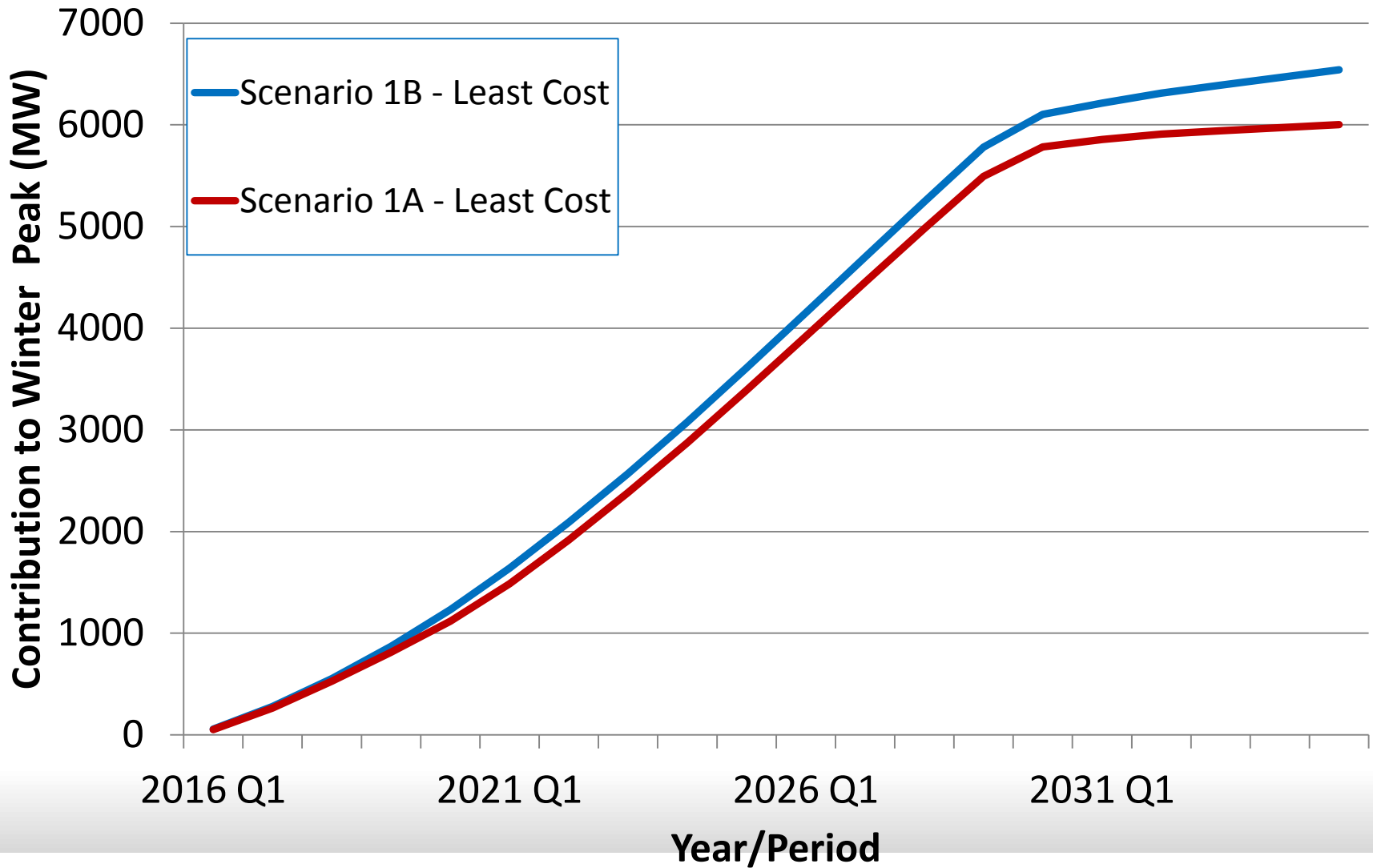
# Average Total RPS Resource Build – Energy Scenarios 1A and 1B



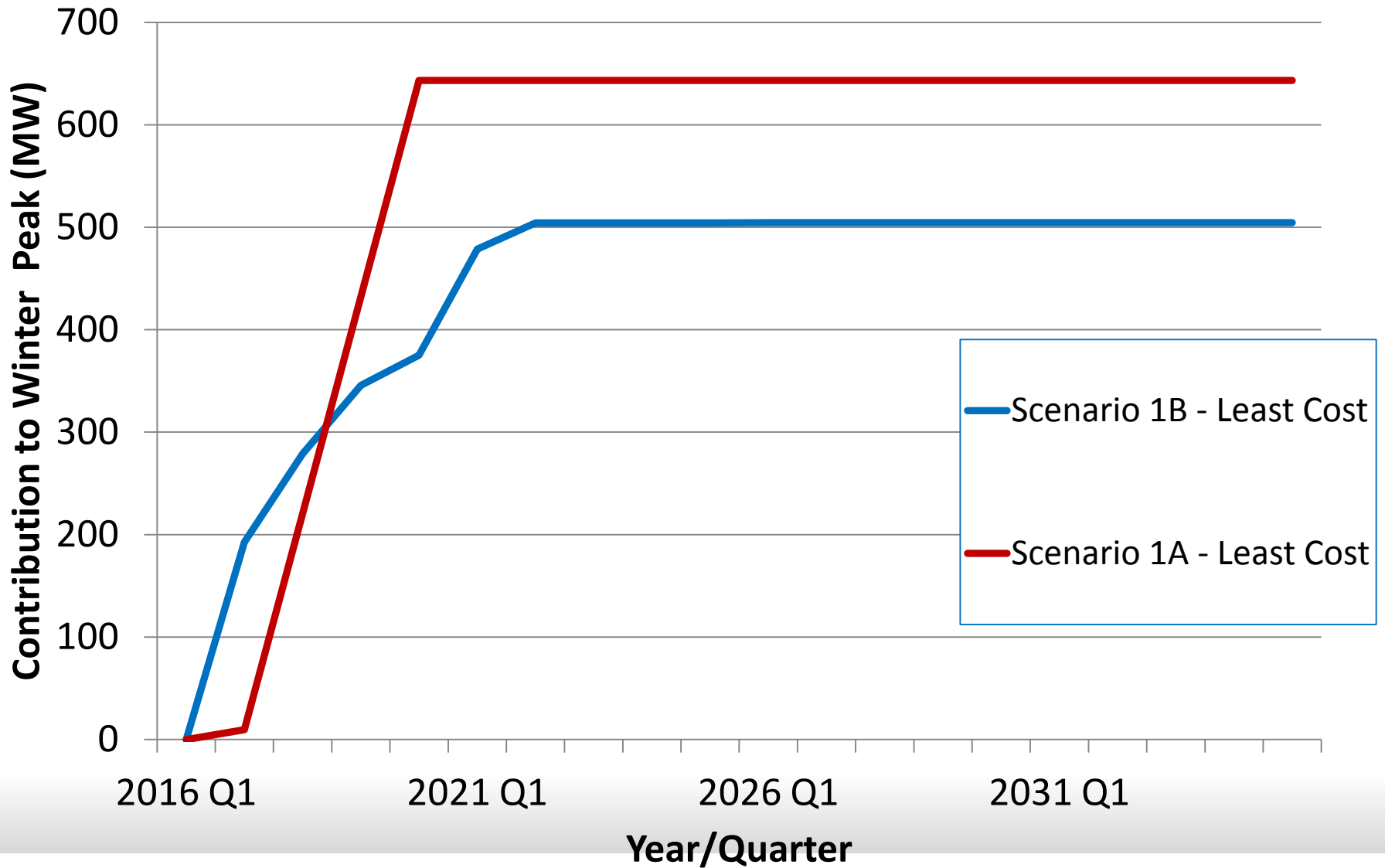
## Average Cumulative Renewable Generation – Energy Scenarios 1A and 1B



# Average Cumulative Conservation Build – Winter Peak Scenarios 1A and 1B

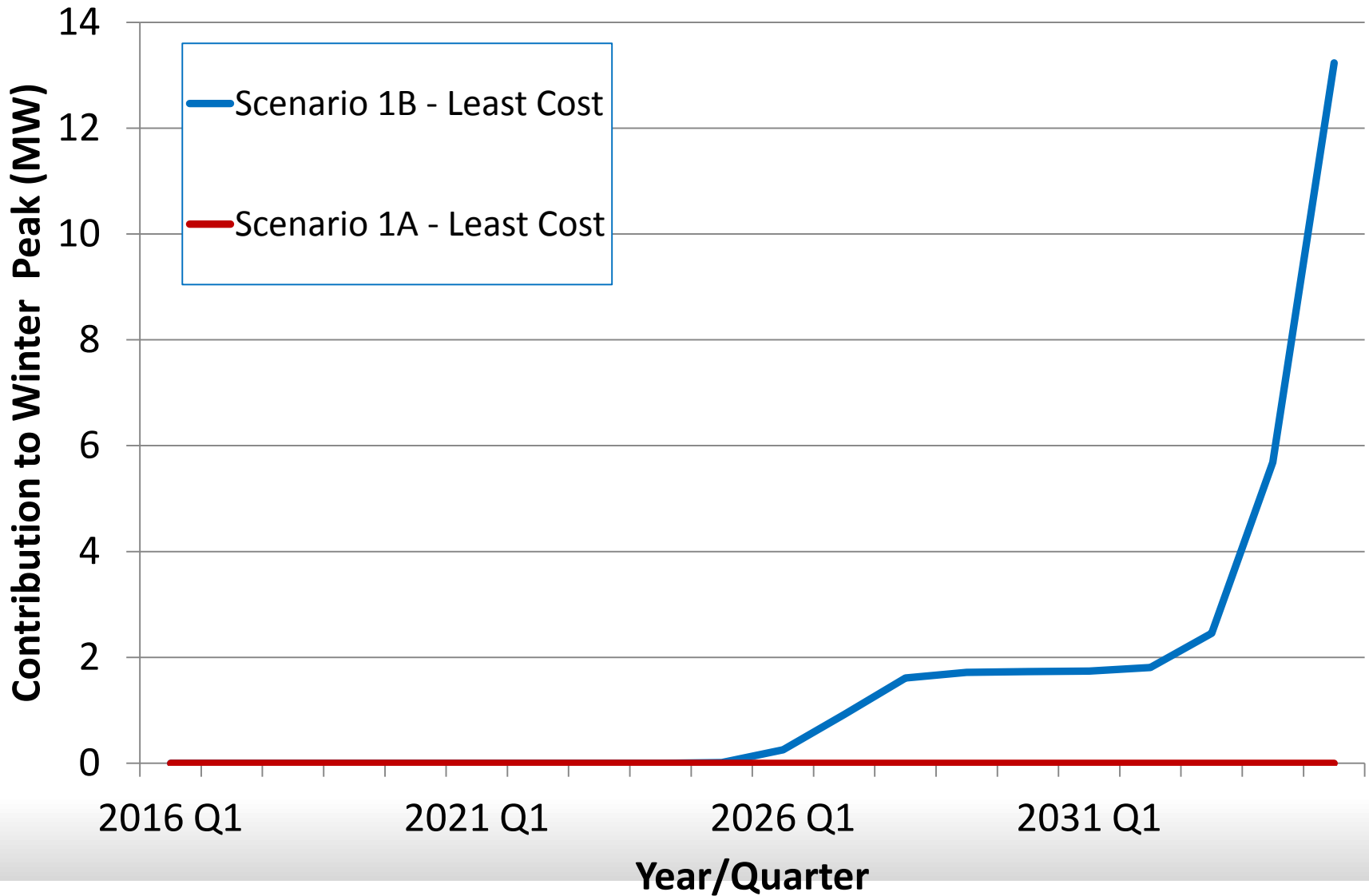


## Average Cumulative Demand Response – Winter Peak Scenarios 1A and 1B

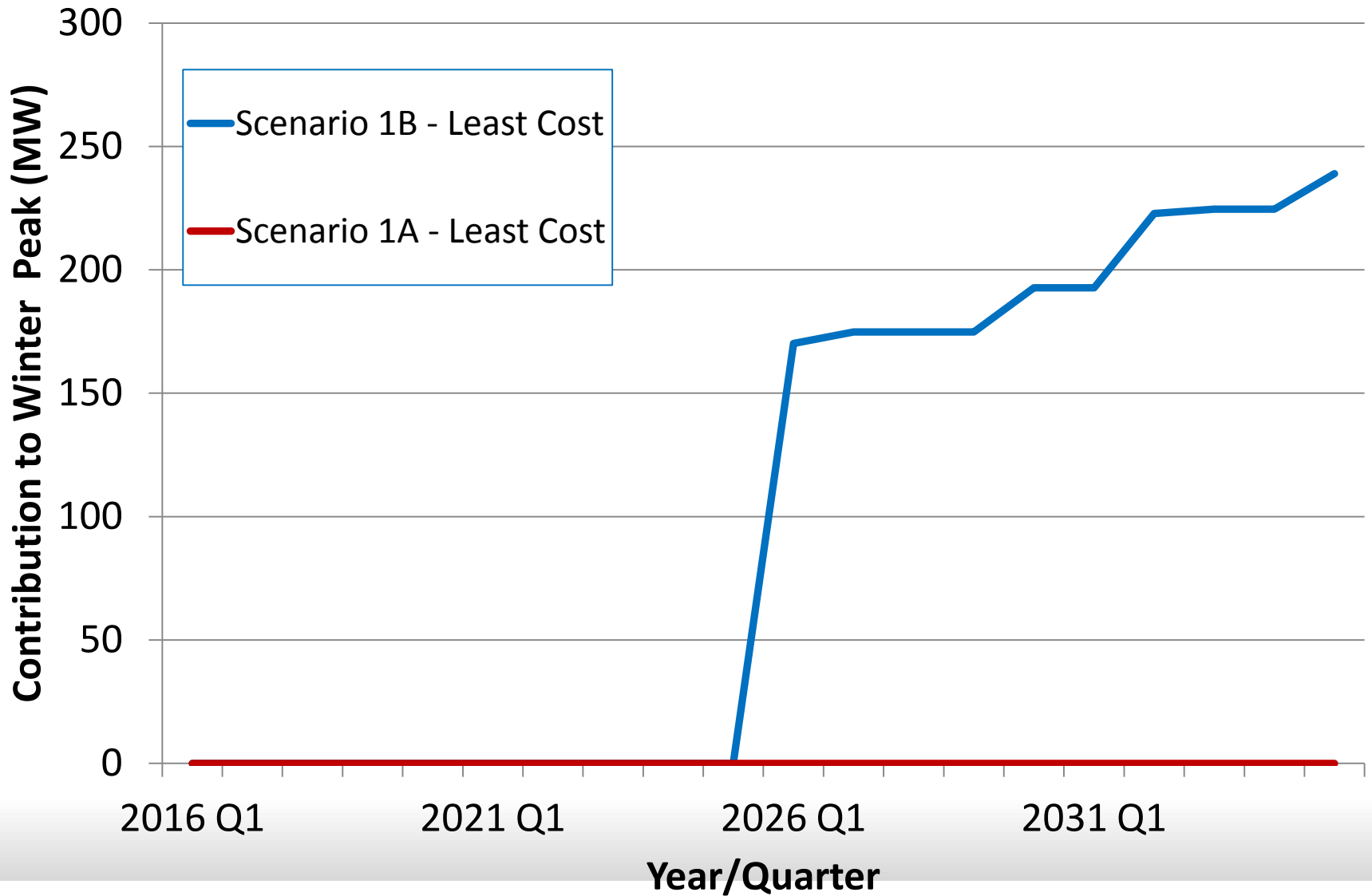




## Average Cumulative Renewable Generation – Winter Peak Scenarios 1A and 1B

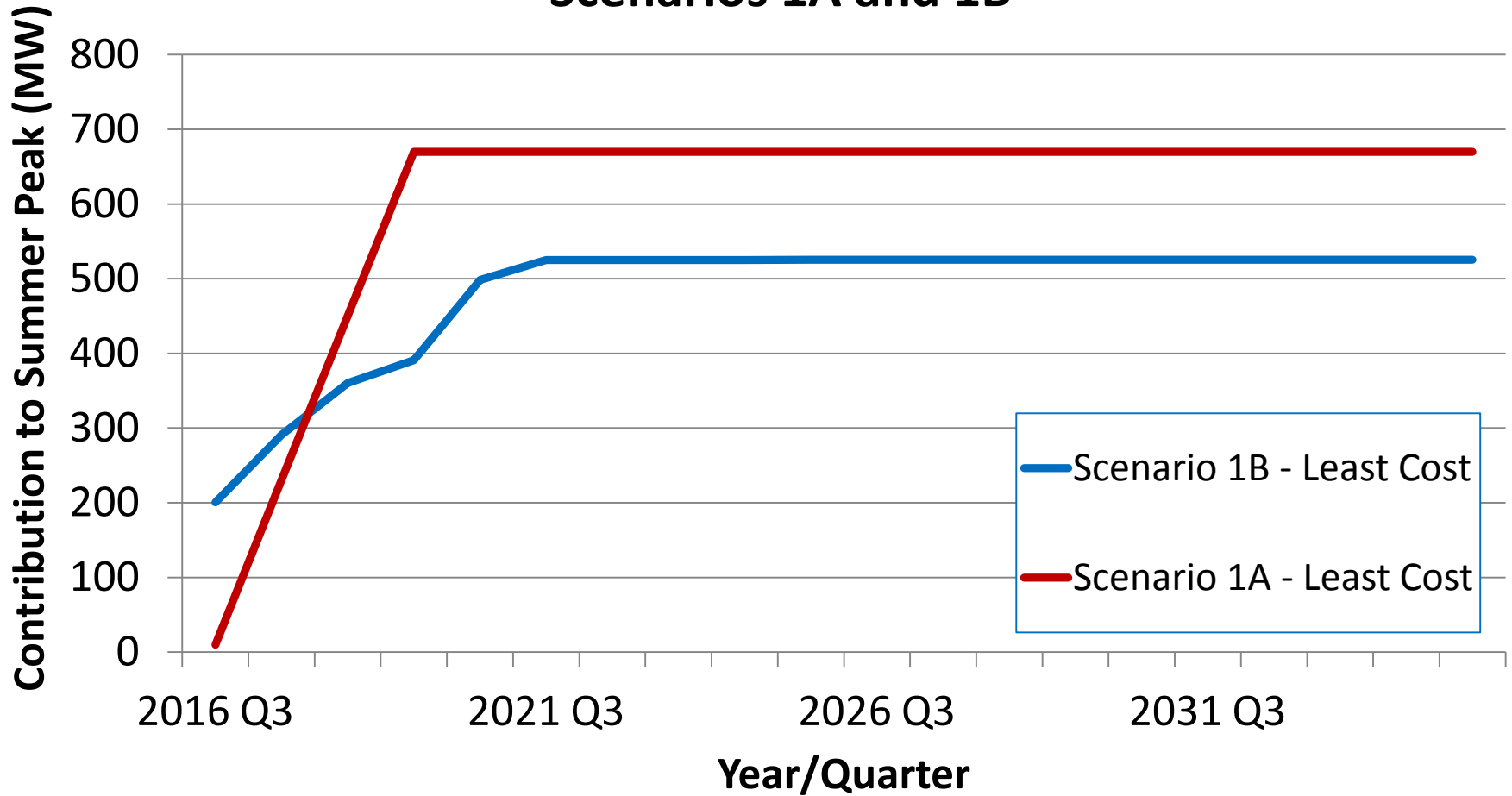


## Average Cumulative Thermal Generation – Winter Peak Scenarios 1A and 1B

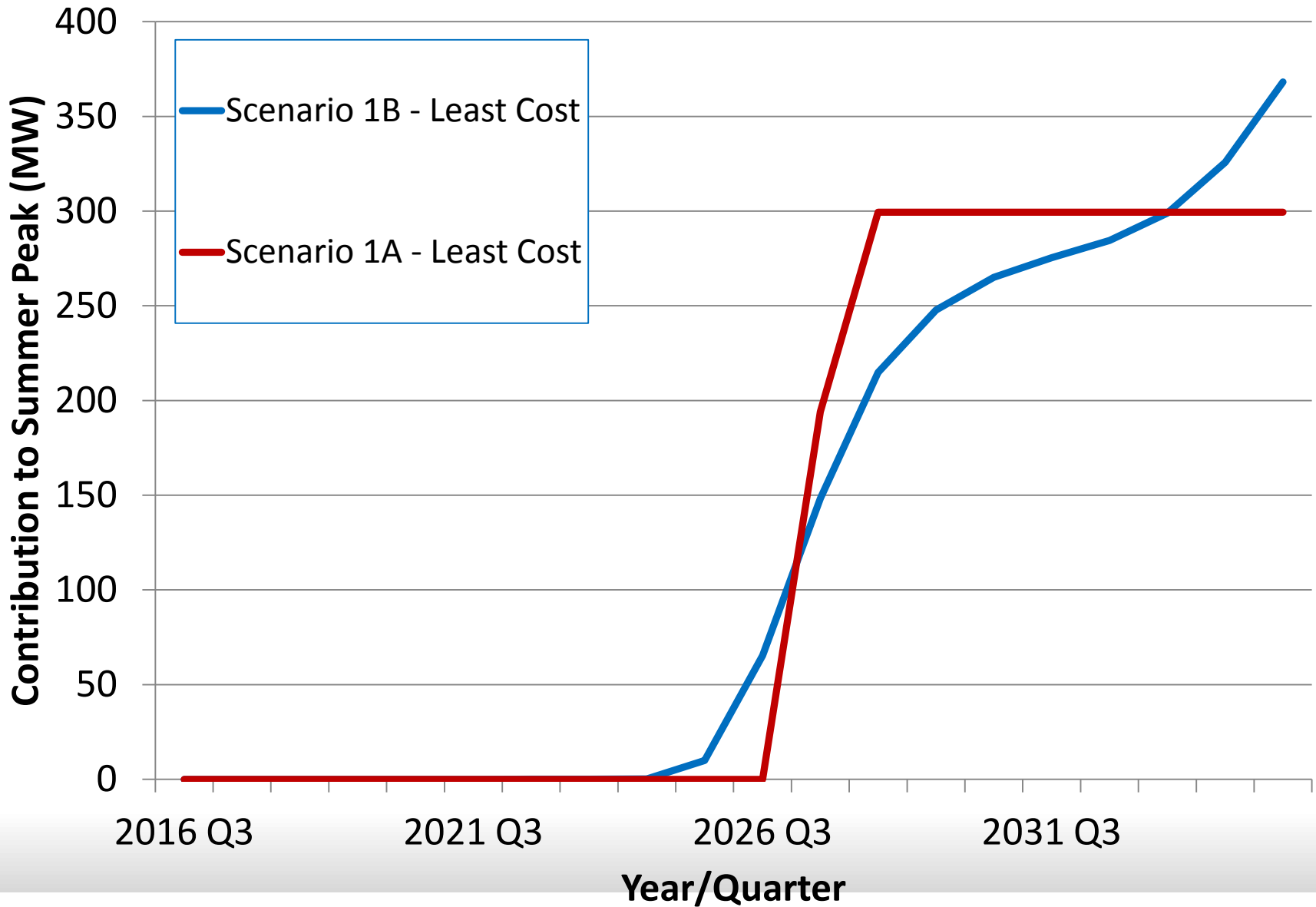


# Average Cumulative Demand Response – Summer Peak

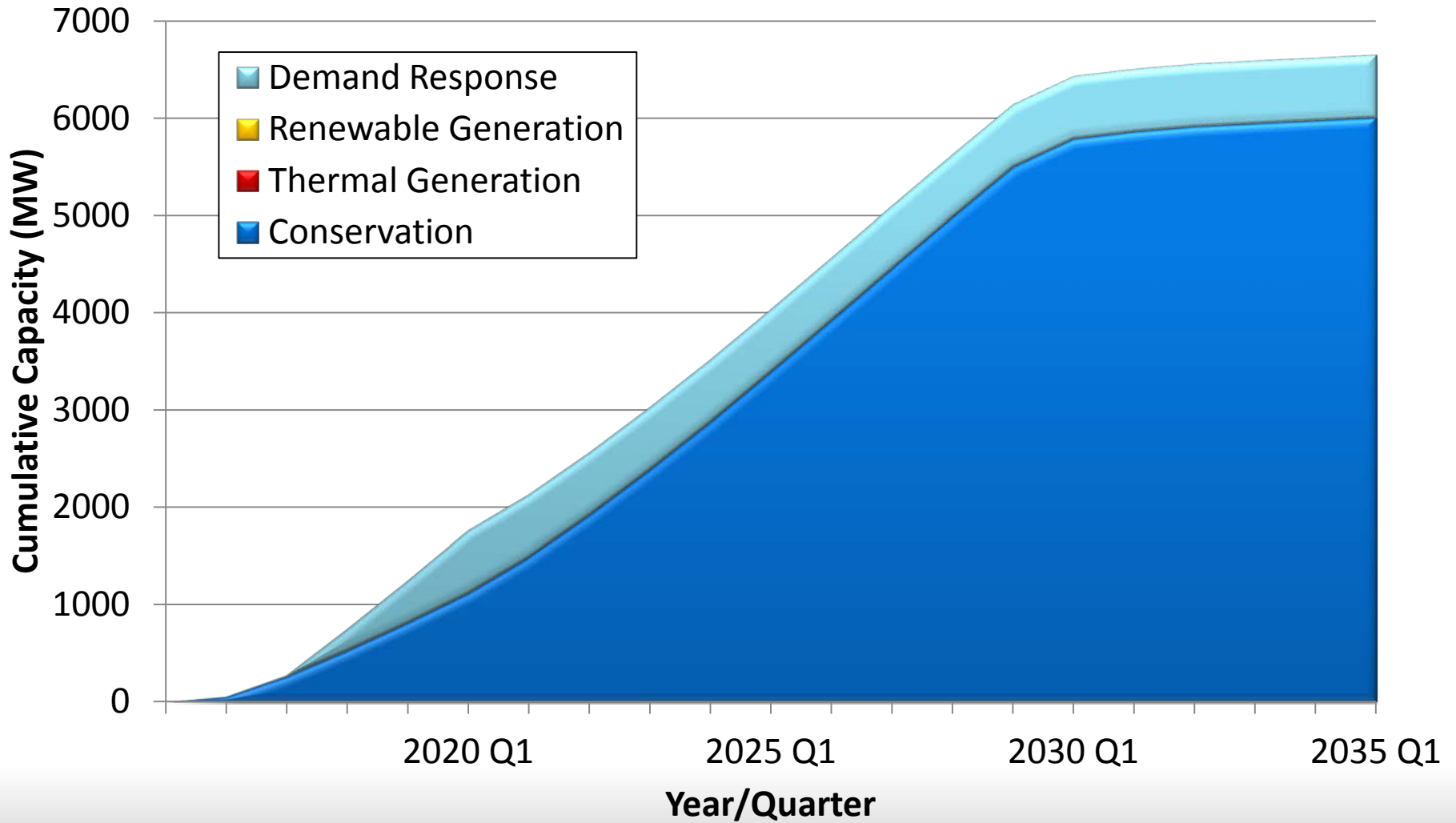
## Scenarios 1A and 1B



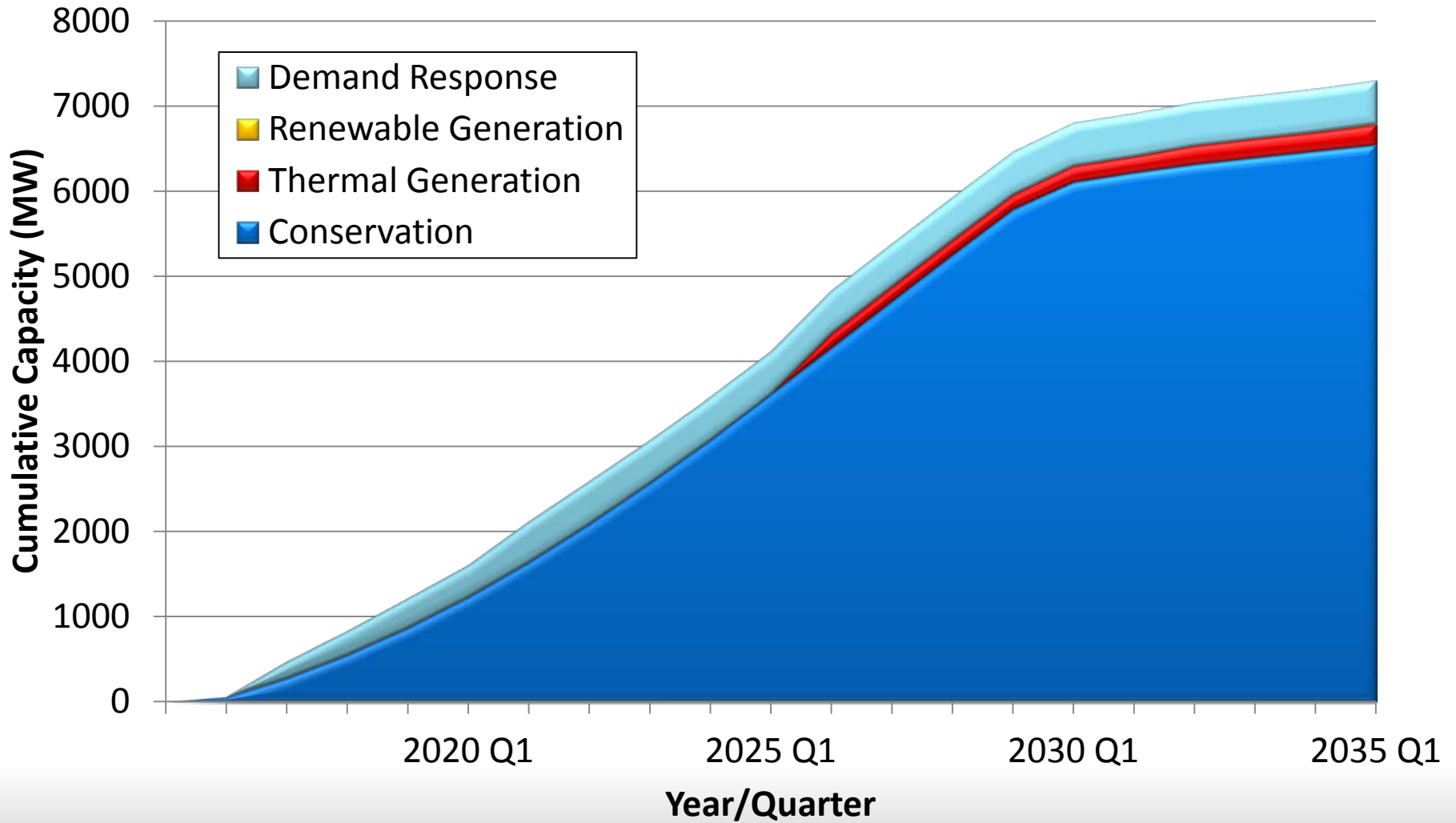
## Average Cumulative Renewable Generation – Summer Peak



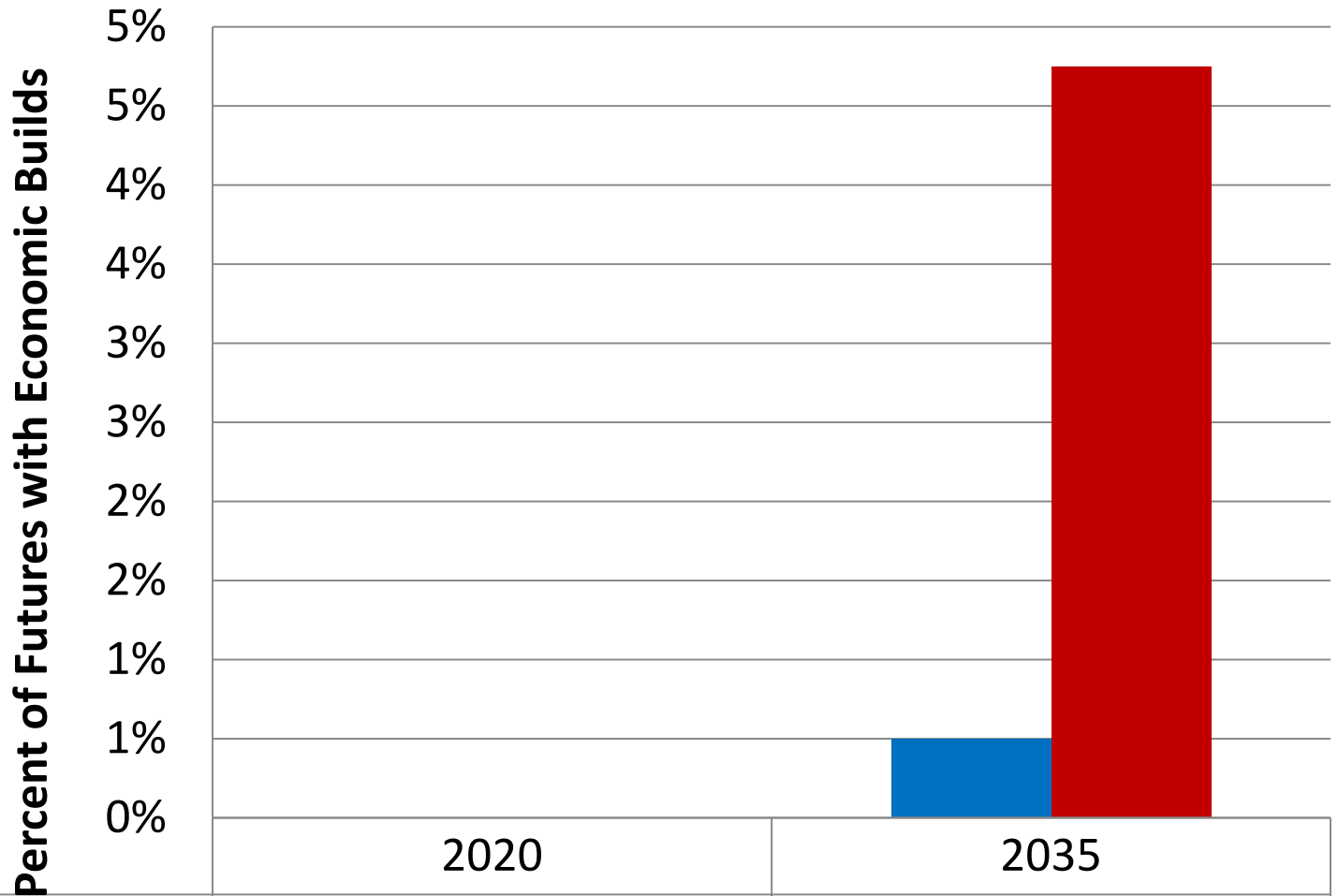
# Winter Peaking Capacity of New Resources - Least Cost Strategy Scenario 1A



# Winter Peaking Capacity of New Resources - Least Cost Strategy Scenario 1B



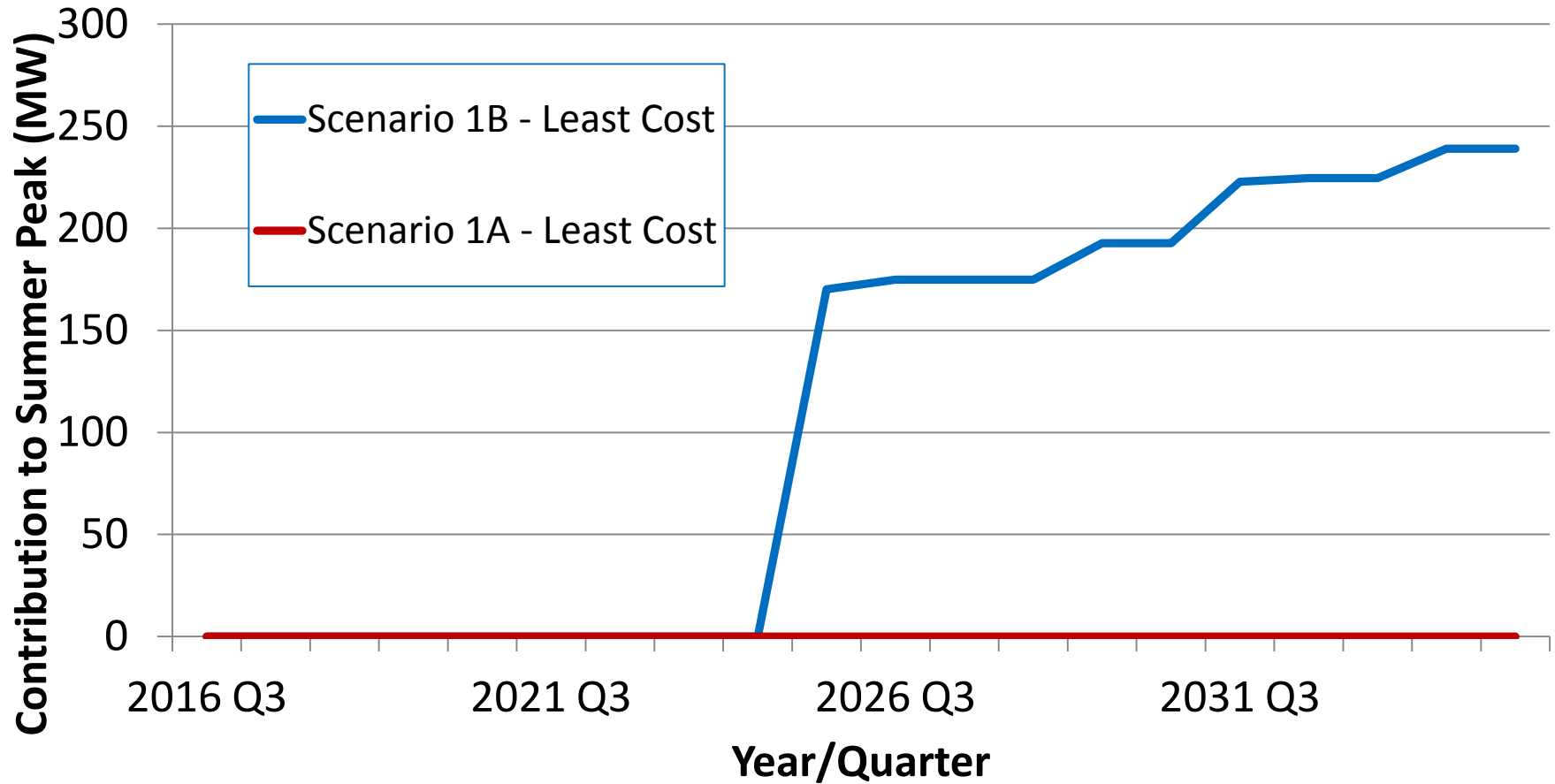
# Economic Builds by Scenario



■ Least Cost Scenario 1B	0%	1%
■ Least Cost Scenario 2C	0%	5%

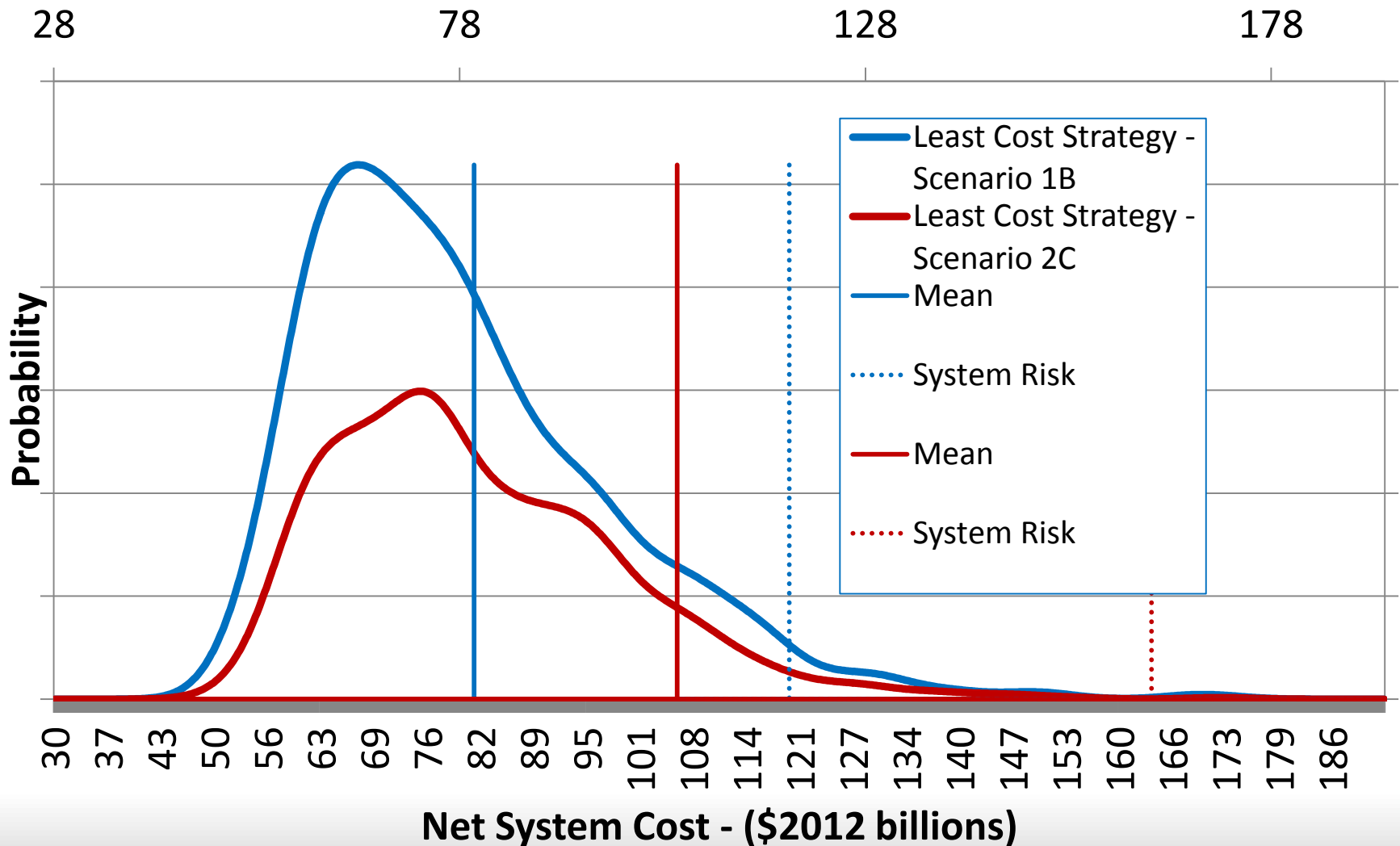
# Average Cumulative Thermal Generation – Summer Peak

## Scenarios 1A and 1B

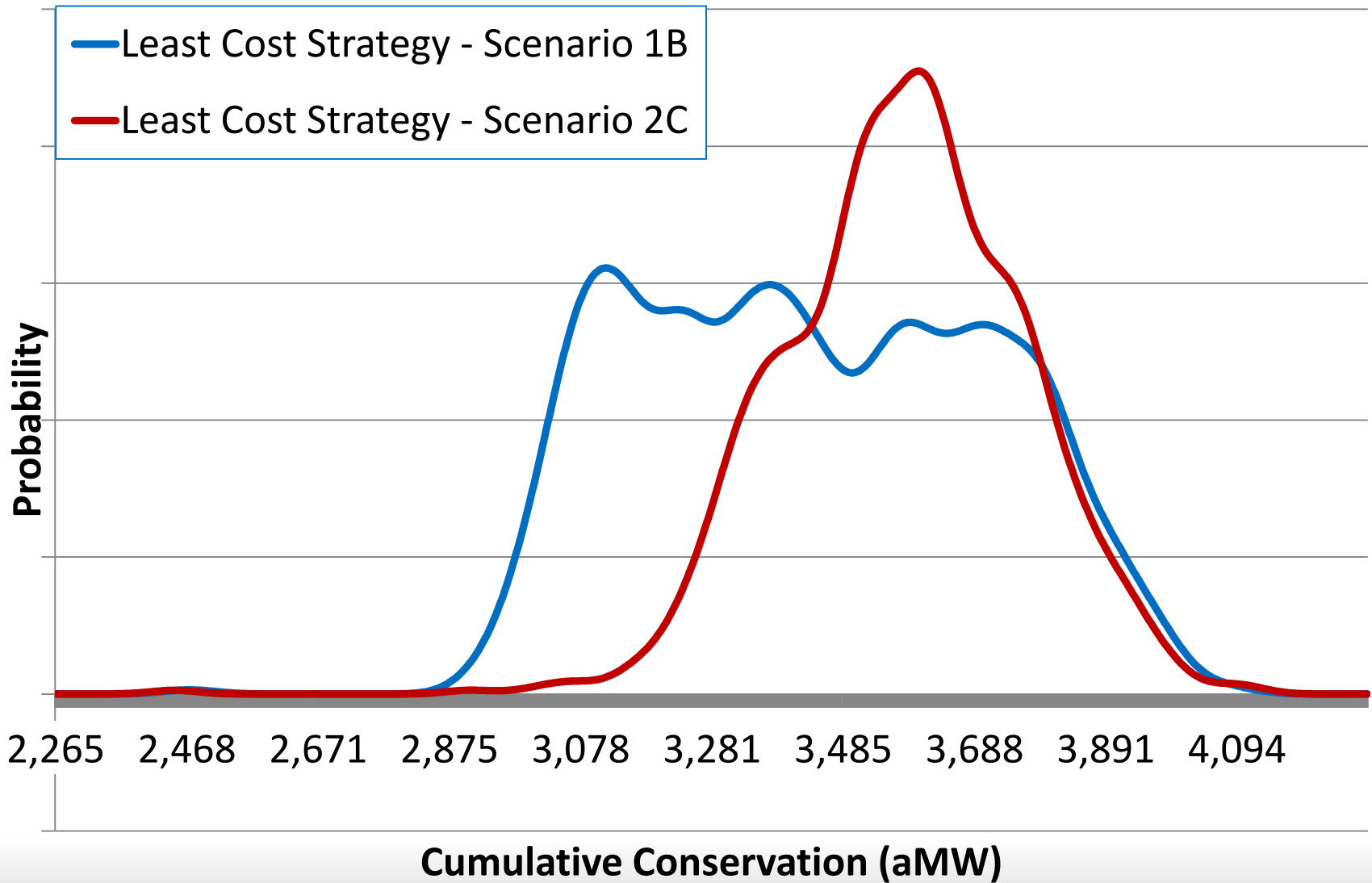




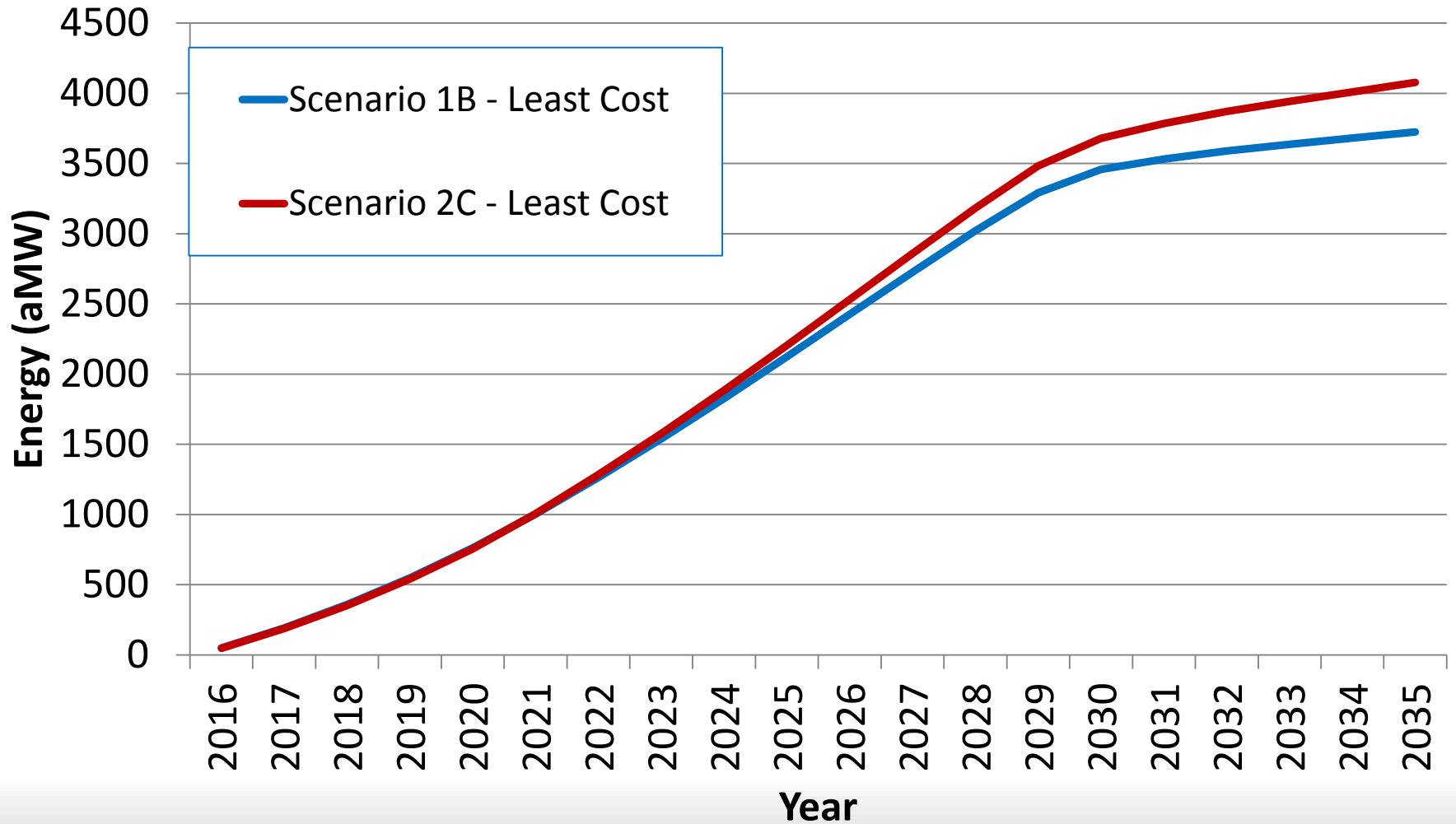
# Distribution of Net System Cost for Least Cost Resource Strategy in Scenarios 1B and 2C



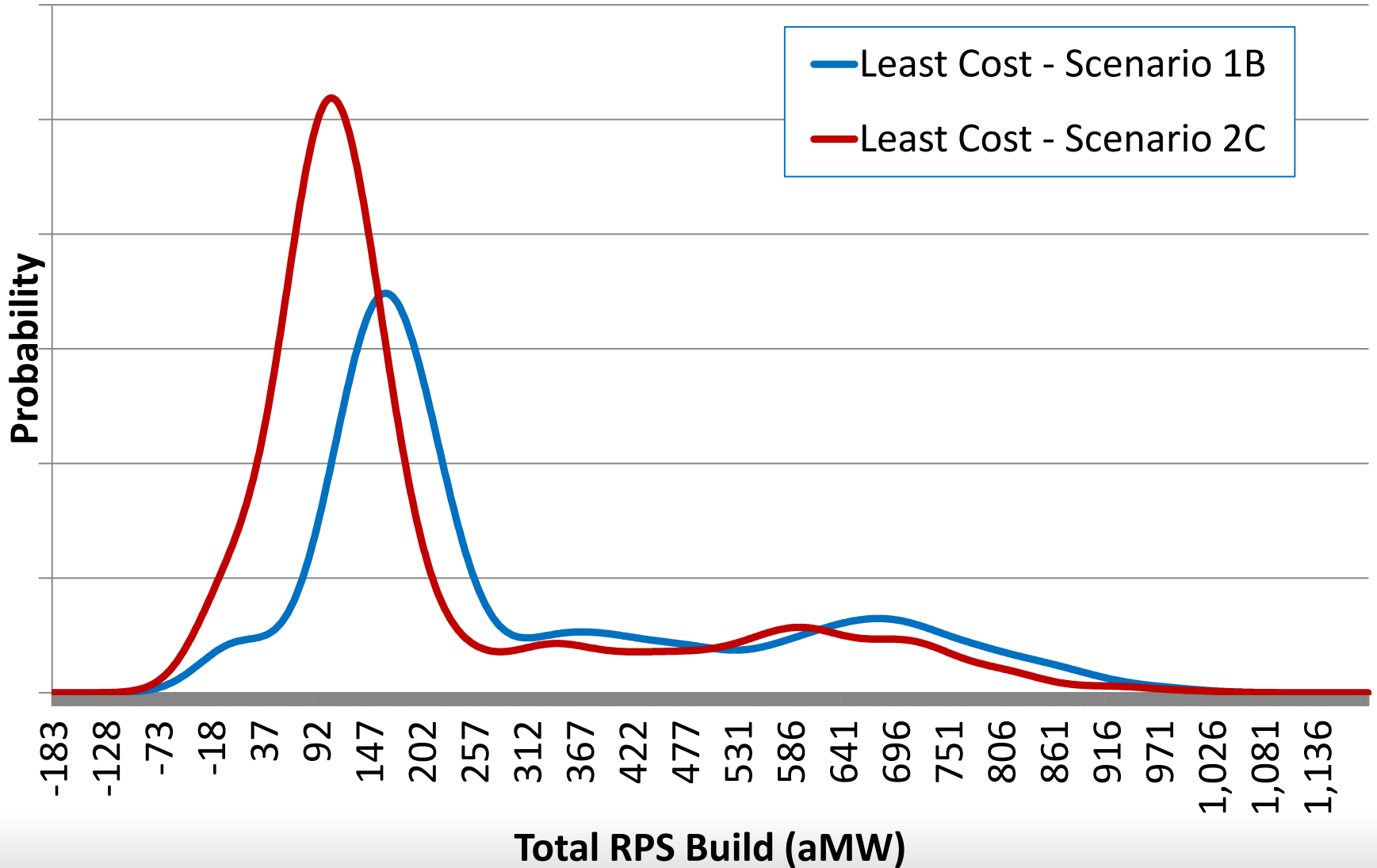
# Distribution of Cumulative Conservation Builds - 2035



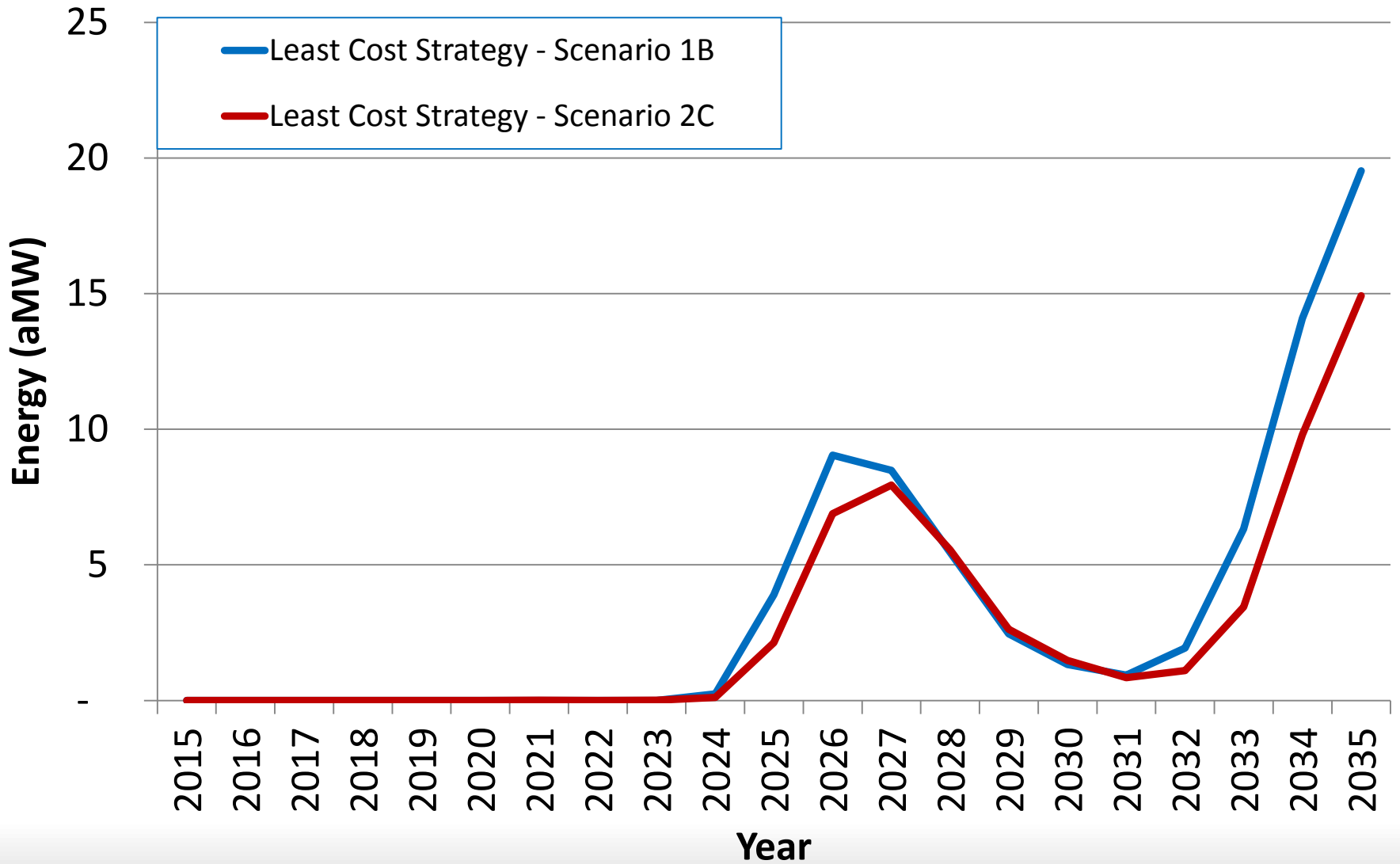
# Average Cumulative Conservation Build – Energy



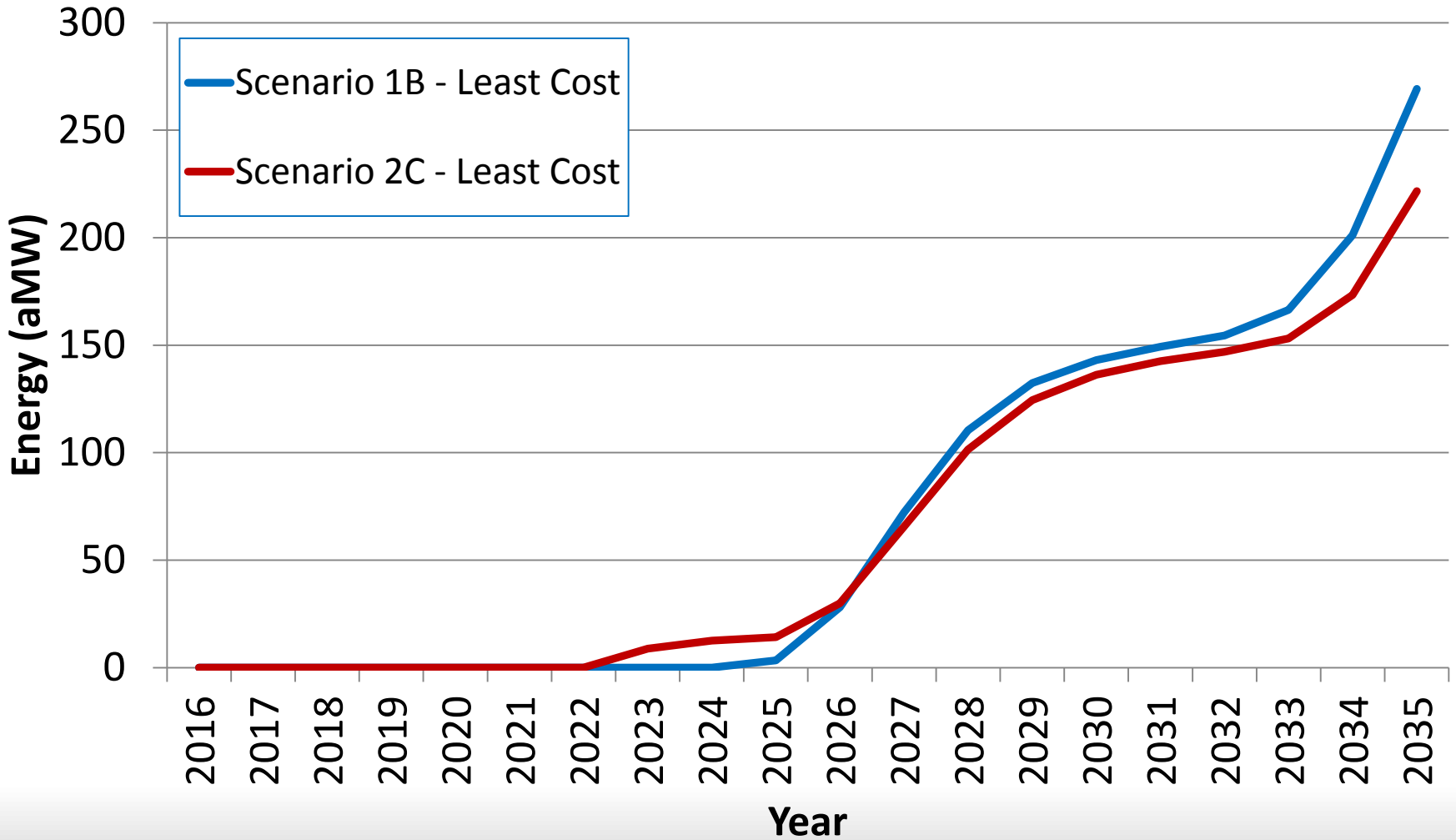
# Distribution of Total RPS Resource Builds - 2035



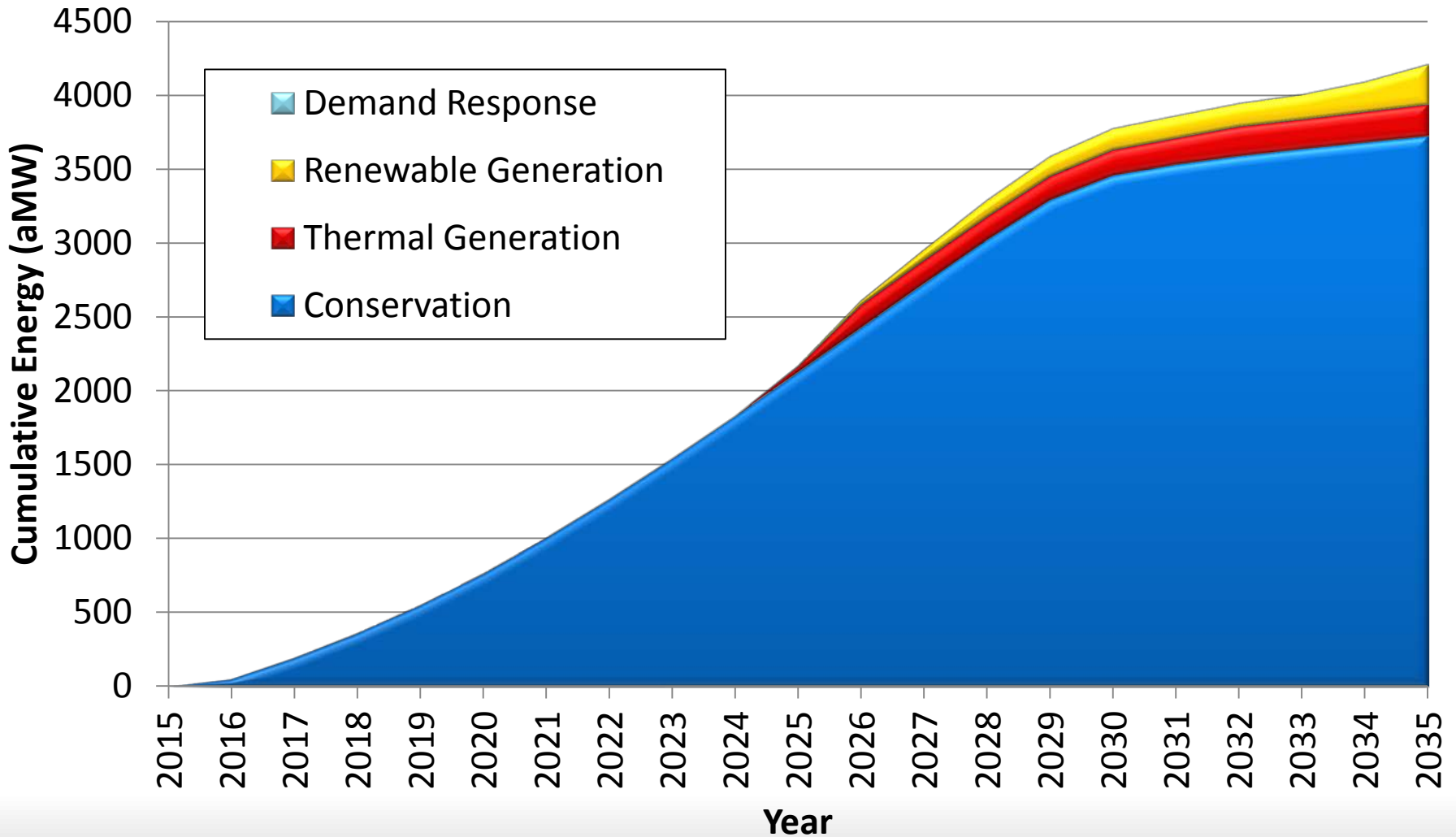
# Average Annual RPS Resource Additions



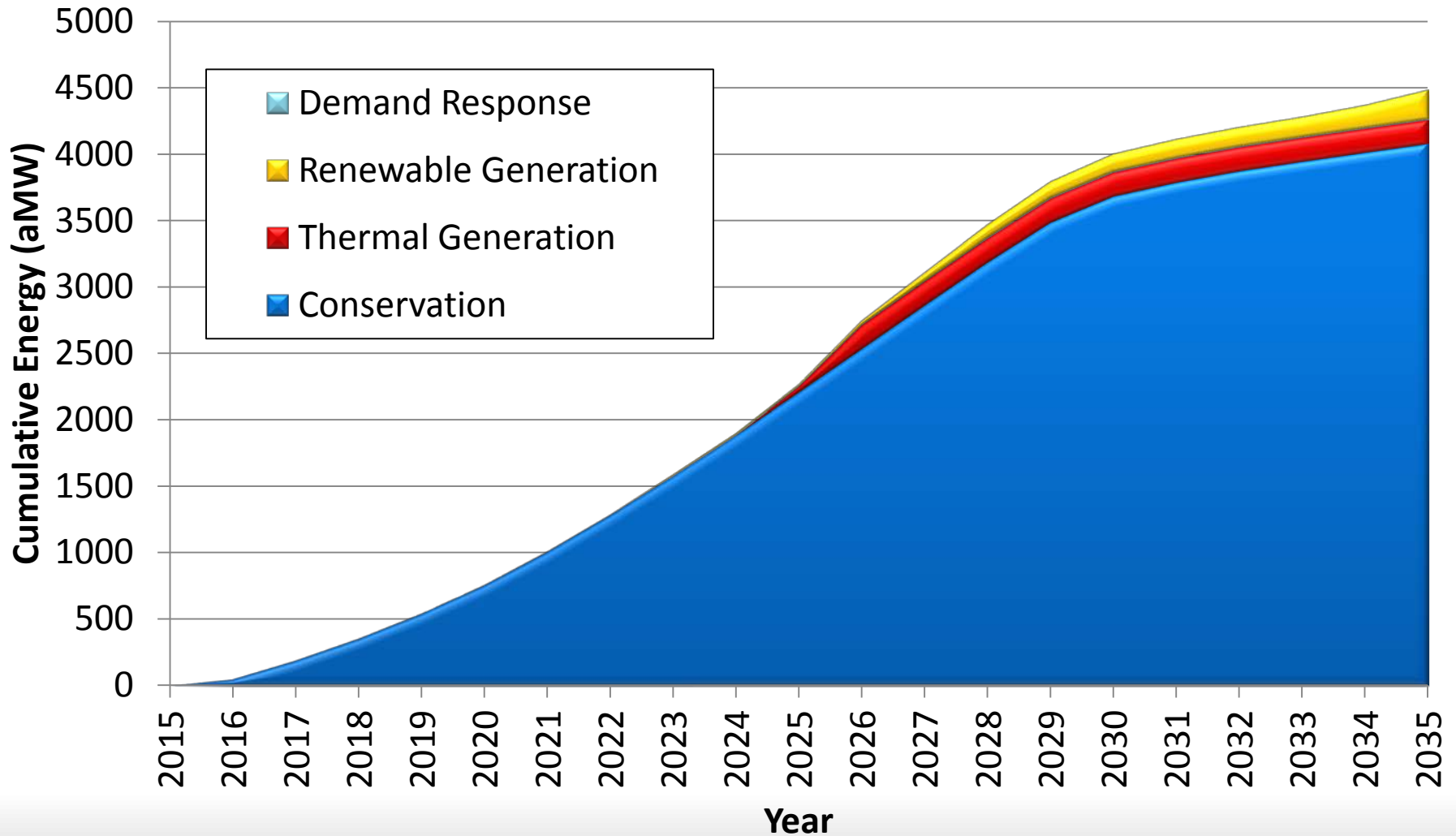
# Average Cumulative RPS Resource Generation - Energy



# Average Cumulative Energy Generation of New Resources - Least Cost Strategy Scenario 1B

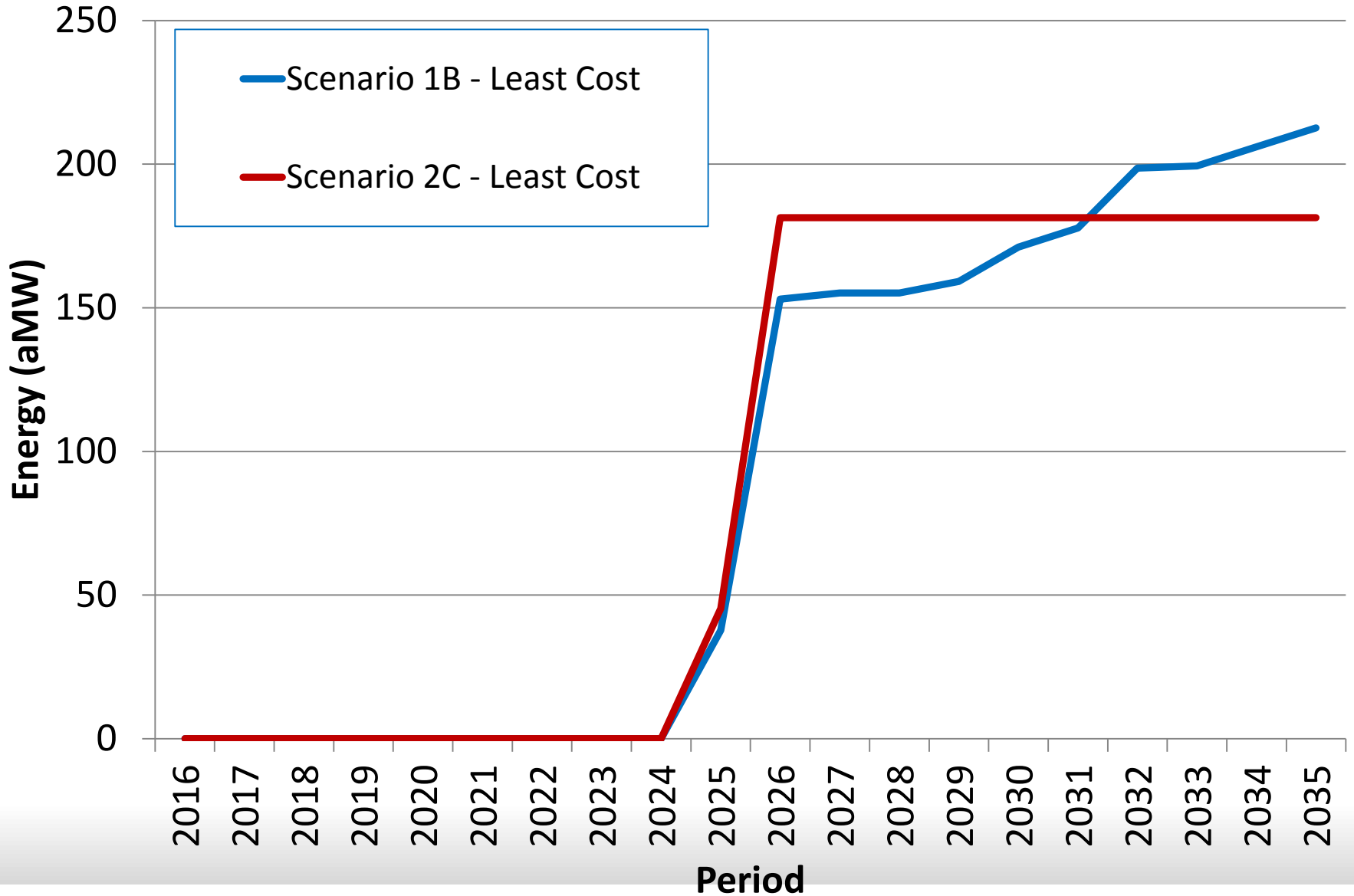


## Average Cumulative Energy of New Resources - Least Cost Strategy Scenario 2C

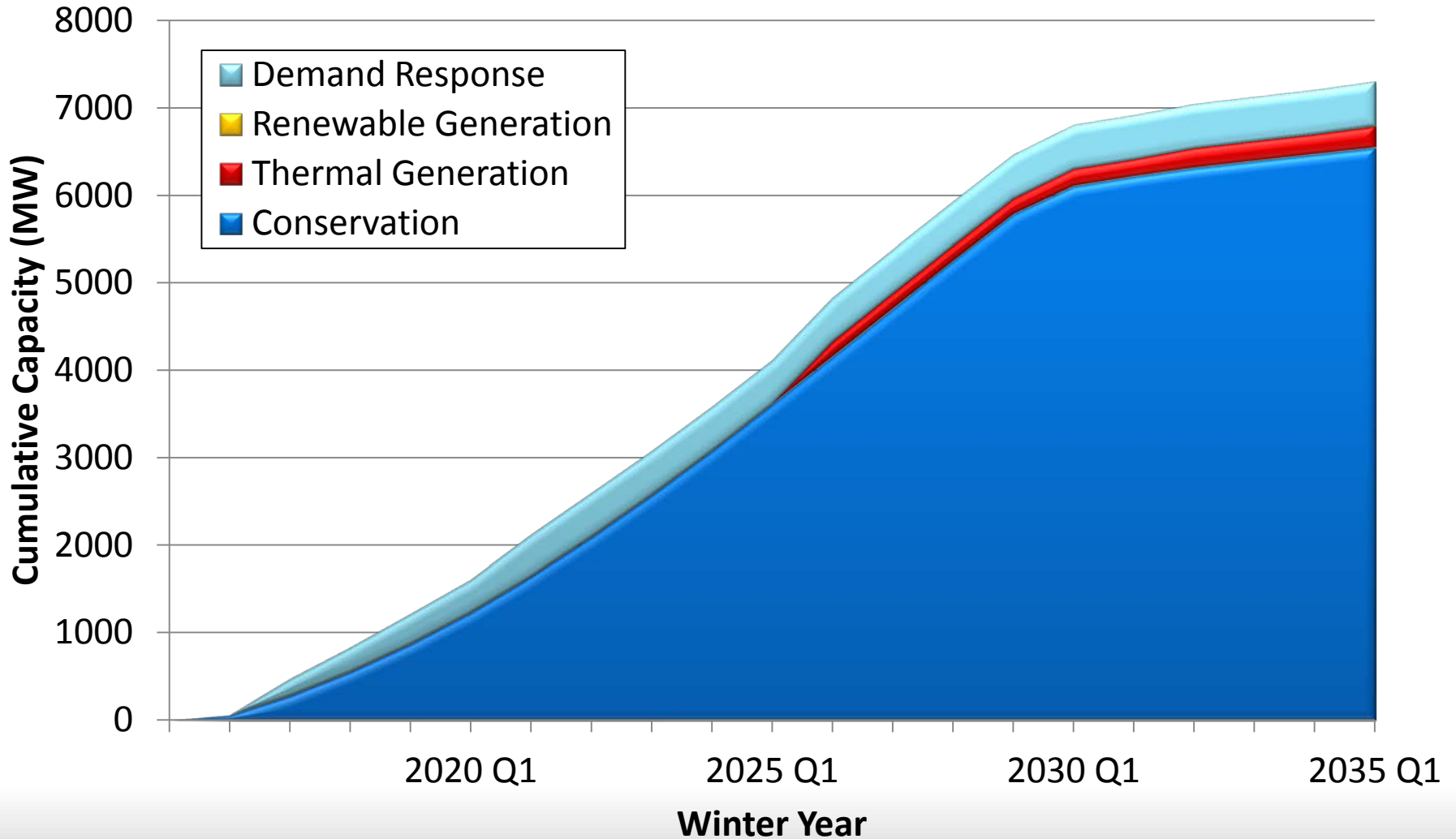




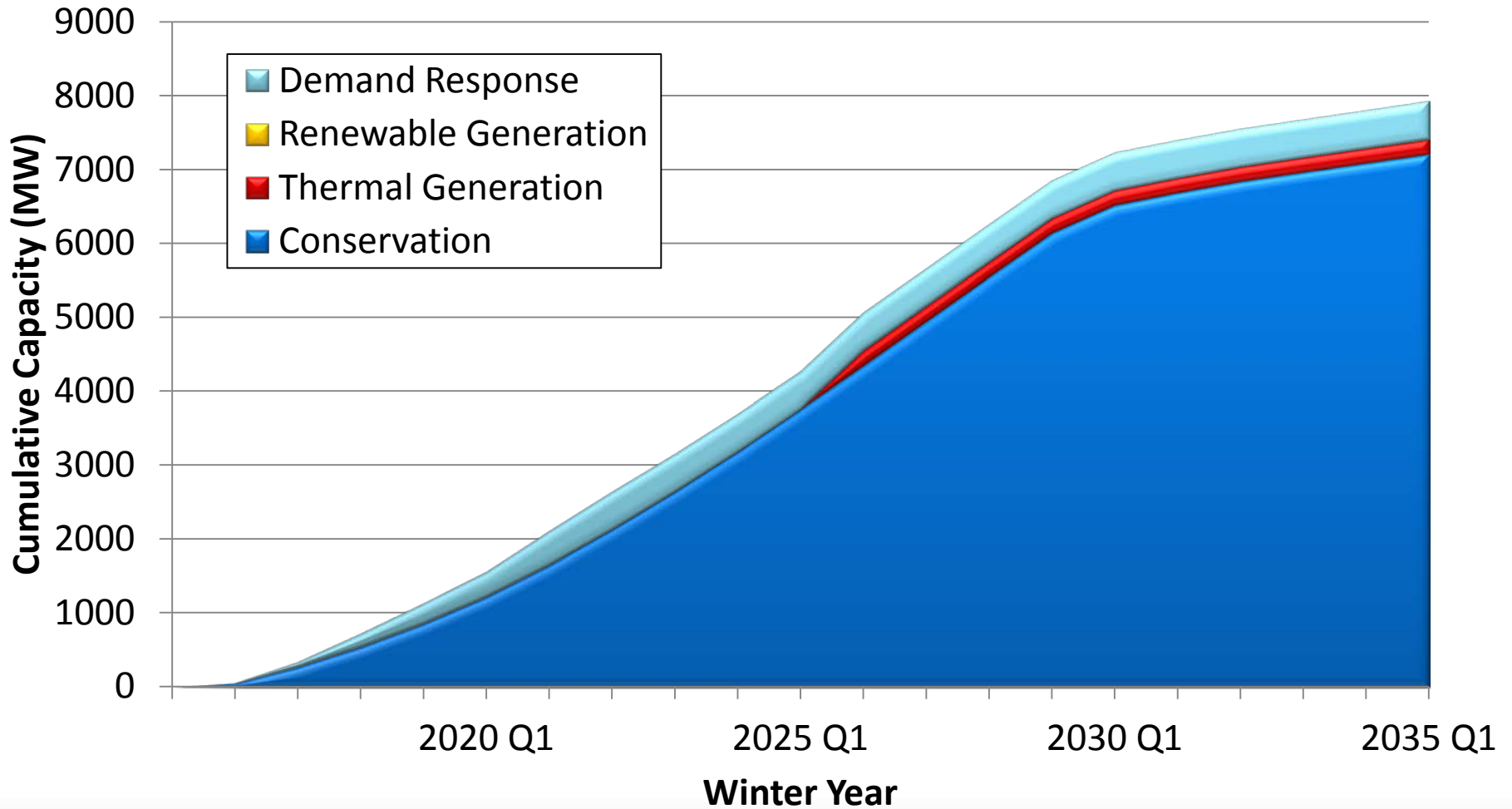
## Average Cumulative Thermal Generation



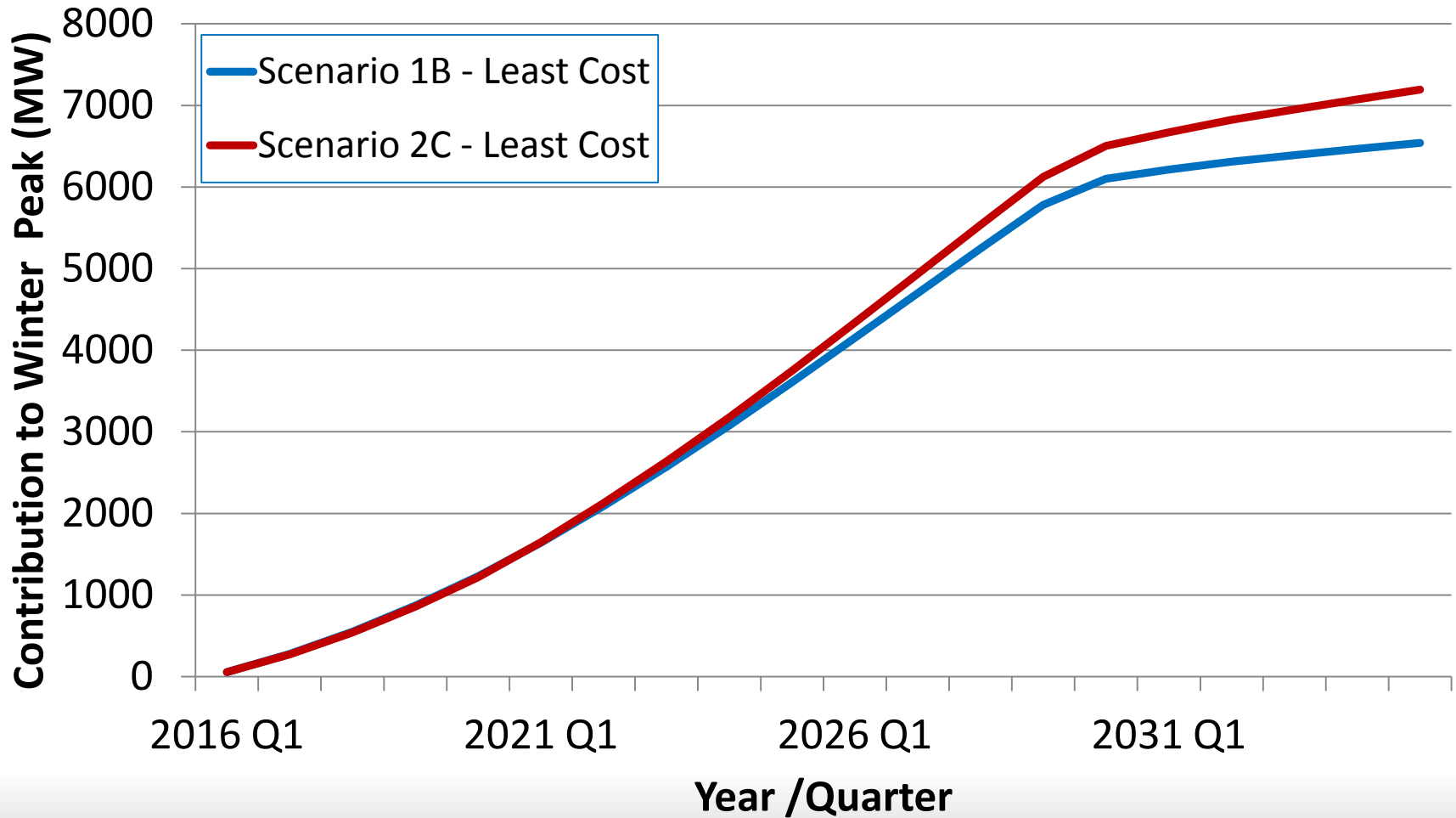
# Average Winter Peaking Capacity of New Resources - Least Cost Strategy Scenario 1B



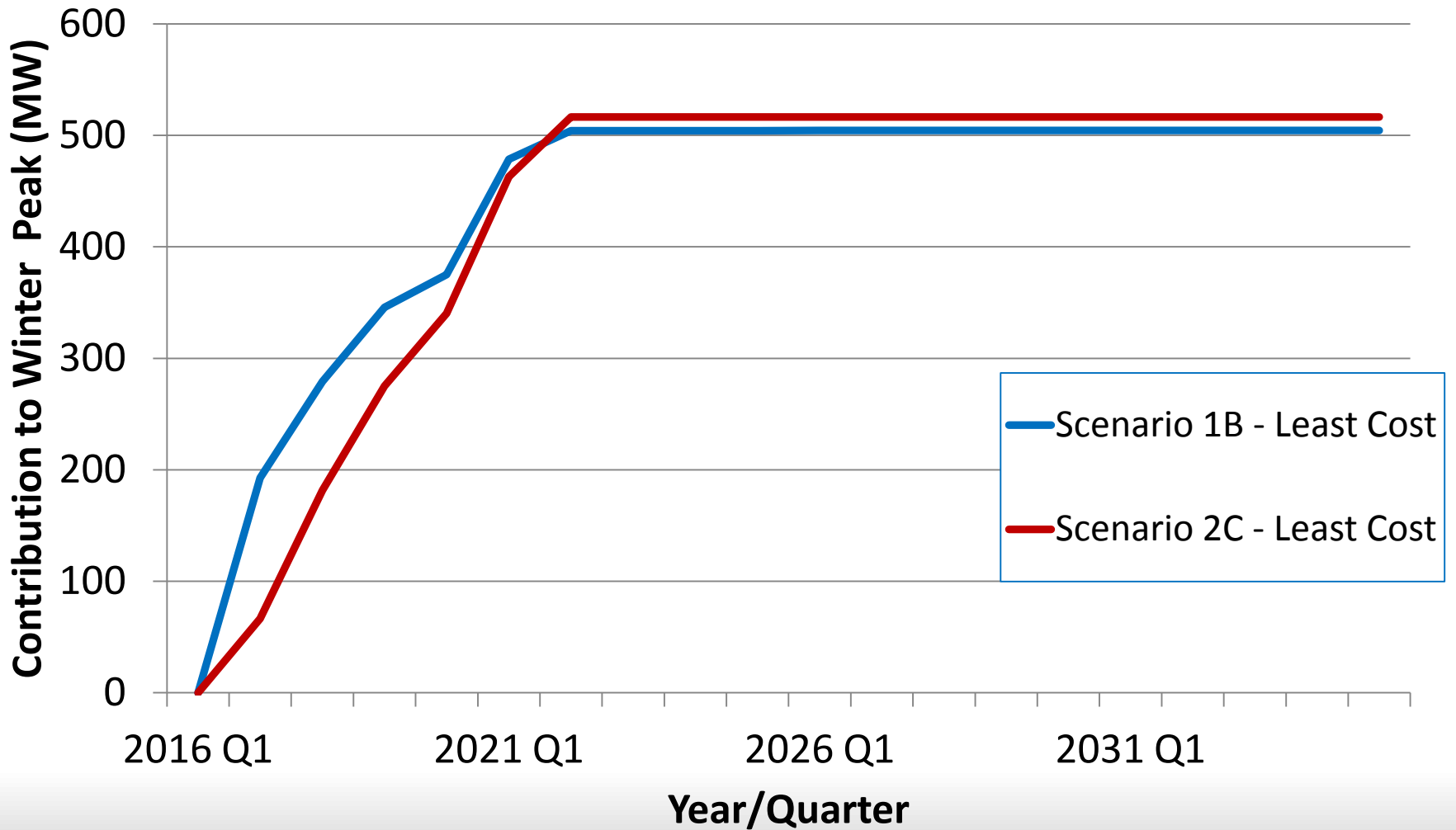
# Average Winter Peaking Capacity of New Resources - Least Cost Strategy Scenario 2C



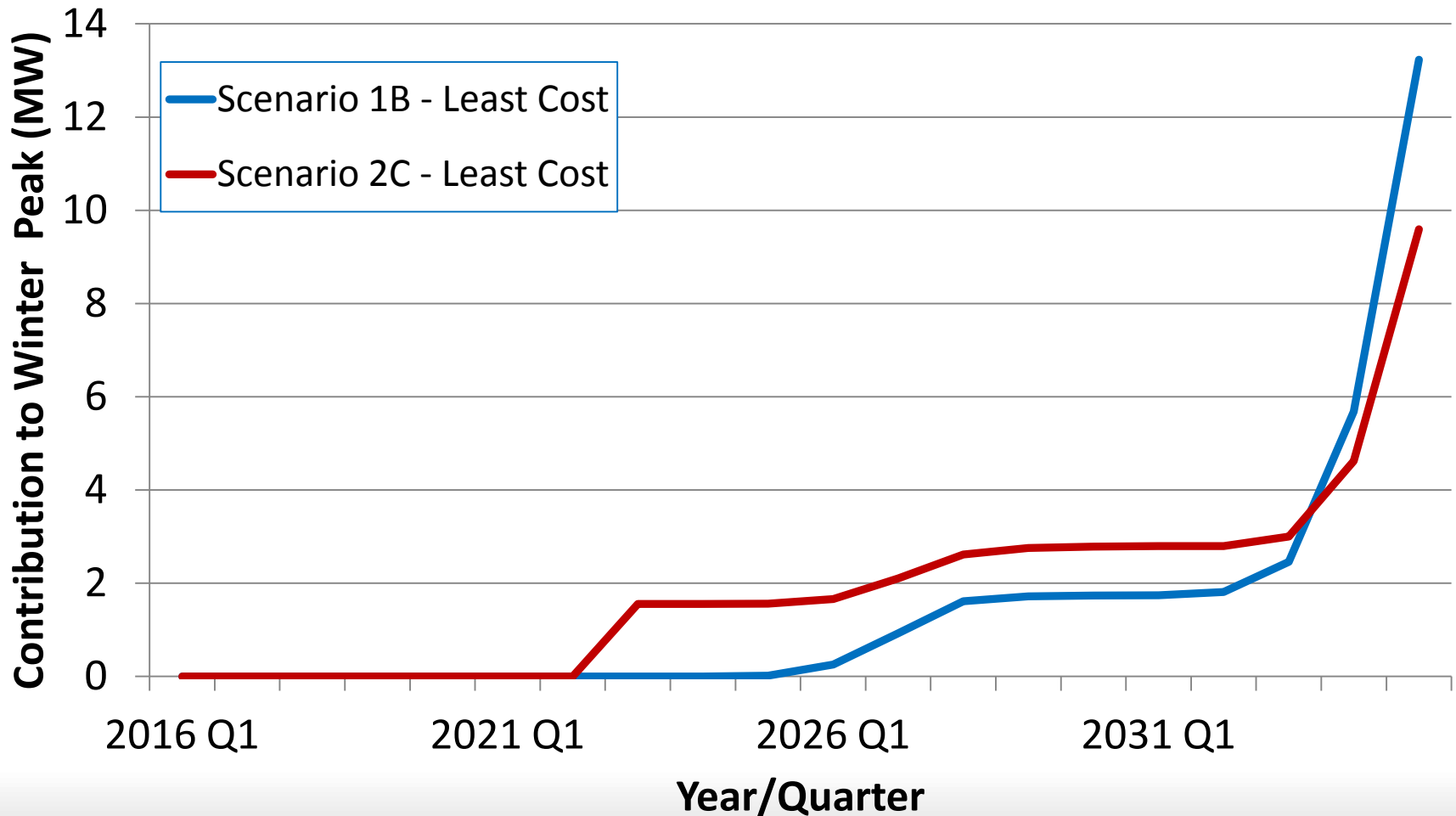
# Average Cumulative Conservation – Winter Peak Capacity



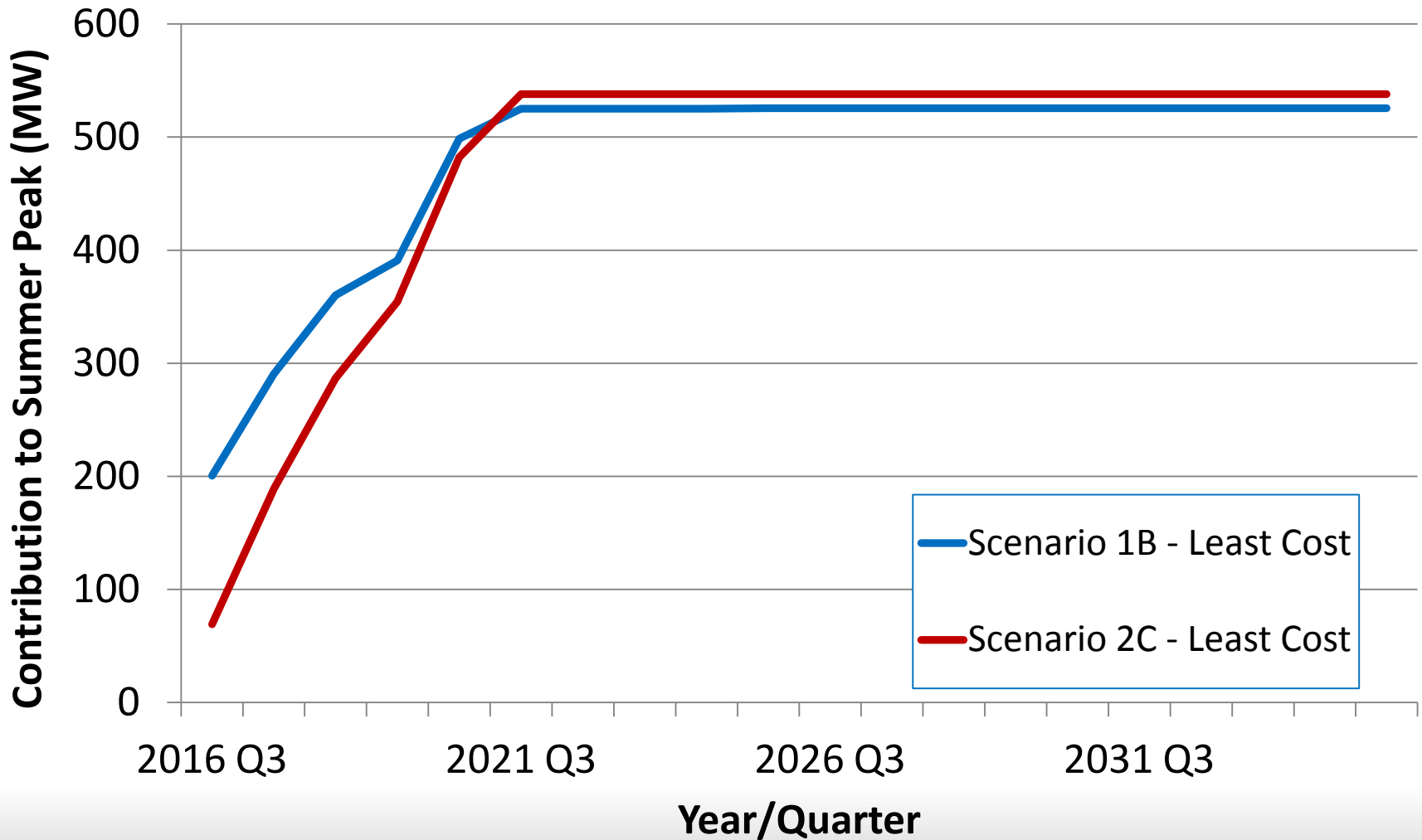
# Average Cumulative Demand Response – Winter Peak



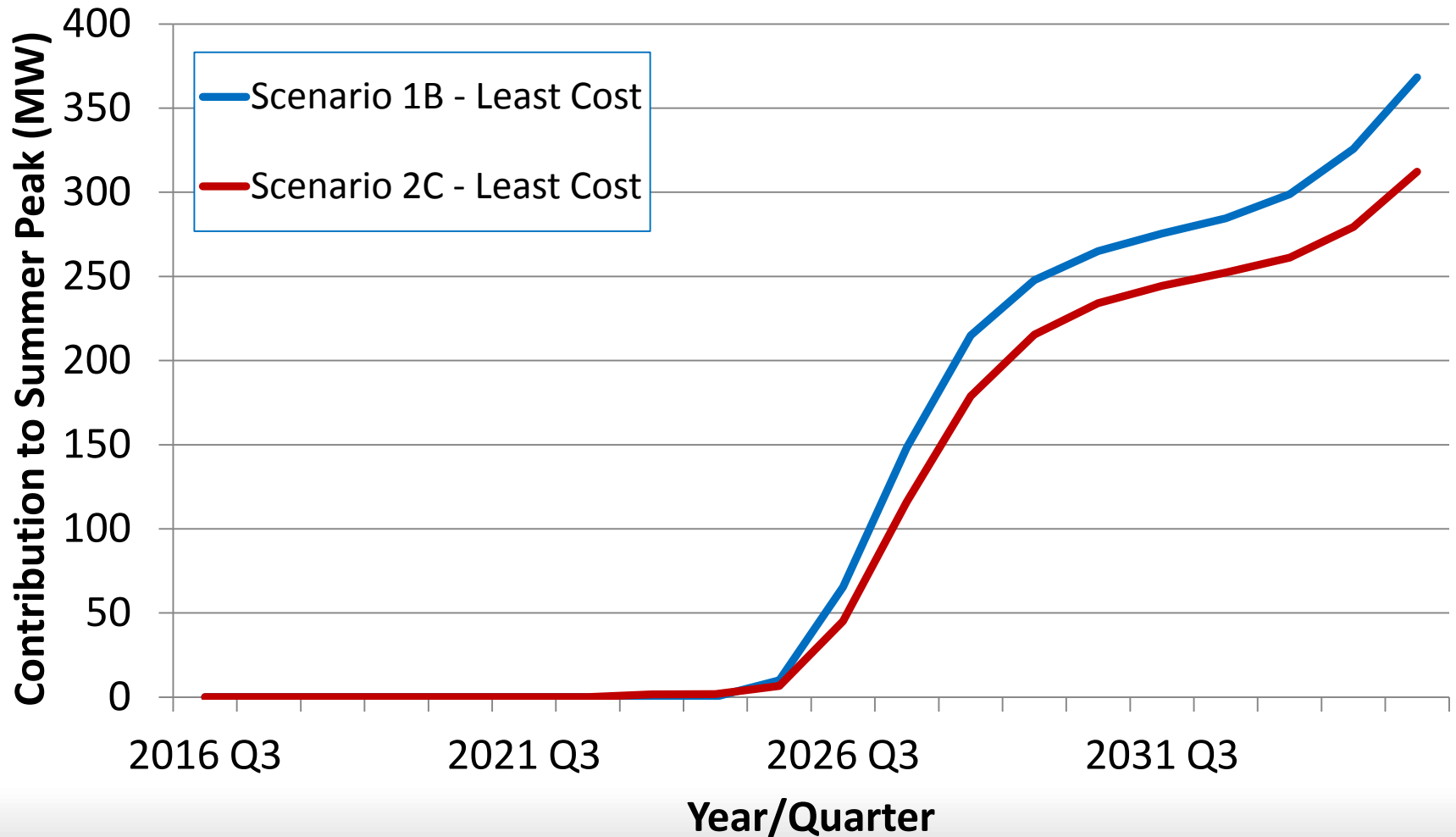
# Average Cumulative RPS Generation – Winter Peak



# Average Cumulative Demand Response – Summer Peak

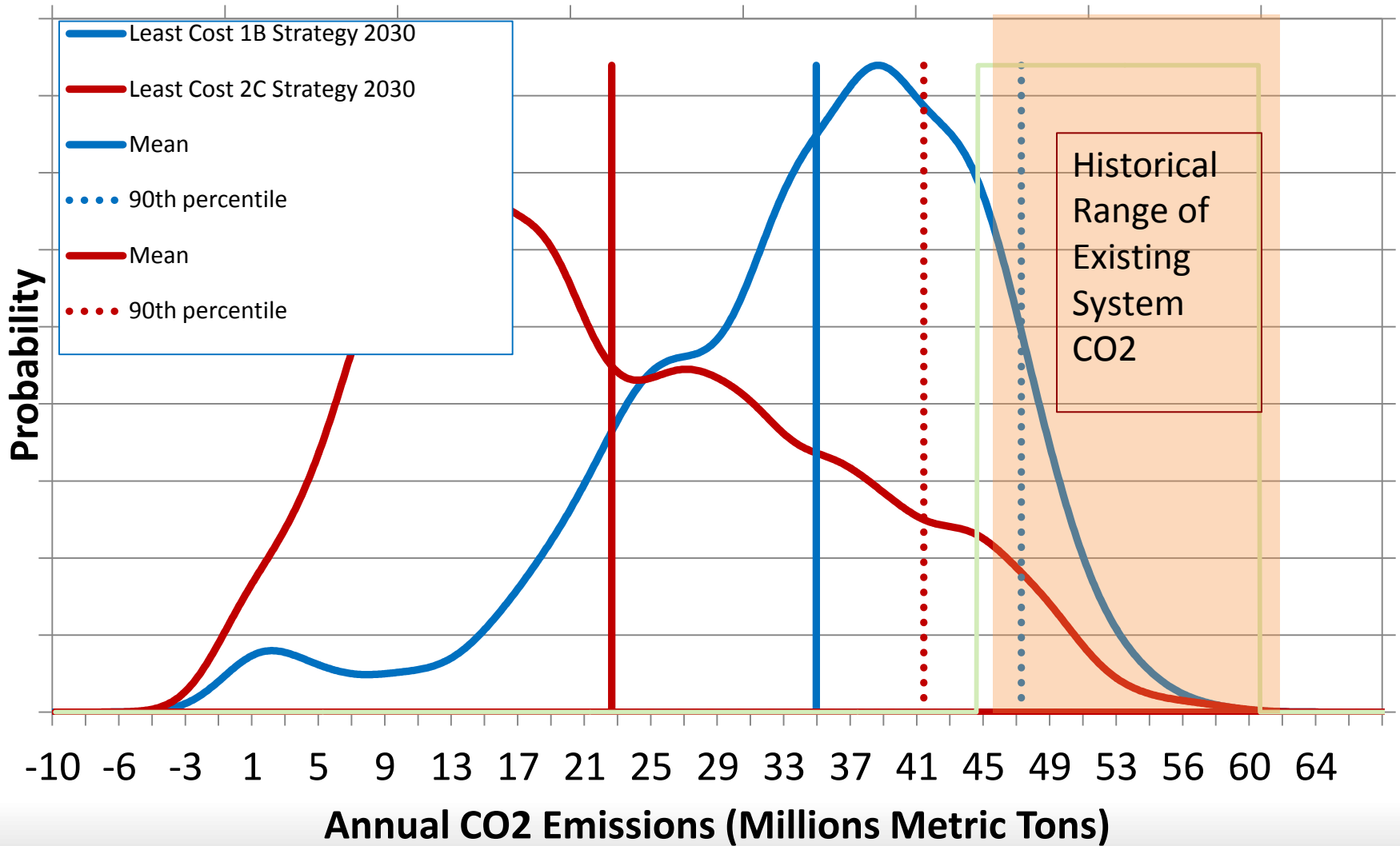


# Average Cumulative Renewable Generation – Summer Peak

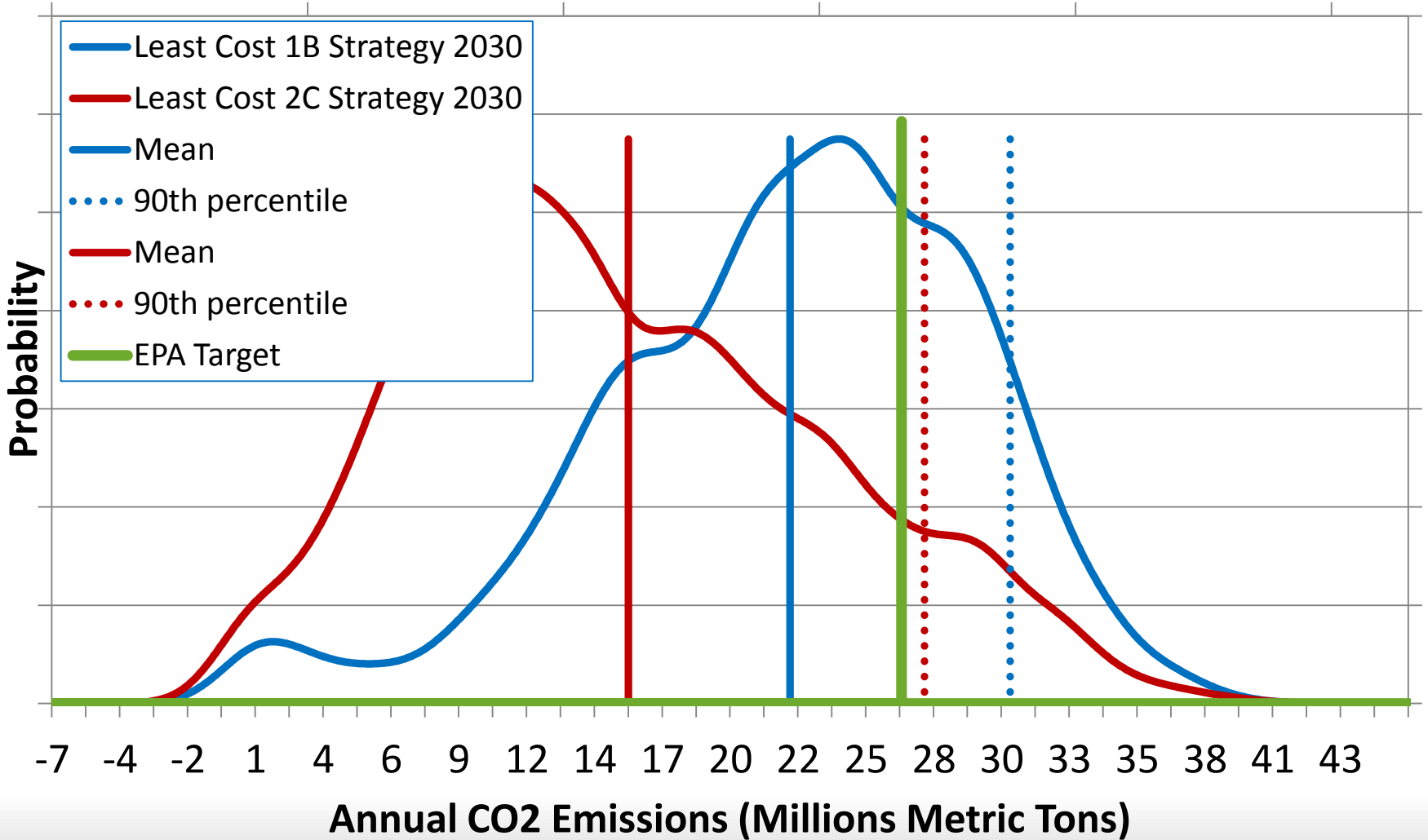




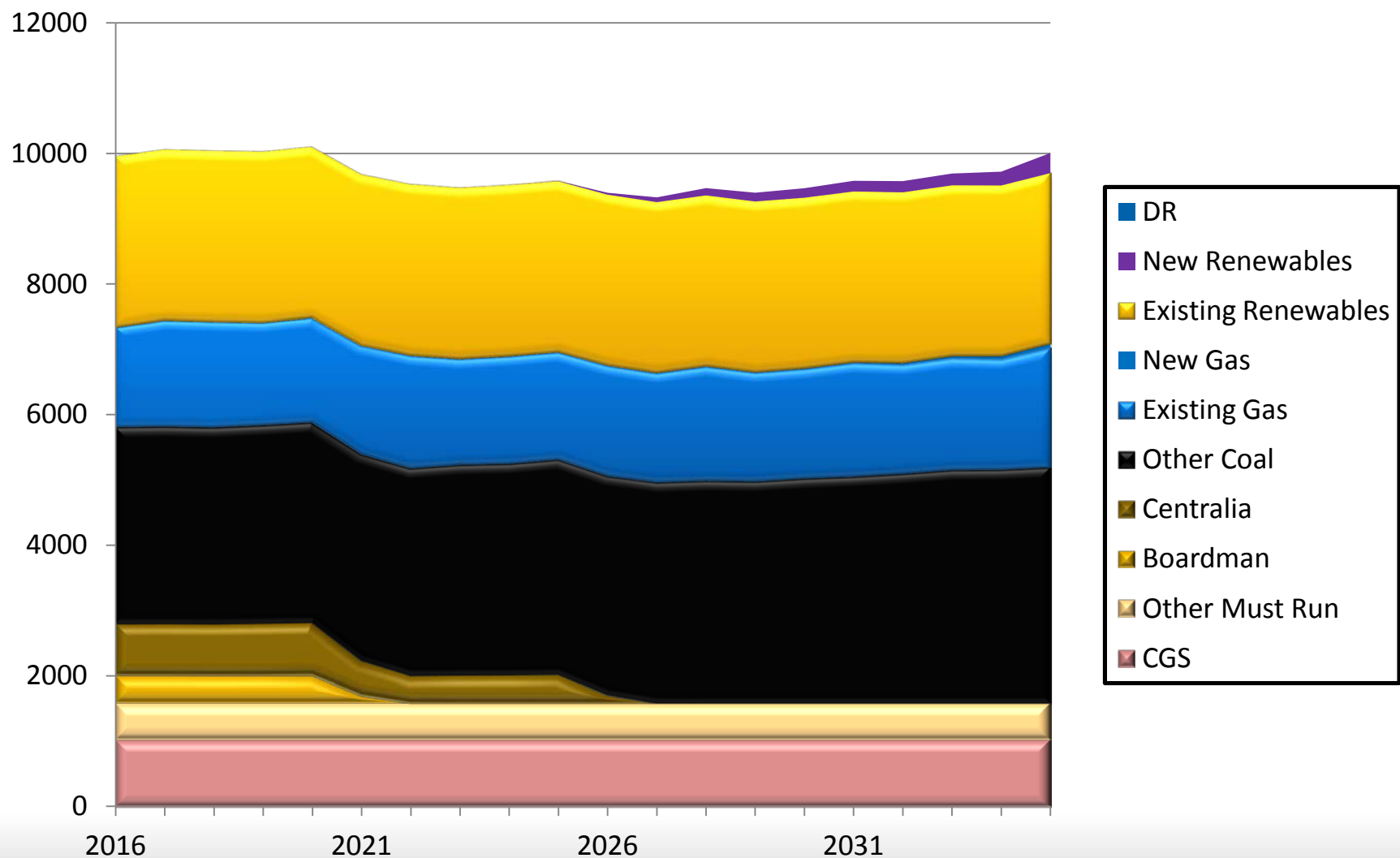
# Total Regional Power System CO2 Emissions - 2030



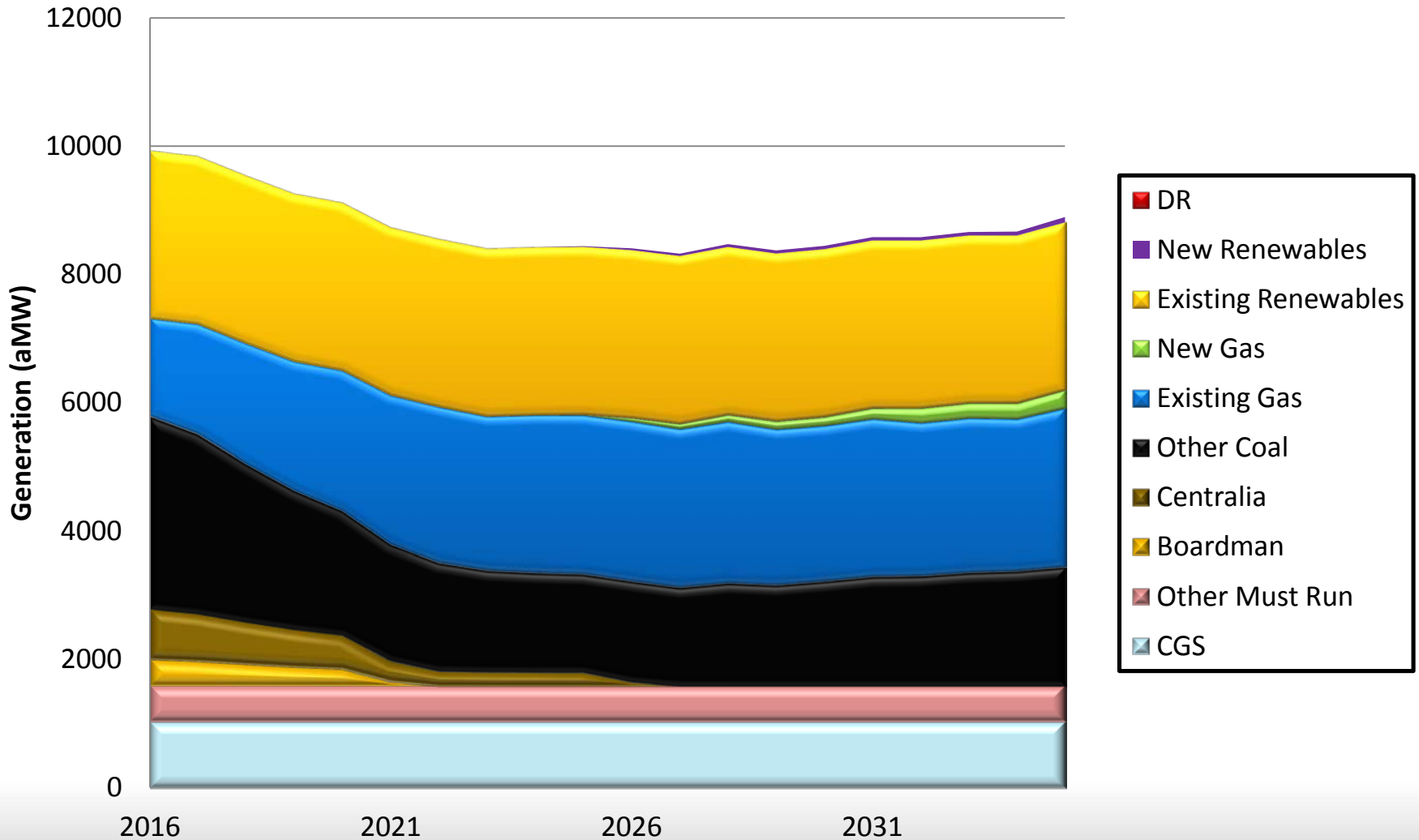
# CO2 Emissions for In-Region Resources Affected by EPA's Proposed Clean Power Plan 111(d) Regulation - 2030



# Thermal Resource Dispatch without Carbon Risk



# Thermal Resource Dispatch with Carbon Risk



Scenario	Scenario Name	Priority	Modeling Effort	DRAFT Schedule
1B	Existing Policy with Uncertainty, w/o GHG reduction risk	1	Med	April
1A	Existing Policy without Uncertainty, w/o GHG reduction risk	2	Med	April
2C	Existing Policy with Uncertainty and with uncertain GHG reduction risk/target.	3	Low	April
2B	Existing Policy with Uncertainty and with certain GHG reduction risk/target. Example Policy Target = Mitigate to Estimated GHG Damage Cost	4	Low	Early May
4C	Major Resource Uncertainty – Faster Pace of Conservation Deployment	5	Low	Early May
4D	Major Resource Uncertainty – Slower Pace of Conservation Deployment	6	Low	Early May
2A	Existing Policy with Uncertainty and with certain GHG reduction risk/target. Example Policy Target = Clean Power Plan/Clean Air Act 111(d) goal (e.g., 30% below 2005 level by 2030)	7	Med	Late May
3A	Lowering carbon emissions with current technology	8	Med	Late May
4A	Major Resource Uncertainty - Unexpected Loss of Major Resource (e.g., CGS Forced Retirement)	9	Med/High	Late May
4B	Major Resource Uncertainty Anticipated Loss of Major Resource(s) (e.g., Snake River Dam Removal,)	10	Low	Late May
3B	Lowering carbon emissions with emerging technology (e.g., storage, CO <sub>2</sub> heat pumps, SSL)	11	High	Not Modeled
5A	Integration of Variable Resources (i.e., Managing the NW Impact of the "Duck Curve"/50% CA RPS)	12	Med/High	Early June
6A	Climate Change Load Impacts Resulting from Direct Effects of Climate Change	13	Low	Early June
6B	Climate Change Hydro Impacts	14	High	Early June
5B	Southwest Market Liquidity Variability	15	Low	Early June