Northwestern Energy Stakeholder Working Group Meeting # 3
2026 MT IRP Planning Cycle

November 10th, 2025

Agenda

Agenda

Introduction/Welcome (30 min)

- News Topic Discussion(s)

Updated IRP Schedule (45 min)

- IRP Progress Towards Draft Release
- Stakeholder Working Group Draft Review Timeline
- Public Sessions

Updates Since last meeting (30 min)

- Base Case Updates
- NWE Merger

Lunch (60 min)

PowerSIMM Finalized ARS Results (80 min)

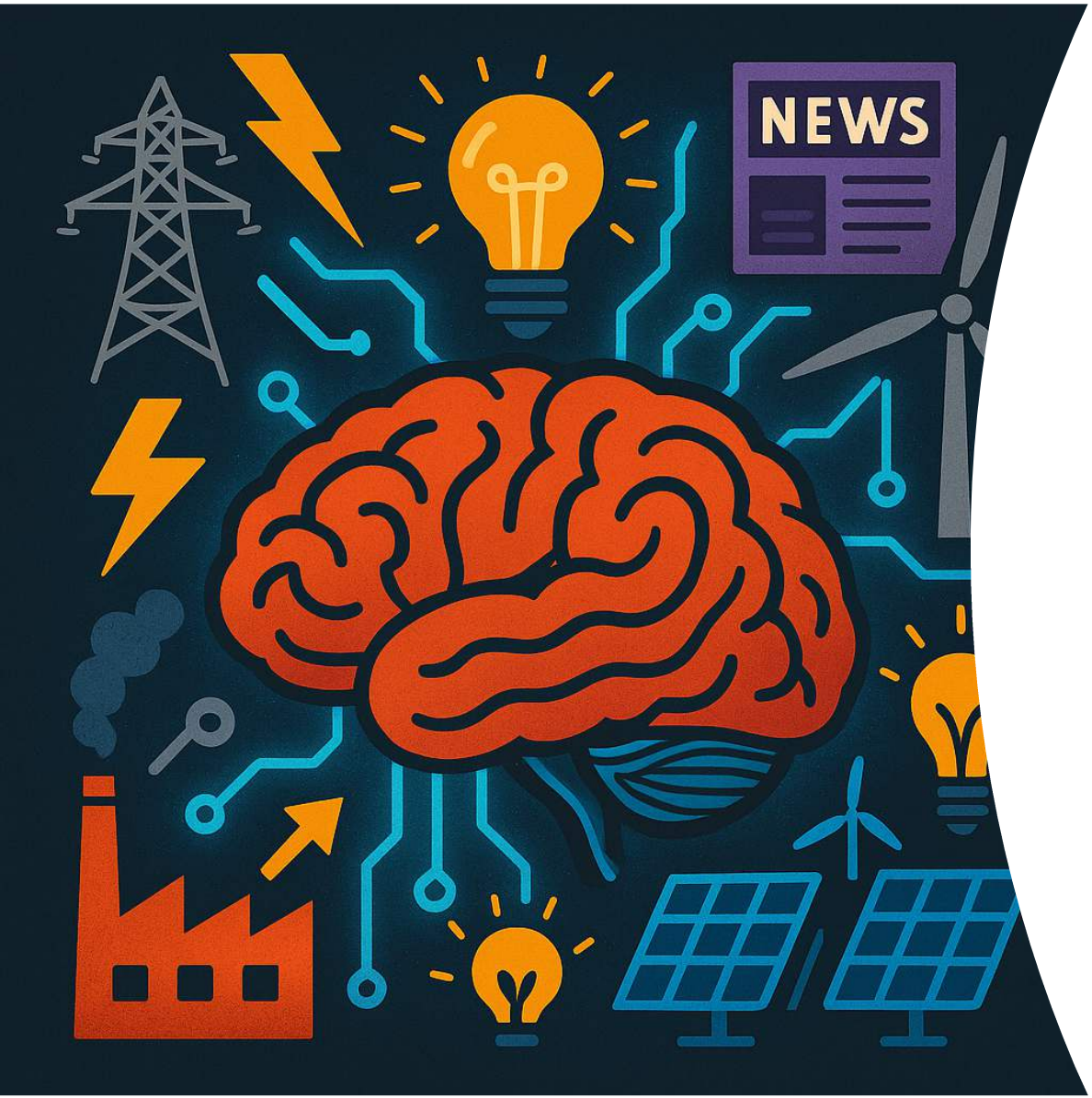
- Review and Discussion of Finalized Results

PowerSIMM PCM Preliminary Results (80 min)

- Review and Discussion of Preliminary Results

Questions/Concerns (10 min)

Introduction



News Topics
(Warm up those brains)

- **October 2025 Publications:**
- Factors Influencing Recent Trends in Retail Electricity Prices in the United States (2 slides)
- China's primary energy through 2060 (2 slides)
- NorthWest Power Conservation Council – 2031 Needs Assessment (2 slides)

"Secure Energy enables Human Flourishing"
– Scott Tinker

Factors Influencing Recent Trends in Retail Electricity Prices in the United States (Slide 1)

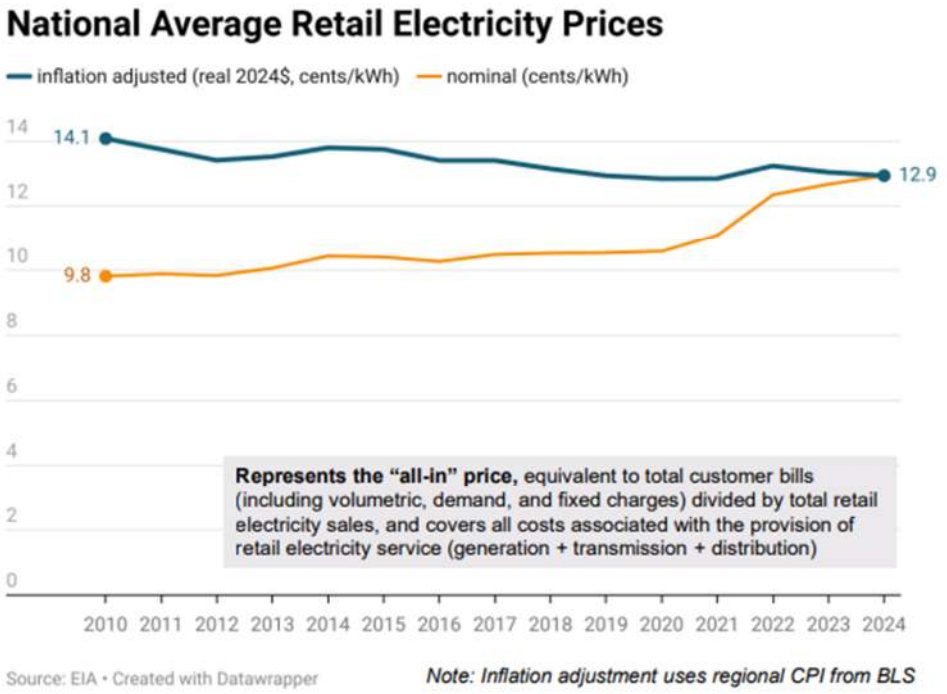
In nominal (not inflation adjusted) terms, the average retail electricity price **increased by 23% from 2019 to 2024** and 32% since 2010

When adjusted for inflation, **real prices in 2024 were the same as 2019** and **8% lower than 2010**

Electricity prices spiked in 2022 at the onset of the Russia-Ukraine war, following natural gas prices

Bottom line: real prices have declined since 2010; more-recent *national* price escalation tracks overall inflation, but, as per later slides, is outpacing inflation in some states

Reminder: Primary focus here and elsewhere is on overall average prices (not just residential)



https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf

Factors Influencing Recent Trends in Retail Electricity Prices in the United States (Slide 2)

8

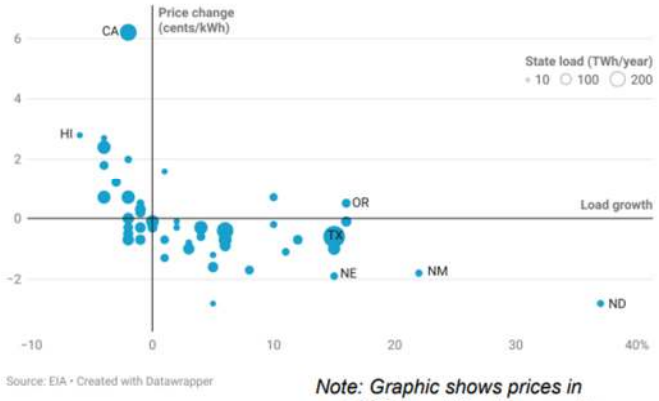
Load growth at the state level has tended to depress retail electricity prices in recent years, by spreading fixed costs over greater load

- Forecasted load growth from data centers, manufacturing, and other drivers has created concerns that increasing load might place upward pressure on wholesale prices and T&D delivery infrastructure, and thus also retail electricity prices[1]
- Over the last 5 years, however, states with the highest growth saw average prices decline in inflation-adjusted terms (over 1 cent/kWh in some cases); states with load reduction / contraction often saw prices increase
- Statistical analysis by LBNL presented later confirms this finding, controlling for other variables
- Recent cost increases have not primarily been due to load growth[2]; it is therefore natural that load growth over this period tended to reduce prices as fixed costs are spread over more demand (and the reverse for load reductions)[3]
- Quotes from Georgia, California, Maine support concept of load growth potentially putting downward pressure on prices
- **Importantly, this relationship need not always exist**: a higher growth future can increase retail prices if new supply and delivery infrastructure is constrained and costly—as it currently appears to be in some or many states

Knowledge Gaps: Under what conditions does load growth increase vs. decrease prices; what is the future likelihood of those conditions?

Load Growth vs. Retail Price Changes from 2019 to 2024

Price change in cents/kWh, inflation adjusted to 2024$. Load growth in percentage terms from 2019 to 2024.

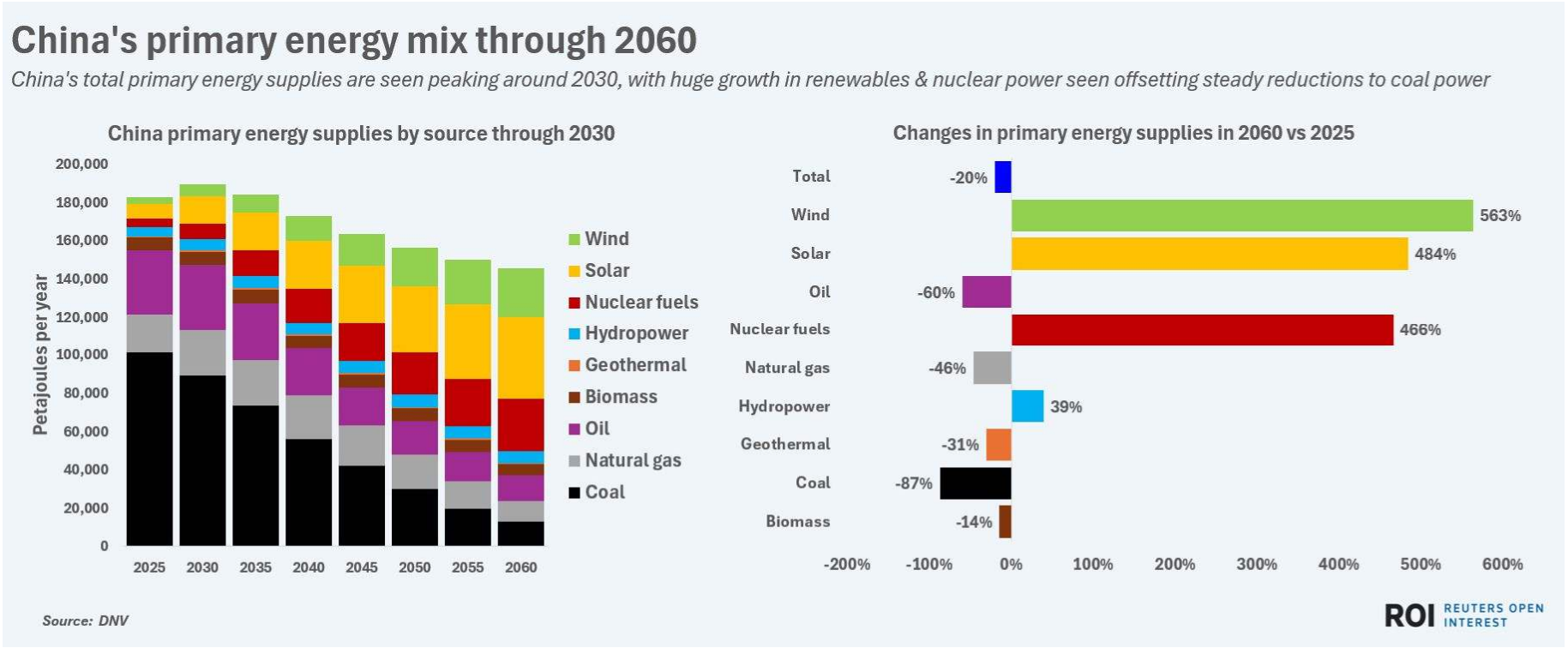


Note: Graphic shows prices in real 2024$; relationships are the same if shown in nominal terms

[1] e.g., Chandramowli et al. (2024), EIA (2025)
[2] Forrester et al. (2024) [3] Fares and King (2017)

https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf

China’s Primary Energy through 2060

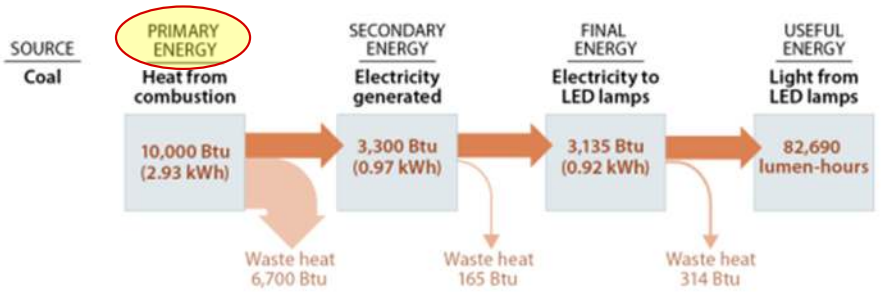


https://www.reuters.com/business/energy/charting-chinas-evolving-primary-energy-mix-through-2060-2025-10-28/

Discussion Items: What is primary energy supply mean? Is China’s energy load reducing in the future?

China's Primary Energy through 2060

The Energy Conversion Process

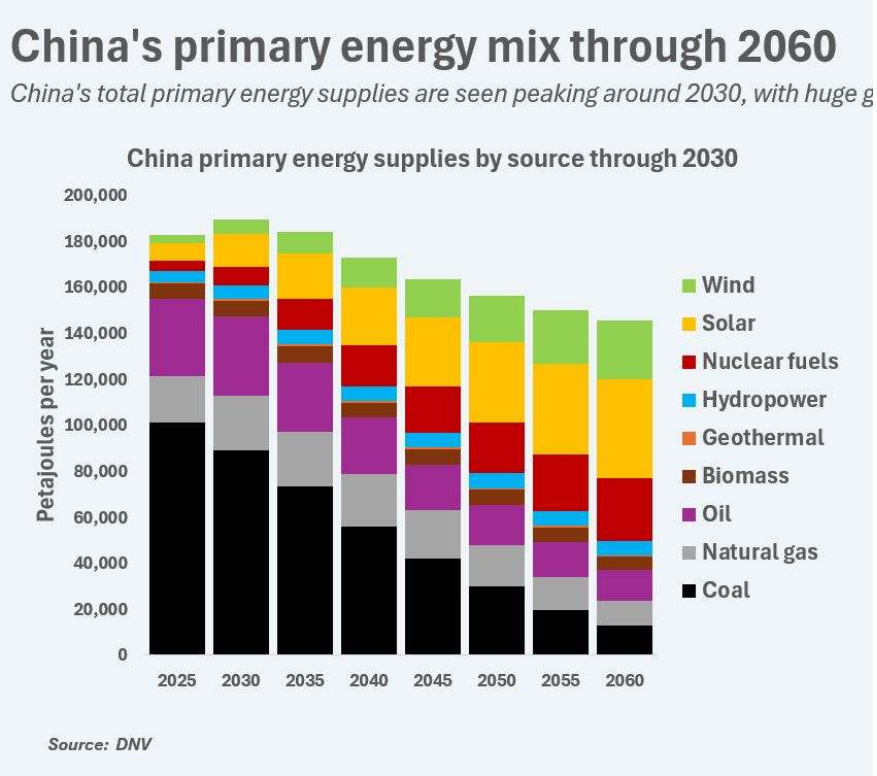


https://yaleclimateconnections.org/2022/10/energy-loss-is-single-biggest-component-of-todays-electricity-system/

Solar/Wind/Hydro – Primary Energy – No losses[1]

1. https://iea.imgix.net/5cccd422-95fb-455f-b20d-708eac190b99/170901CommentaryEnergyBalancesSankey.png?auto=compress%2Cformat&fit=min&q=80&rect=0%2C0%2C1920%2C1080&w=965&fit=crop&fm=jpg&q=70&auto=format&h=543

China's Primary Energy through 2060



Based on the previous side:

- Why is the primary coal energy being reduced?
- Is this graph causing an amplified view of their energy transition?
- Is China closing down coal plants?

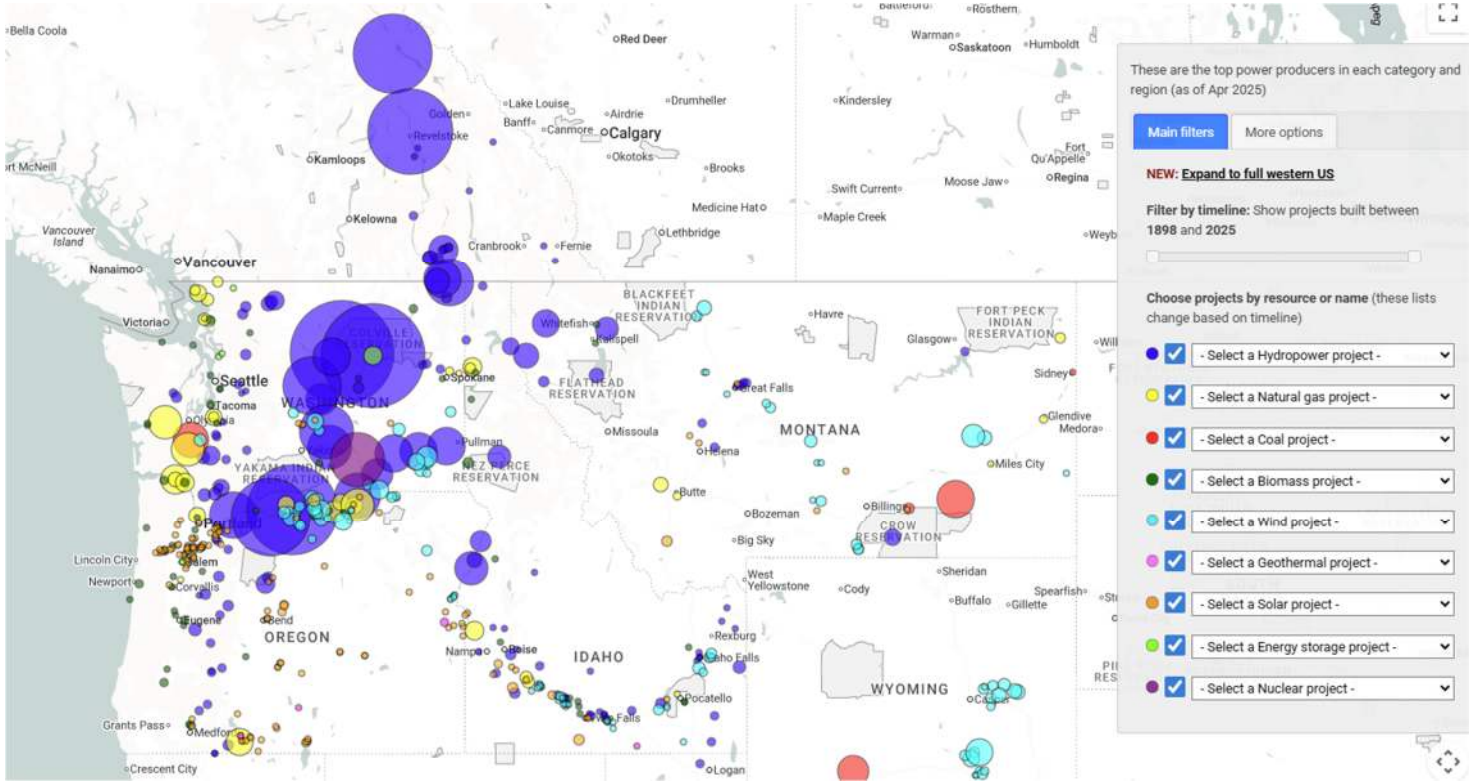
Another Article

"The country began building 94.5 gigawatts (GW) of new coal-power capacity and resumed 3.3GW of suspended projects in 2024, the highest level of construction in the past 10 years"

https://www.carbonbrief.org/chinas-construction-of-new-coal-power-plants-reached-10-year-high-in-2024/

1. https://iea.imgix.net/5cccd422-95fb-455f-b20d-708eac190b99/170901CommentaryEnergyBalancesSankey.png?auto=compress%2Cformat&fit=min&q=80&rect=0%2C0%2C1920%2C1080&w=965&fit=crop&fm=jpg&q=70&auto=format&h=543

Northwest Power and Conservation Council 2031 Needs Assessment

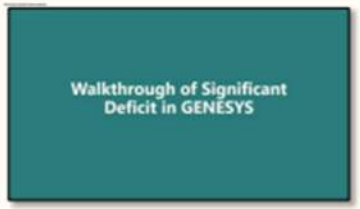


NWPCC planning authority is focused on Washington, Oregon, Idaho, and Montana, the map includes generation outside the region because Northwest utilities own, contract for, or rely on resources across the broader Western grid.

https://www.nwcouncil.org/energy/energy-topics/power-supply/power-generation-map-overview/

Northwest Power and Conservation Council 2031 Needs Assessment

Initial Conclusions



- The modeling shows significant needs across all seasons, with the largest and longest gaps appear in the winter
- The expected load growth is the largest driver of the needs seen in this study
- There are differences between the sensitivities in terms of needs, and these differences vary by month
- Peak challenges are greater than energy challenges, meaning that a portfolio of resources will be needed to meet both peak and energy needs identified in these studies throughout the year

https://www.nwcouncil.org/fs/19637/2025_10_1b.pdf

Northwest Power and Conservation Council 2031 Needs Assessment

Overall Results Compared to Metrics

	Frequency			Extreme Deficits		
	Annual LOLEV (events)	Winter LOLEV (events)	Summer LOLEV (events)	VaR Duration (hr)	VaR Peak (MW)	VaR Energy (MWh)
Adequacy Criteria	0.2	0.1	0.1	8	1,200	9,600
BiOp	218	61	75	22	9,681	354,192
RCBA	210	57	85	21	10,366	348,771
New MOP	189	59	55	21	8,917	326,858
Limited Flex	168	49	53	22	10,200	327,008

https://www.nwcouncil.org/fs/19637/2025_10_1b.pdf

As NW faces rolling blackouts, study says renewable energy may not be enough

By Monica Samayoa (OPB)
Oct. 30, 2025 7 a.m.

According to initial findings of a study, current projections show Oregon and Washington could face a nearly 3 GW gap by 2030, or the equivalent of powering about 1.4 million homes.

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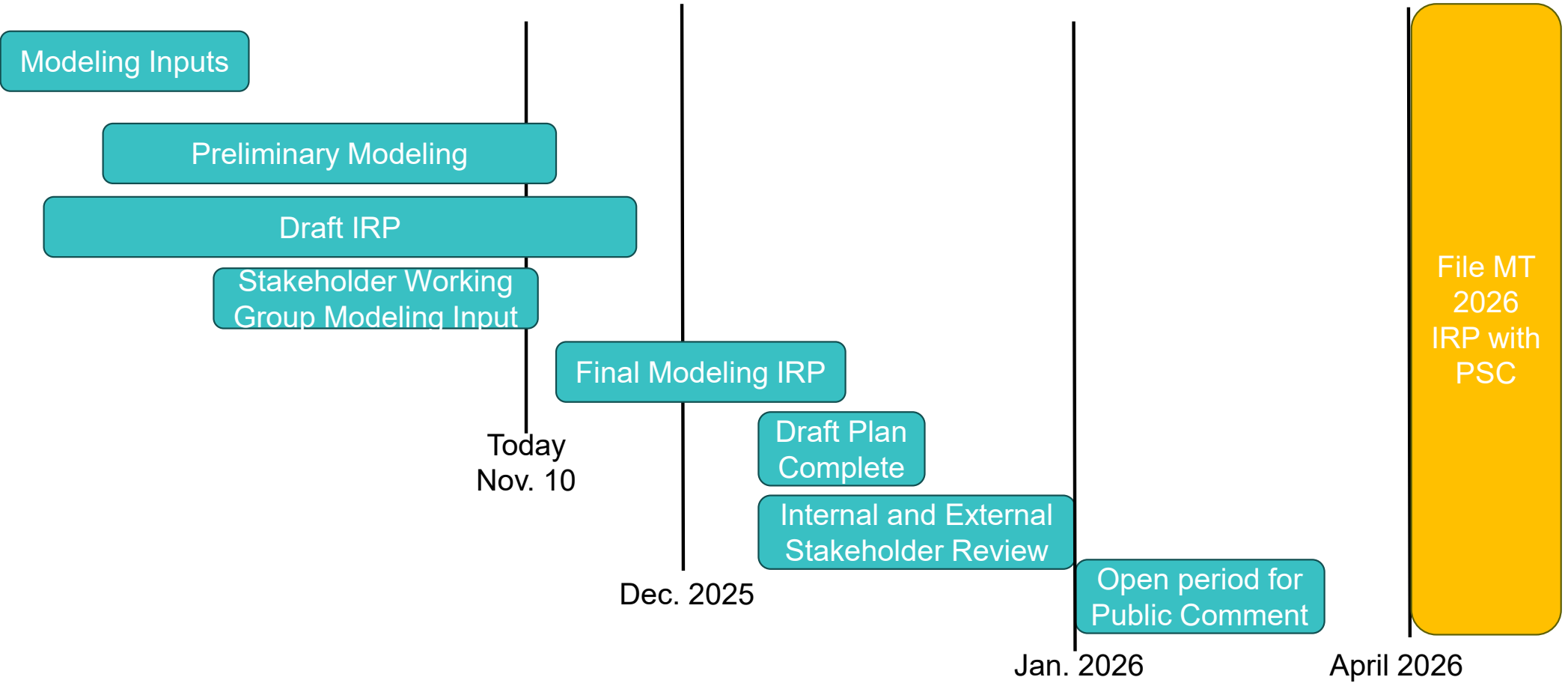
Oregon and Washington are falling so far behind on upgrades to the electrical grid that the states could start seeing rolling blackouts during extreme weather as soon as next year, according to a preliminary analysis shared at a utility industry and regional power producers conference this month.

The findings are stark. By 2030, the gap between what the region is generating and what people need could reach 9 gigawatts — or the average amount consumed by the entire state of Oregon. As coal power plants go offline, data centers boot up, and more people switch to electric appliances and vehicles, the grid is strained and there's not enough renewable energy projected to come online to fill the gap.

https://www.opb.org/article/2025/10/30/renewable-energy-oregon-washington-power-electrical-grid/

Updated IRP Schedule

Timeline – High Level (see detailed workplan)



Stakeholder Working Group Review

- SWG Members will be given a chance to review and provide comments on the draft IRP prior to release to the public
  - Timeline: 23-30 December 2025
  - Will be sent via LiquidFiles to members

Public Sessions

- NorthWestern is planning to hold 4 public in-person sessions after the release of the draft plan
  - Timeline for these is end of January/February 2026
  - Dates and Locations are still TBD

Updates Since Last Meeting

NWE Merger

- On October 20, 2025, NorthWestern Energy and Black Hills Corp. submitted a joint application submitted to the Montana Public Service Commission (Docket No. **2025.10.078**, available at www.psc.mt.gov) seeking regulatory approval for their proposed merger

- The merger is pending. It does not change anything related to the 2026 Northwestern Montana IRP.

Modeling Update 1: Base Case – Puget Colstrip Shares

- Modeling of Puget's 370MW share:
  - Removed from the Base Case (no 2026 Resource Adequacy need for Customers)
  - Added as sensitivity in within the model

- What is happening with Puget's 370MW Share?
  - Puget's share will be acquired by a subsidiary (not the Montana utility).
  - The subsidiary has a contract to sell the output to Mercuria Energy America, LLC.

Modeling Update 2: Fuel Infrastructure Updates

- Fuel infrastructure, i.e. natural gas, and electric interconnection and network upgrade costs are included in the total cost for all candidate resources. Before, these costs were going to be included post-processing.

Electric Transmission Related Cost Estimates*	Estimate (2026$)
230 kV POI ($)	$9,226,207
Network Upgrades ($/MW Nameplate)	$1,291,137

Natural Gas Transmission Cost Estimate*	Estimate (2026$)
Gas Transmission Upgrades ($/MW Nameplate)*	$547,611

Discussion Item: What is the impact of including these costs in the model?

*Excluded for a single deployment of a 50MW dual fuel aero.

Modeling Update 3: Long Duration Energy Storage

- Long duration energy storage (LDES)
  - Limited to ~10% of the peak load, or 150 MW (3 units of 50MW with 100-hour duration)

- Reason:
  - The model heavily favored LDES.
  - Without further reliability and operational analysis, we limited the selection to ensure that too much LDES does not create a reliability issue.

Modeling Update 4: Overbuilt Constraint

- Implemented an 150MW overbuild constraint:
  - Adds a penalty for builds greater than 150MW of accredited capacity needs.
  - Modeling impacts: See ARS Results: Scenario A – Base Case slide below.

- Why an overbuild constraint?
  - Overbuild constraints keep the model focused on customer reliability needs, preventing excess capacity built for speculative market gains rather than serving native load.
  - Also, building too much capacity too early can raise customer bills by adding costs before the resources are needed, with only uncertain market revenues to offset them.

PowerSIMM Finalized ARS Results

Scenarios for 2026 MT IRP

A. Base Case – Colstrip retires December 31, 2042.

B. Colstrip retires June 30, 2029, according to MATS.

C. Colstrip complies with MATS using baghouse on July 1, 2030. Colstrip retires December 31, 2042.

D. Colstrip retires December 31, 2031, according to GHG.

E. Colstrip retires December 31, 2035.

Sensitivities for 2026 MT IRP

F. 50% power costs.

G. 150% power costs.

H. 50% natural gas costs.

I. 150% natural gas costs.

J. 150 MW of additional data center load

K. 650 MW of additional data center load

L. 1160 MW of additional data center load

M. Allow carbon emitting resources after 2035 (PSC request from 2023 IRP)

N. Only allow carbon free resources to be selected in ARS

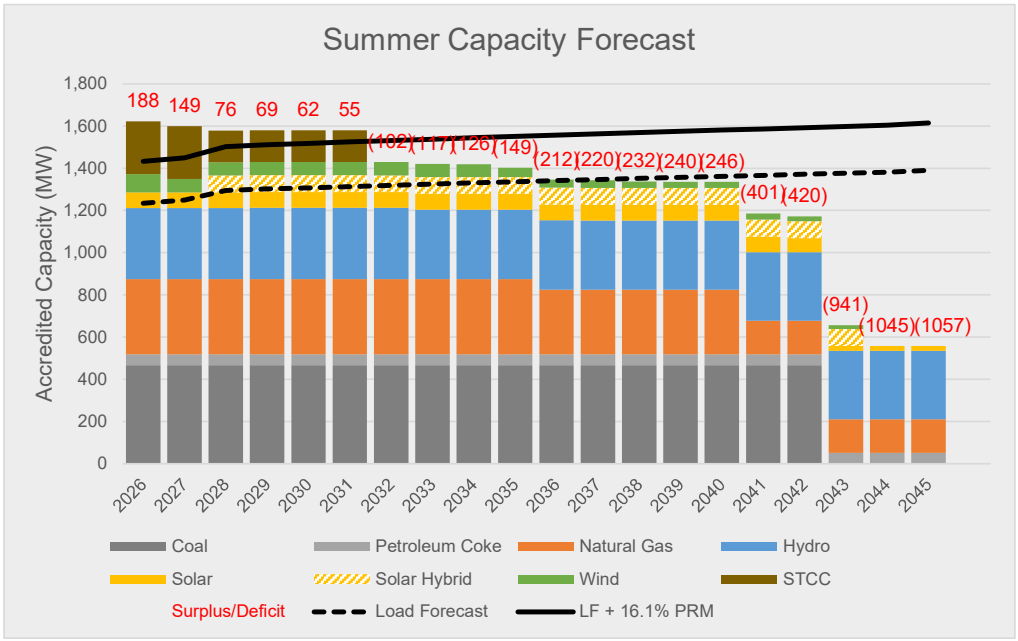
O. Add 370 MW Puget acquisition for retail customers

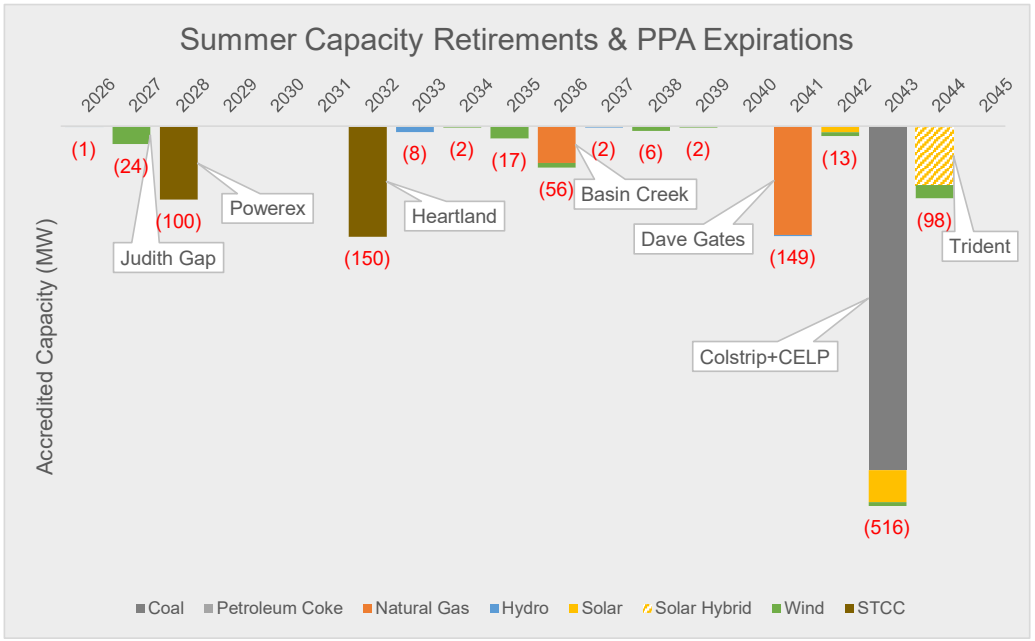
P. No 222 MW Avista acquisition

Q. Add 300 MW of North Plains Connector transmission project

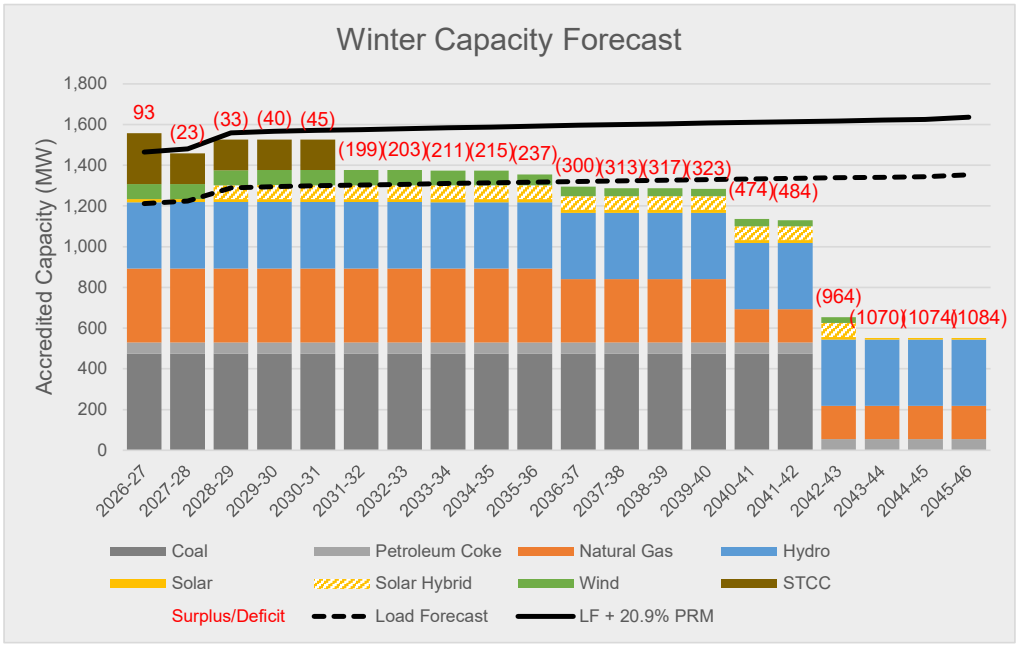
R. Increase the amount of DSM and NEM in the load forecast

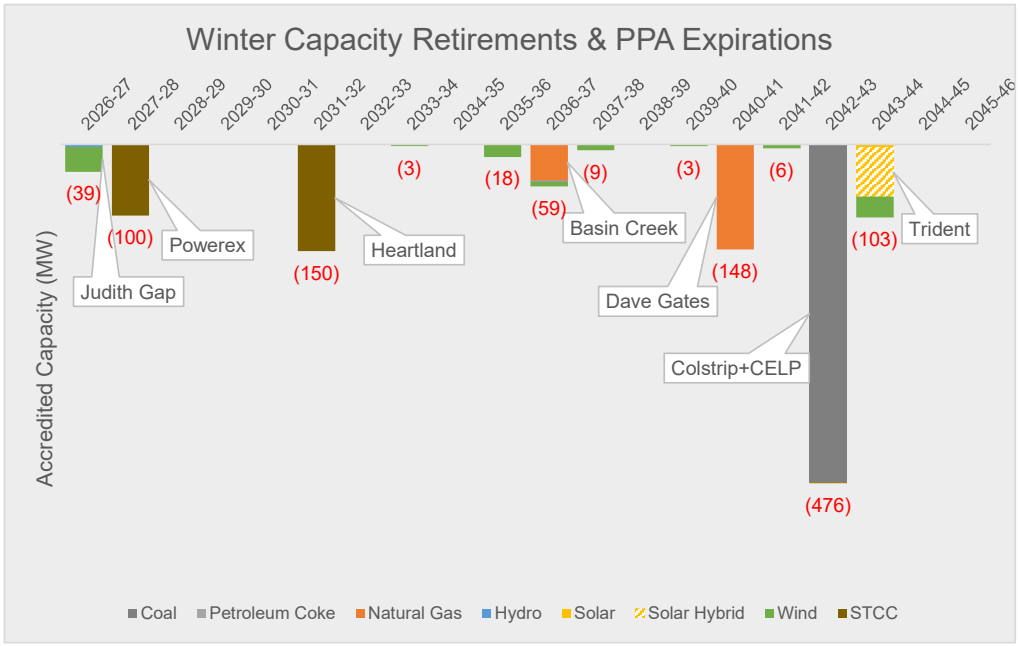
Summer Capacity Forecast & Retirements





Winter Capacity Forecast & Retirements

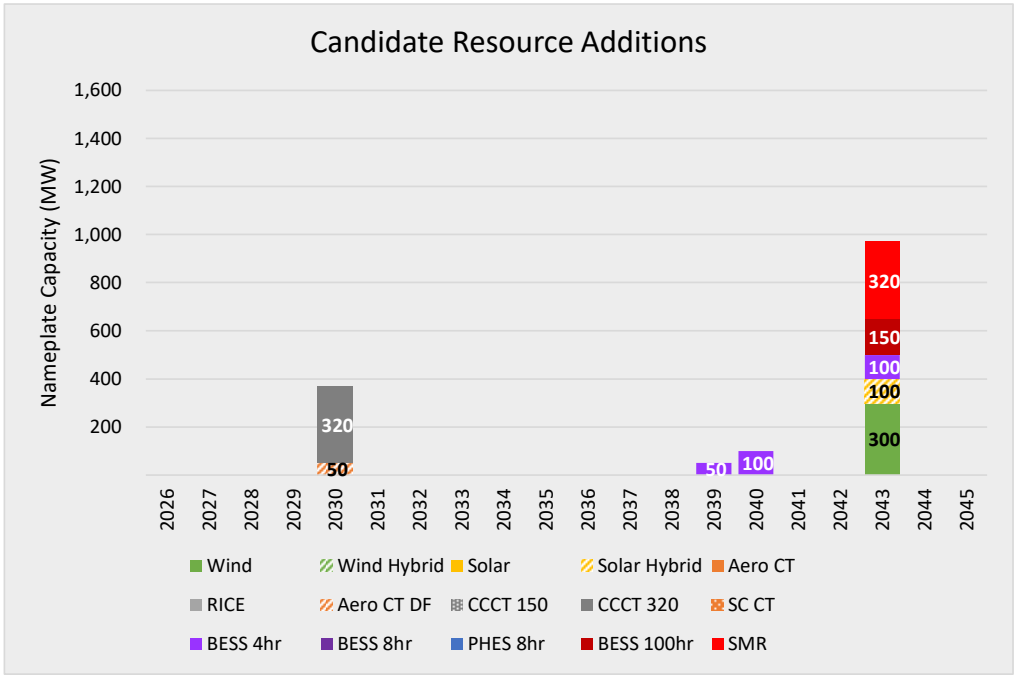




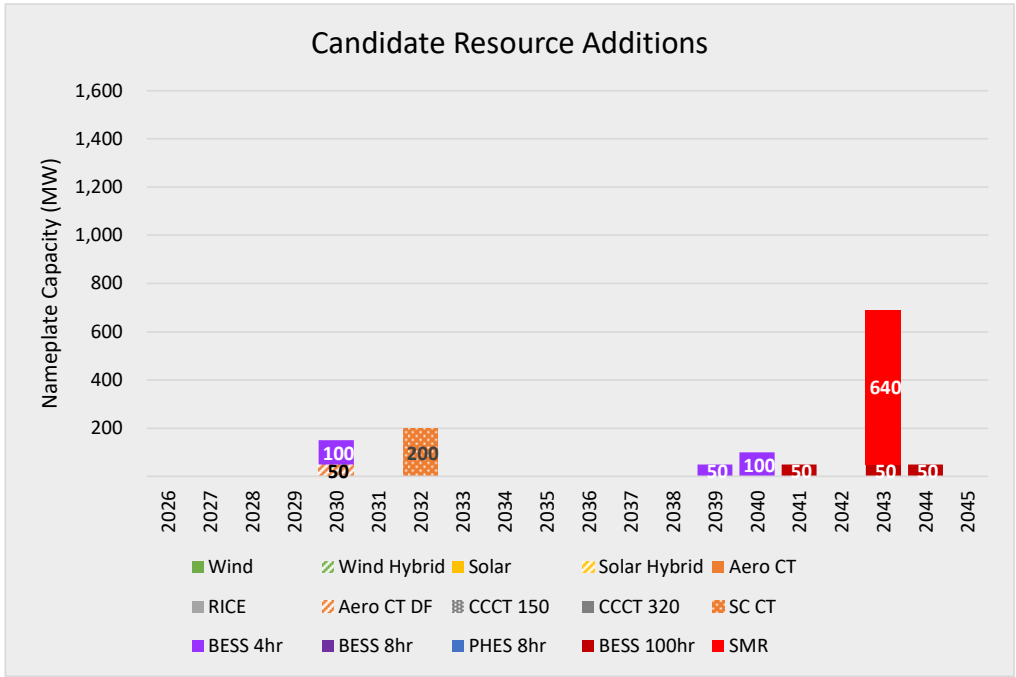
Base Case and Main Scenarios

ARS Results: Scenario A – Base Case

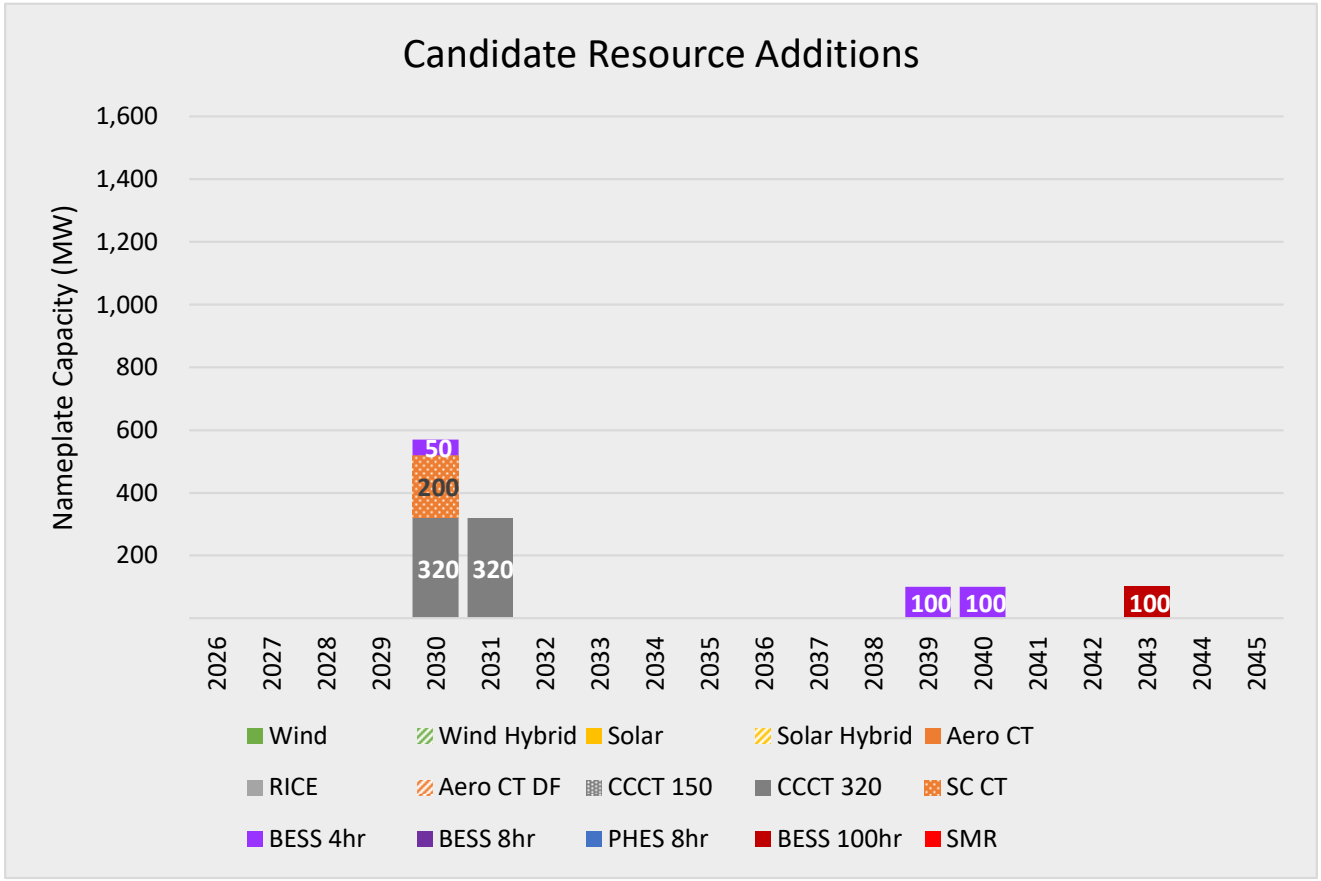
No overbuild constraint



With overbuild constraint above 150 MW threshold



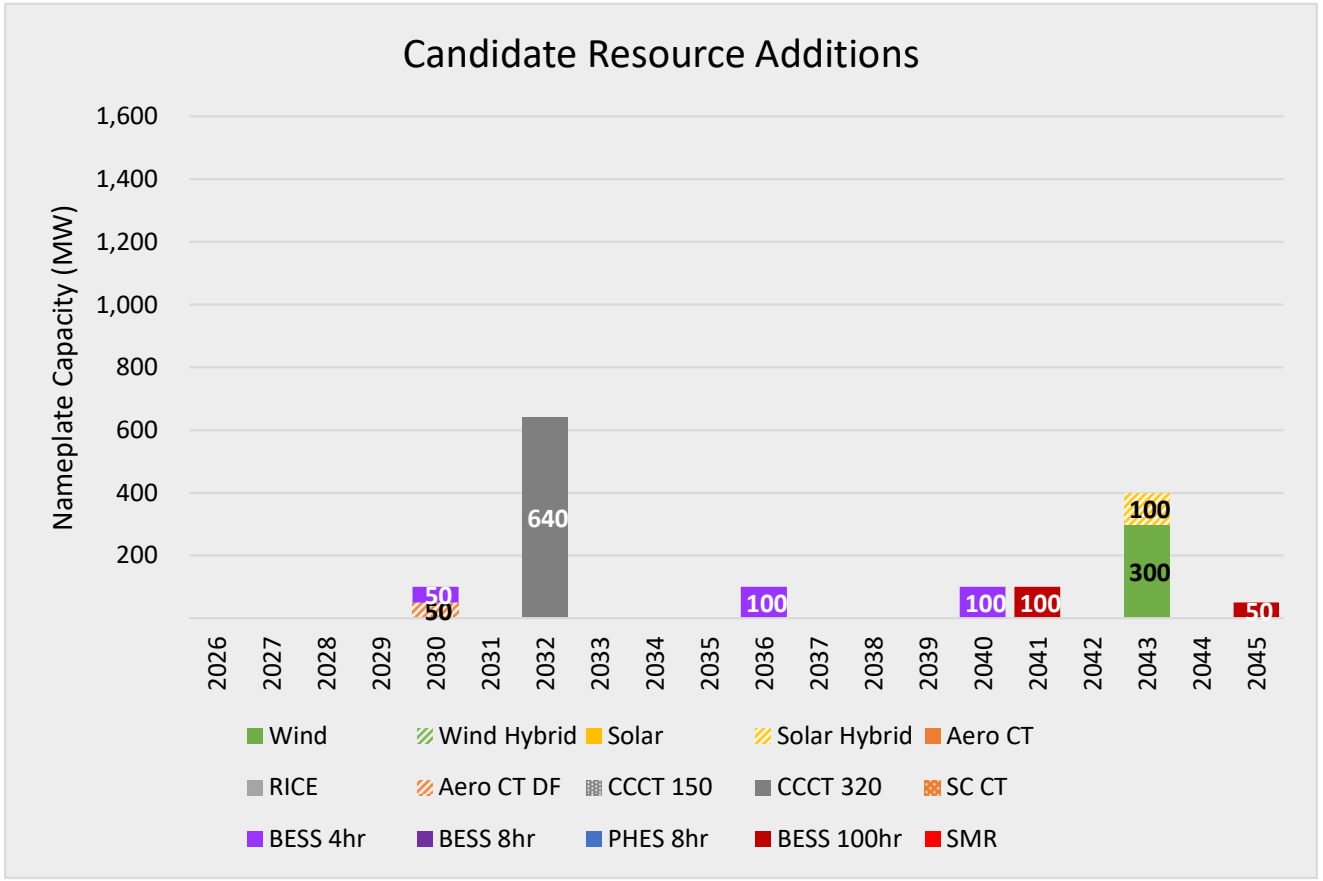
ARS Results: Scenario B – Colstrip Retires to Comply with MATS



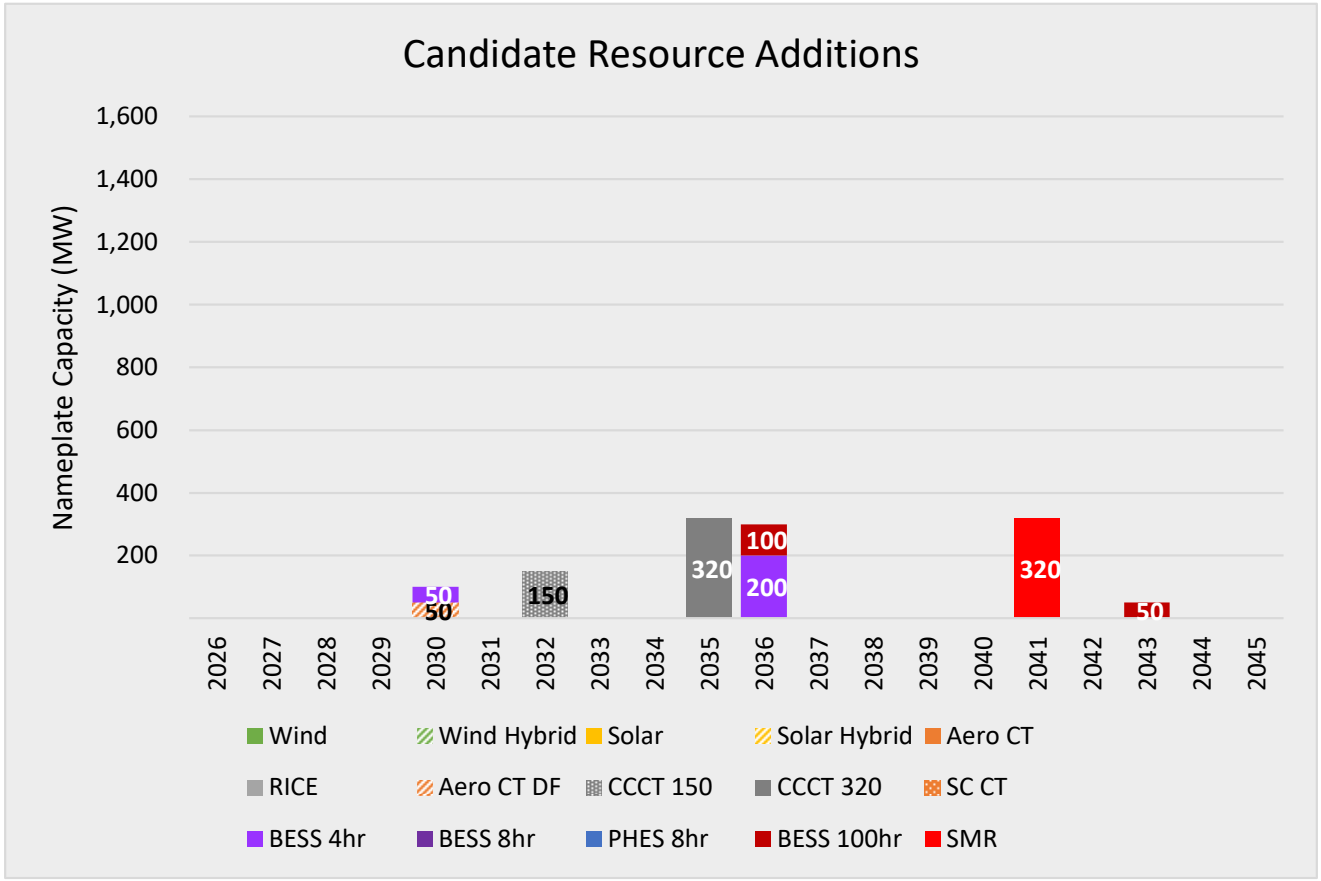
ARS Results: Scenario C – Colstrip Complies with MATS via Baghouse

- No change from Scenario A, Base Case.

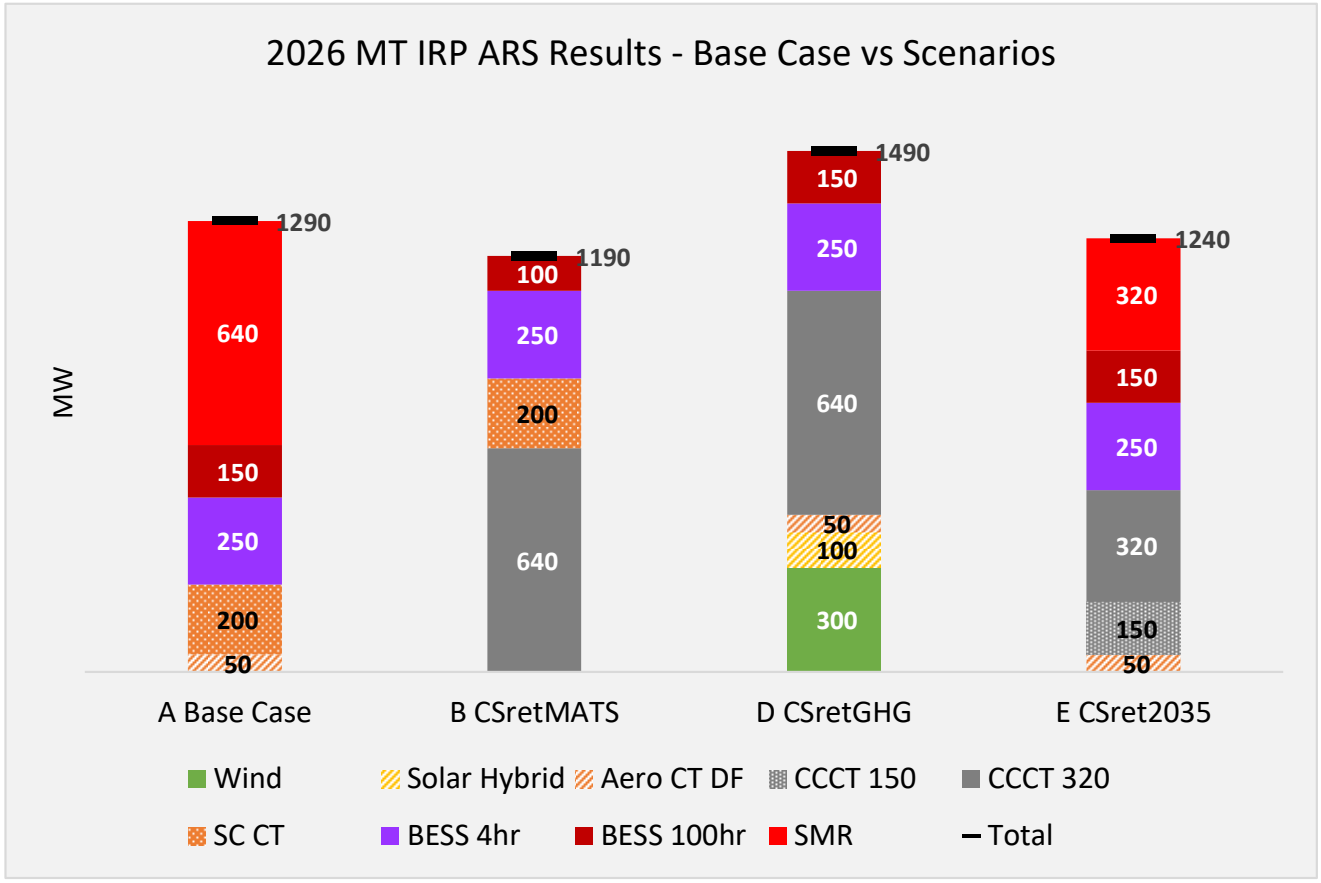
ARS Results: Scenario D – Colstrip Retires to Comply with GHG



ARS Results: Scenario E – Colstrip Retires in 2035

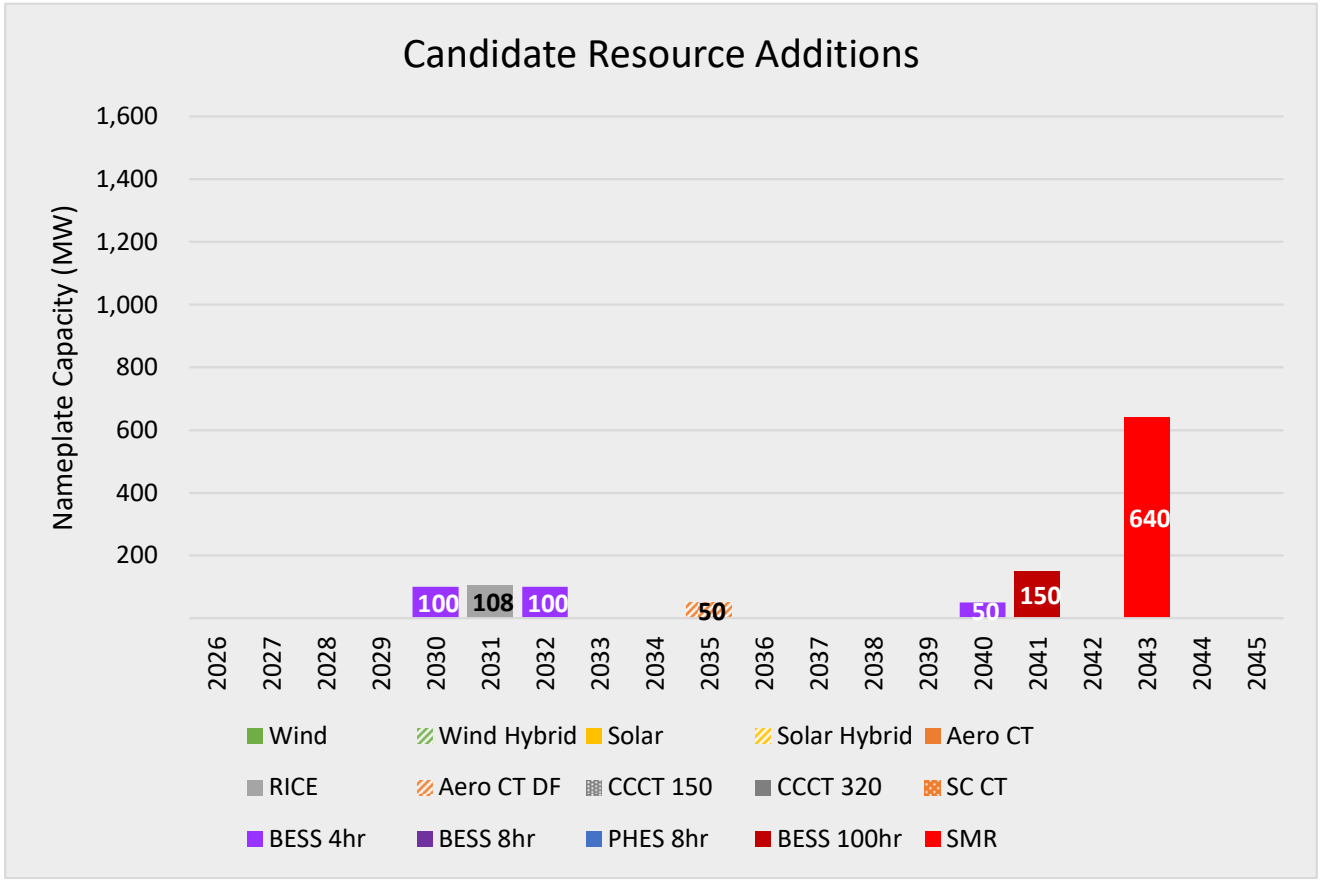


ARS Summary of Base Case and Main Scenarios

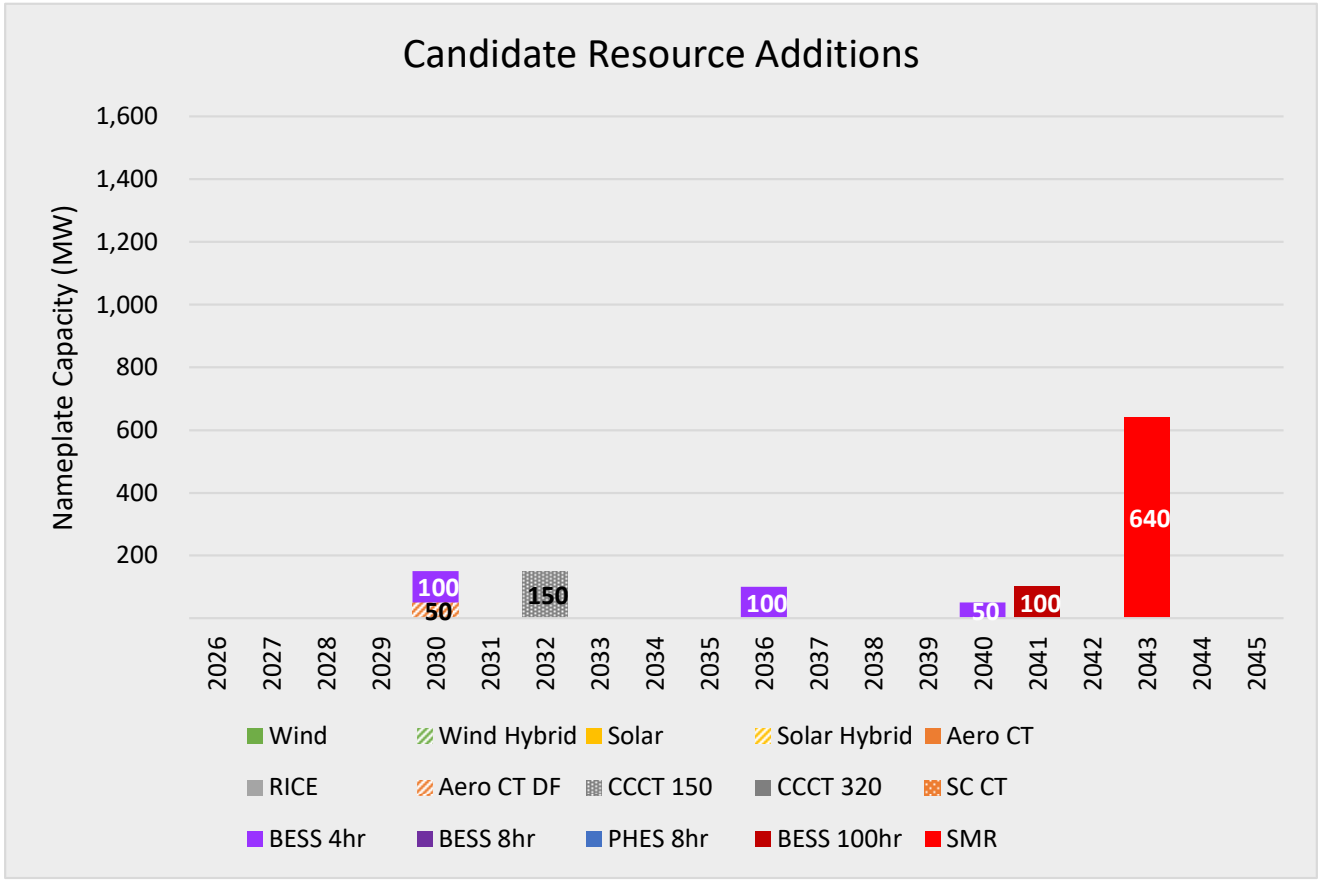


Commodity Sensitivities

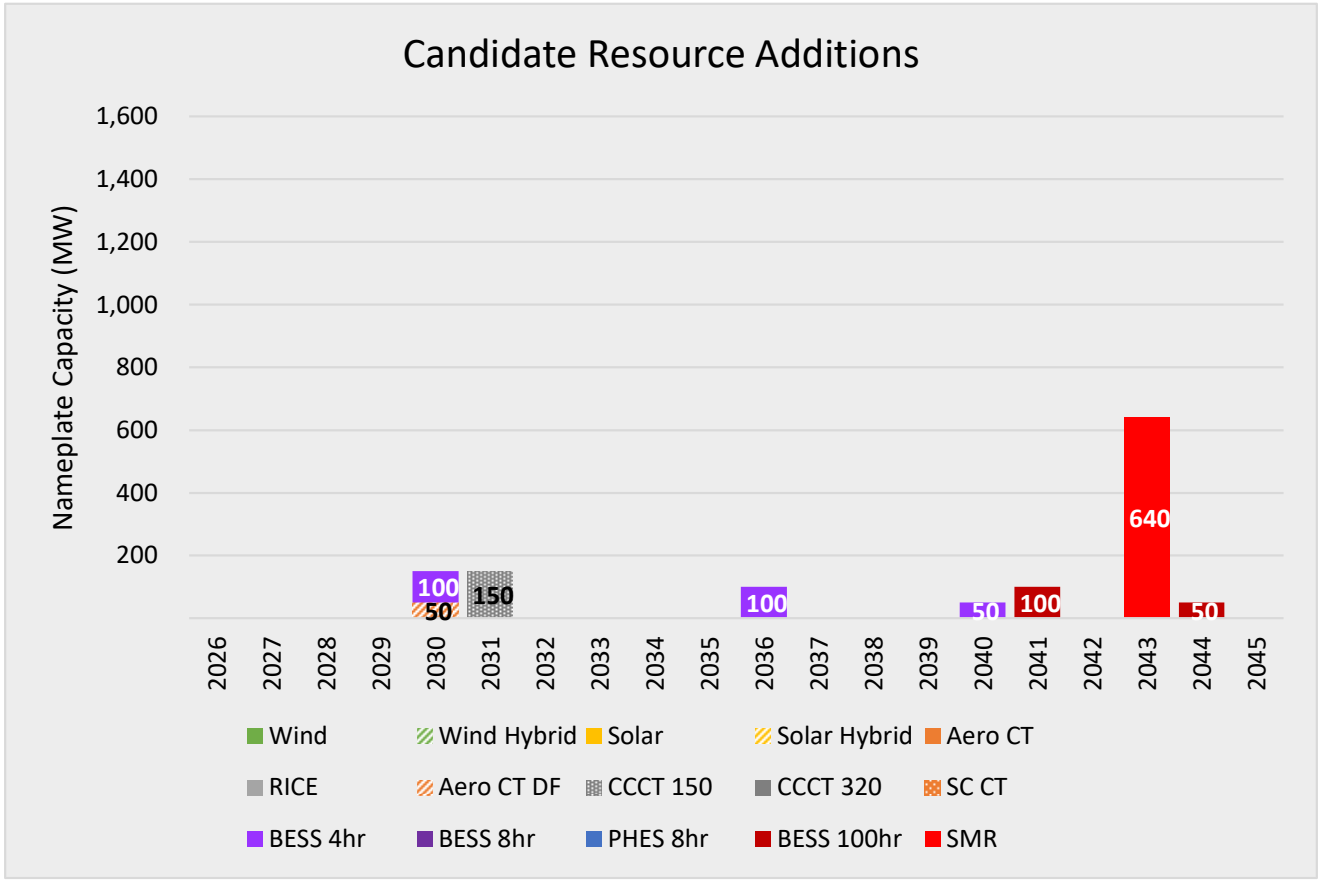
ARS Results: Sensitivity F – Power Price Forecast Reduced by 50%



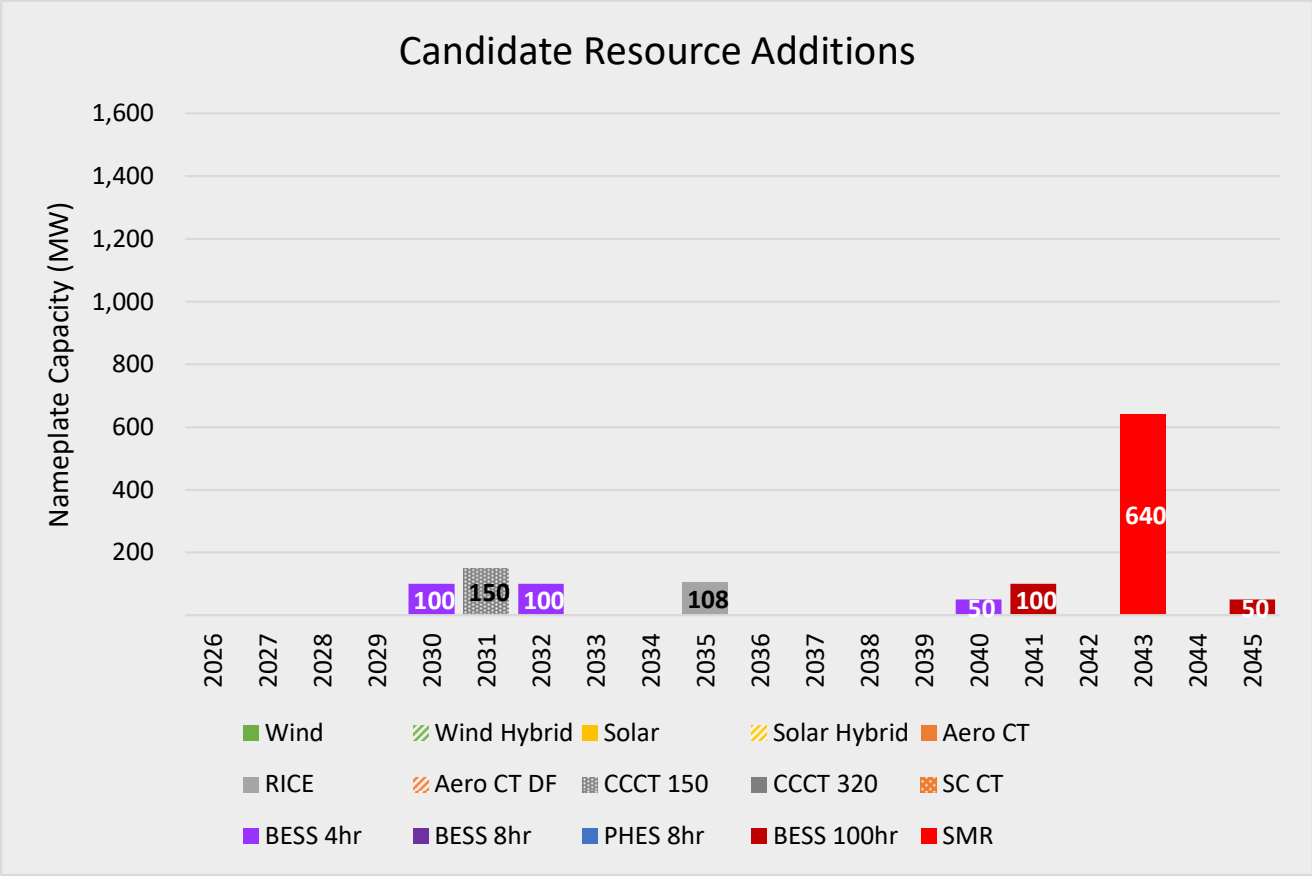
ARS Results: Sensitivity G – Power Price Forecast Increased by 50%



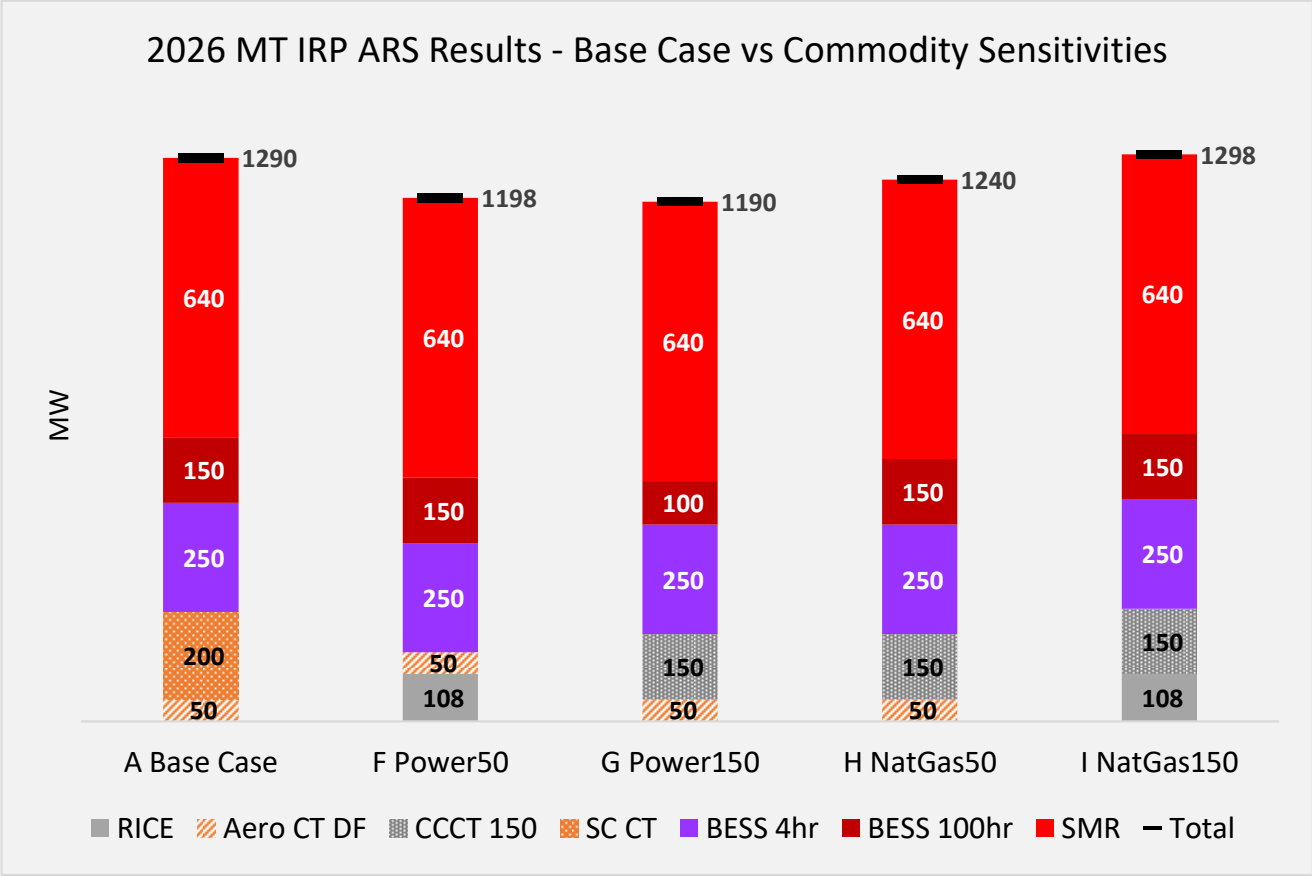
ARS Results: Sensitivity H – Natural Gas Price Forecast Reduced by 50%



ARS Results: Sensitivity I – Natural Gas Price Forecast Increased by 50%

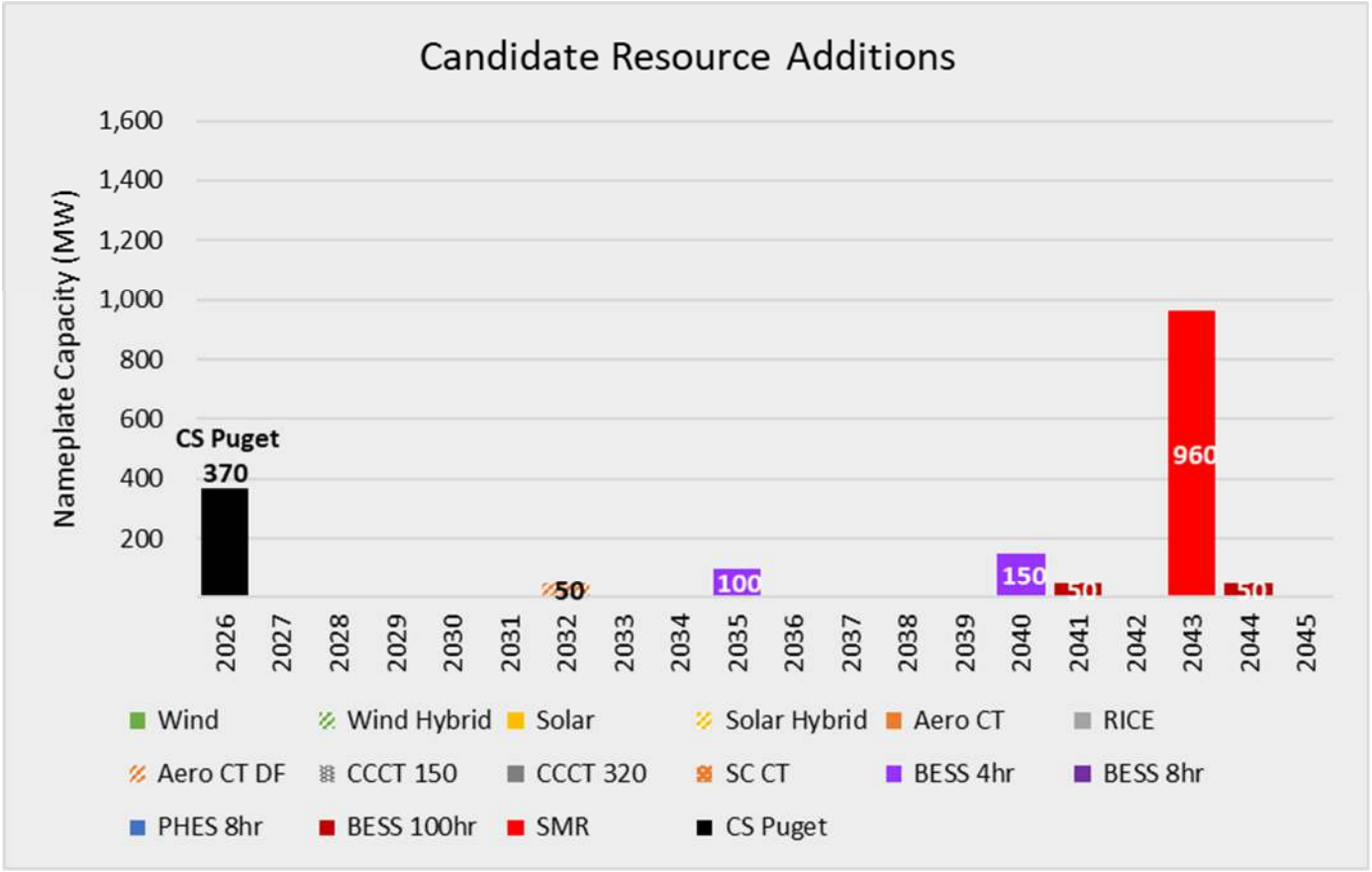


ARS Summary of Commodity Sensitivities

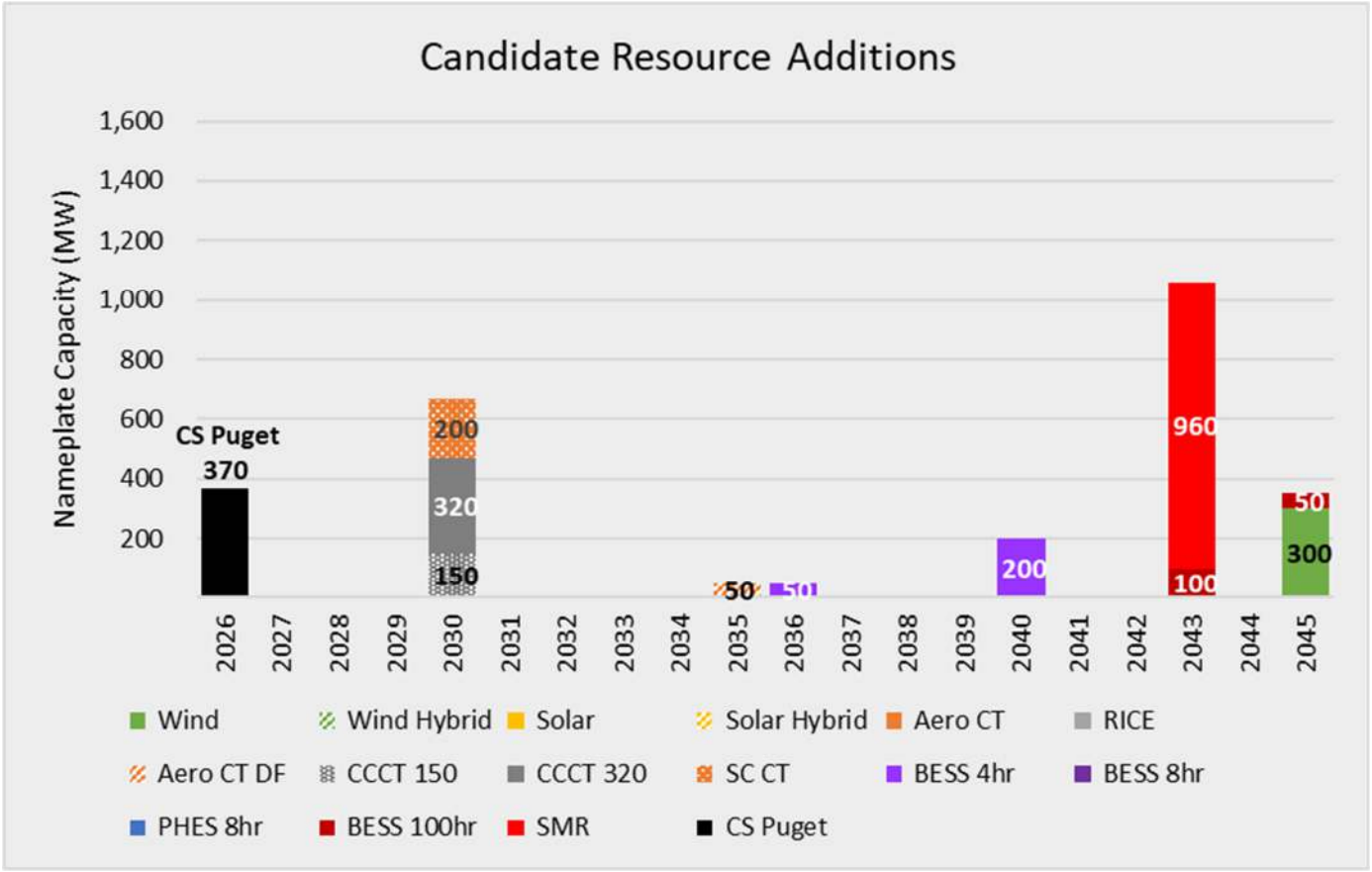


Data Center Sensitivities

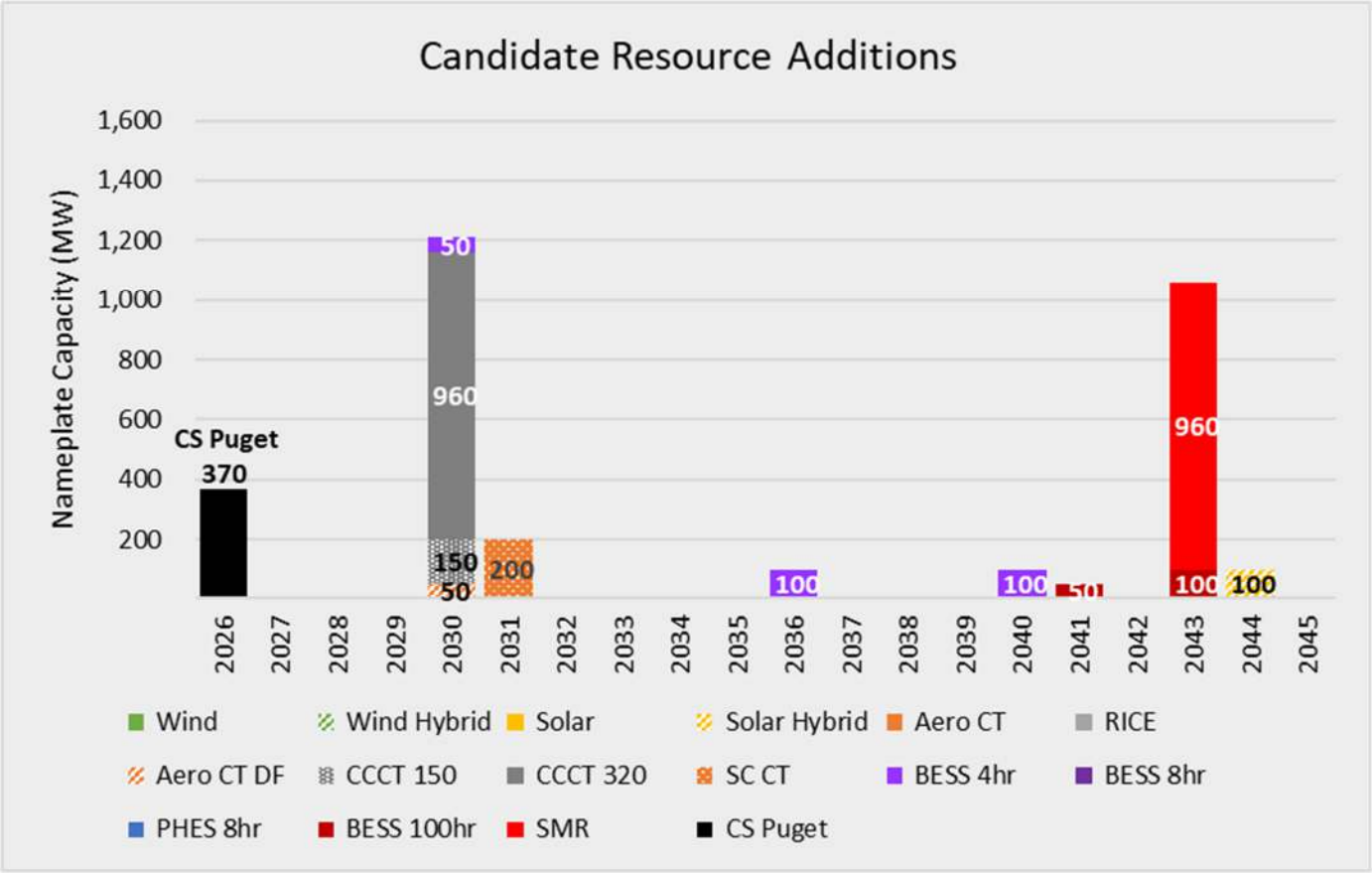
ARS Results: Sensitivity J – Add 150 MW of Data Center Load



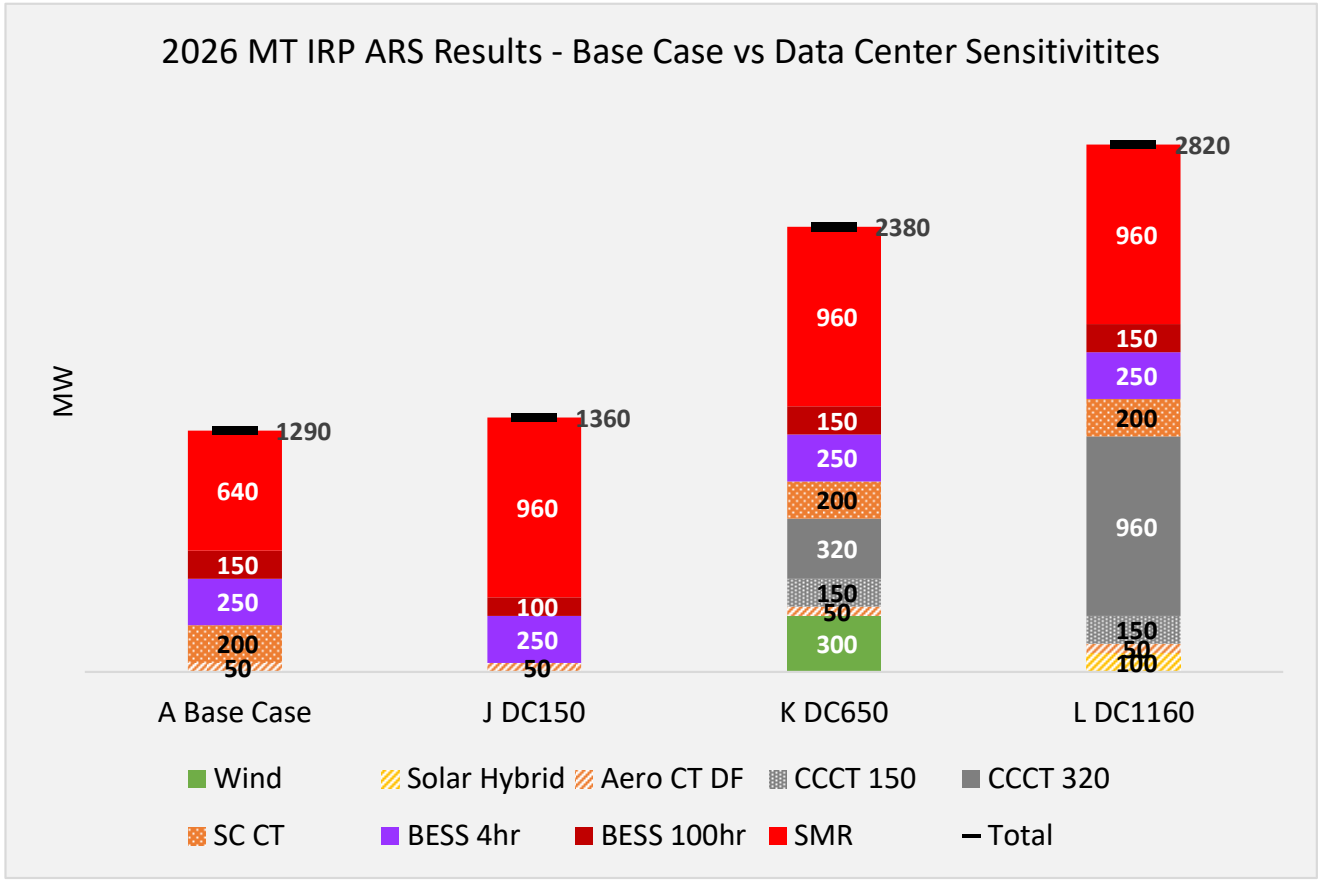
ARS Results: Sensitivity K – Add 650 MW of Data Center Load



ARS Results: Sensitivity L – Add 1,160 MW of Data Center Load

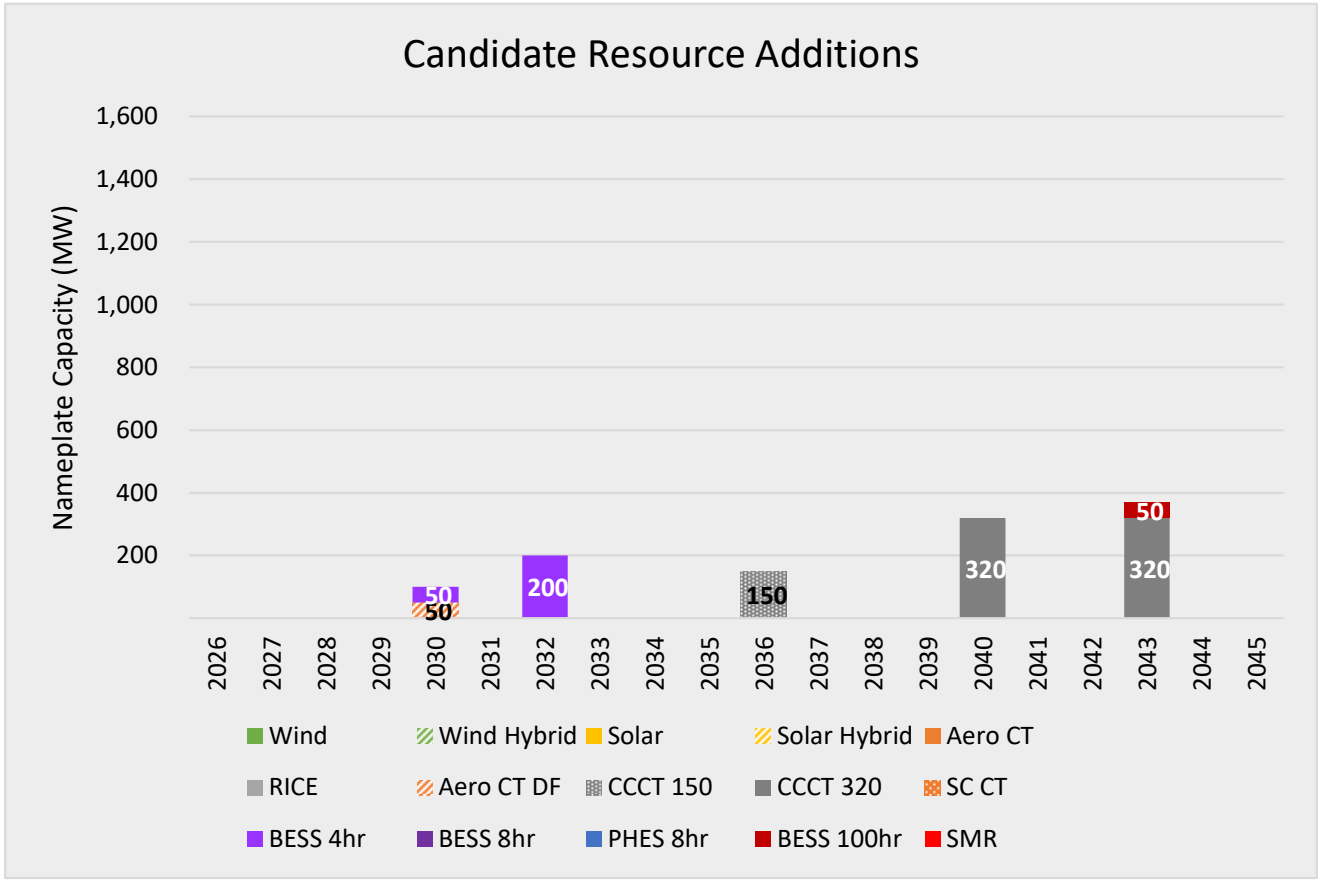


ARS Summary of Data Center Sensitivities

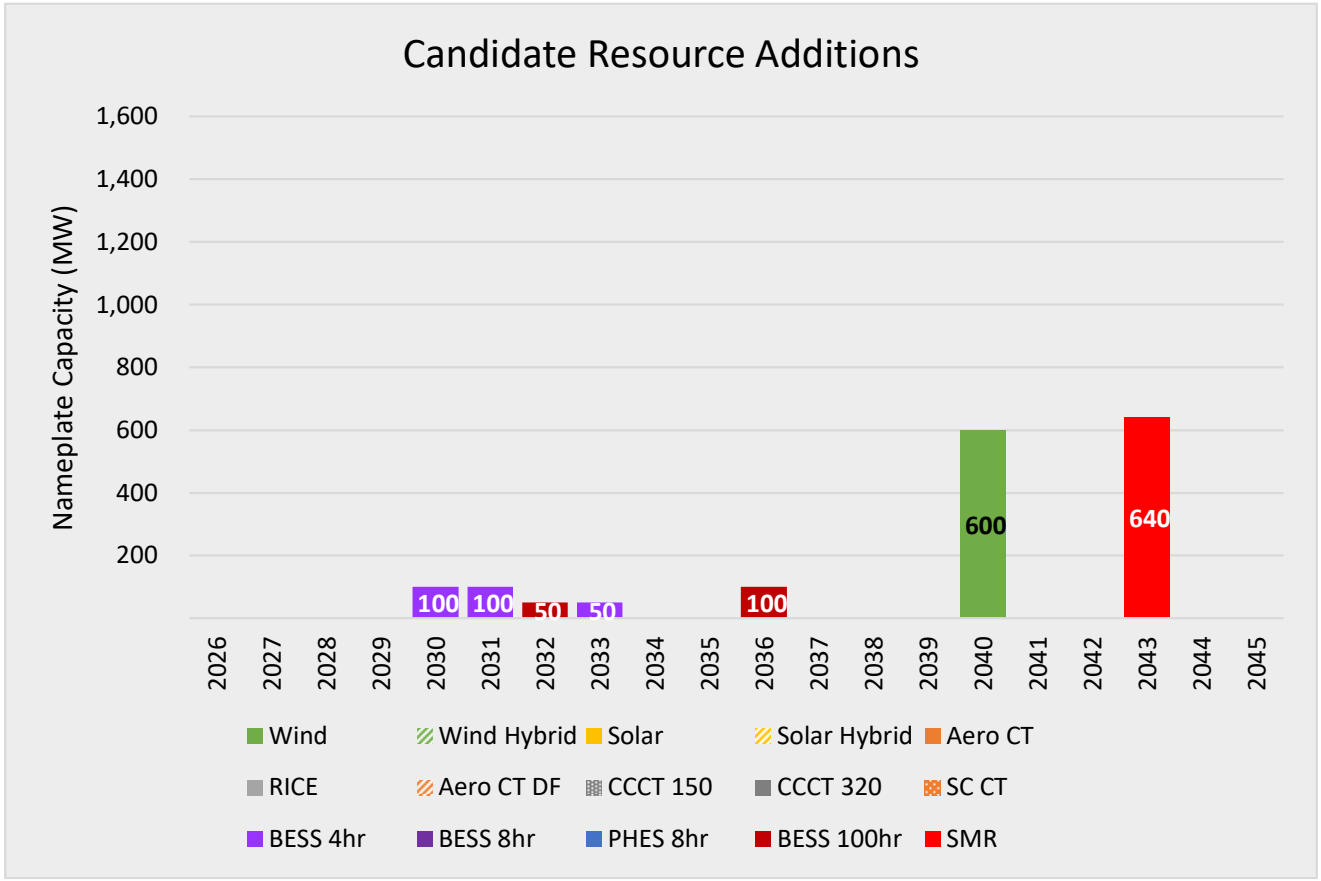


Resource Sensitivities

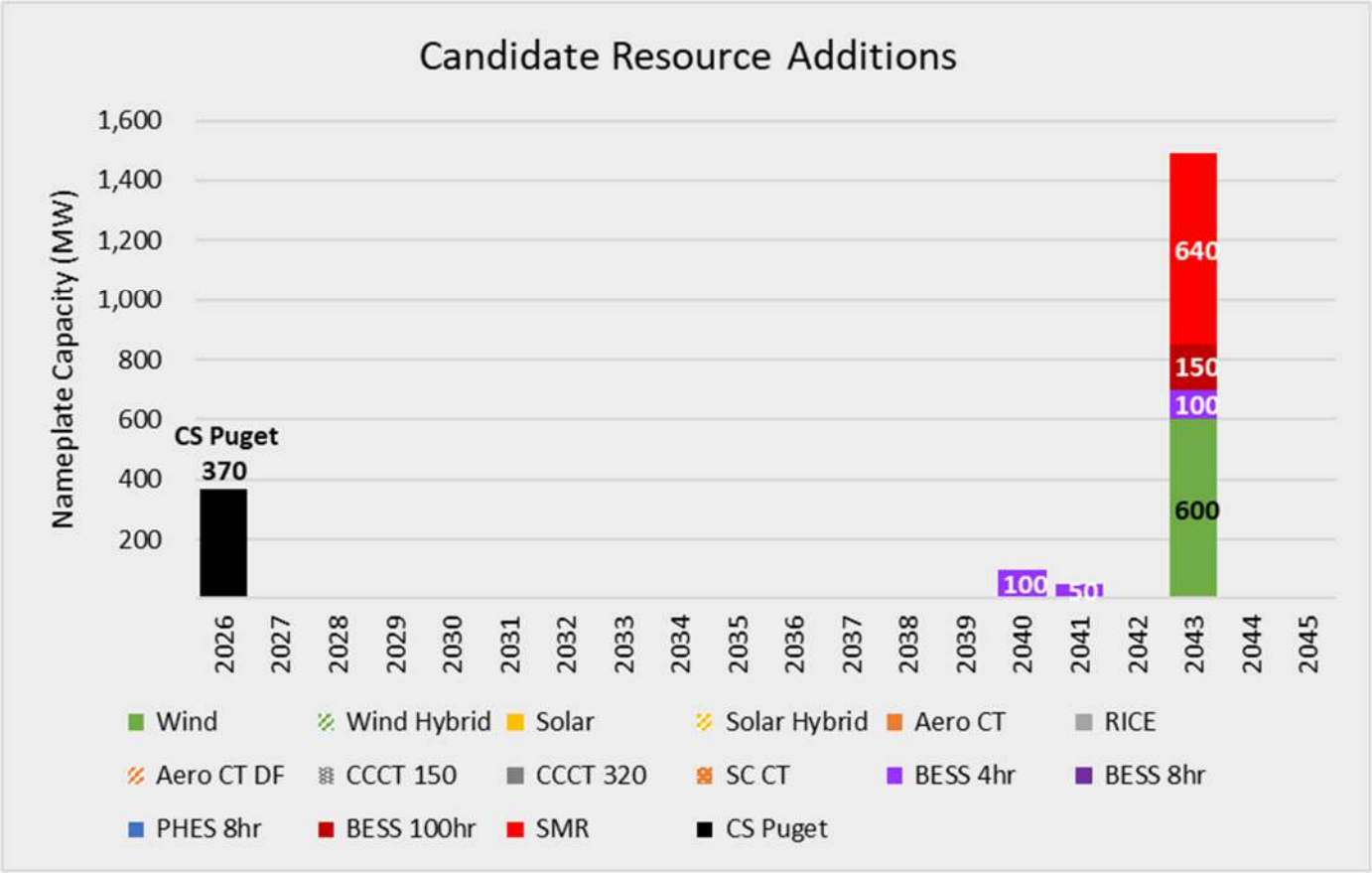
ARS Results: Sensitivity M – No Limitation on Carbon Emitting Resources



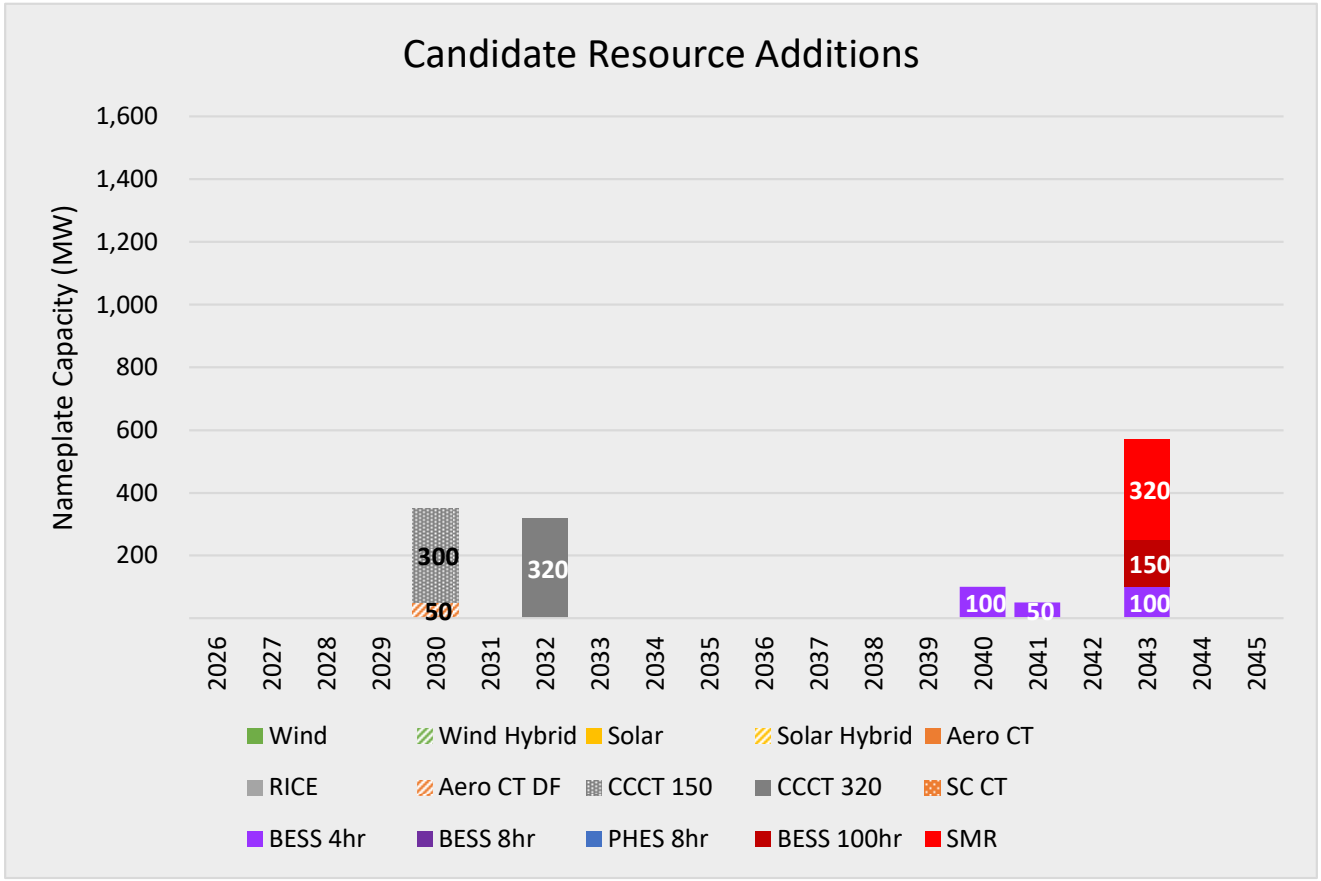
ARS Results: Sensitivity N – Carbon Free Candidate Resources Only



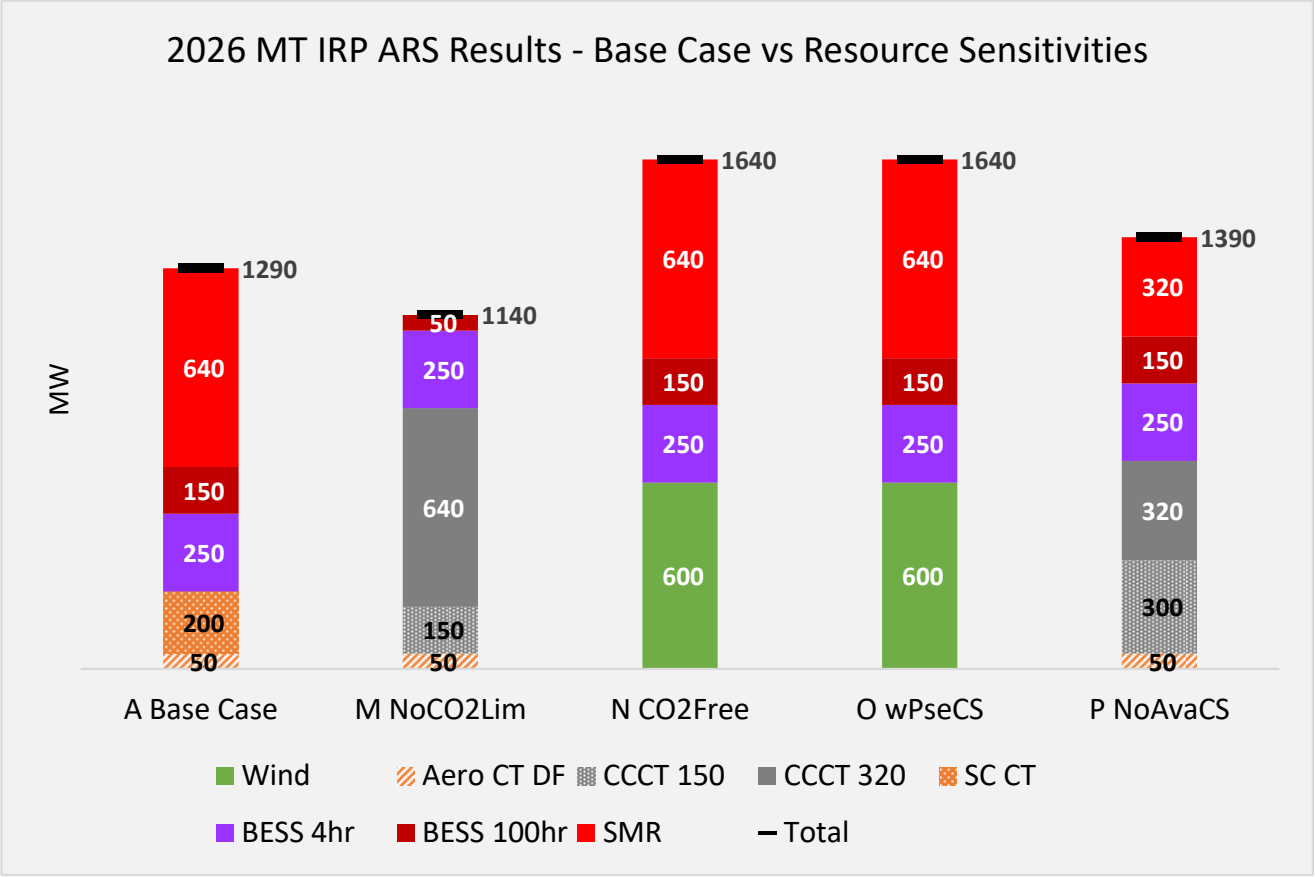
ARS Results: Sensitivity O – PSE Colstrip Share is used for Retail Load



ARS Results: Sensitivity P – Avista's Colstrip Shares are not Acquired



ARS Summary of Resource Sensitivities

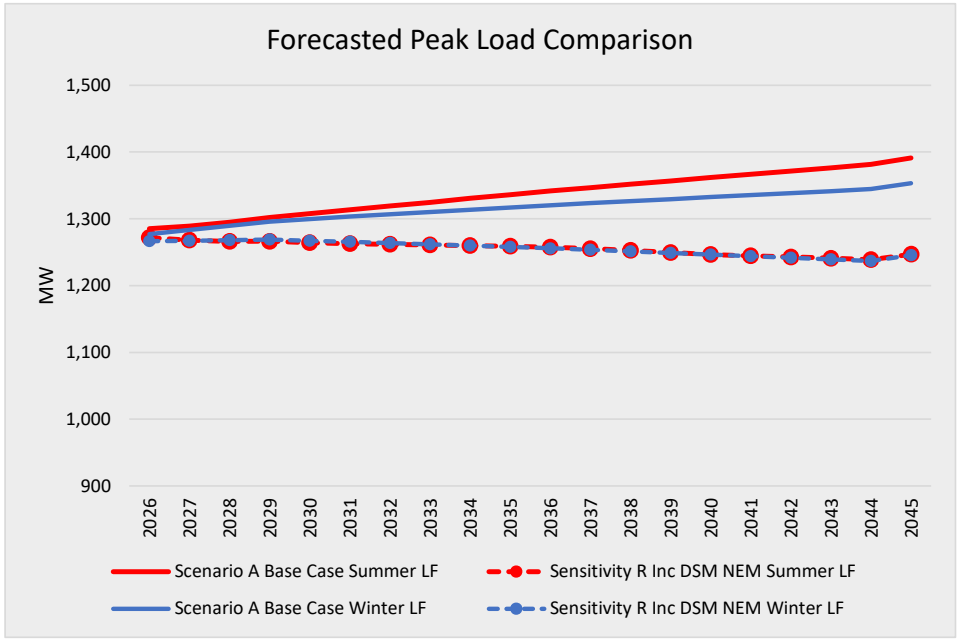


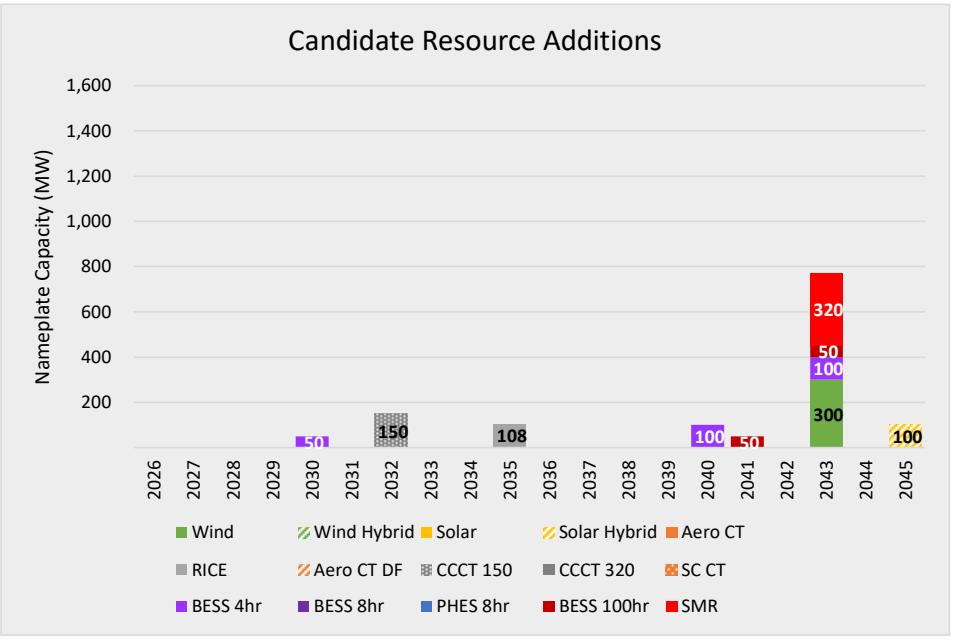
Other Sensitivities

ARS Results: Sensitivity Q – Add 300 MW of NPC Capacity

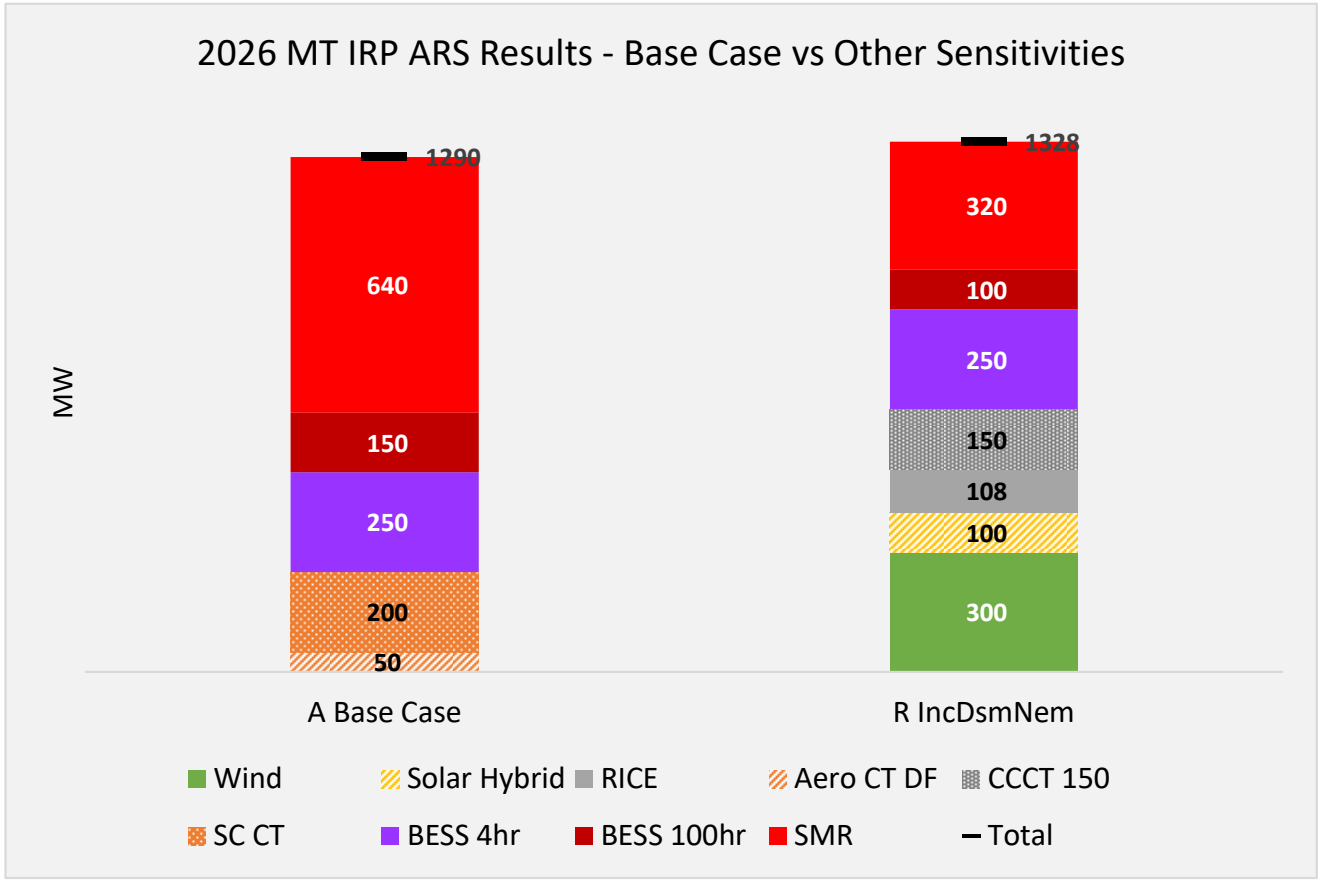
- No change from Scenario A, Base Case.

ARS Results: Sensitivity R – Increase DSM and NEM Forecasts





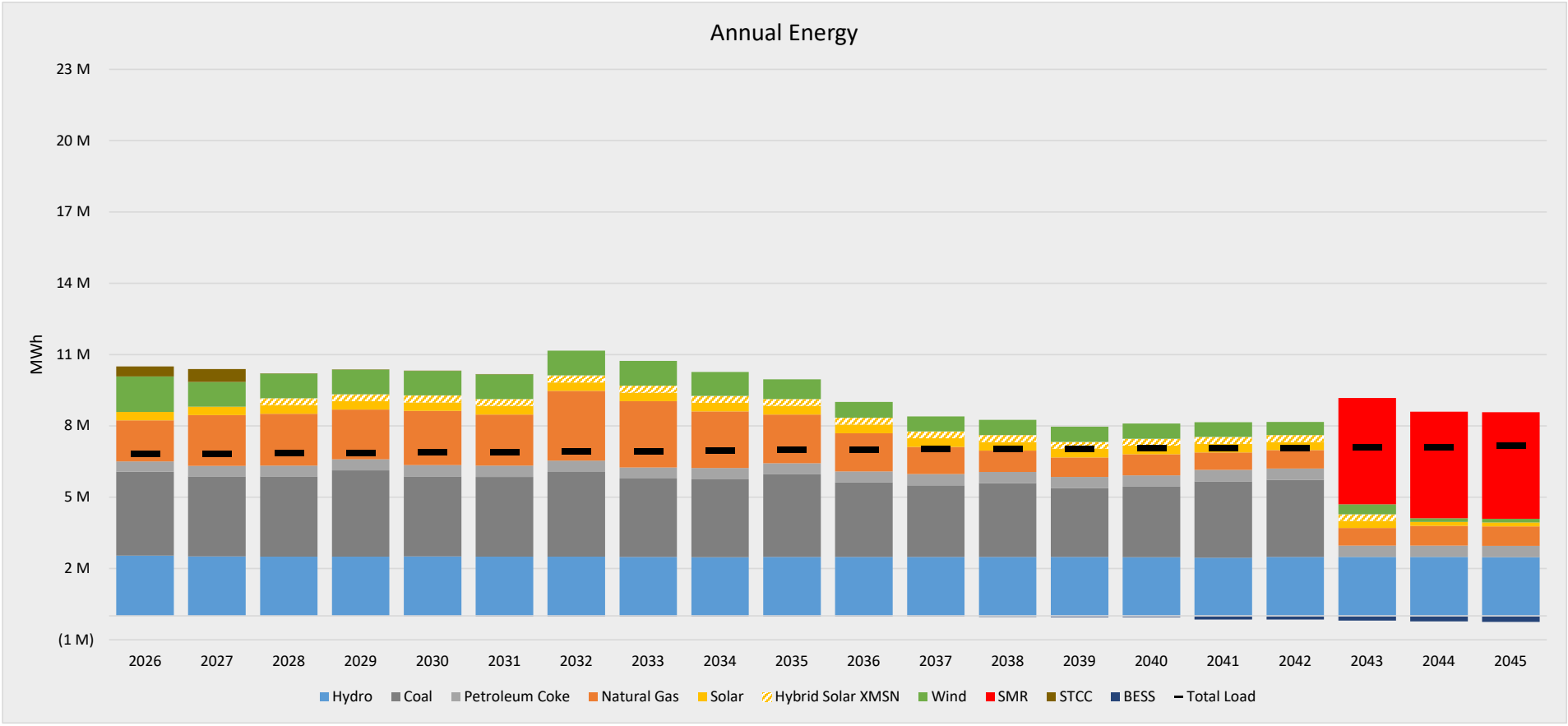
ARS Summary of Other Sensitivities



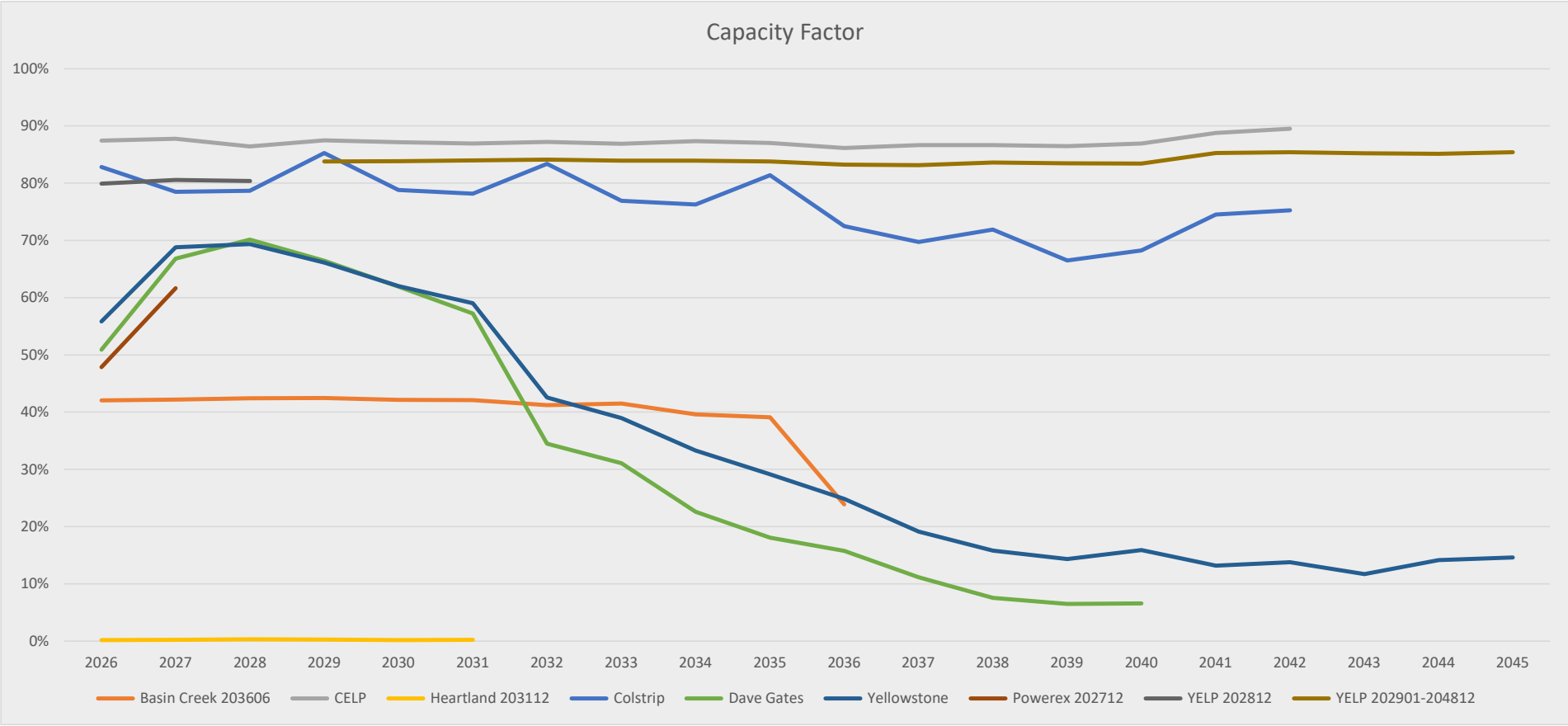
PowerSIMM Preliminary PCM Results

PCM Results: Scenario A – Base Case

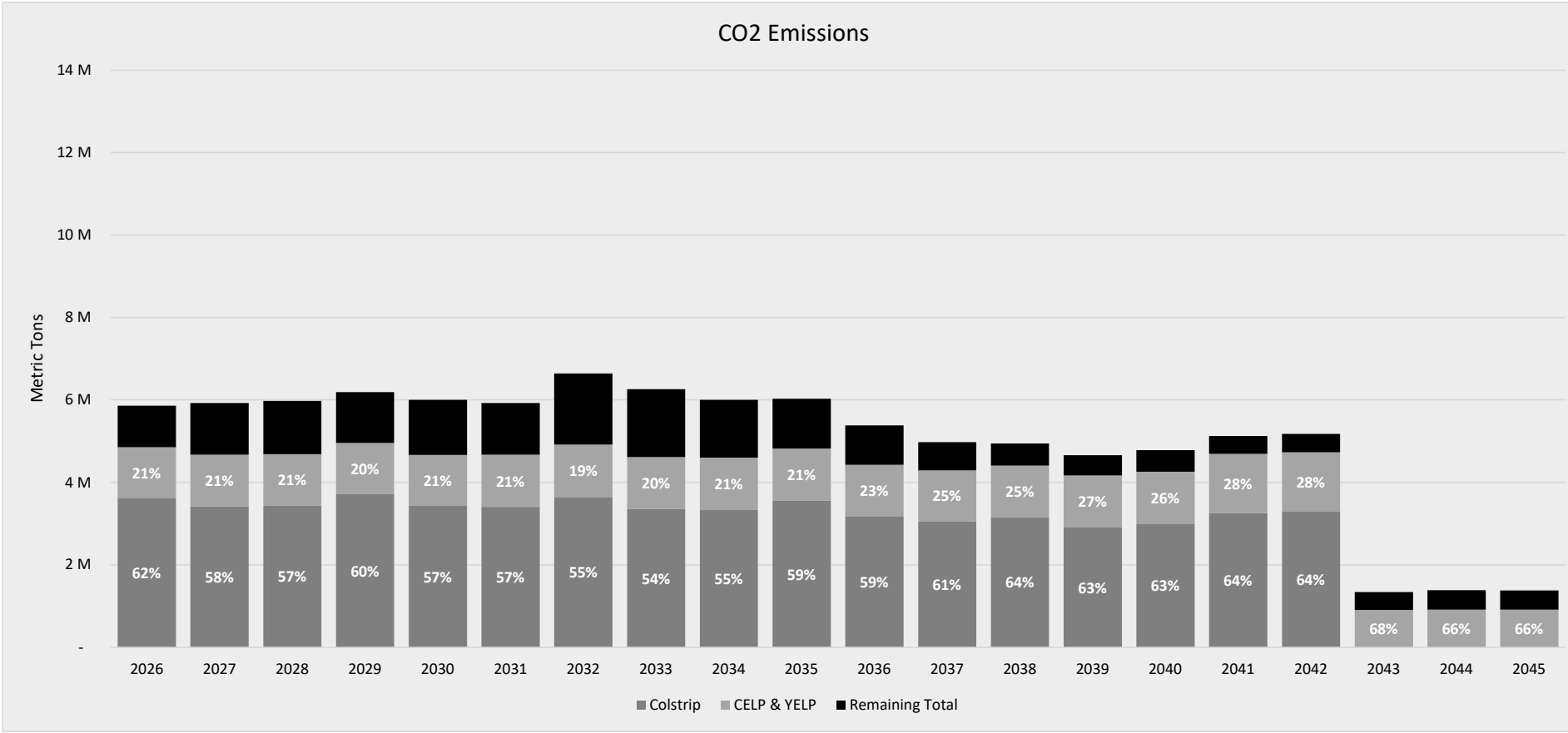
Energy production for PCM results of Scneario A – Base Case.



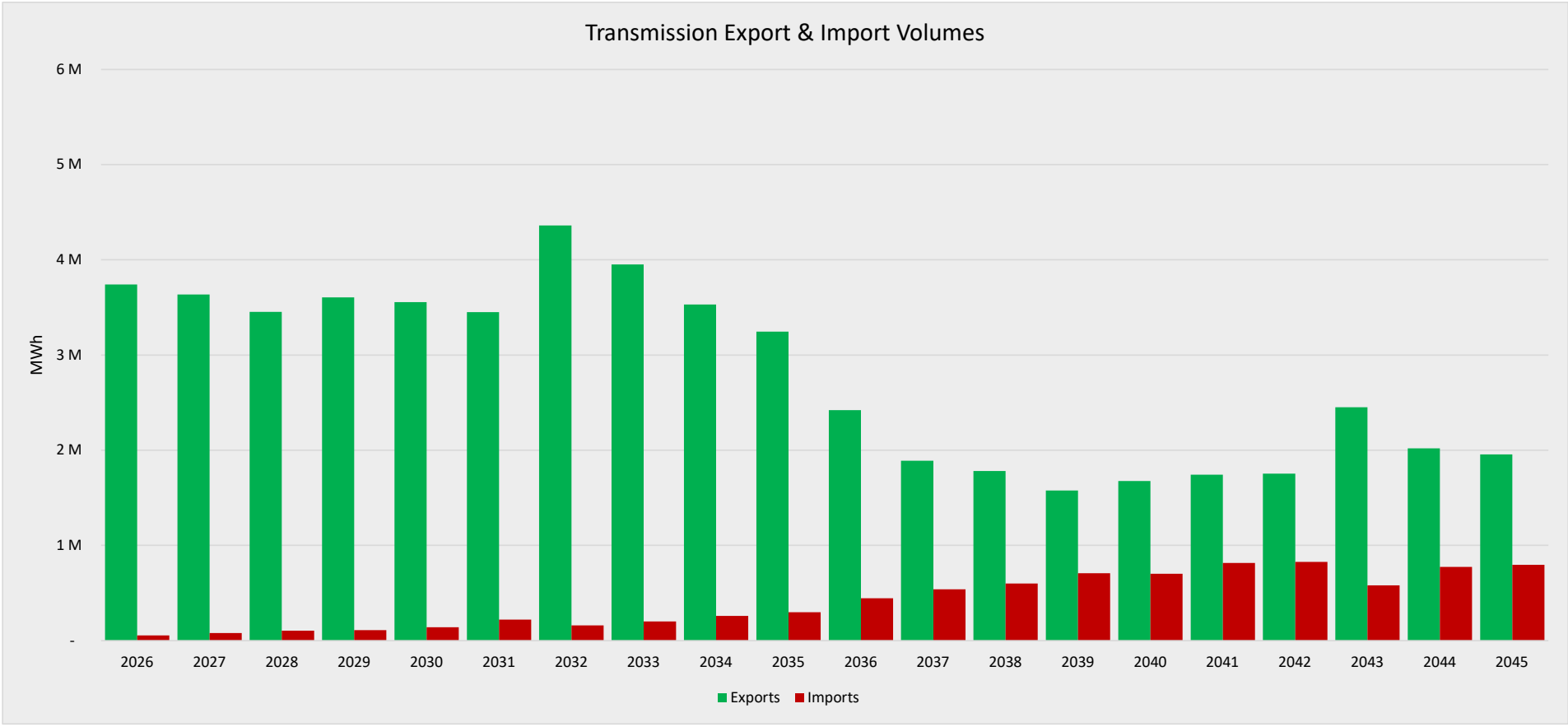
Capacity Factor for PCM results of Scenario A – Base Case.



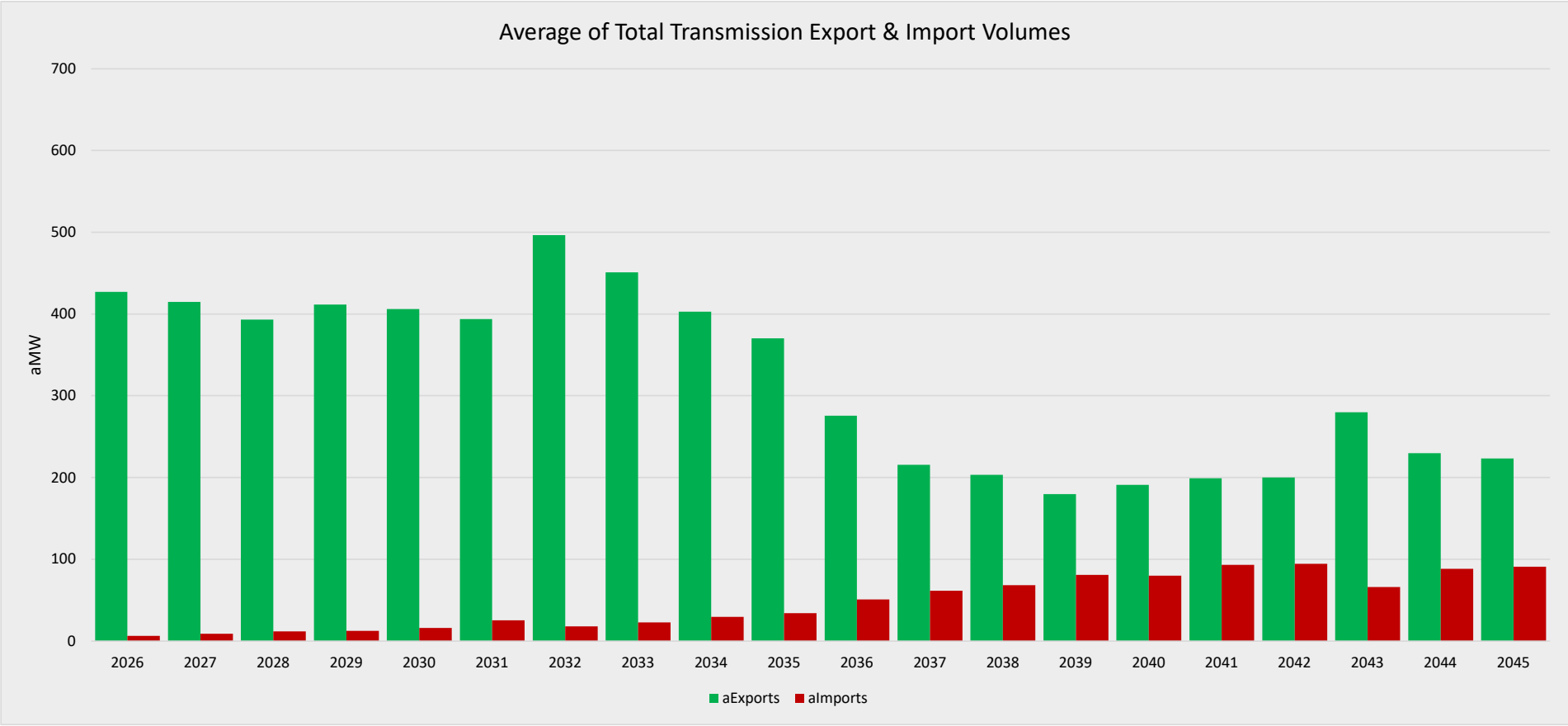
Emissions for PCM results of Scenario A – Base Case.



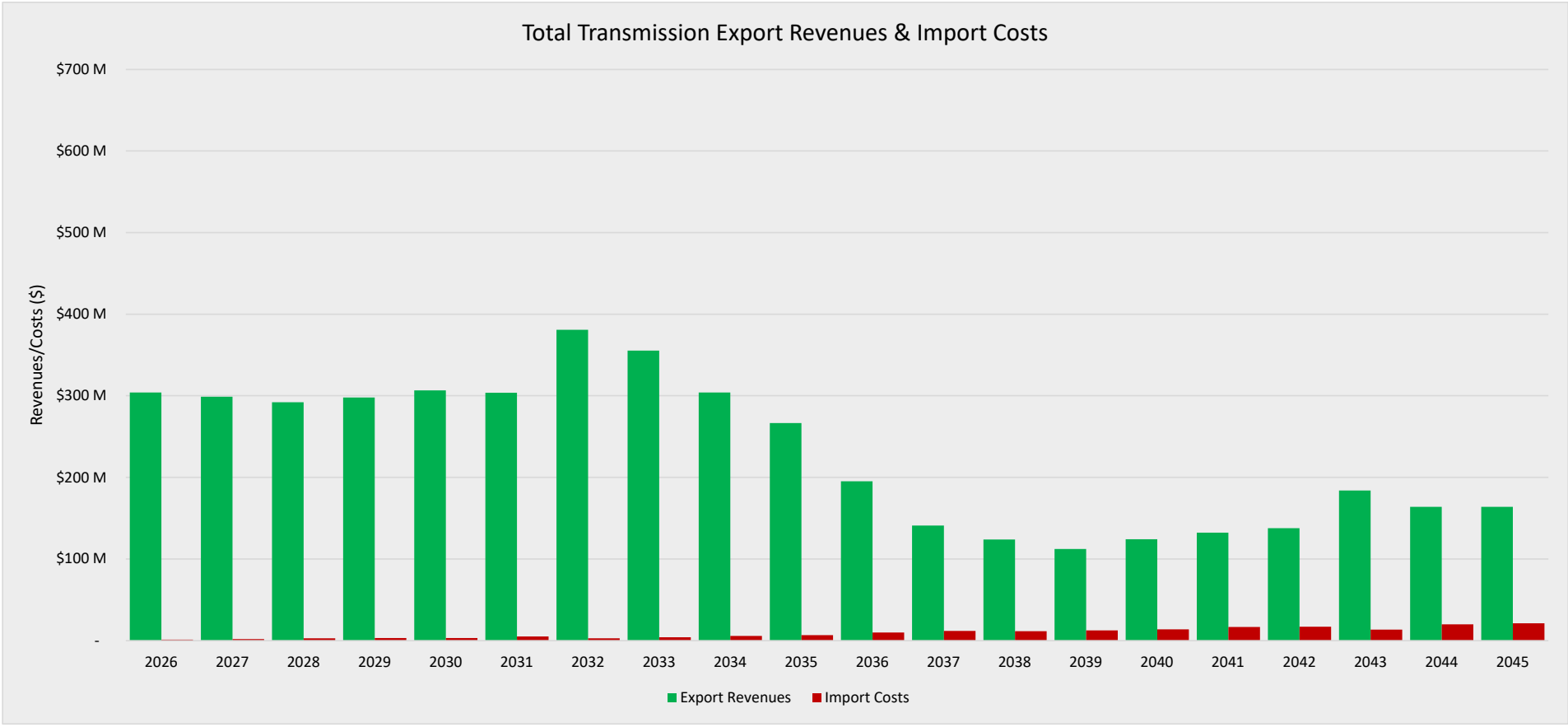
Transmission volumes for PCM results of Scenario A – Base Case



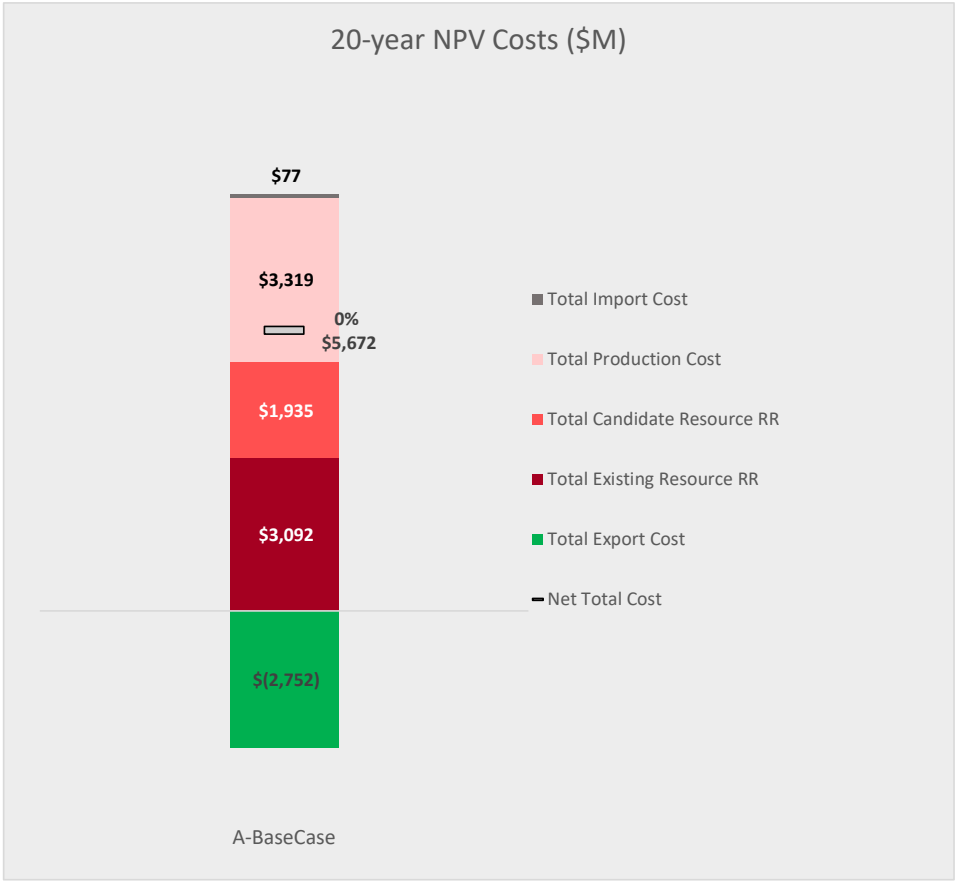
Average transmission usage for PCM results of Scenario A – Base Case



Transmission revenues for PCM results of Scenario A – Base Case.



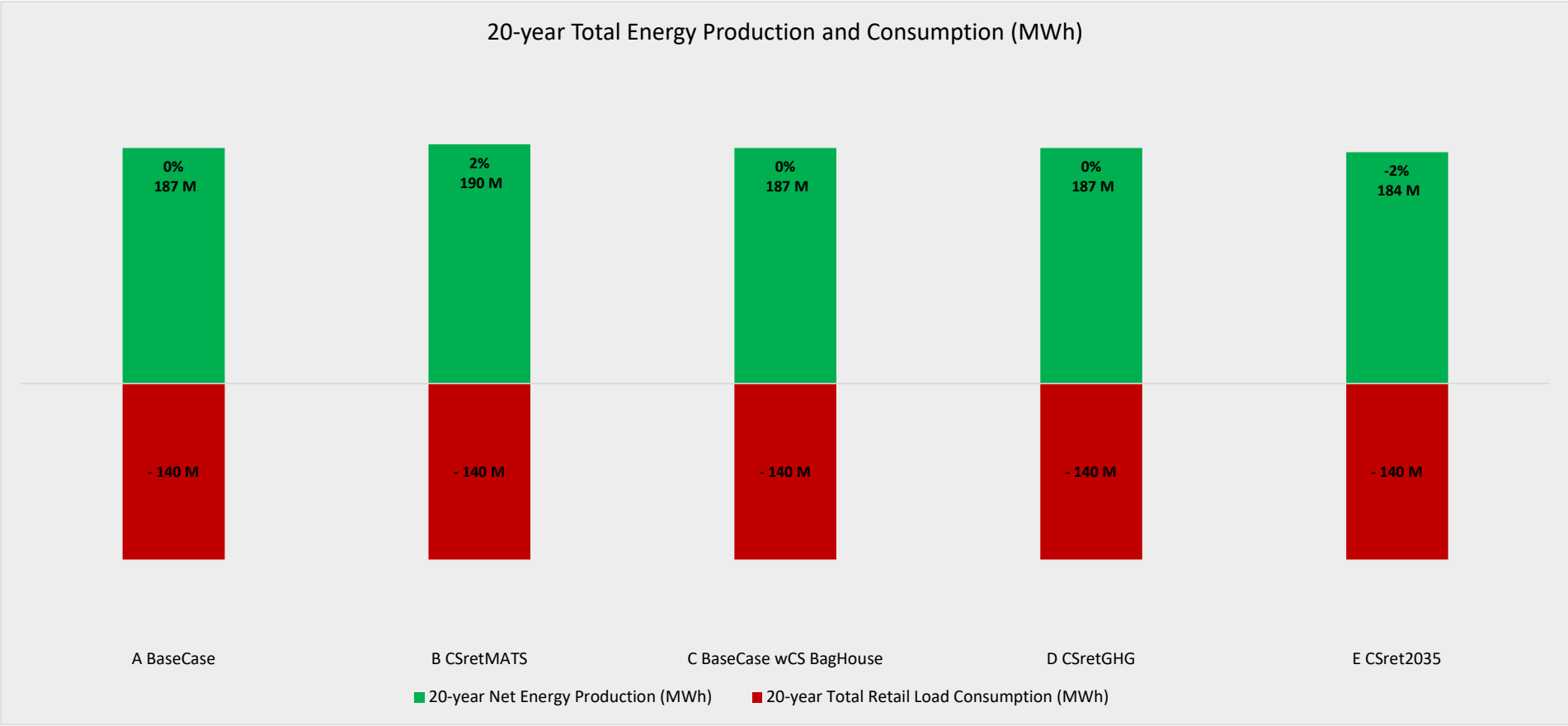
Total portfolio costs for PCM results of Scenario A – Base Case.



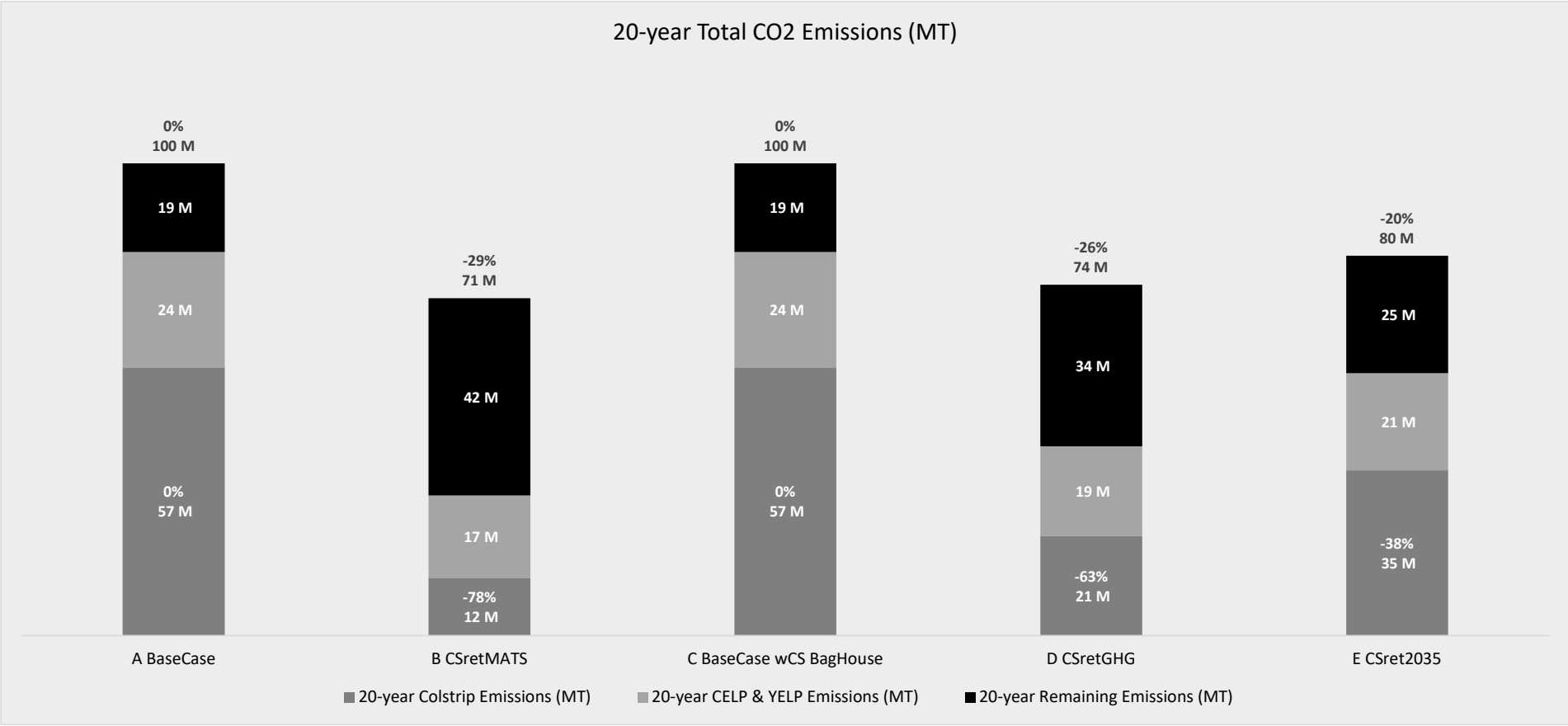
PCM Summary

Base Case & Main Scenarios

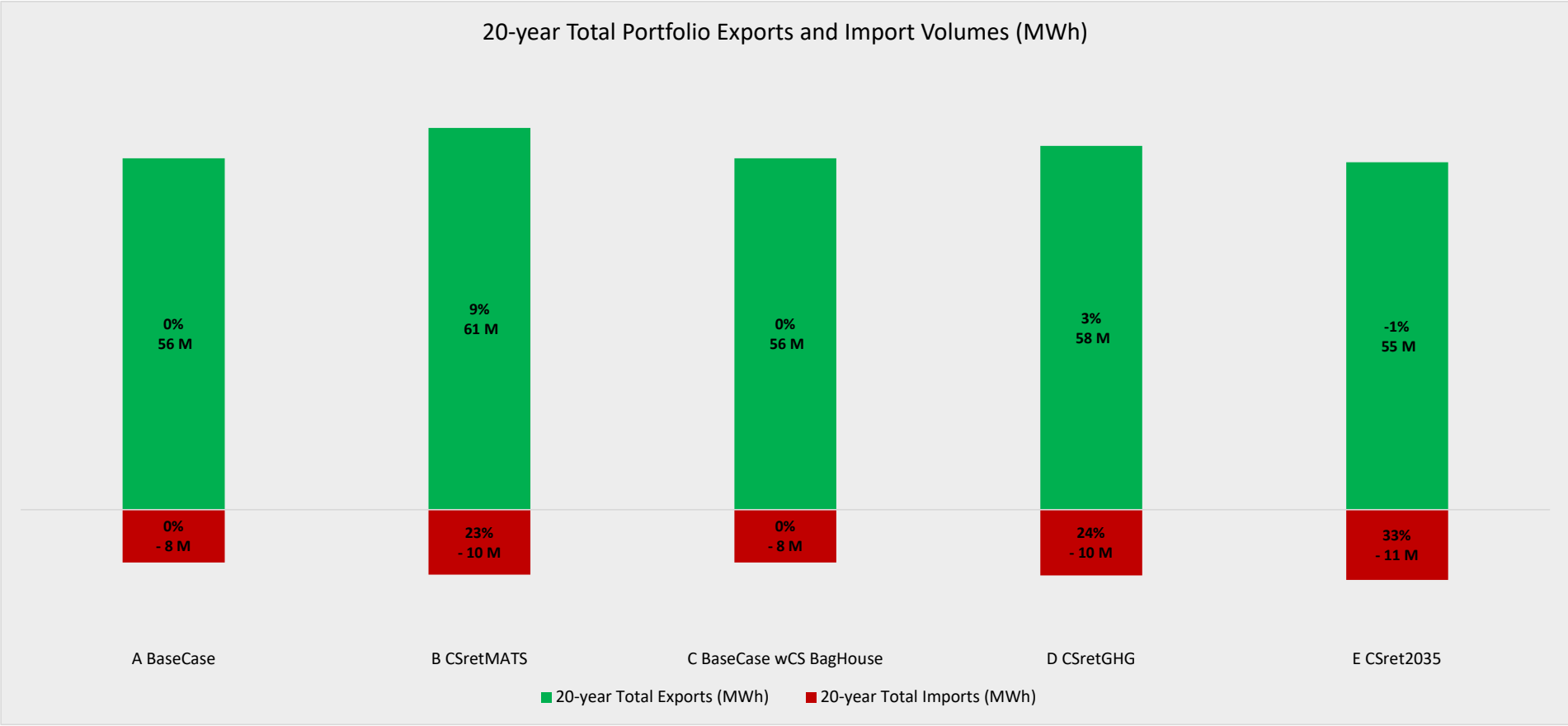
The total energy production of the Base Case and the Main Scenarios relative to the forecasted load.



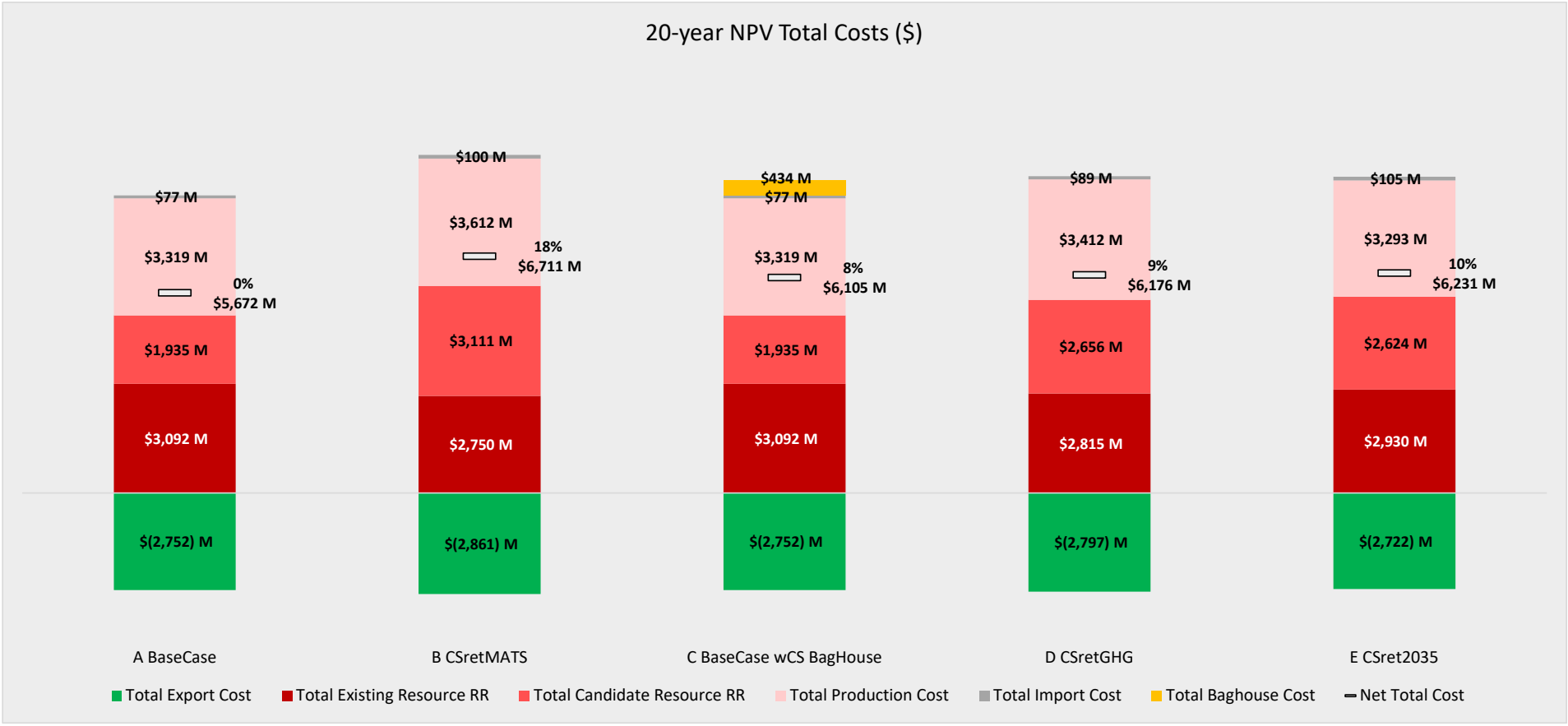
CO2 emissions from the Base Case and the Main Scenarios.



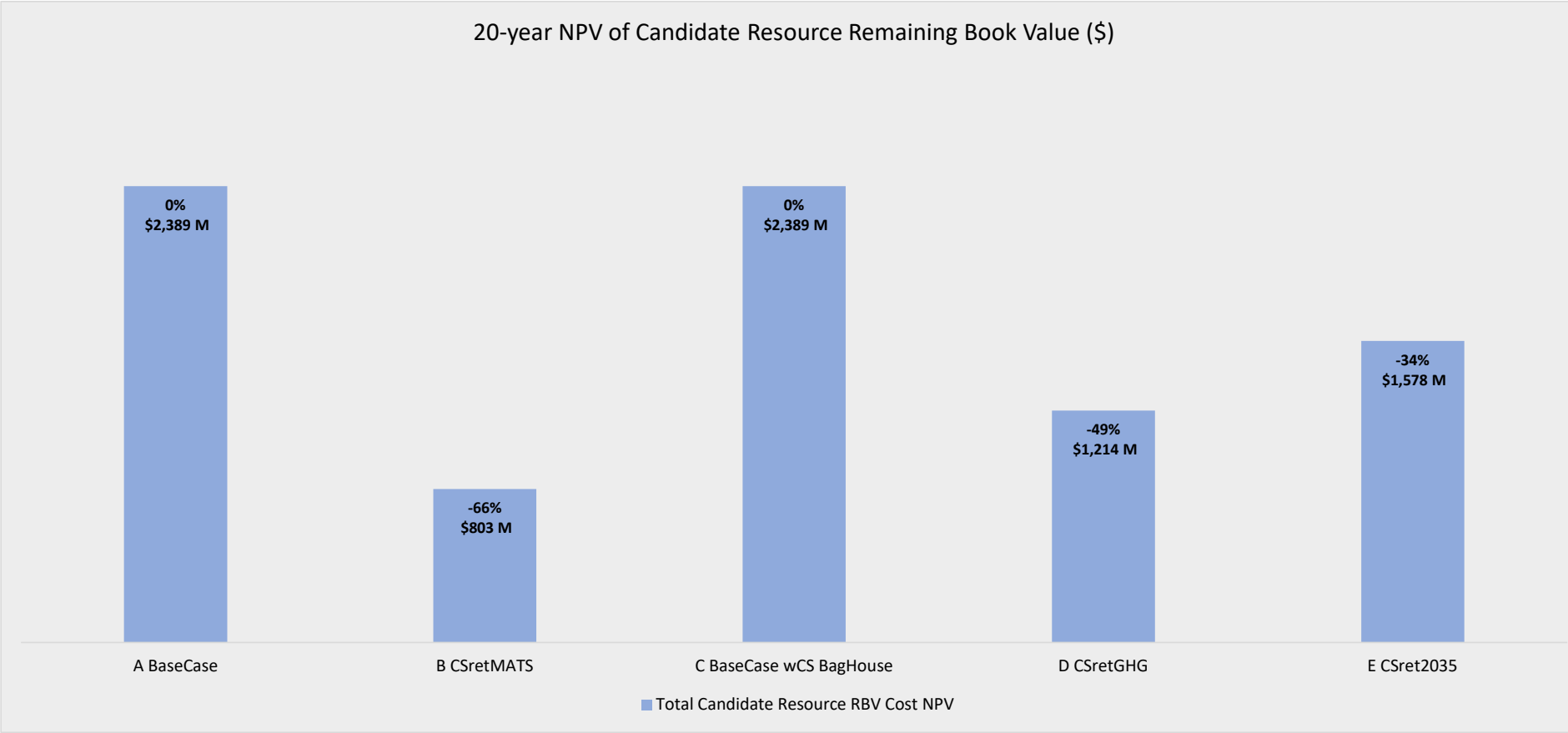
Transmission imports and exports from the Base Case and the Main Scenarios.



PCM results for the Base Case and the Main Scenarios

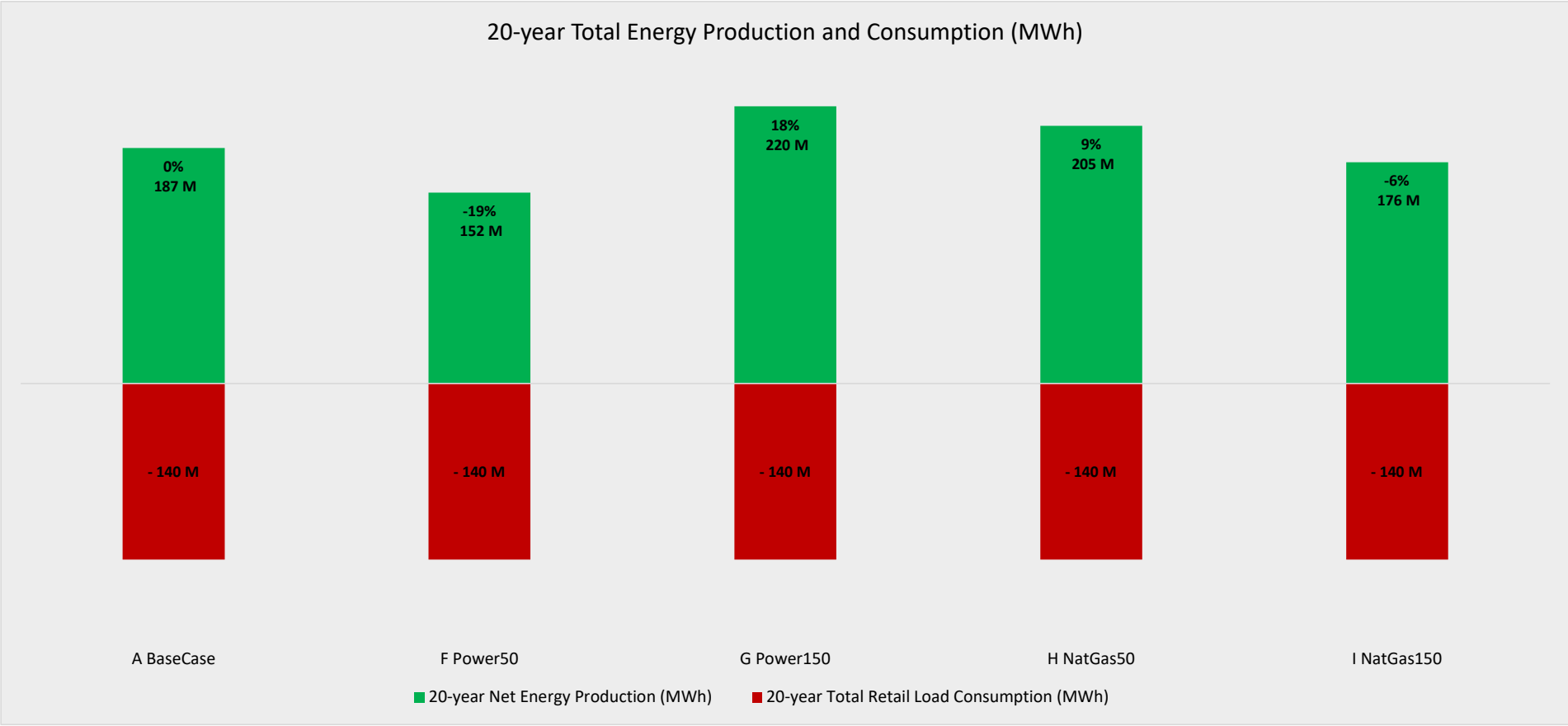


Remaining book value for candidate resources in the Base Case and the Main Scenarios.

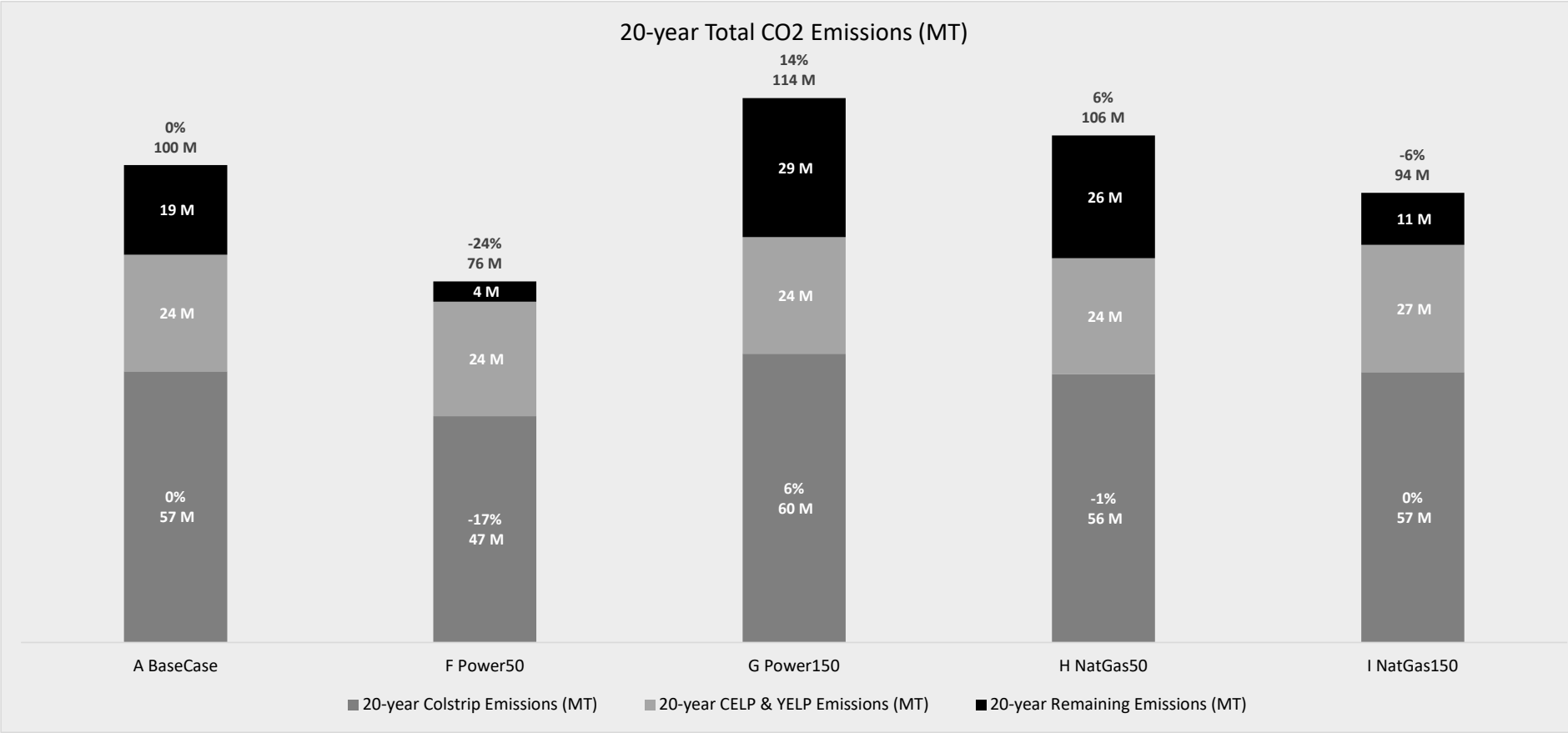


Base Case & Commodity Sensitivities

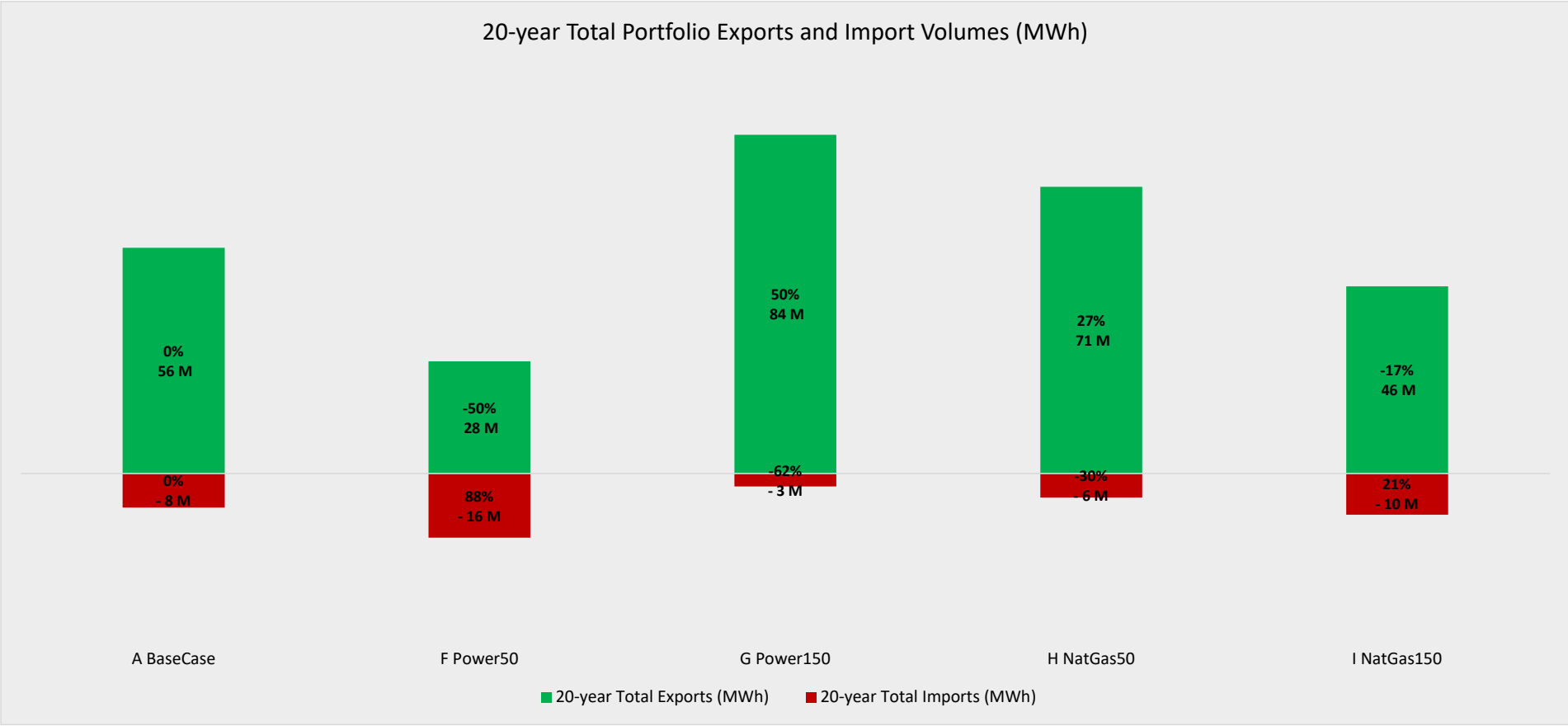
The total energy production of the Base Case and Commodity Sensitivities relative to the forecasted load.



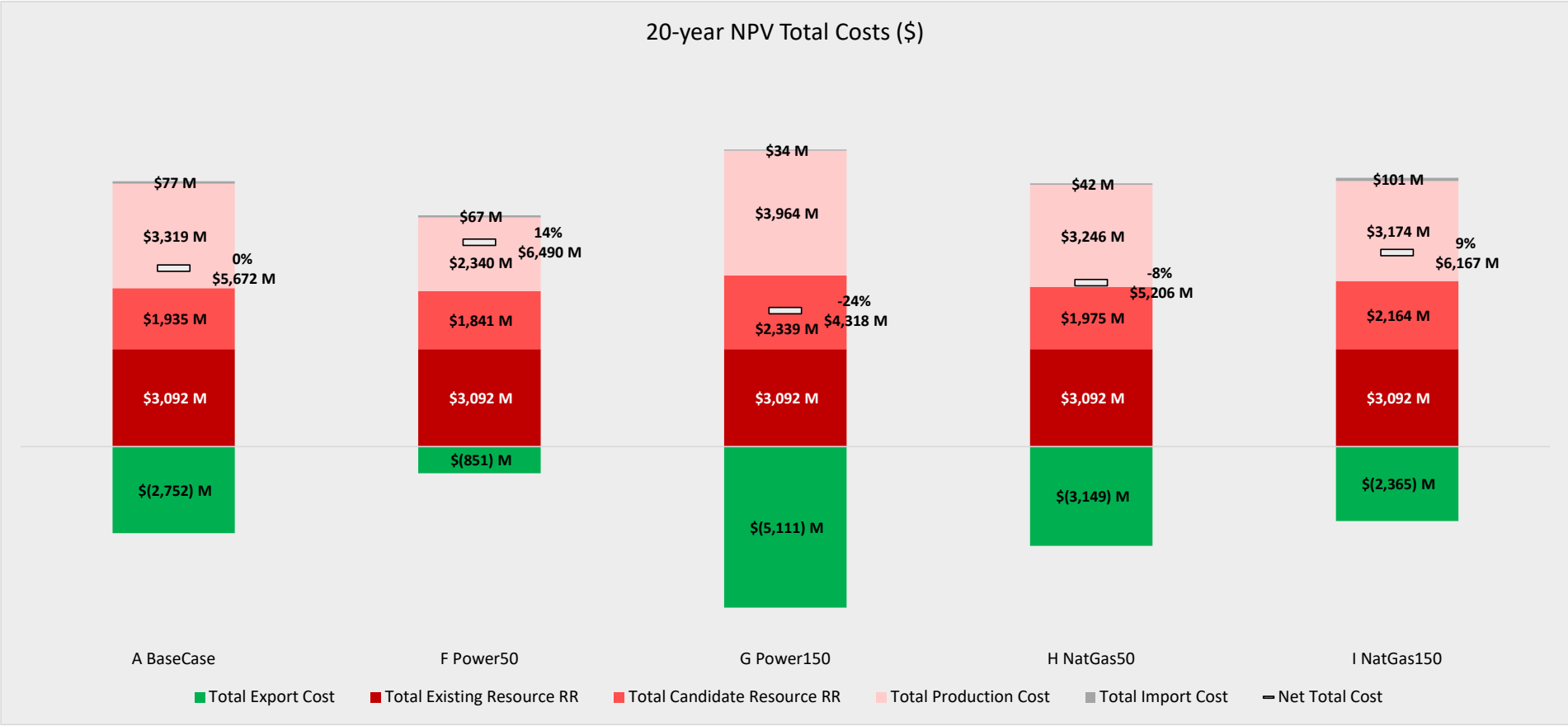
Carbon emissions from the Base Case and Commodity Sensitivities.



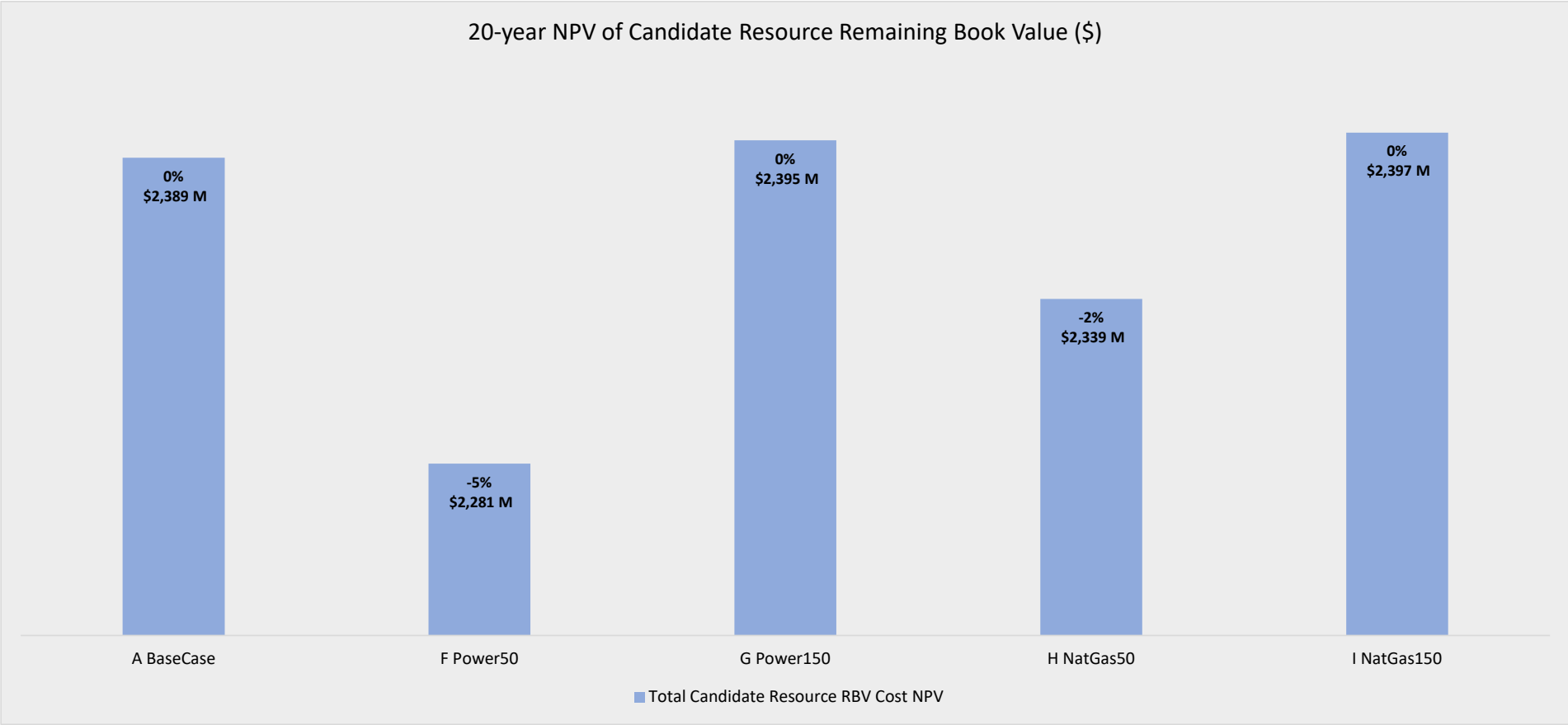
Transmission imports and exports from the Base Case and Commodity Sensitivities.



PCM results for the Base Case and Commodity Sensitivities.

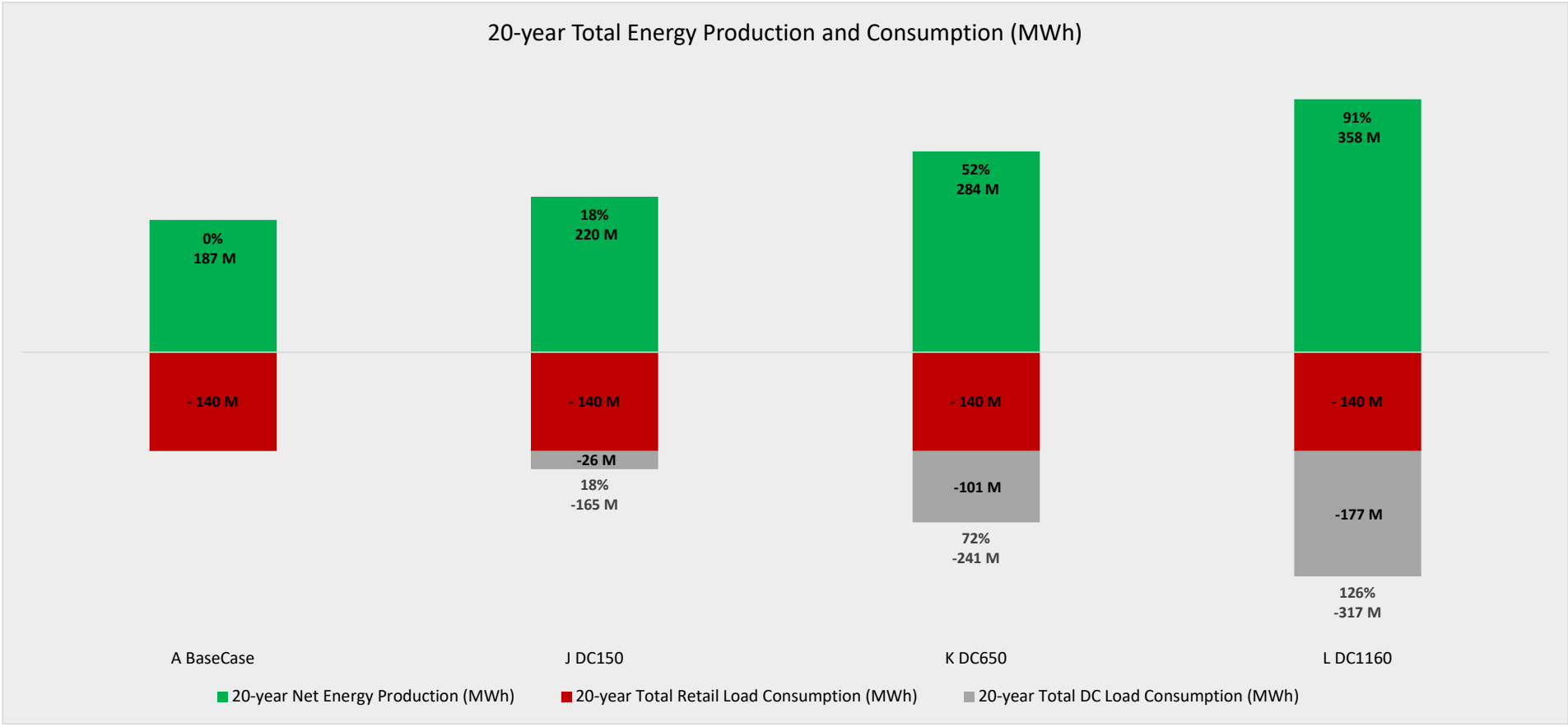


Remaining book value for candidate resources in the Base Case and Commodity Sensitivities.

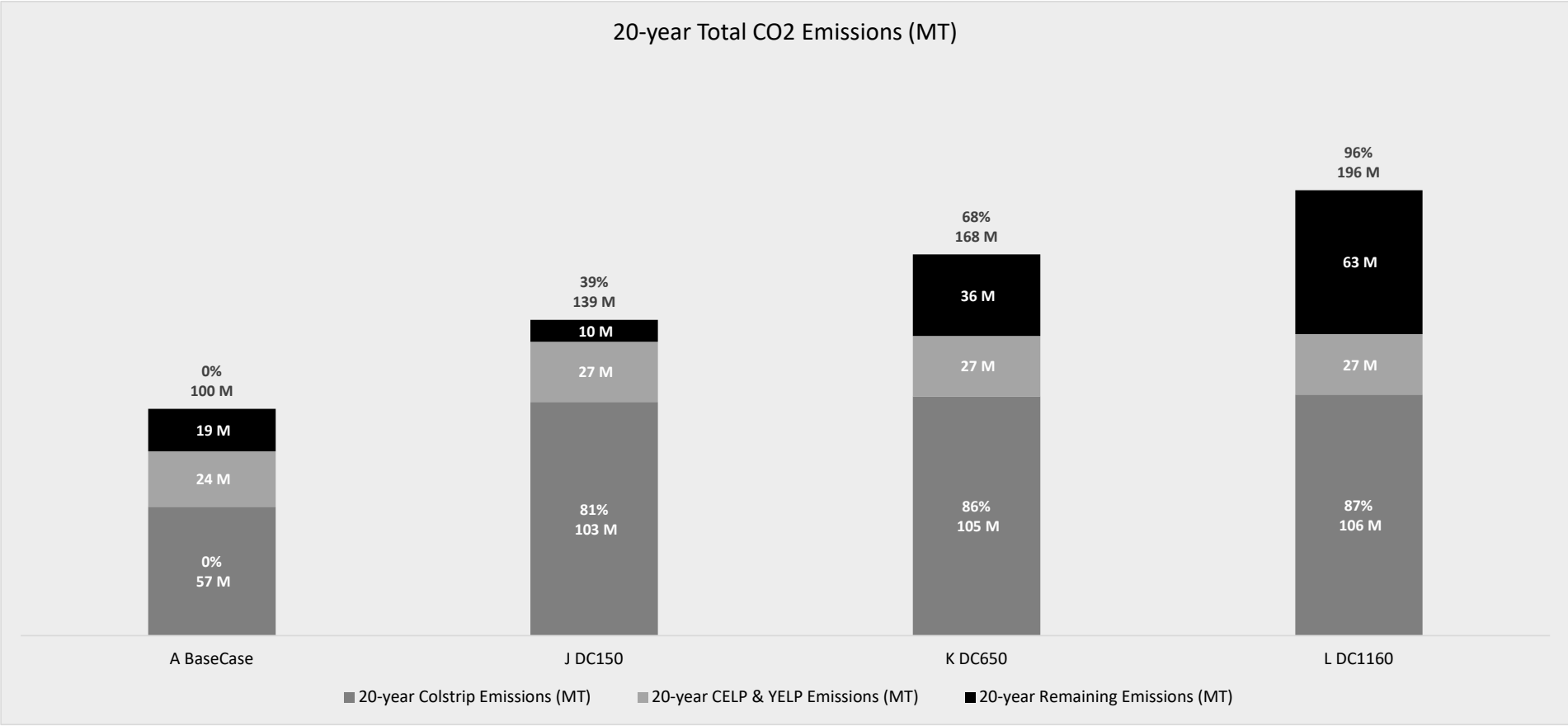


Base Case & Data Center Sensitivities

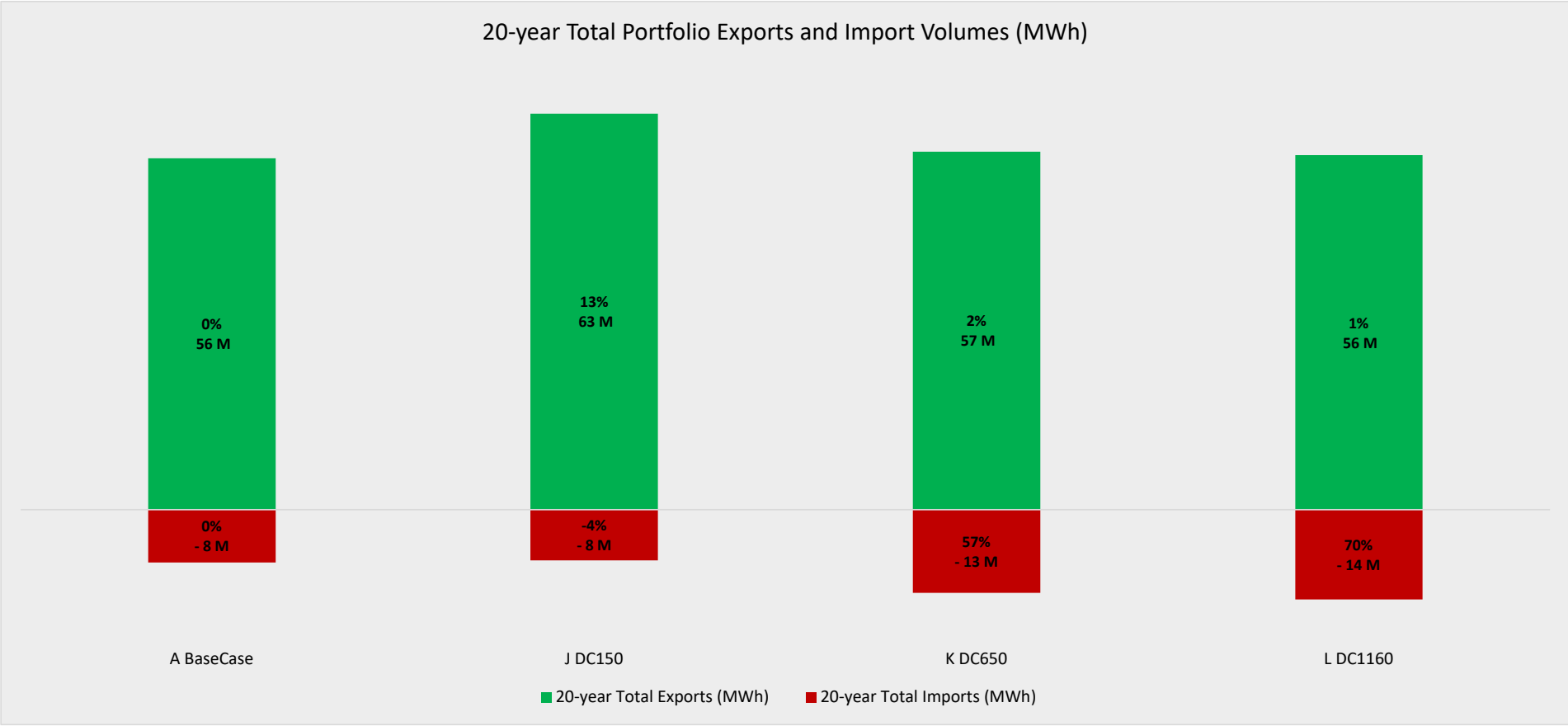
The total energy production of the Base Case and the Data Center Sensitivities relative to the forecasted load.



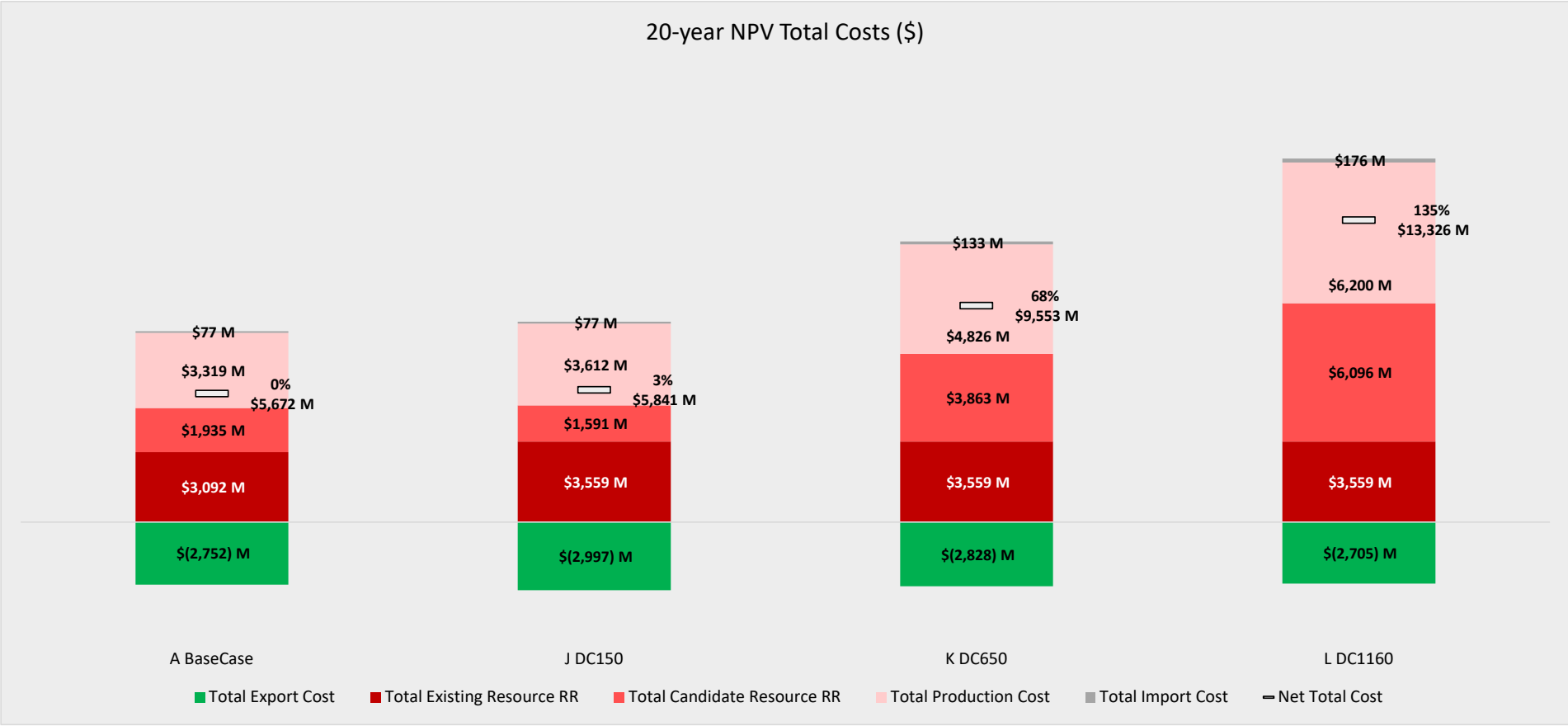
Carbon emissions from the Base Case and the Data Center Sensitivities.



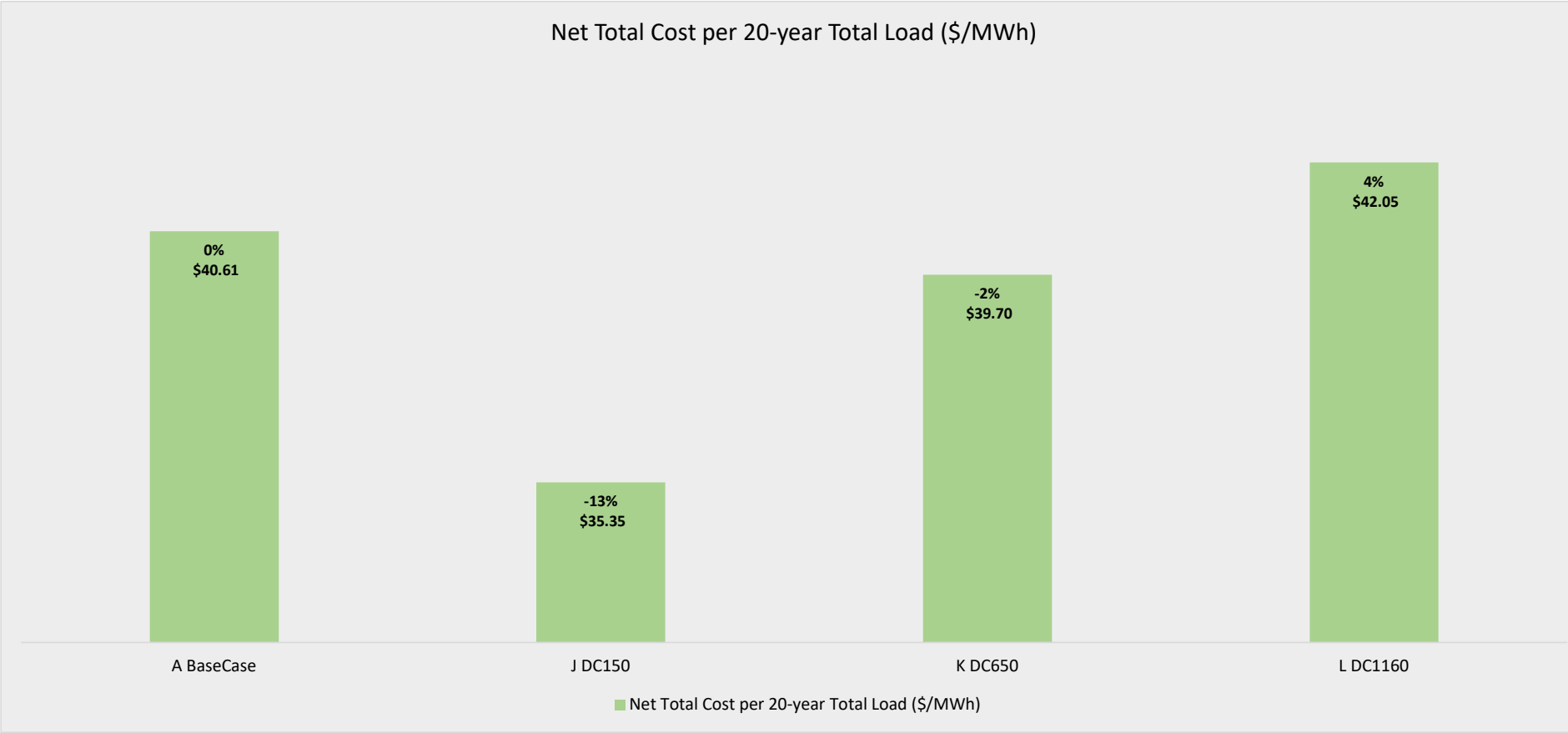
Transmission imports and exports from the Base Case and the Data Center Sensitivities.



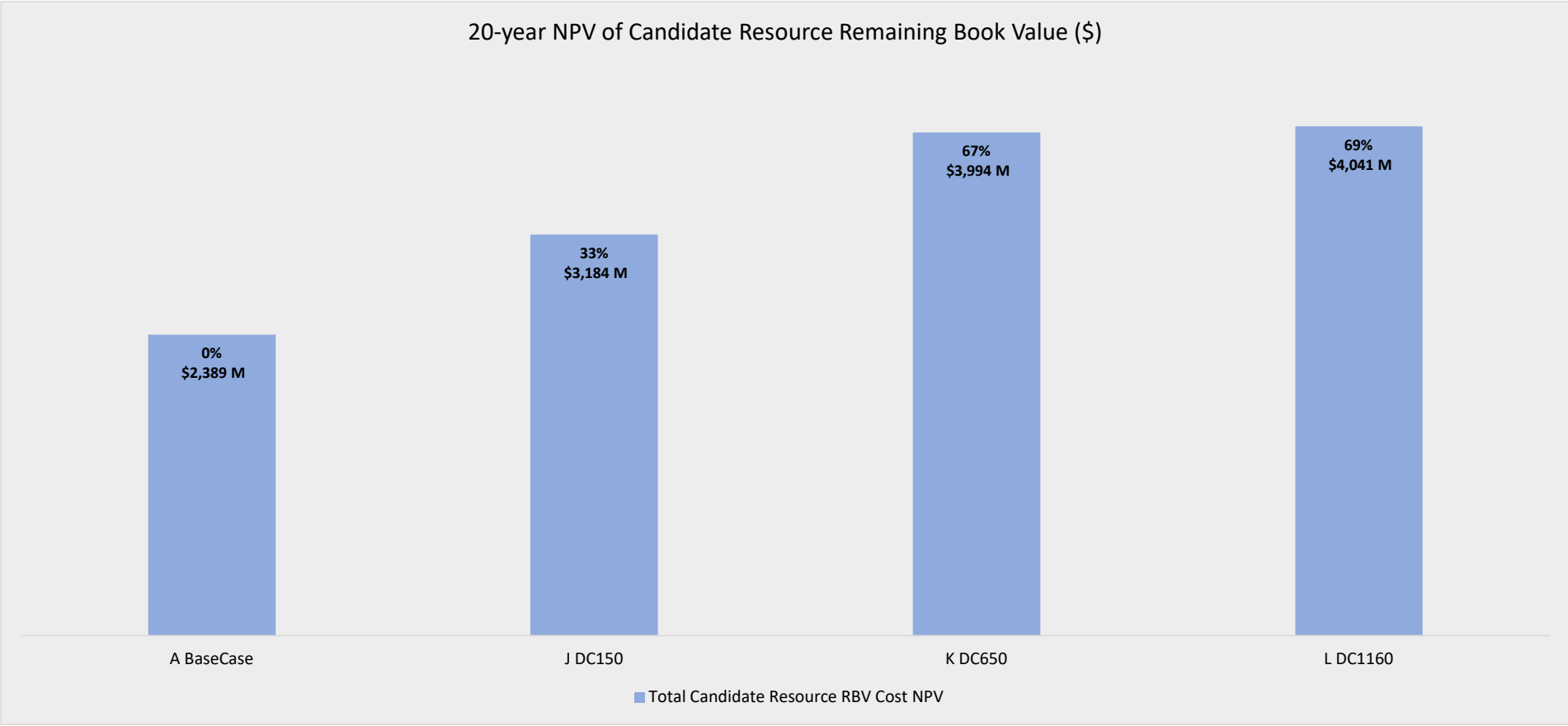
PCM results for the Base Case and Data Center Sensitivities.



PCM results for the Base Case and Data Center Sensitivities represented as the 20-year NPV total cost per total 20-year total load.

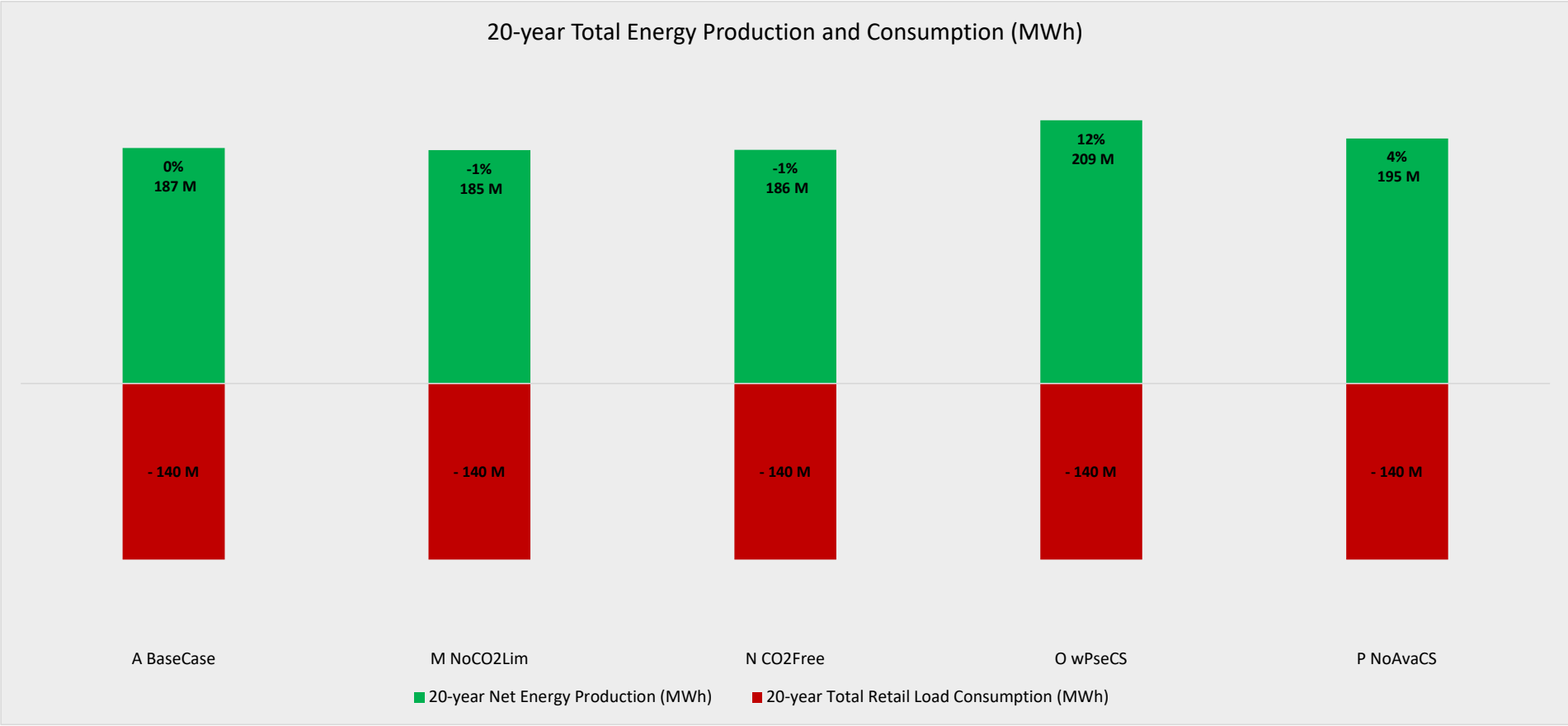


Remaining book value for candidate resources in the Base Case and Data Center Sensitivities.

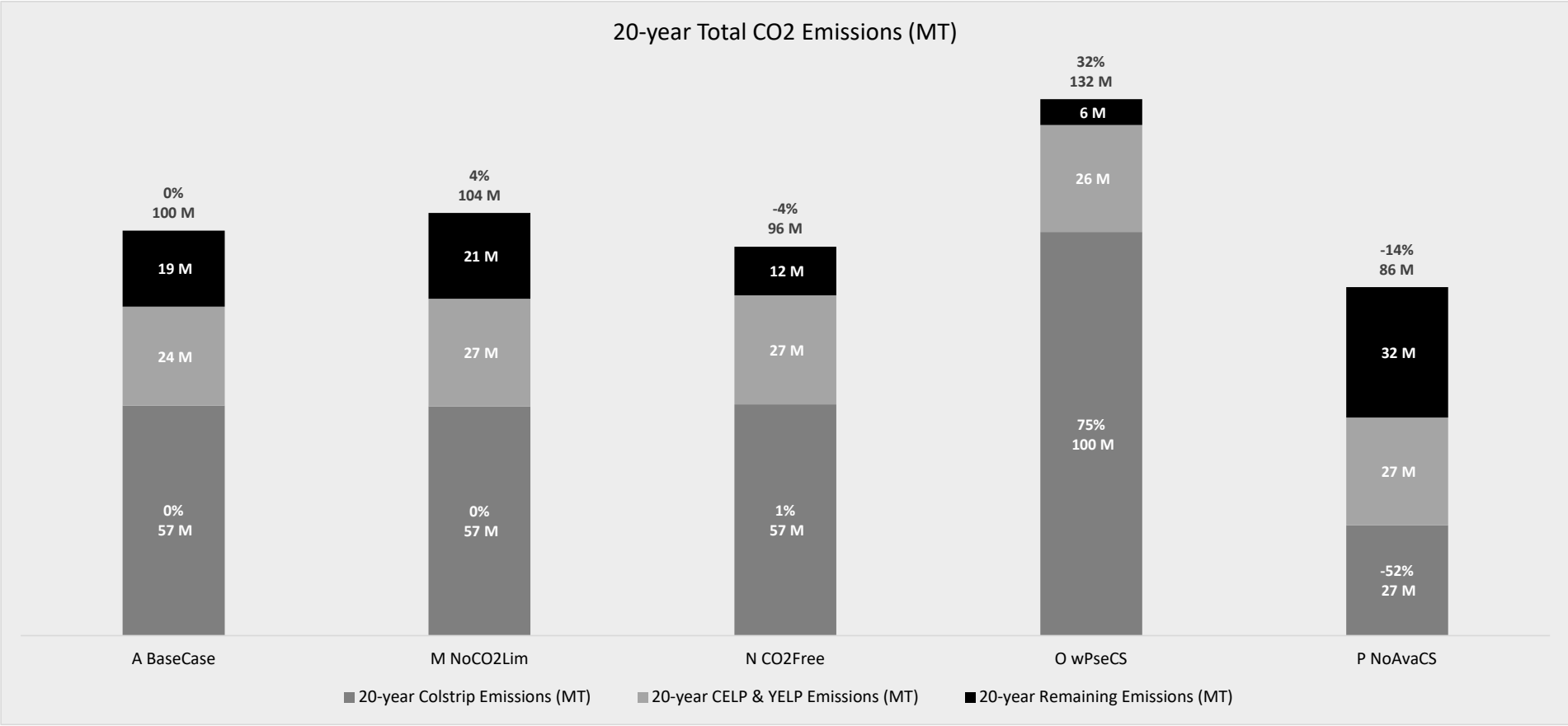


Base Case & Resource Sensitivities

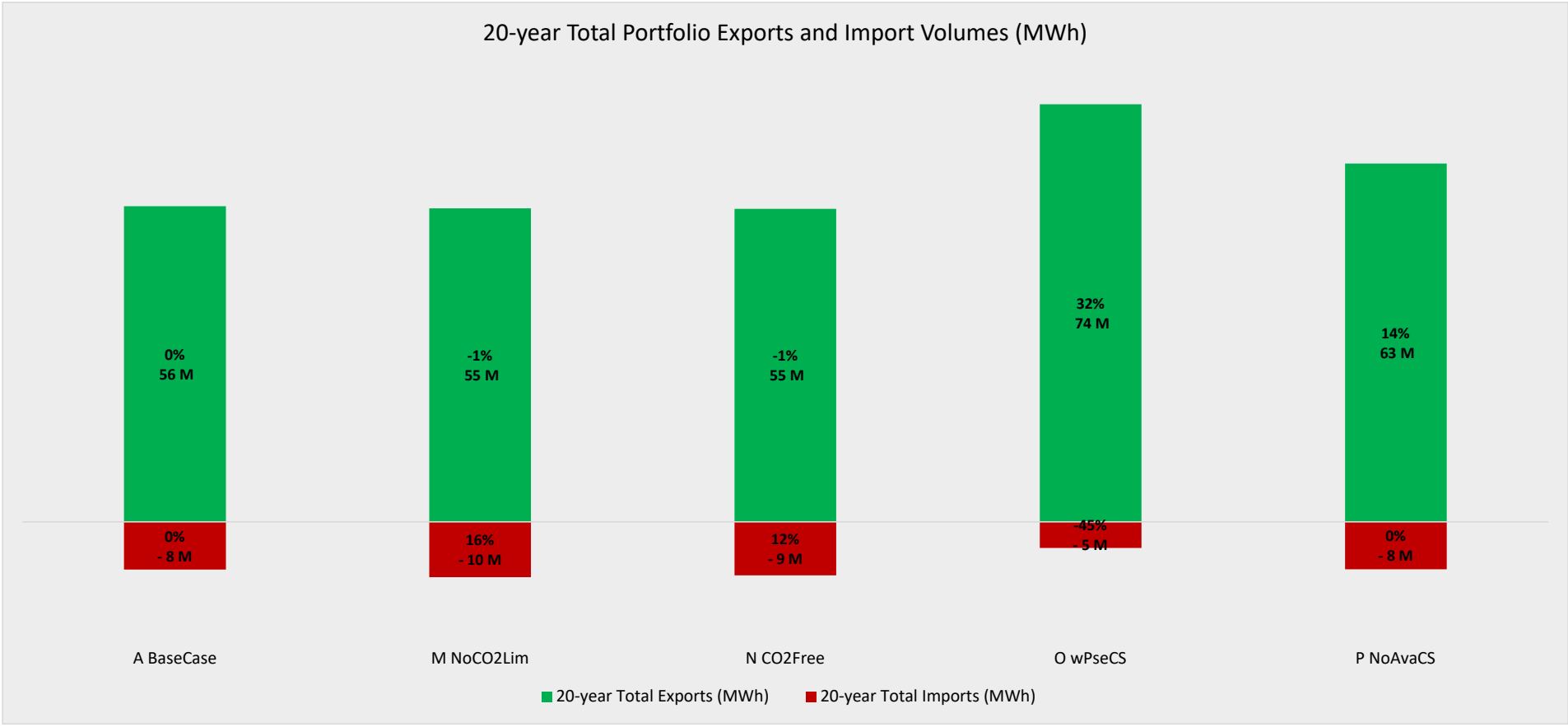
The total energy production of the Base Case and the resource sensitivities relative to the forecasted load.



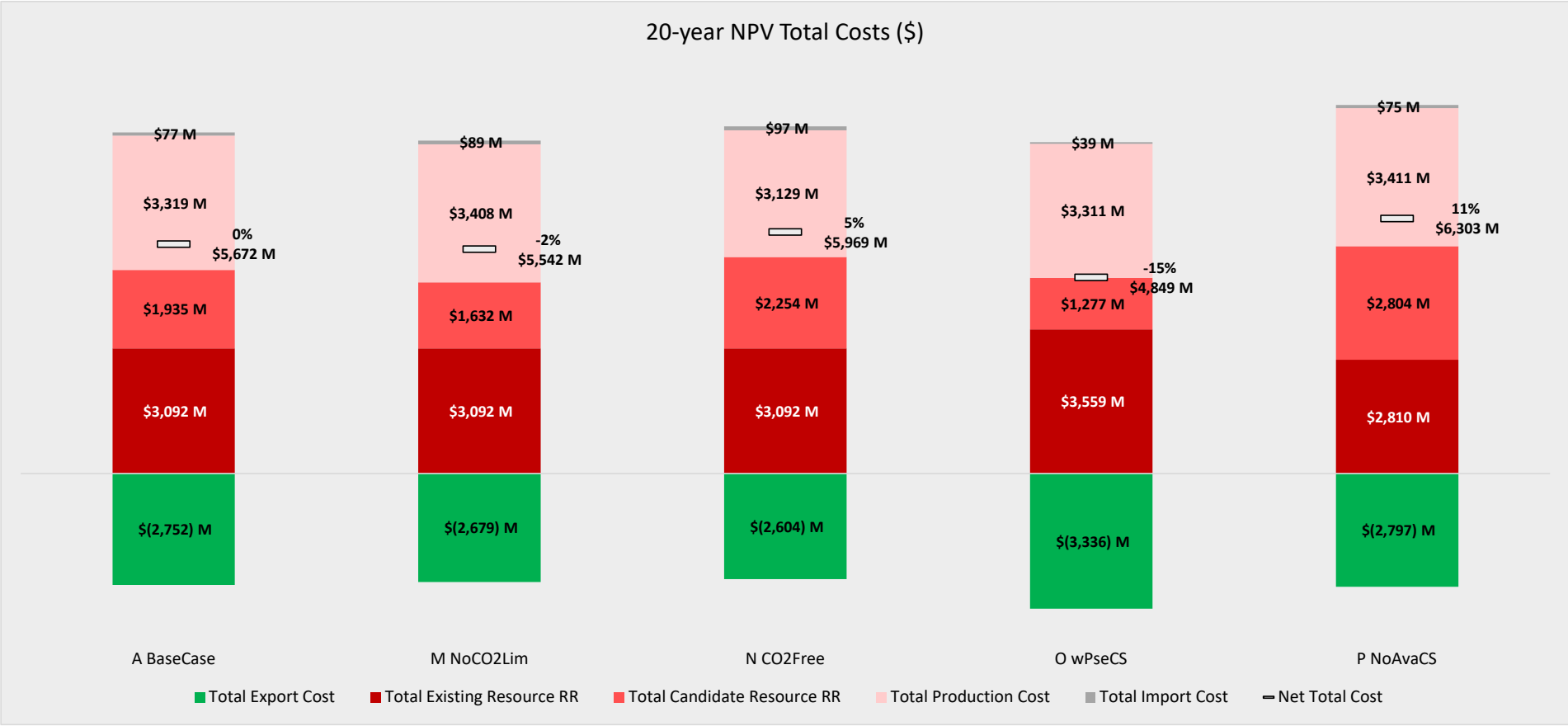
Carbon emissions from the Base Case and the resource sensitivities.



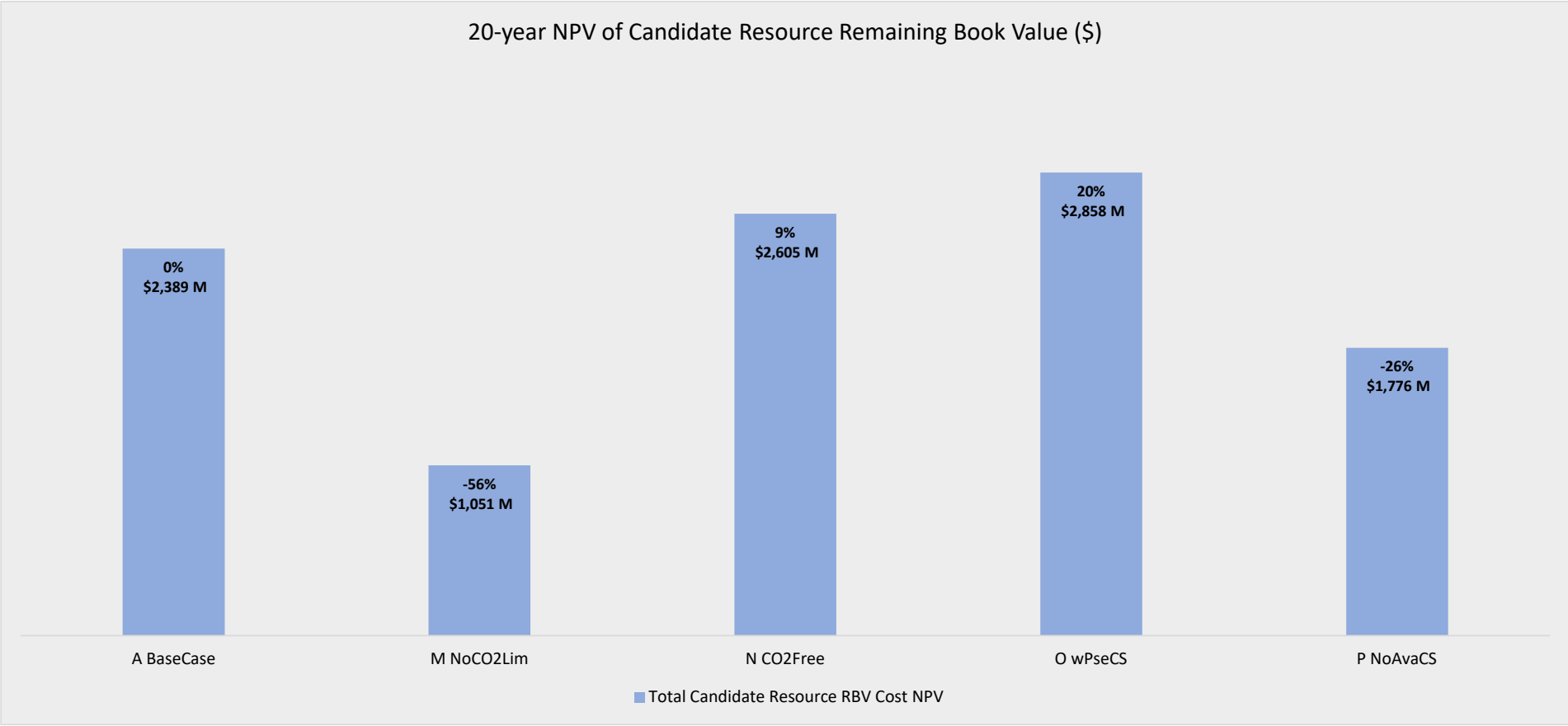
Transmission imports and exports from the Base Case and the resource sensitivities.



PCM results for the Base Case and the resource sensitivities.

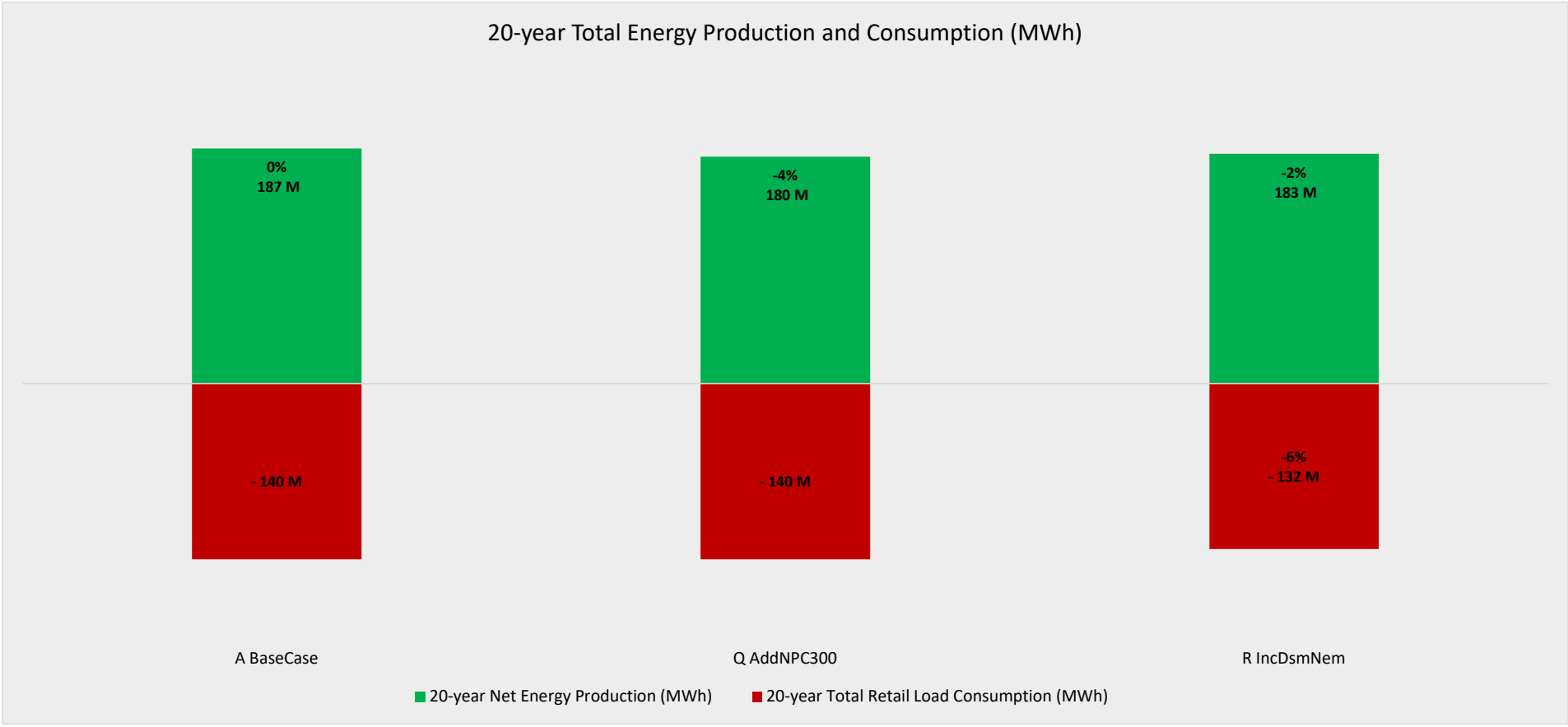


Remaining book value for candidate resources in the Base Case and the resource sensitivities.

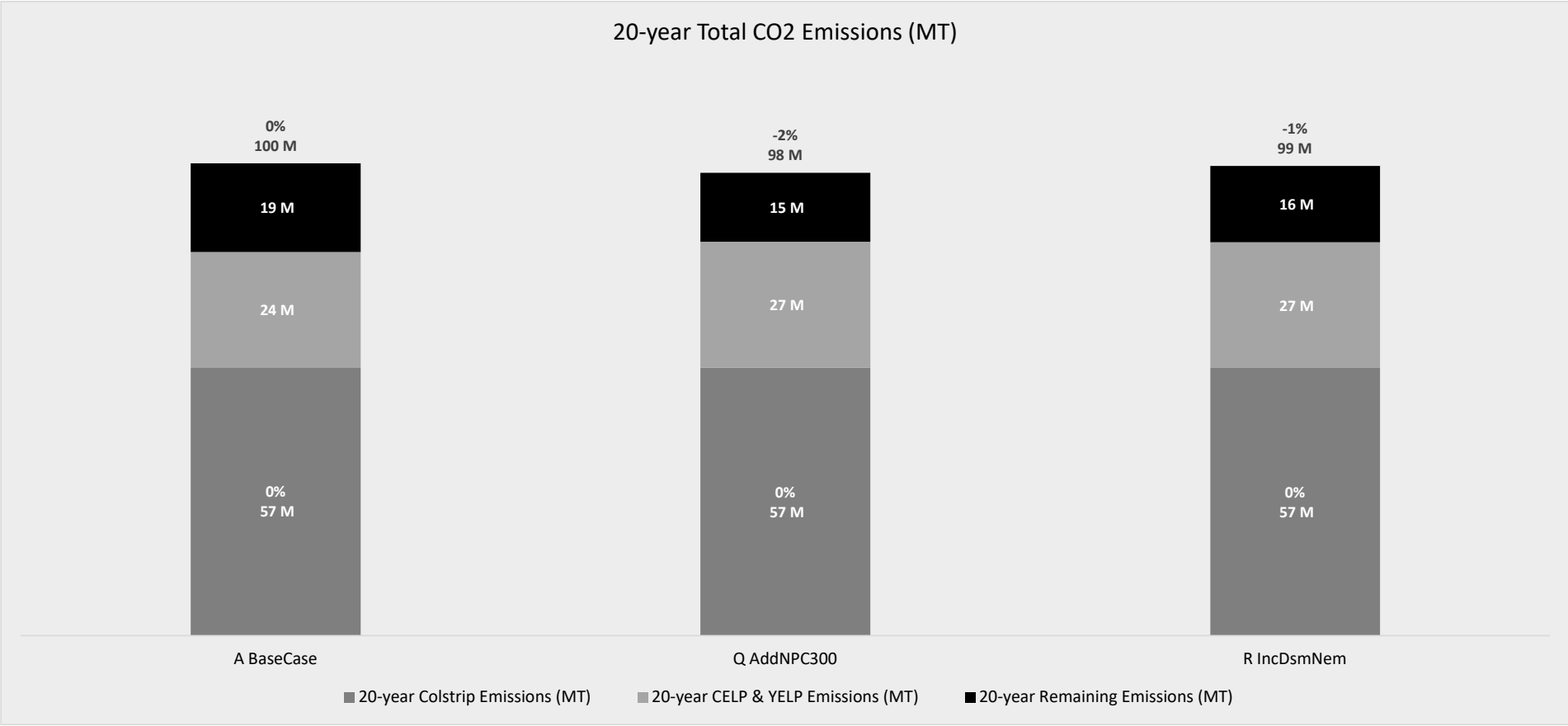


Base Case & Other Sensitivities

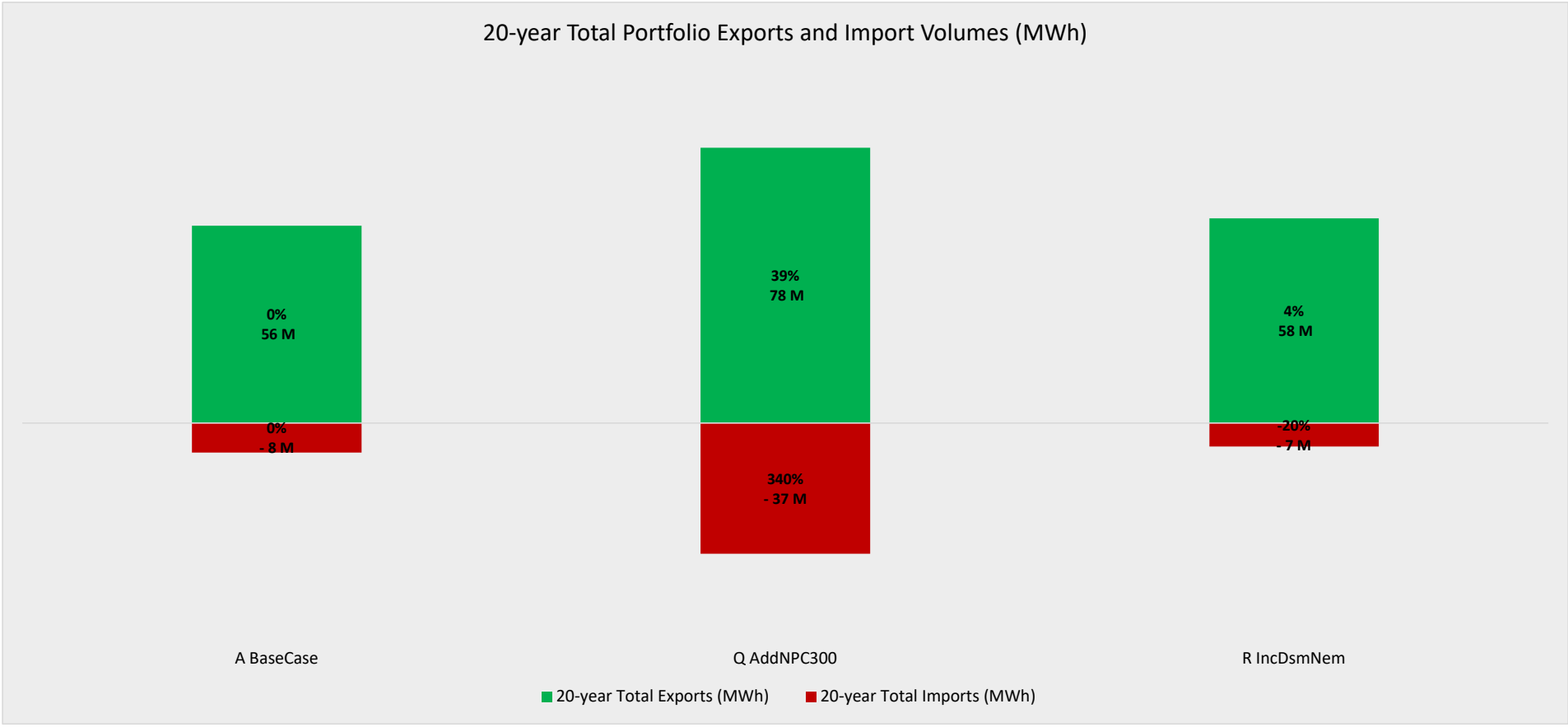
The total energy production of the Base Case and the other sensitivities to the forecasted load.



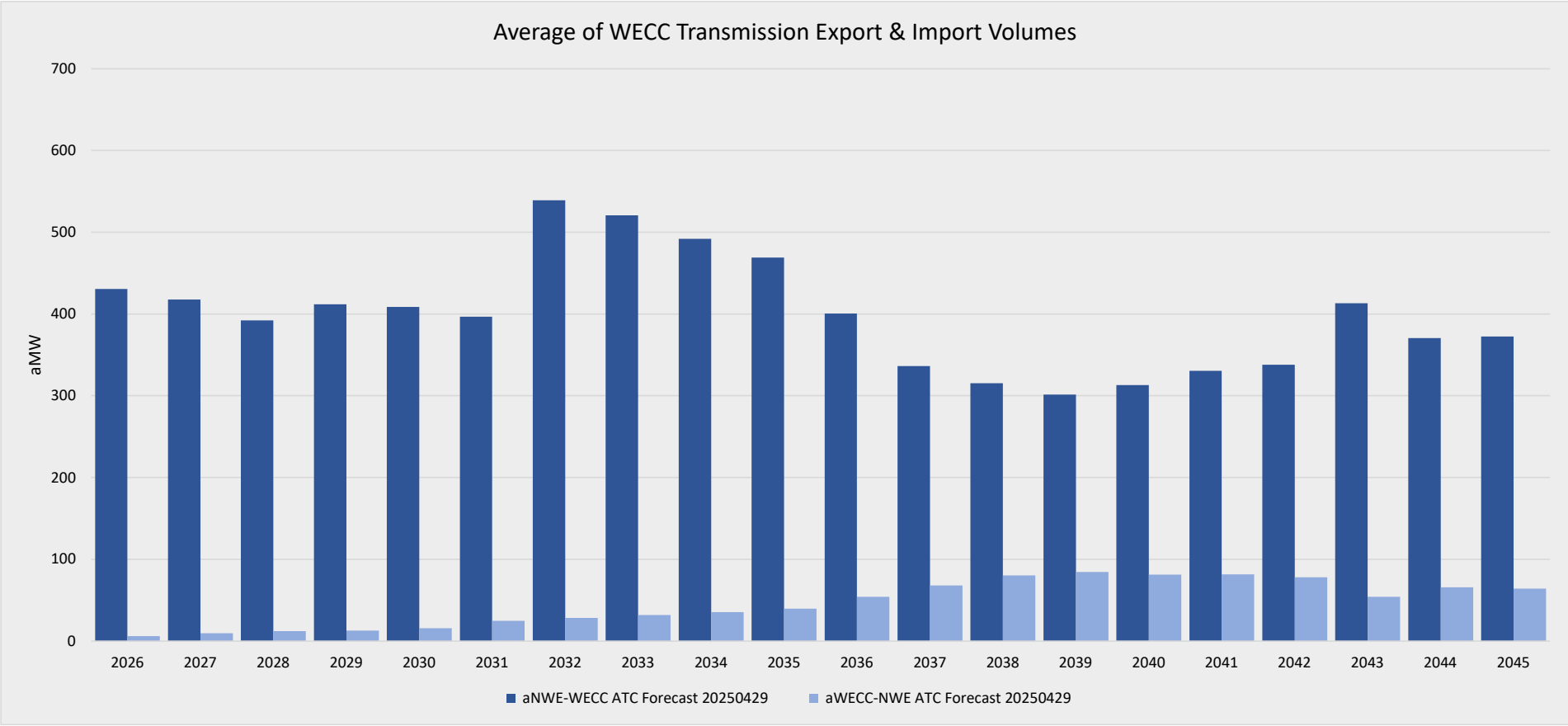
Carbon emissions from the Base Case and the other sensitivities.



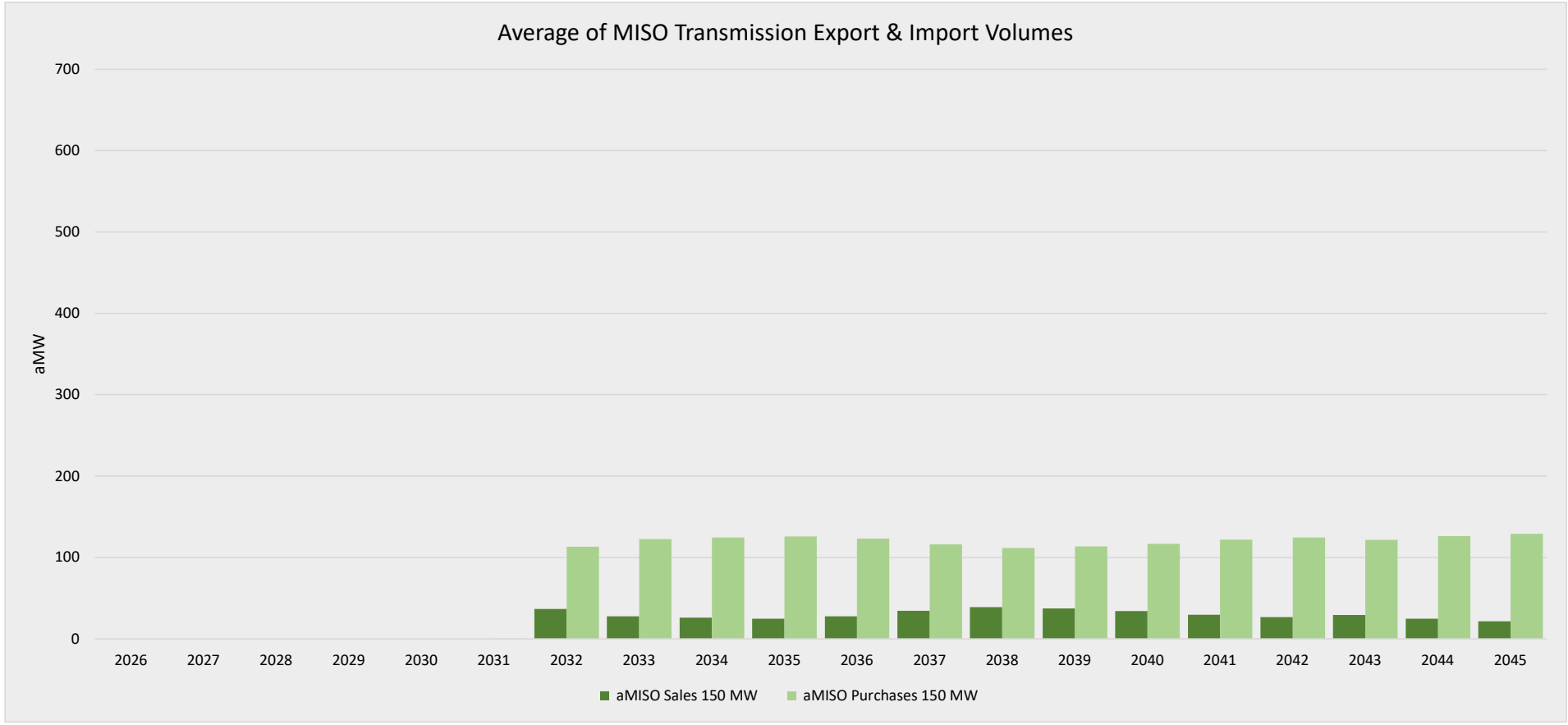
Transmission imports and exports from the Base Case and the other sensitivities.



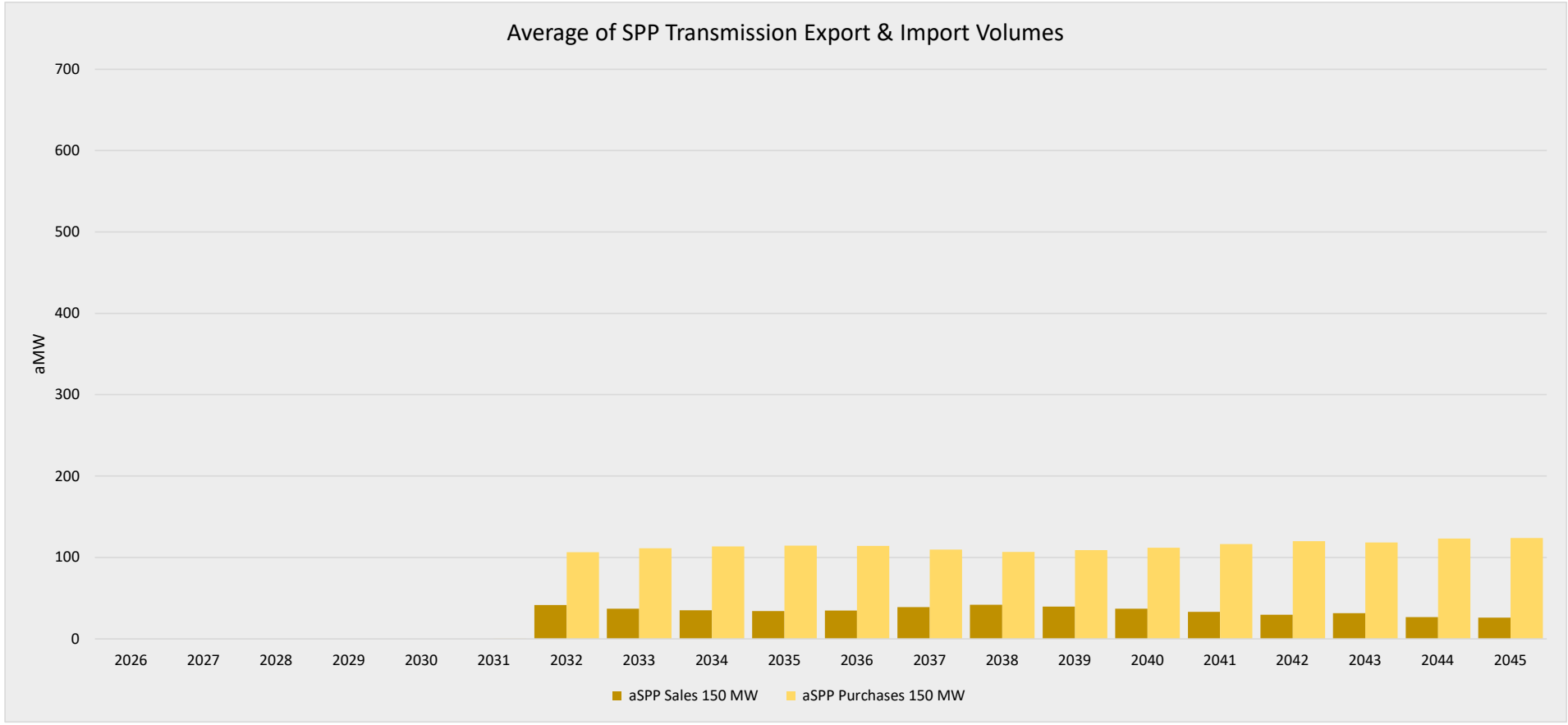
Sensitivity Q transmission imports and exports from and to the WECC interconnection.



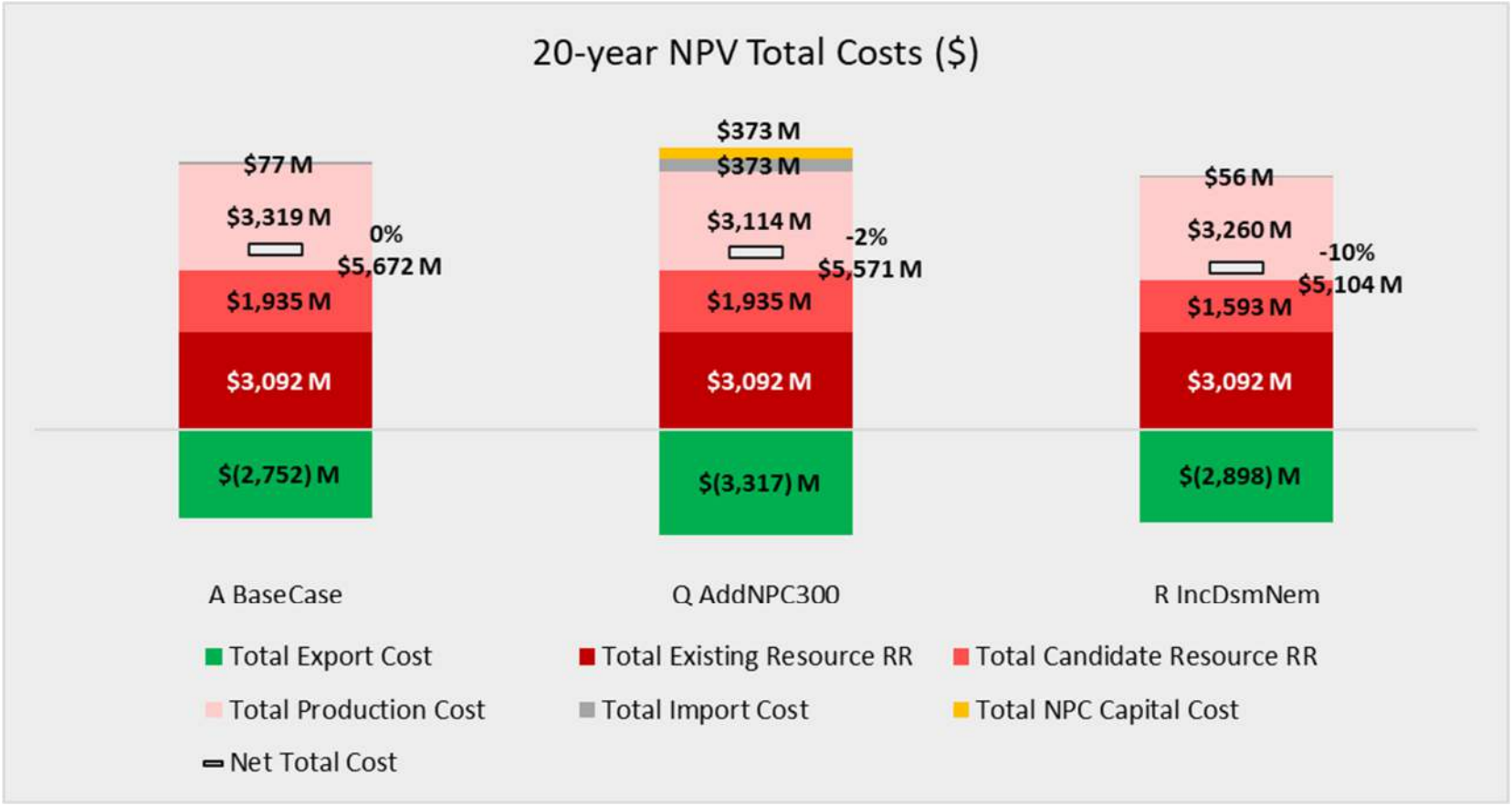
Sensitivity Q transmission imports and exports from and to the SPP power market.



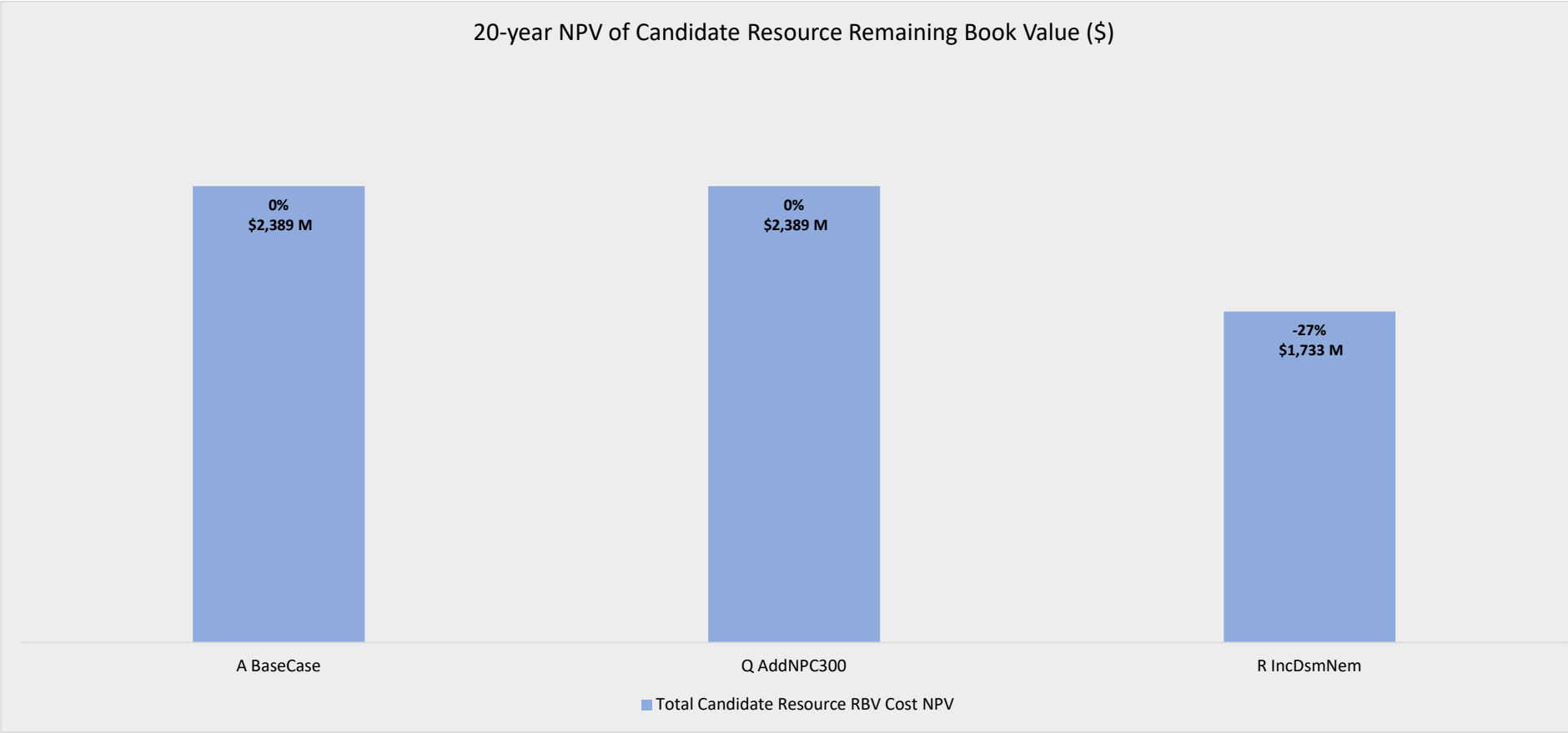
Sensitivity Q transmission imports and exports from and to the MISO power market.



PCM results for the Base Case and the other sensitivities.



Remaining book value for candidate resources in the base case and the other sensitivities.



Questions/Comments?