2021 Integrated Resource Plan

March 19, 2021

Welcome

2021 El Paso Electric Company Integrated Resource Plan Public Participation March 2021 Meeting

Agenda

1) IRP modeling status summary
2) NM Renewable Energy Act requirements
3) Transmission for new resources
4) Assumptions update
5) Model updates and results
6) Next steps

Safe Harbor

Certain matters discussed in this Integrated Resource Plan ("IRP") public advisory group presentation other than statements of historical information are "forward-looking statements" made pursuant to the safe harbor provisions of the Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended.

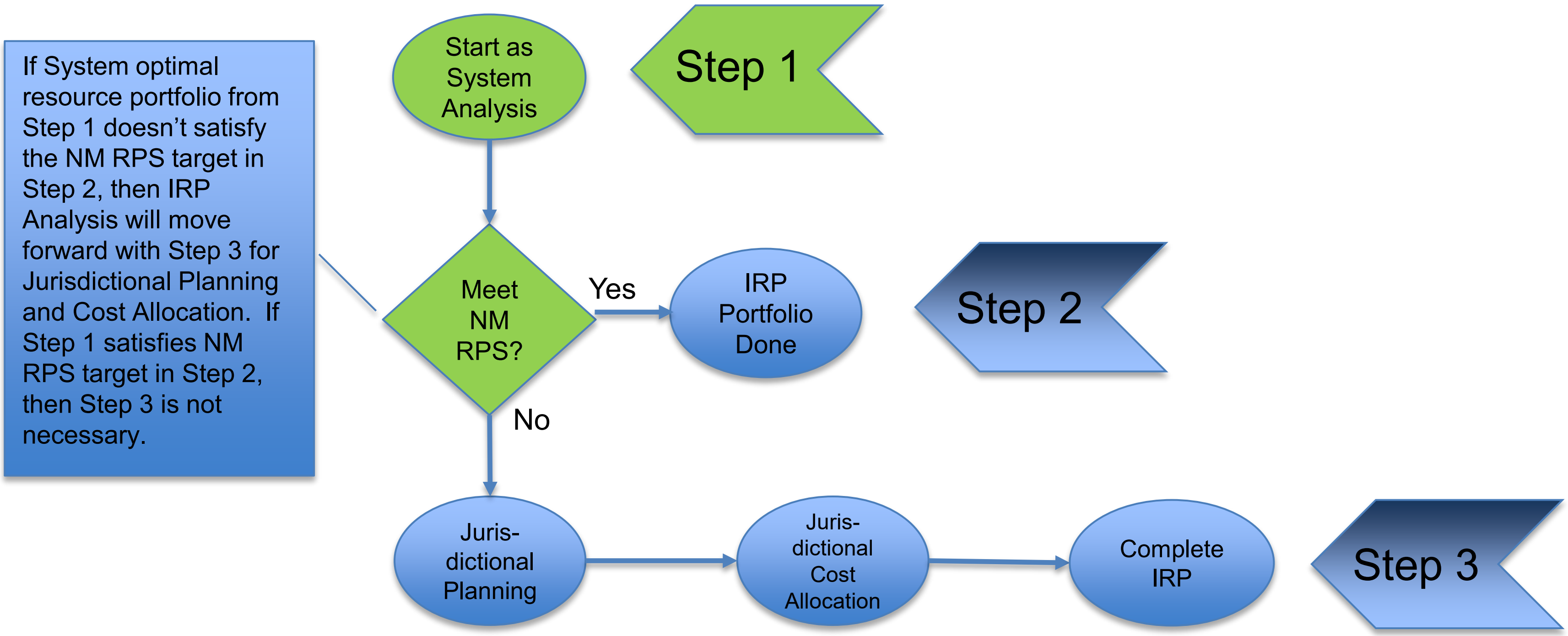
Forward-looking statements often include words like we “believe”, “anticipate”, “target”, “project”, “expect”, “predict”, “pro forma”, “estimate”, “intend”, “will”, “is designed to”, “plan” and words of similar meaning, or are indicated by the Company’s discussion of strategies or trends. Forward-looking statements describe the Company’s future plans, objectives, expectations or goals and include, but are not limited to, statements regarding [anticipated future generation costs, resource need, customer growth rates, rate structure, fuel costs, purchased power pricing]. Such statements are subject to a variety of risks, uncertainties and other factors, most of which are beyond El Paso Electric Company's ("EPE" or the "Company") control, and many of which could have a significant impact on the Company's operations, results of operations, and financial condition, and could cause actual results to differ materially from those anticipated. Additional information concerning factors that could cause actual results to differ materially from those expressed in forward-looking statements is contained in EPE's Form 10-K for the fiscal year ended December 31, 2019 and Quarterly Reports filed in 2020. Any such forward-looking statement is qualified by reference to these risks and factors. EPE cautions that these risks and factors are not exclusive.

Although the Company believes that the expectations reflected in such forward-looking statements are reasonable, no assurances can be given that these expectations will prove to be correct. Forward-looking statements by their nature that could substantial risks and uncertainties that could significantly impact expected results, and actual future results could differ materially from those described in such statements. Management cautions against putting undue reliance on forward-looking statements or projecting any future assumptions based on such statements. Forward-looking statements speak only as of the date of this IRP public advisory group presentation, and EPE does not undertake to update any forward-looking statement contained herein, except to the extent the events or circumstances constitute material changes in this IRP that are required to be reported to the New Mexico Public Regulation Commission ("NMPRC" or "Commission") pursuant to its IRP Rule, 17.7.3 New Mexico Administrative Code.

Meeting Format and Guidelines

- **Presentations will be by EPE staff and invited speakers.**
  - Presenters will complete presentation prior to answering questions.
- **Participants may submit questions through the WebEx Q&A box.**
- **Please use the Chat box for technical issues/questions.**
- **Communications should be respectful, to the point and on topic.**
- **Written questions submitted after the meeting will be responded to in writing within 10 days.**

Process Map for IRP Analysis



- Completed initial system analysis and additional carbon reduction sensitivities for system
- Provide results and Step 2 assessment for determination if system portfolio satisfies NM REA requirements

IRP Modeling Efforts

Jurisdictional Analysis

- **While the initial analyses are for system portfolios**
  - Reference case for system is necessary to provide the basis for assessing NM REA compliance
  - Provide indicative portfolios and results which are informative for NM REA requirements
- **Next steps will address New Mexico specific REA requirements**
  - Assessment of jurisdictional allocations
  - Additional scenarios to ensure NM REA compliance

Renewable Energy Act

Requirements of REA as Amended

- **Incremental targets**
  - 2020 20% Renewable
  - 2025 40% Renewable
  - 2030 50% Renewable
  - 2040 80% Renewable/Carbon-Free Energy
  - 2045 80% Renewable and 100% Carbon-Free

"no later than January 1, 2040, renewable energy resources shall supply no less than eighty percent of all retail sales of electricity in New Mexico; provided that compliance with this standard until December 31, 2047 shall not require the public utility to displace zero carbon resources in the utility's generation portfolio on the effective date of this 2019 act"

Renewable Energy Act

Requirements of REA as Amended

- **Reliability requirements and considerations for 2040 and 2045 targets**

"maintain and protect the safety, reliable operation and balancing of loads and resources on the electric system"

- **Cost considerations for 2040 and 2045 targets**
  - There is presently no guidance on what is reasonable rate impact to customer

"prevent unreasonable impacts to customer electricity bills, taking into consideration the economic and environmental costs and benefits of renewable energy resources and zero carbon resources"

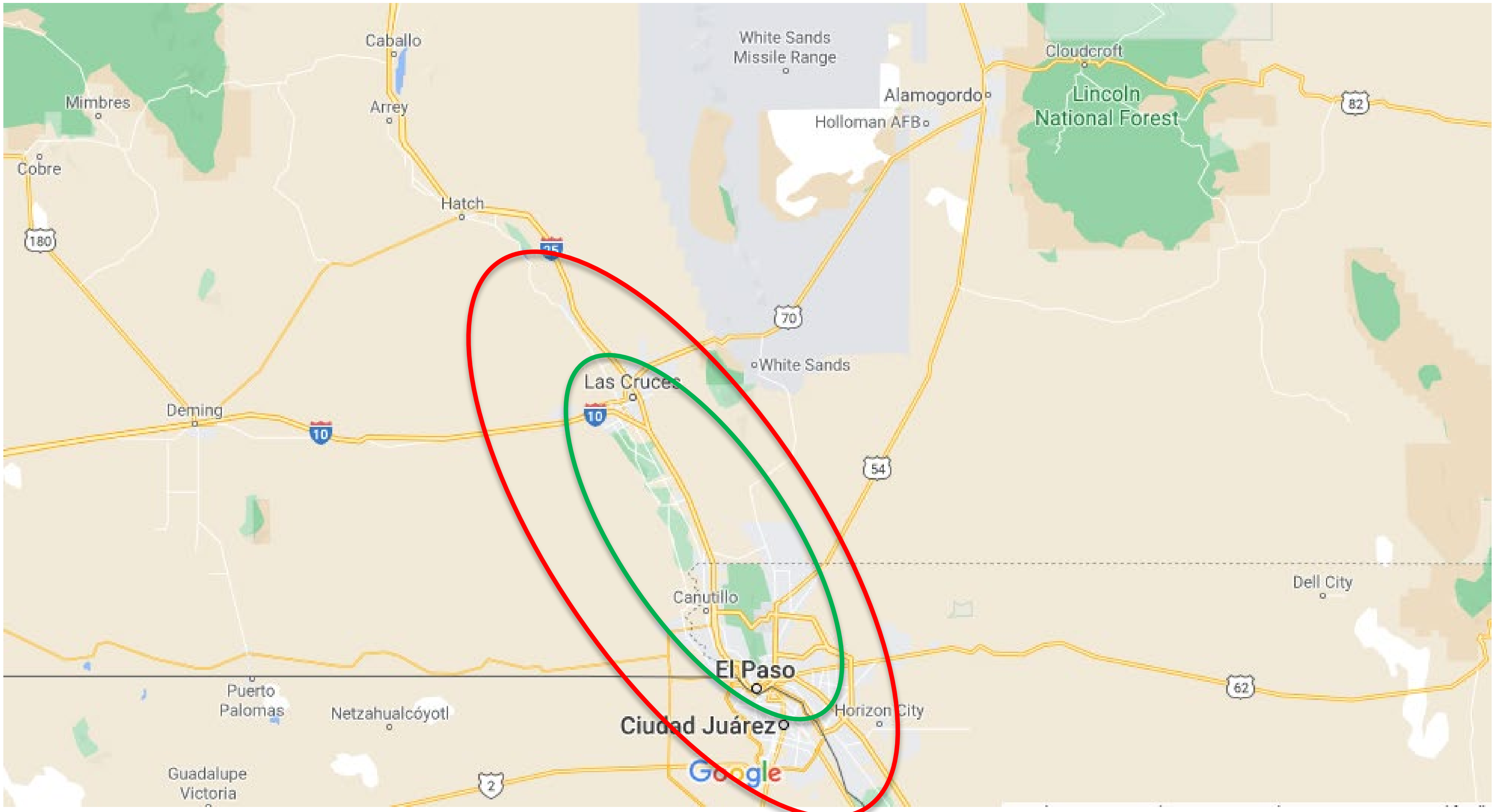
Renewable Energy Act

IRP Modeling and Report

- **The IRP modeling and report will provide**
  - Alternatives for meeting the NM REA renewable energy and carbon free requirements
  - Identify cost differentials for alternatives to meet the REA requirements
  - Make a recommendation on optimal portfolio to meet the NM REA

Transmission Costs

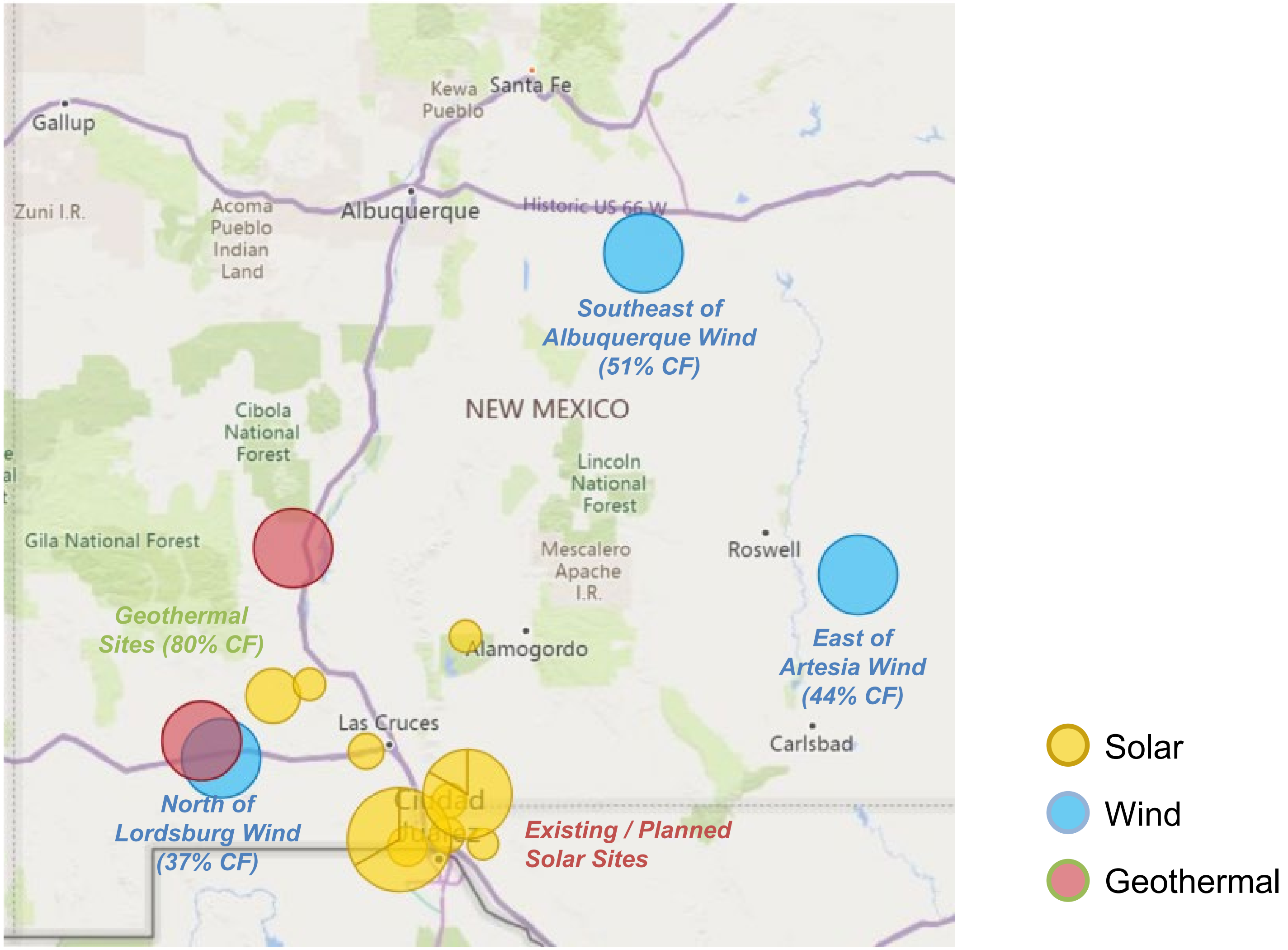
Local Transmission System Geographic Bounds



Local System

Peripheral to Local System

Renewable resource locations



The system currently does not have any wind or geothermal facilities. These are locations for potential future projects

Transmission Costs

IRP Modeling

- **Resources located outside of EPE's local transmission system include additional transmission costs for importing their energy to serve load**
- **Solar resources are located peripheral to local transmission system, but do have transmission upgrade requirements**
- **Wind resources are geographically constrained for siting and remotely located to EPE's local transmission system**
  - Transmission costs are included in addition to the cost of the wind resource itself for the model to consider (may range between $900k and $1,500k per mile)
  - Example - Artesia wind pocket is approximately 165 miles from EPE's load pocket

Energy+Environmental Economics

El Paso Electric IRP Modeling Update

Draft System Portfolio Results

3/19/2021

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Agenda

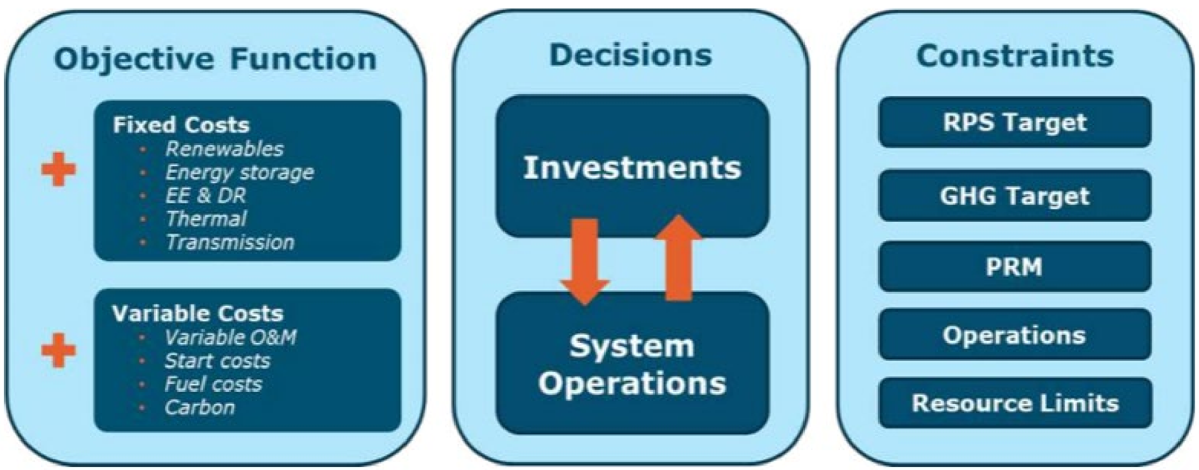
- Assumption Updates
- Draft reference case results for system
- Draft low carbon sensitivity results
- Draft reliability target sensitivity results

Energy+Environmental Economics

Methodology Overview

Overview of RESOLVE Capacity Expansion Model

+ **RESOLVE co-optimizes investments and operations to minimize total NPV of electric system cost**
  - Investment and operations are optimized in a single state
  - Single-stage optimization directly captures linkages between investment decisions and system operations
+ **RESOLVE analyzes the complex operational considerations and economic tradeoffs of a highly renewable grid**



Select RESOLVE Modeling Details

Modeling Horizon: 2021 – 2045

Modeled years:
2023, 2027, 2031, 2035, 2040, 2045

PRM based on 1-in-10 standard

Resources that contribute to the PRM:

- Nuclear, gas, and hydrogen facilities
- Wind, solar, geothermal, biomass
- Batteries

New Mexico RPS + TX RPS

E3 modeled the least-cost and reference cases and obtained the same portfolio in each

Resources that can contribute to RPS:

- Utility-scale solar
- Wind
- Geothermal
- Biomass

Energy balance

Load + battery charging = generation + imports + battery discharging during all operating hours

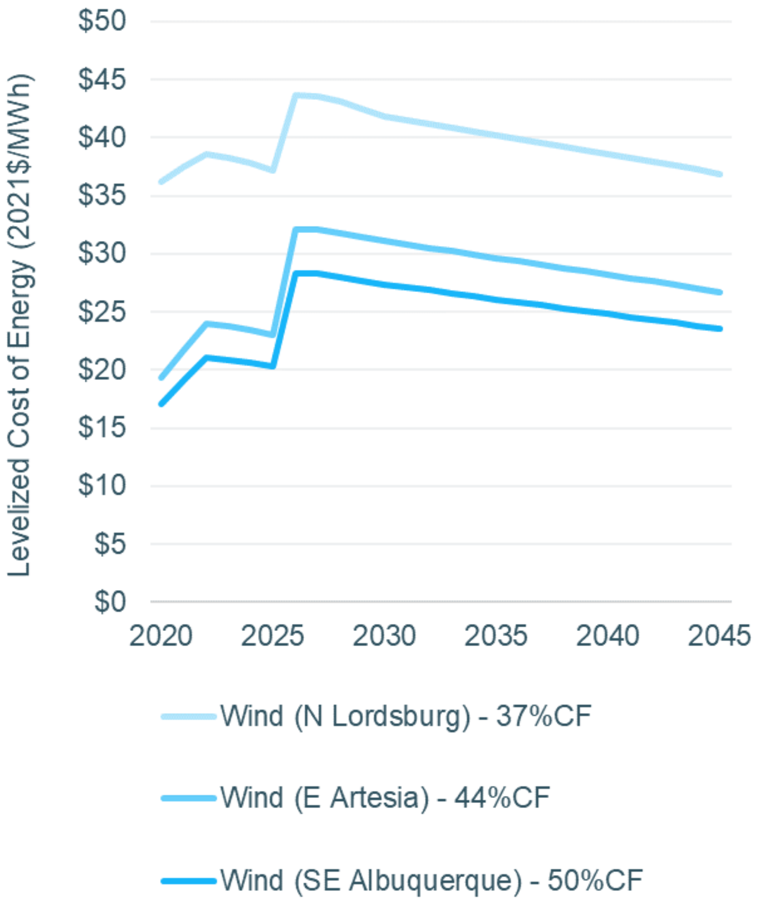
Resources are selected based on cost and value in satisfying load in all hours of the year, as well as all other constraints

Assumption Updates

Wind costs

- **The PPA rates for wind are expected to rise in the near term**
  - This is due to the step-down of the production tax credit (PTC)
  - Wind projects coming online between 2022 and 2025 are assumed to capture a 60% PTC
- **Technological improvements are expected to drive down the cost of wind facilities in the long run**

Real Levelized Cost ($/MWh)



Source: NREL 2020 Annual Technology Baseline
Note: costs do not include transmission upgrade costs

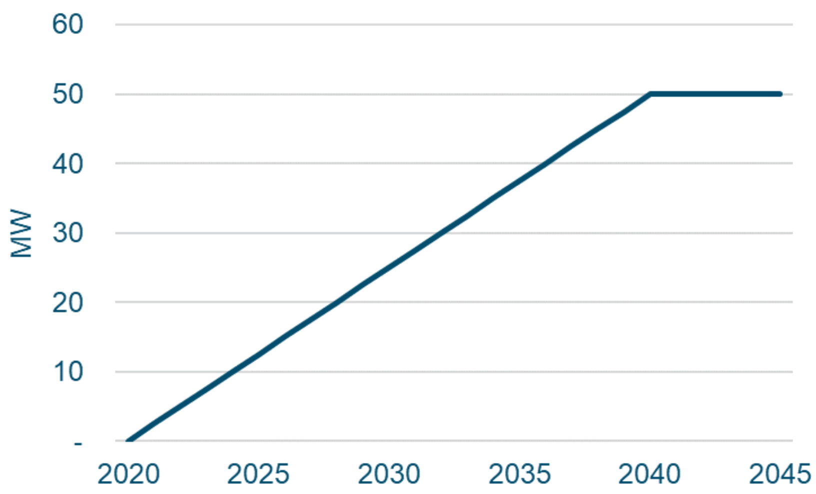
Cost of Renewable Options

+ **The levelized cost of energy (LCOE) can be a helpful metric for understanding the relative cost of renewable resources**
  - LCOE is a **cost metric** and doesn't say anything about resource value
  - **LCOE is not a direct input into the model**
+ **When selecting resources, RESOLVE considers the value of every resource, which depends on…**
  - Operational characteristics
  - Seasonal, daily, hourly production
  - Penetration of a given resource (e.g. diminishing ELCC for solar, storage, and wind at higher levels)
  - Need to add storage for integration (e.g. daytime to nighttime shifting)
+ **In 2031, the LCOE ranges for resources are as follows (in 2021 $):**
  - Note that here the LCOE includes the cost of the resource, transmission, and (for wind southeast of Albuquerque) wheeling costs
  - **Solar**: $17-33/MWh
  - **Wind**: $37-87/MWh
  - **Geothermal**: $106-111/MWh
  - **Biomass**: $134/MWh
+ **These resources also differ in value:**
  - Contribution to capacity needs
  - Coincidence with energy demand
  - Synergistic or antagonistic interactions with other resources
  - Value as a function of resource penetration

Smart Thermostat Program

+ **Smart thermostats are considered as a demand-side resource**
  - We assume that each thermostat has a potential demand reduction of 0.87 kW
  - The program cost is estimated to be $25 per thermostat per year
  - The potential for smart thermostat penetration is estimated to be 25 MW by 2030 and 50 MW by 2040
    - This assume enrollment increases to ~22,000 by 2030 and ~44,000 by 2050
  - There are limits to the duration and number of calls during summer
    - Using RECAP, the ELCC contribution for thermostats is estimated to be ~70%

Smart Thermostats Capacity (MW)

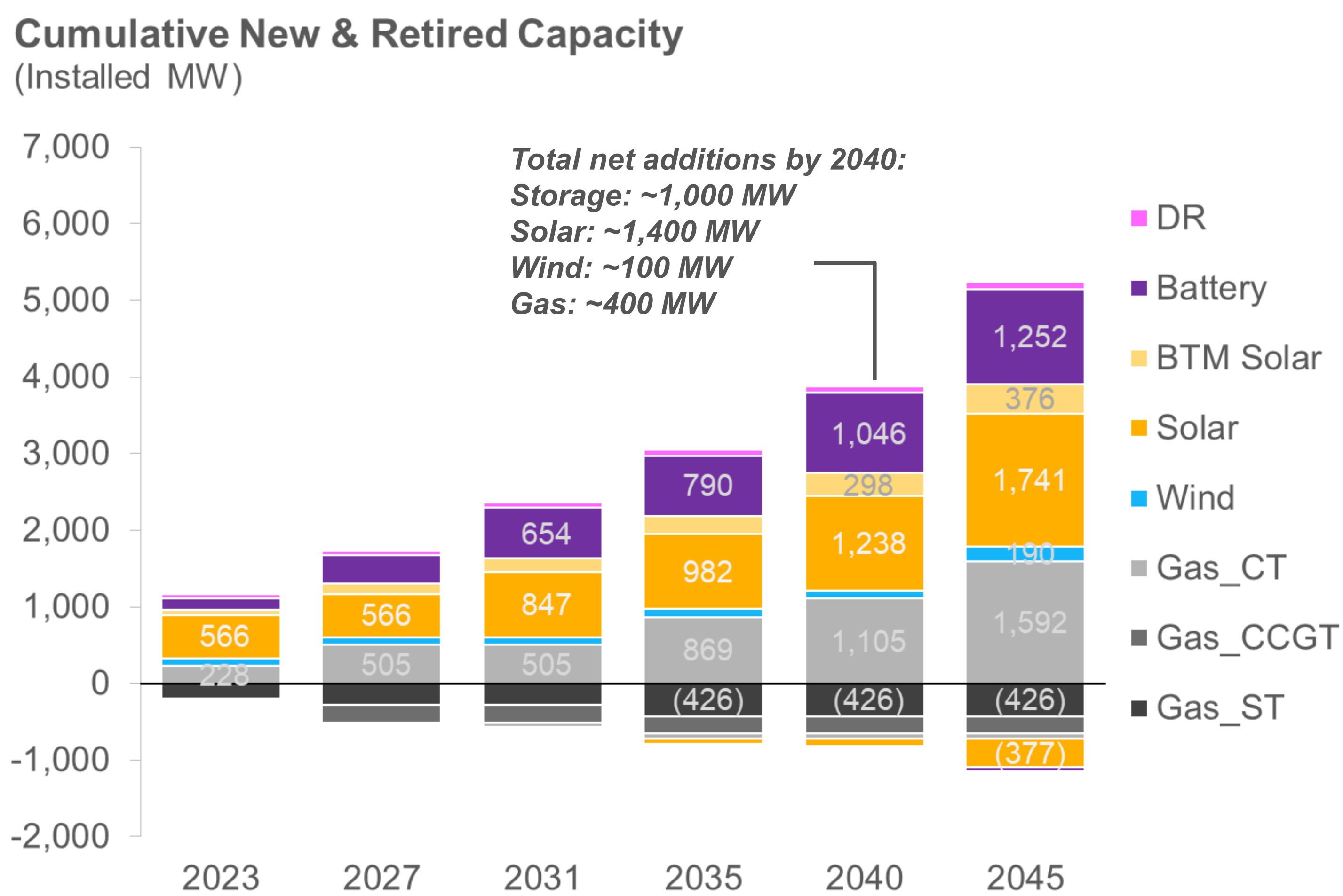


Thermal Plant Must-Run Requirements

+ **Palo Verde is modeled as a must-run resource that generates around the clock at maximum capacity**
  - Refueling outages are modeled in fall/spring on an 18-month refueling cycle for each unit
+ **Existing and new gas plants are modeled as dispatchable resources (not as must-run units)**
  - Gas generation is dispatched economically accounting for plant operating characteristics
  - Operating characteristics vary by gas plant:
    - Pmin: 5% – 46% (New gas CT: 20%)
    - Min up time: Gas ST and CC – 6 hr, Gas CT – fully flexible
    - Min down time: Gas ST – 18 hr, Gas CC – 6 hr; Gas CT – fully flexible

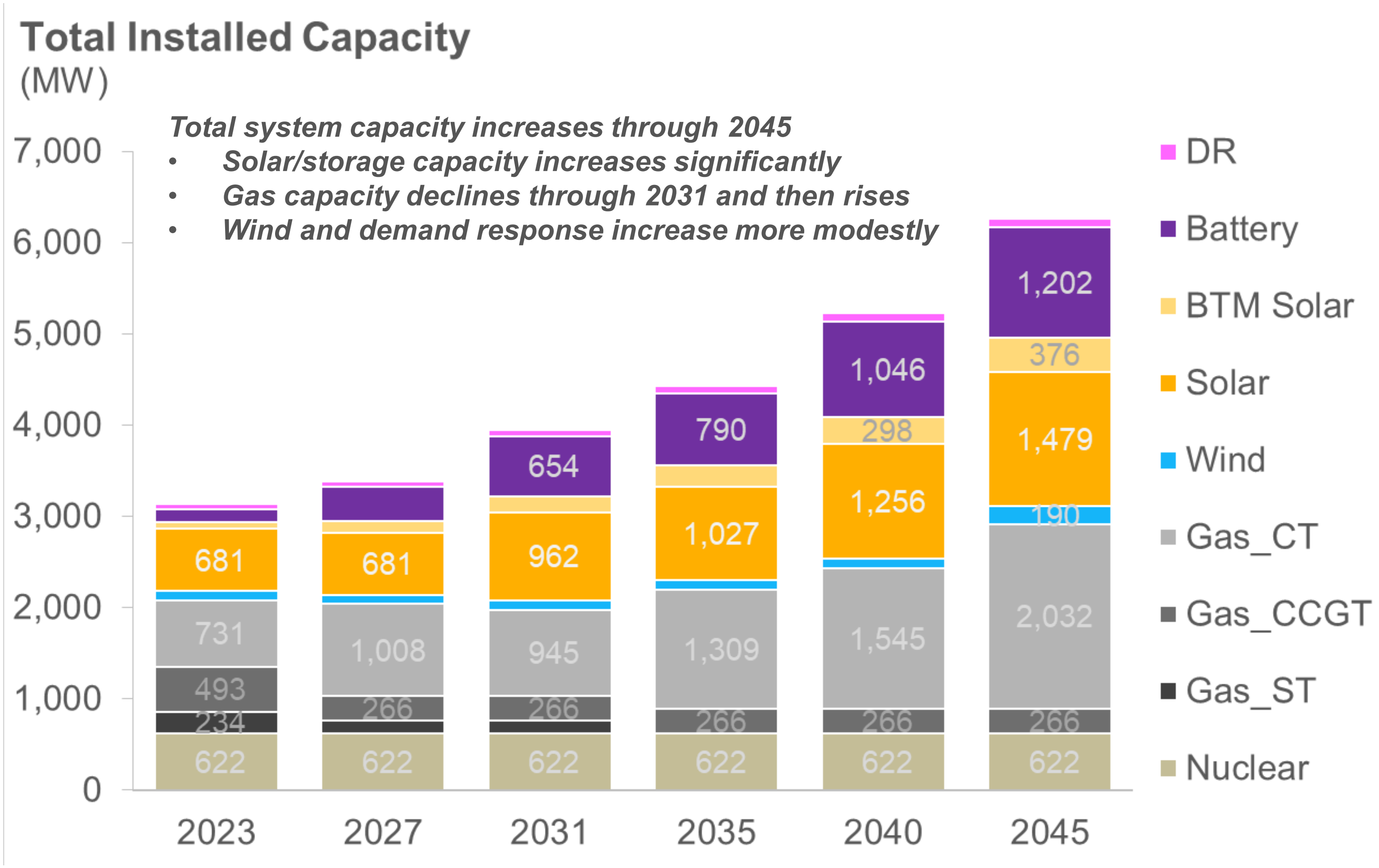
Reference Case Results

Reference Case Results: New & Retired Capacity

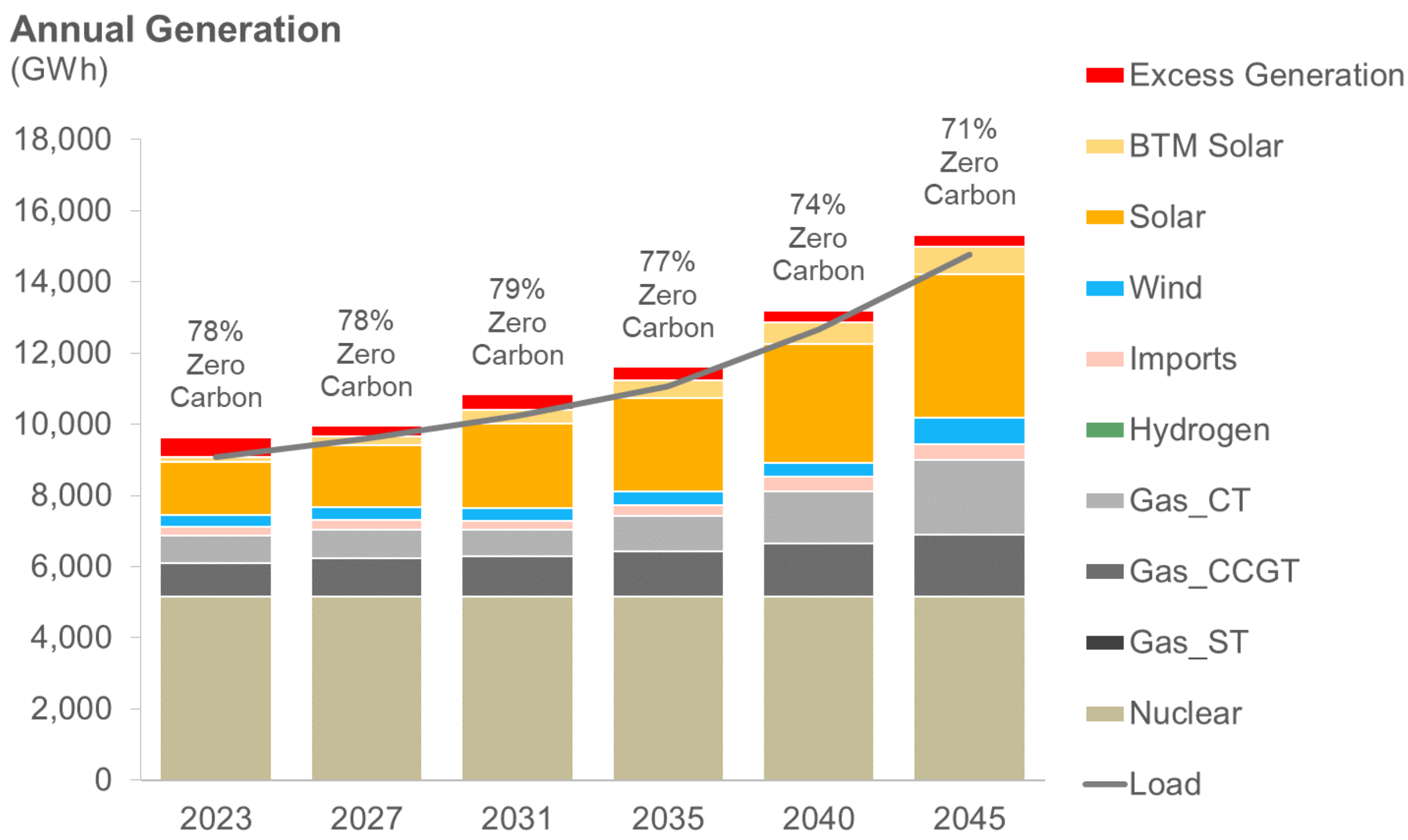


DR = demand response; BTM Solar = behind-the-meter solar
E3 will consider unit lifetime extensions in subsequent analysis

Reference Case Results: Total Generation Portfolio

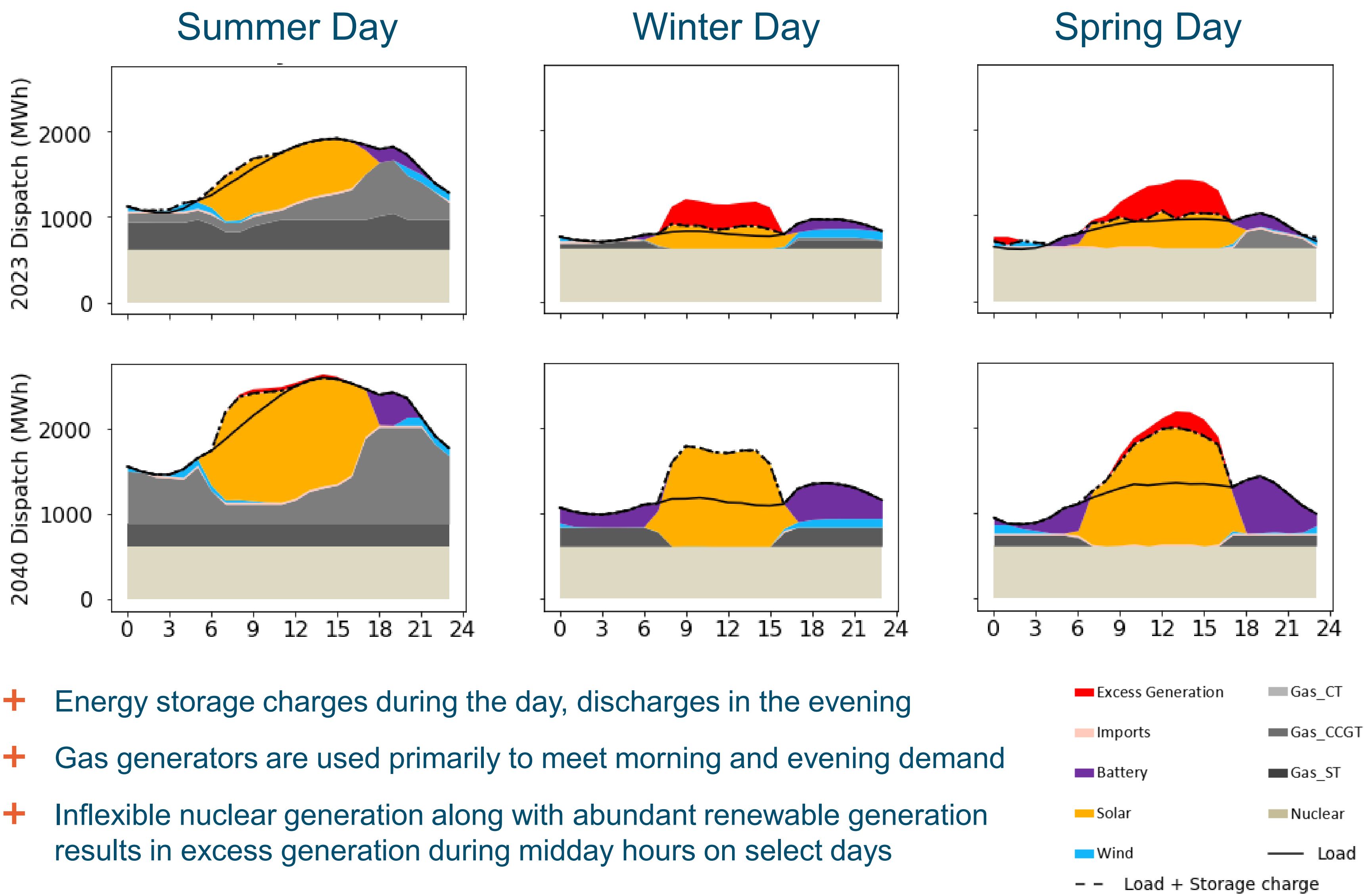


Reference Case Results: Annual Energy Mix



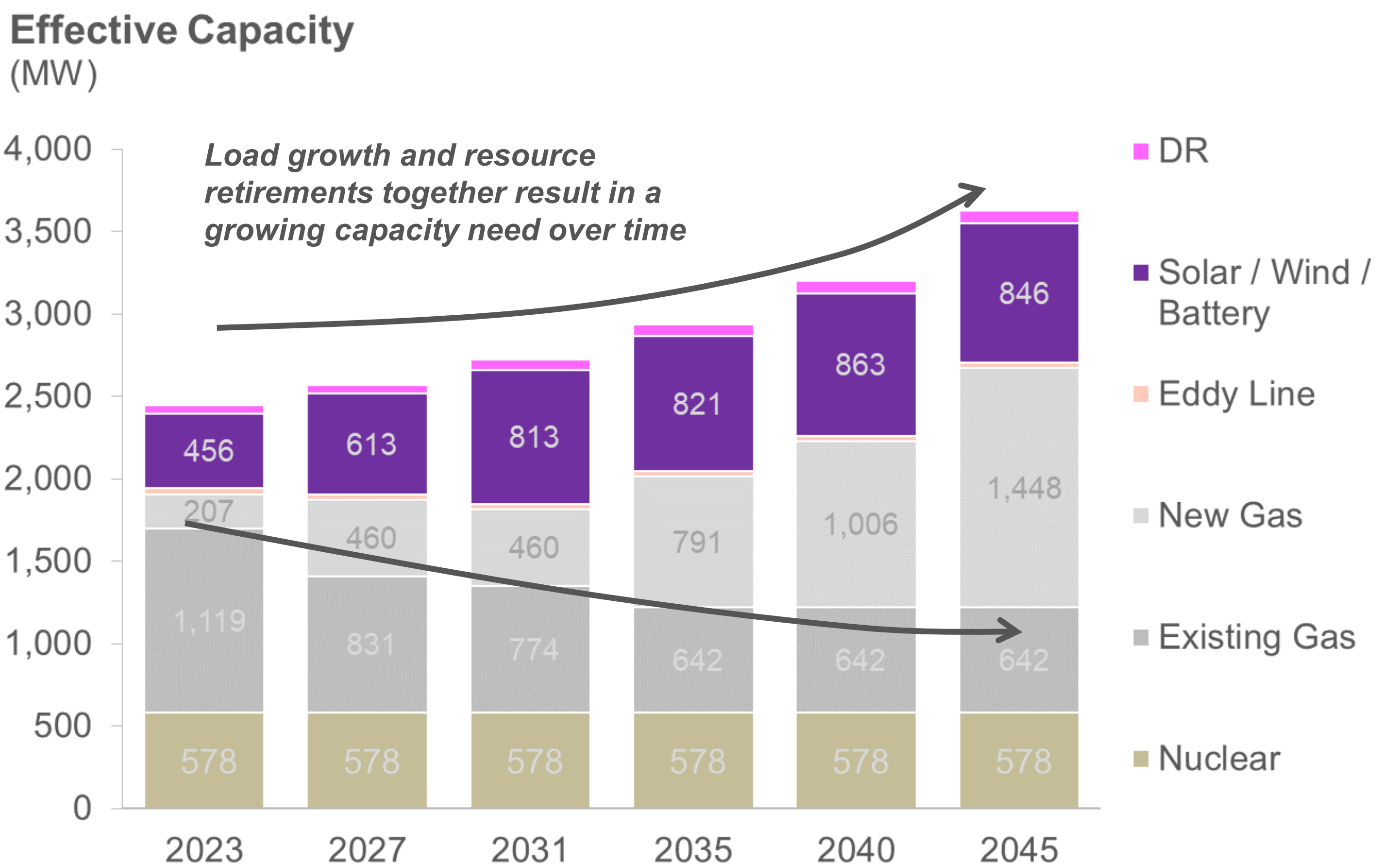
Sales or exports of excess generation are not conserved in these results

Dispatch in 2023 and 2040



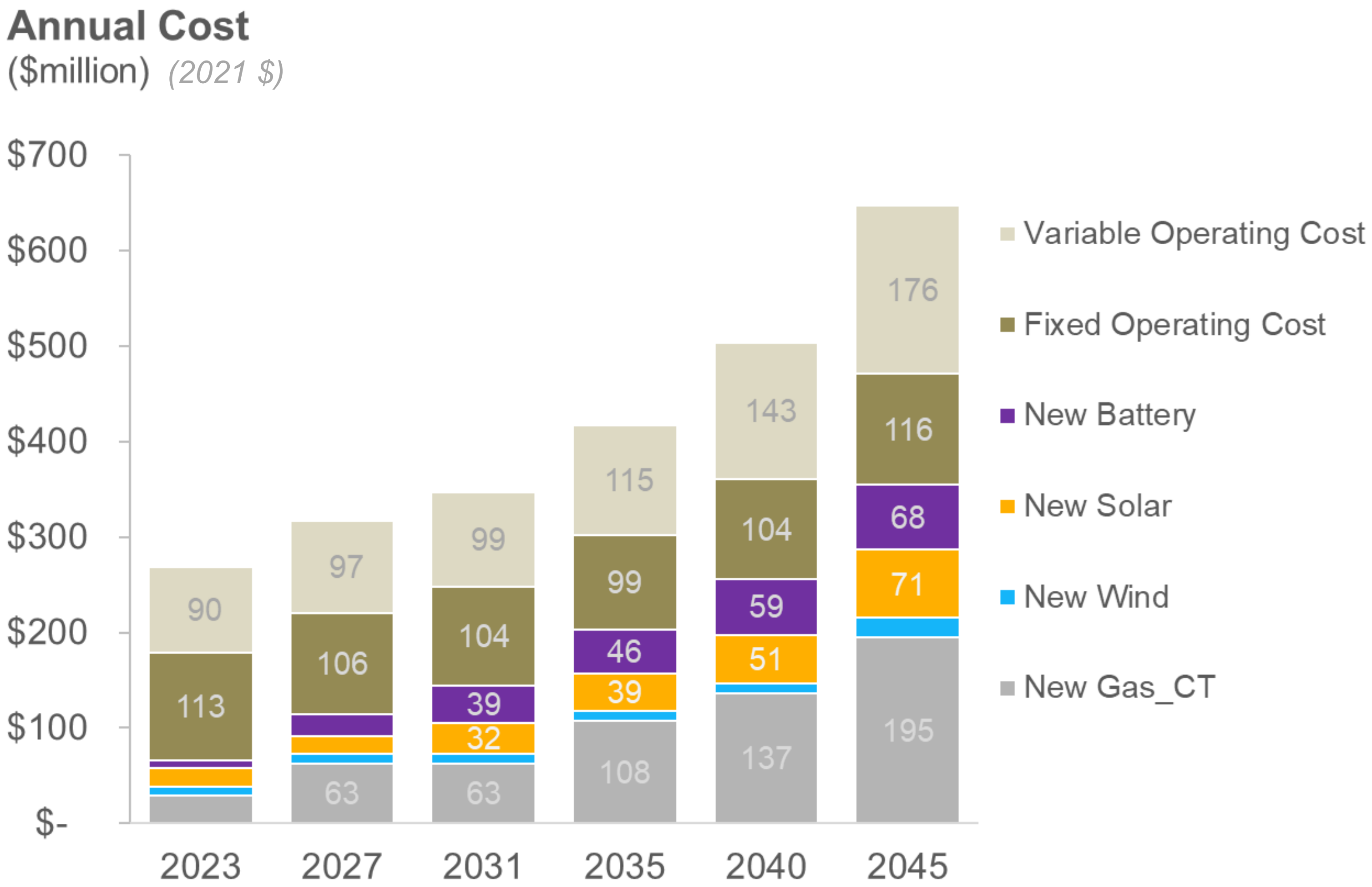
- Energy storage charges during the day, discharges in the evening
- Gas generators are used primarily to meet morning and evening demand
- Inflexible nuclear generation along with abundant renewable generation results in excess generation during midday hours on select days

Reference Case Results: Effective Capacity

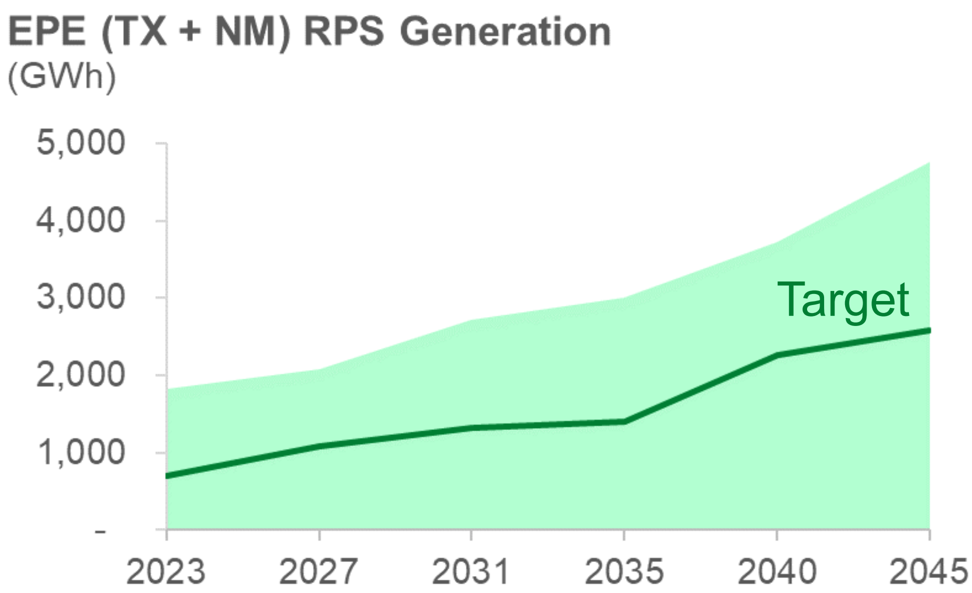


Effective capacity is the amount of capacity that can be counted towards the PRM

Reference Case Results: Annual Cost



RPS Compliance



Generation from RPS-eligible resources exceeds the aggregate RPS requirements in New Mexico and Texas in every year of the planning horizon

This portfolio may comply with both the New Mexico REA and the Texas renewable energy requirements, depending on how resources are allocated to each jurisdiction

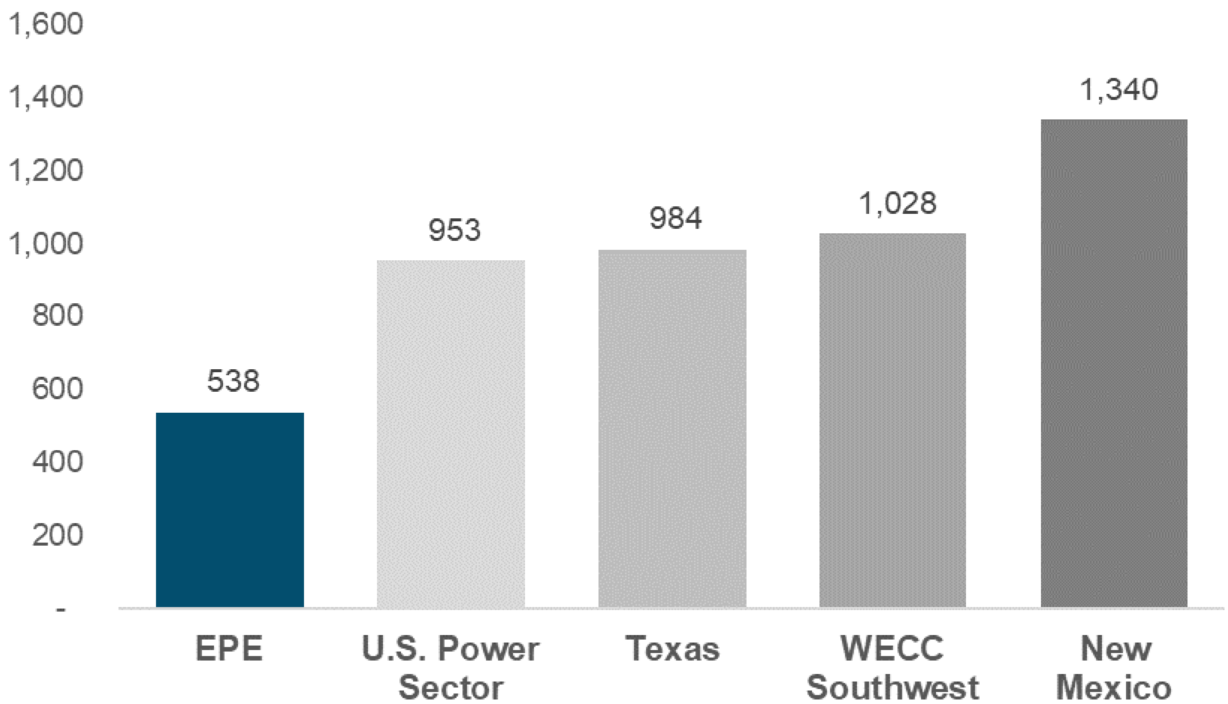
Alternatively, if resources were allocated according to load ratio share between Texas and New Mexico, additional renewable resources may be needed to satisfy the New Mexico REA.

This issue will be explored further during the next meeting.

Low-Carbon Sensitivity Results

Carbon Intensity of the El Paso Electric System

2018 Carbon Intensity
(lbs./MWh)

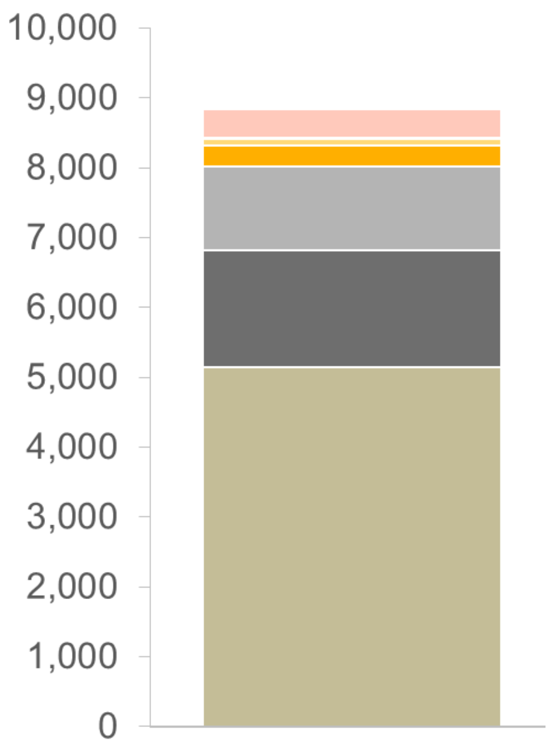


Source: U.S. EPA, 2020. Emissions & Generation Resource Integrated Database (eGRID)

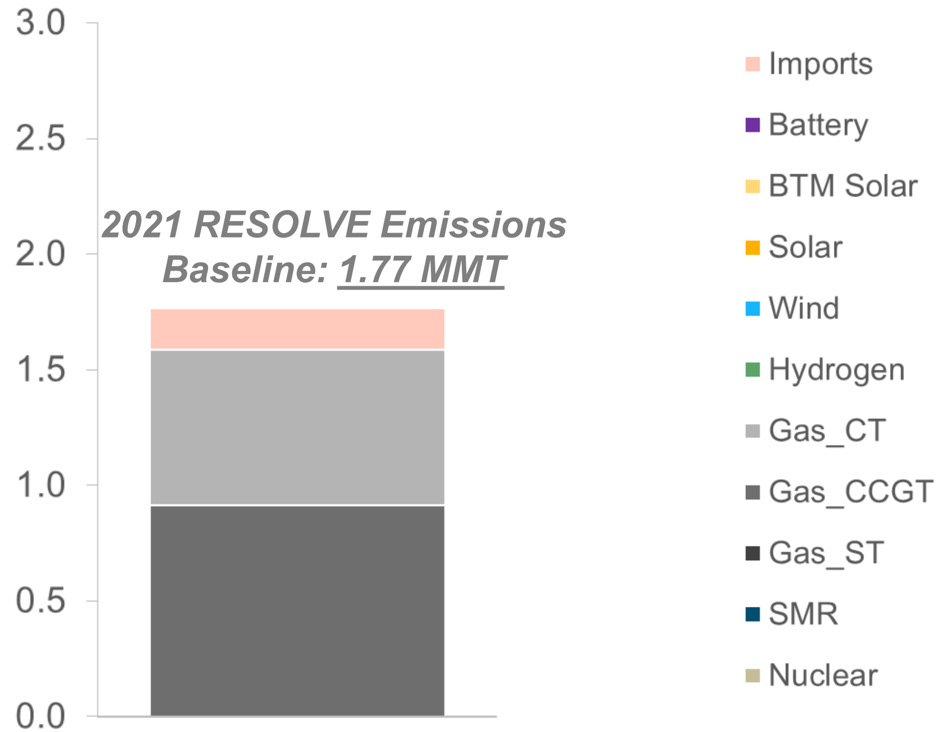
El Paso Electric Baseline GHG Emissions

Baseline Year: 2021

Baseline Generation
(GWh/yr)



Baseline Emissions from Native Load
(Million metric tons/yr)



Decarbonization Scenarios

E3 modeled the cost of achieving various decarbonization targets

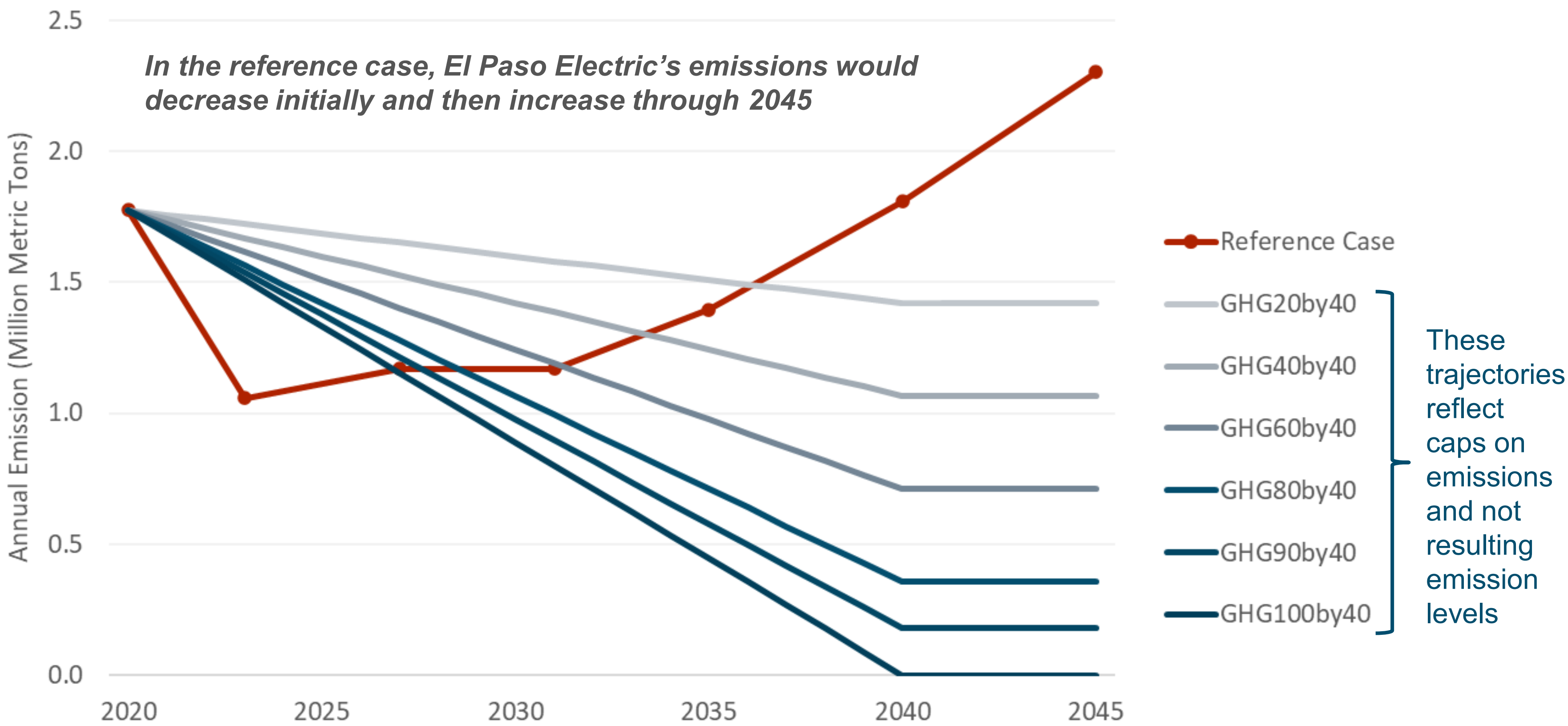
+ The targets are defined as percentage reductions in greenhouse gas emissions vs. the 2021 modeled baseline
+ The targets range from 20% to 100% GHG reductions by 2040
+ The targets are assessed under two scenarios
  1. Hydrogen and nuclear SMR technologies are available
  2. Hydrogen and nuclear SMRs technologies are NOT available

Decarbonization Scenarios

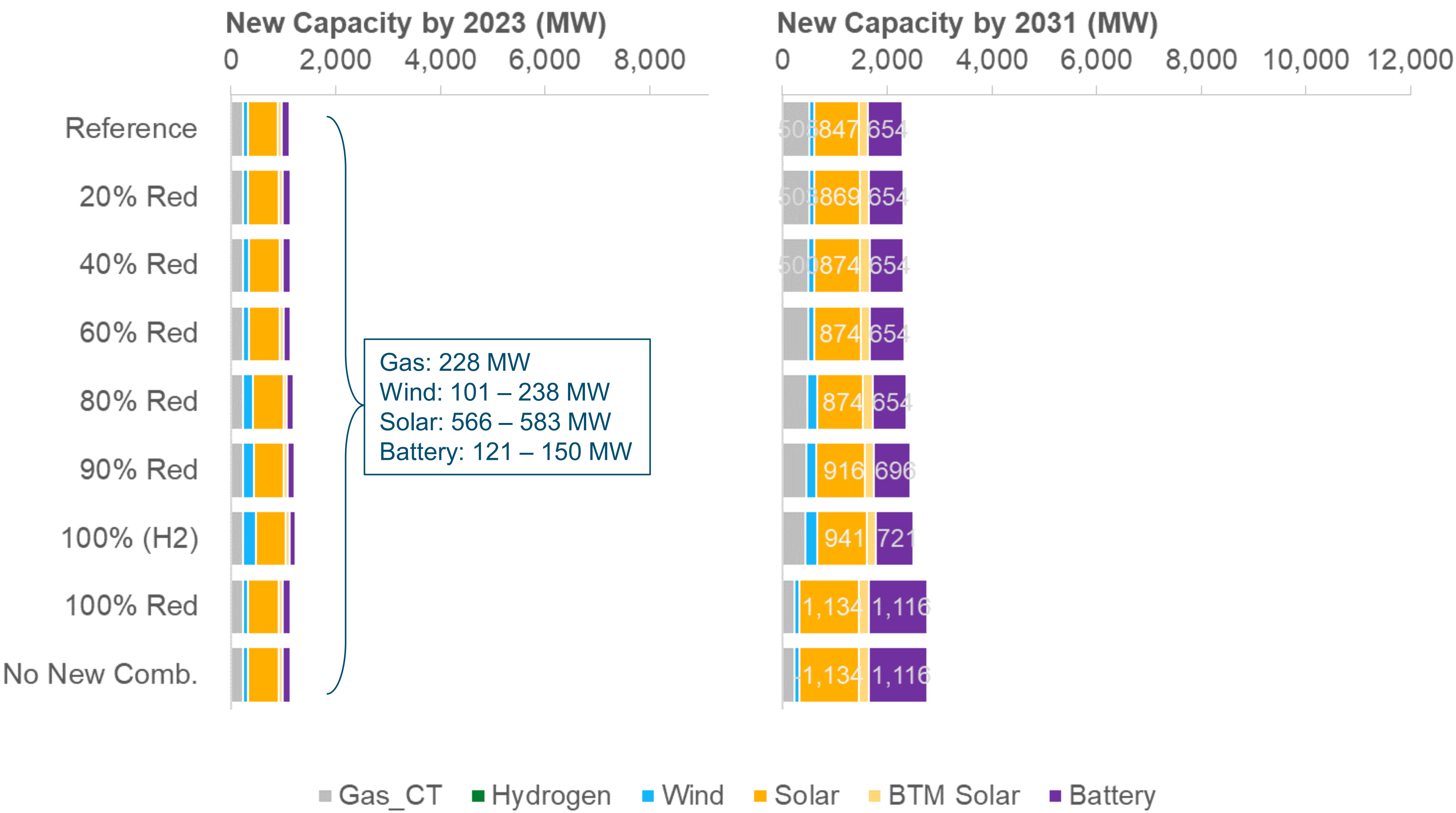
Scenario	2035 Target	2040/45 Target	Change per Year
GHG20by40	15%	20%	1.0%
GHG40by40	30%	40%	2.0%
GHG60by40	45%	60%	3.0%
GHG80by40	60%	80%	4.0%
GHG90by40	68%	90%	4.5%
GHG100by40	75%	100%	5.0%

GHG = greenhouse gases

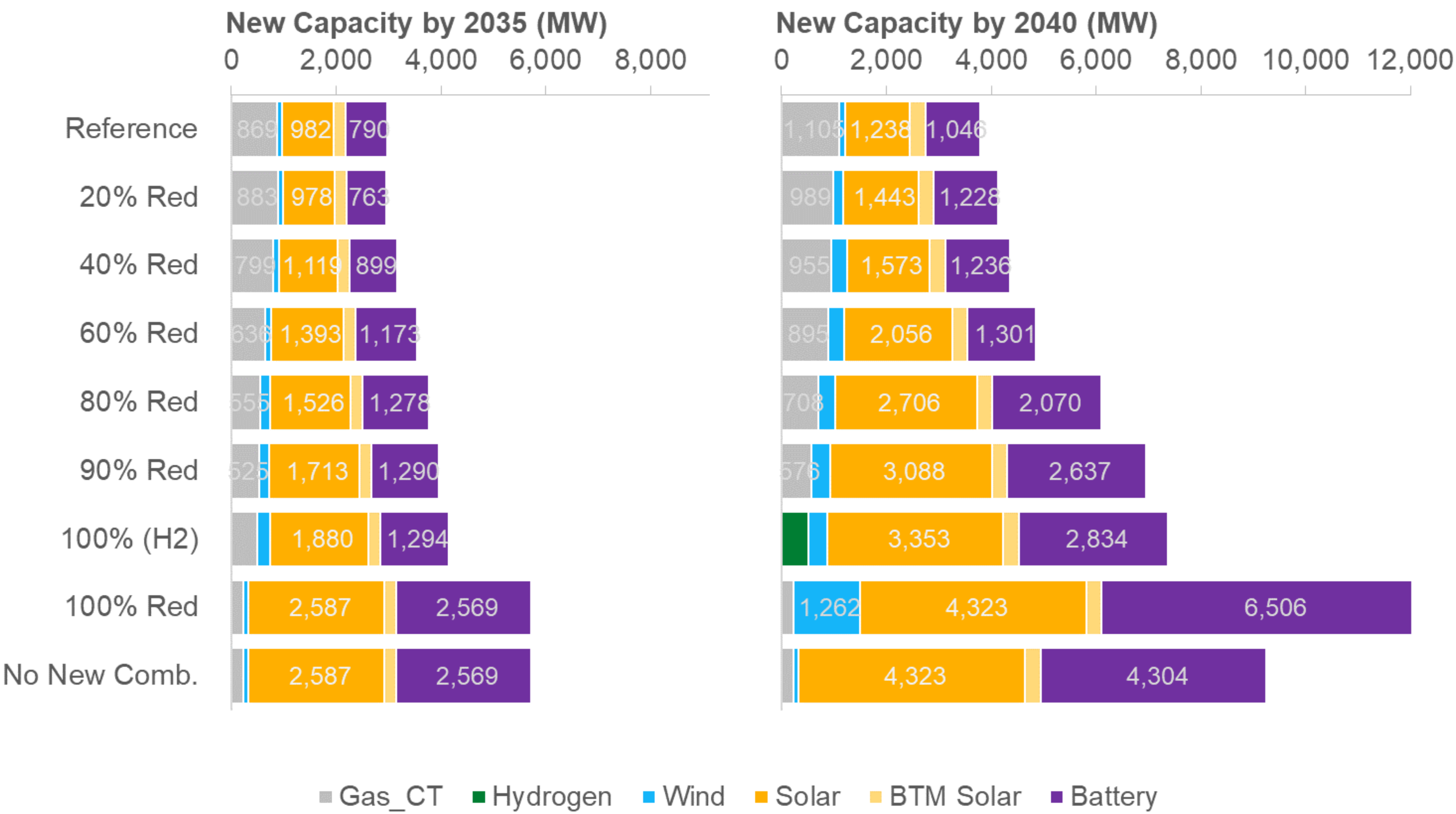
GHG Emissions Trajectories



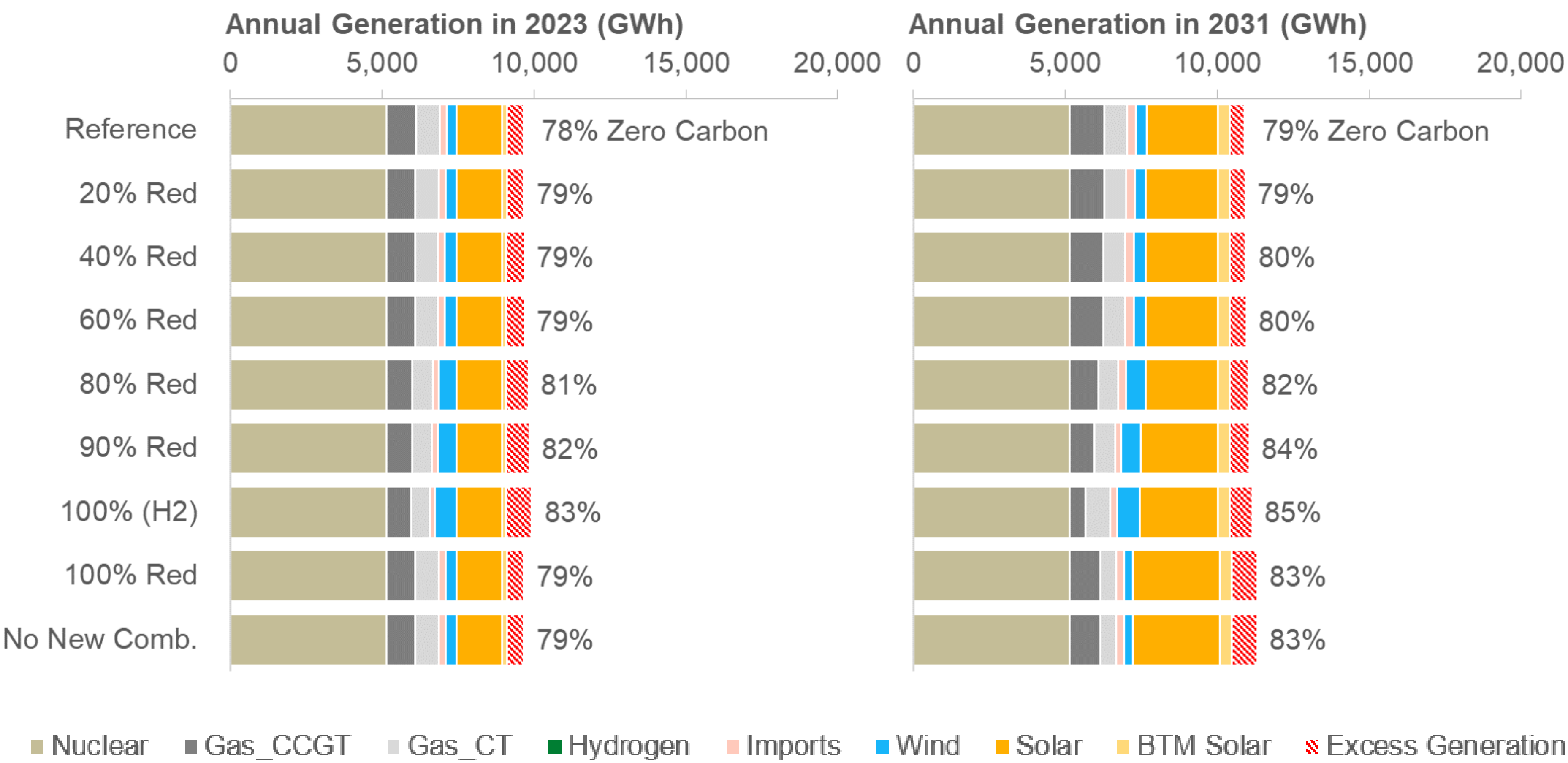
Low Carbon Scenario Results: New Capacity in 2023 and 2031



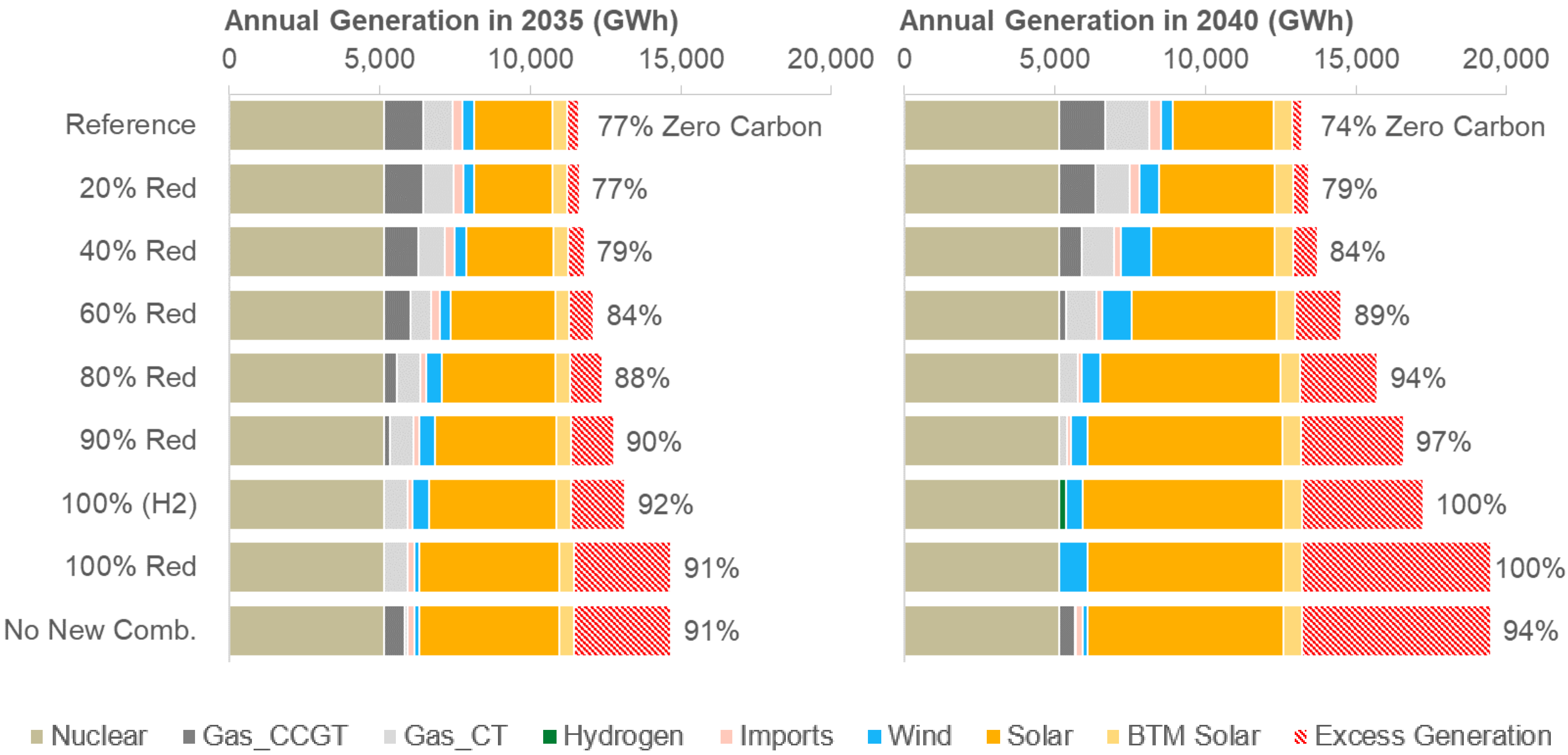
Low Carbon Scenario Results: New Capacity in 2035 and 2040



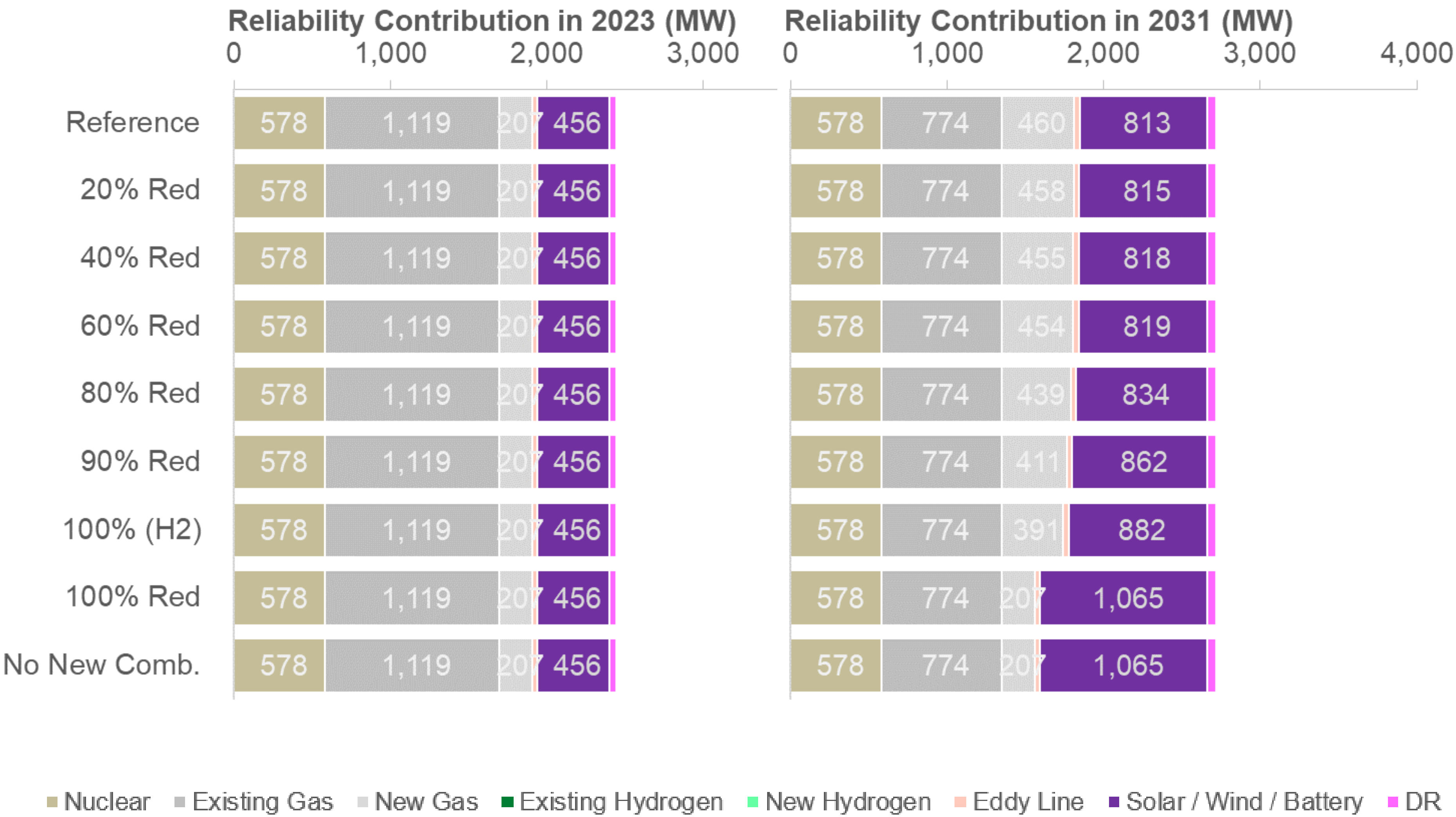
Low Carbon Scenario Results: Annual Generation in 2023 and 2031



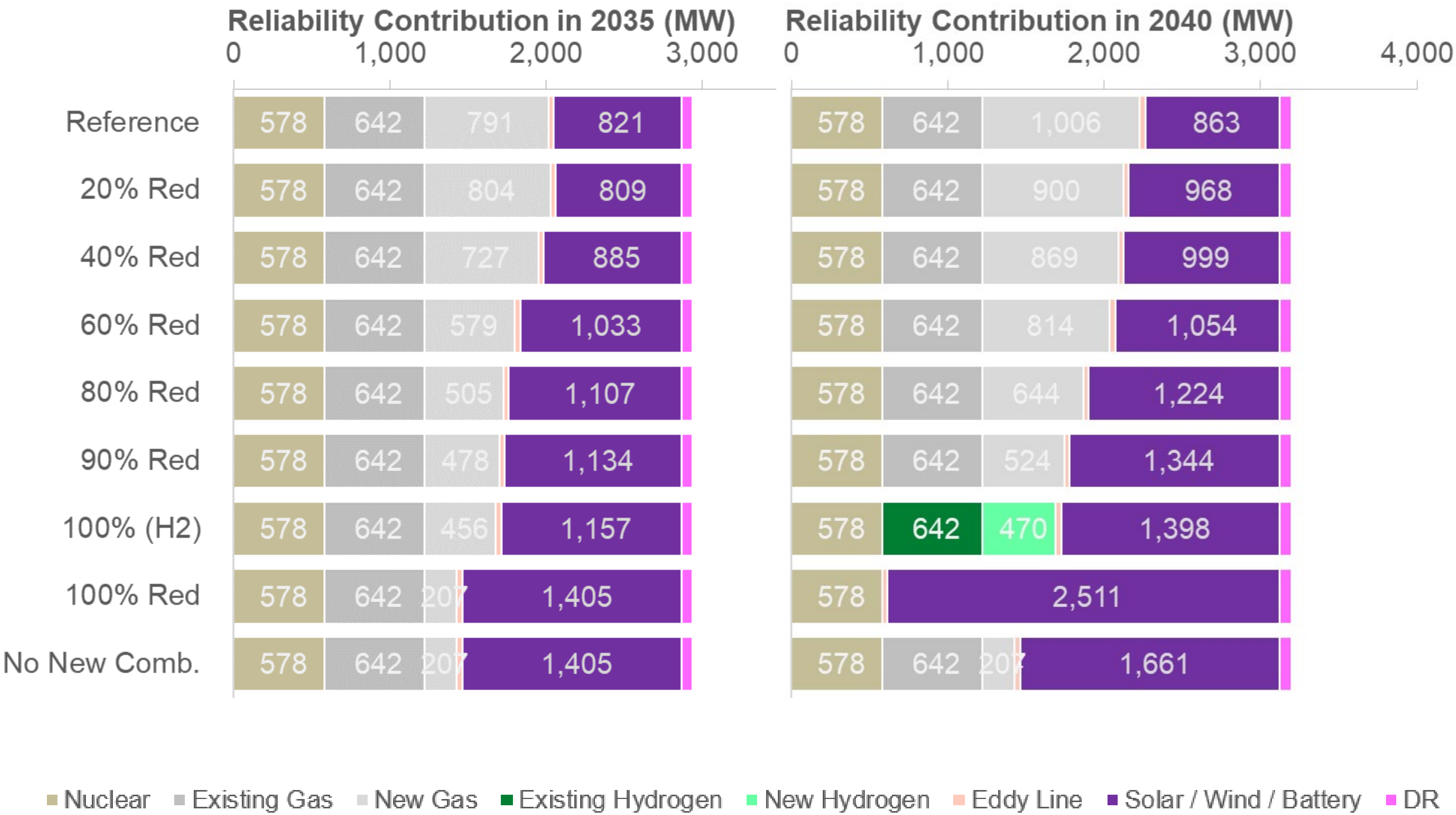
Low Carbon Scenario Results: Annual Generation in 2035 and 2040



Low Carbon Scenario Results: Effective Capacity in 2023 and 2031

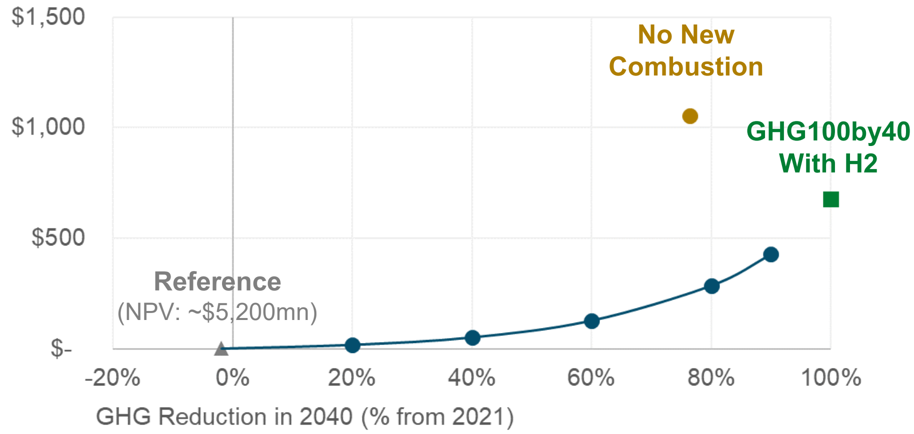


Low Carbon Scenario Results: Effective Capacity in 2035 and 2040

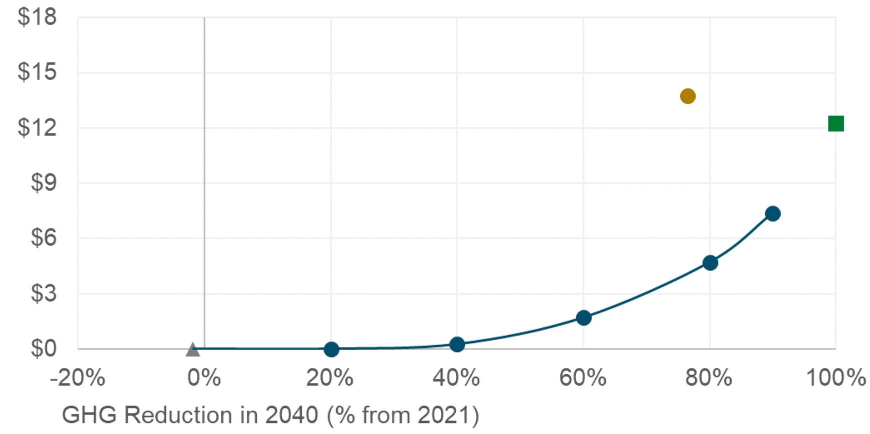


Low Carbon Scenario Results: Cost of Decarbonization

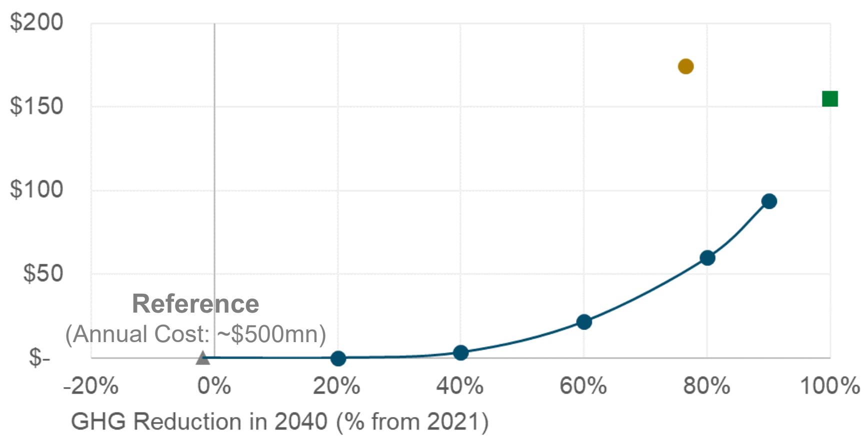
Additional Cost of Decarbonization
($million incremental 2021-2045 NPV)



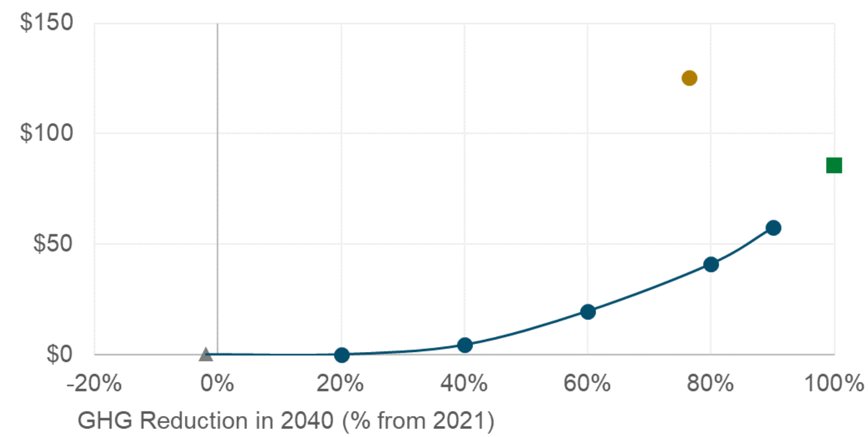
Rate Impact of Decarbonization in 2040
($/MWh) *2021$*



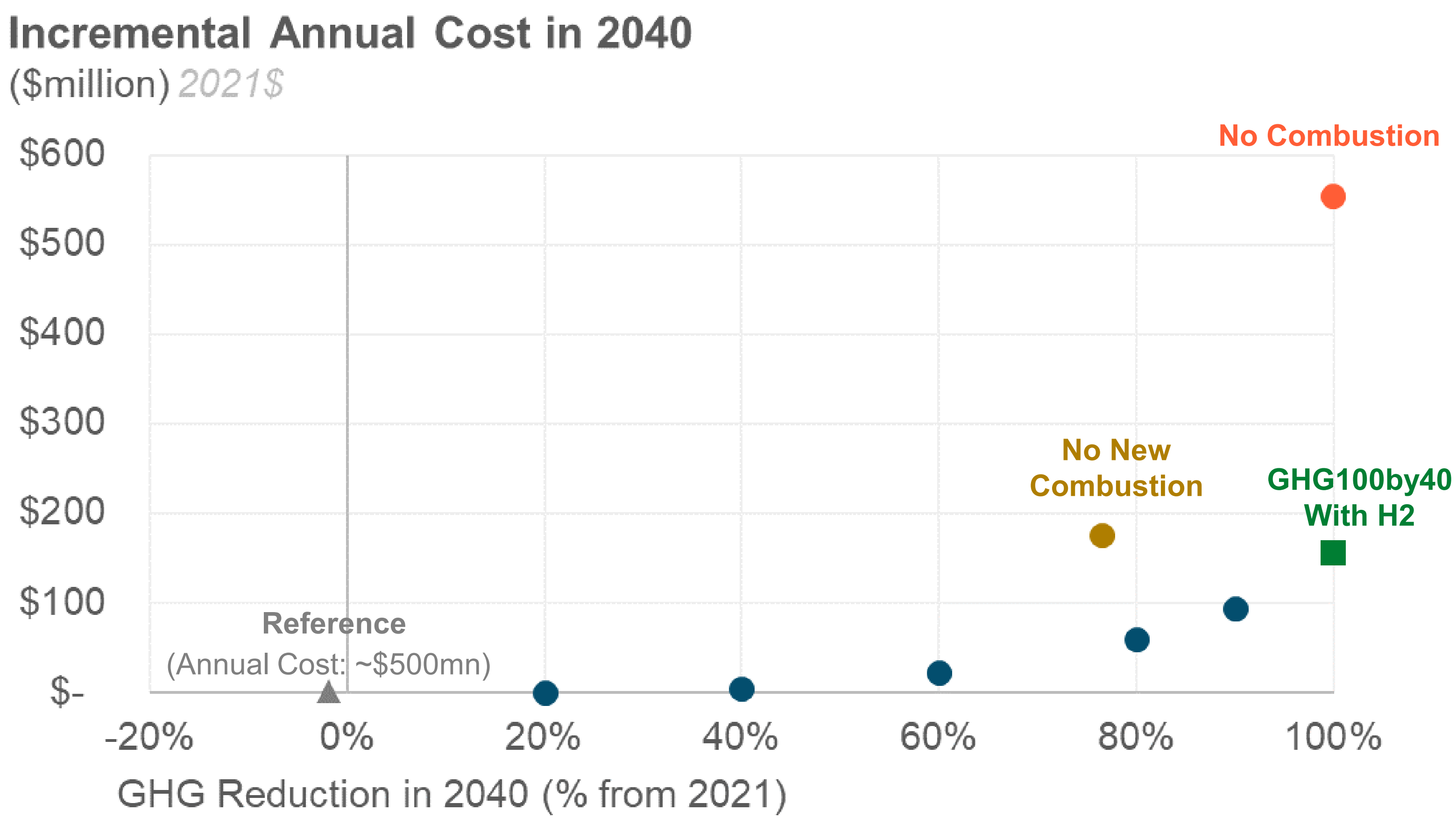
Incremental Annual Cost in 2040
($million) *2021$*



Average Carbon Abatement Cost in 2040
($/MT CO2) *2021$*



Cost of Full Decarbonization



Takeaways from Low-Carbon Scenario Analysis

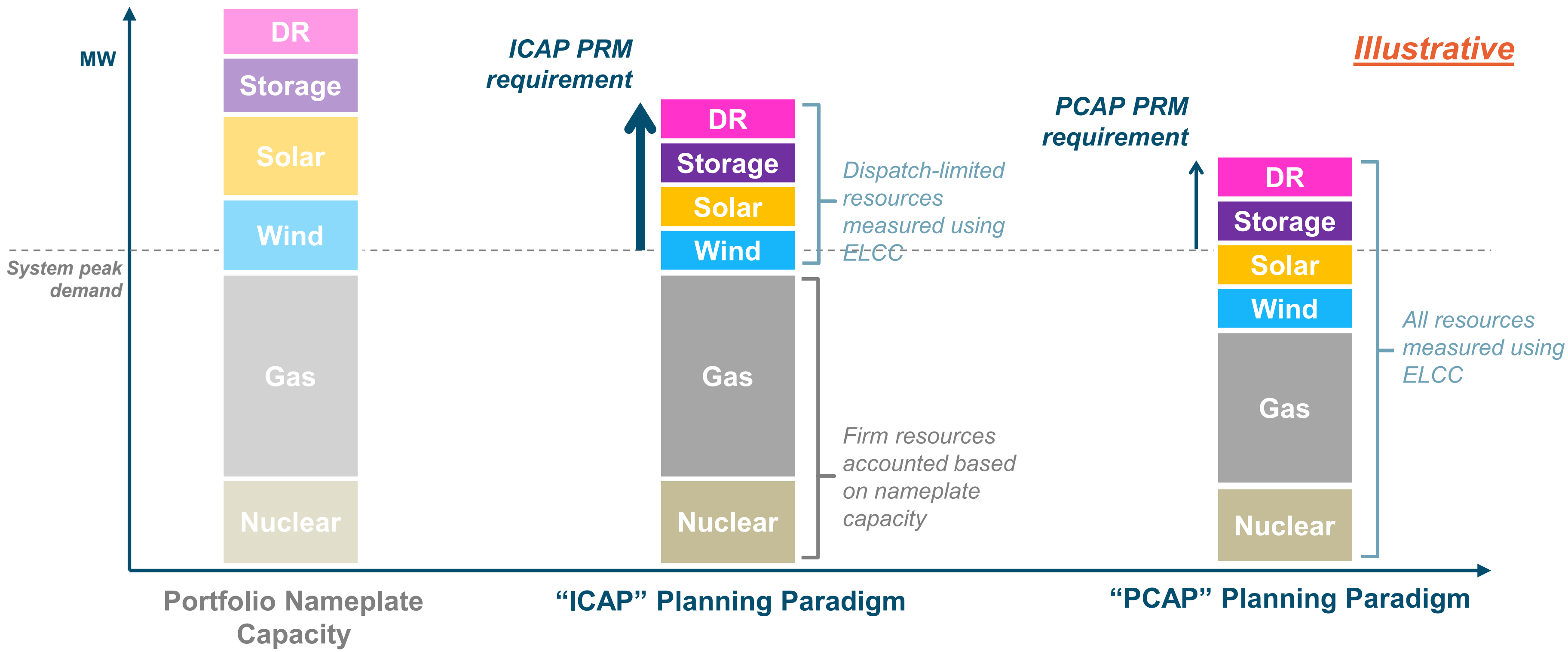
1. **El Paso Electric can achieve a low-carbon grid through a combination of nuclear and renewable generation**
   - Palo Verde provides a significant quantity of zero-carbon baseload generation
   - Low-cost solar can be integrated with the addition of battery storage
2. **The cost of decarbonization increases with more ambitious decarbonization targets**
   - Renewable integration becomes more challenging at higher penetration levels, requiring more renewable and storage additions to decarbonize further
3. **Firm resources are needed to ensure reliability while maintaining affordability**
   - The capacity contribution of renewables and storage declines with increasing penetration. Without firm resources, an unattainable overbuild of renewable and short duration storage resources would be needed to ensure reliability
   - Firm resources, such as plants that can burn hydrogen, may not operate frequently but would be available to ensure reliability when other resources are not
   - Retiring all gas plants is cost prohibitive and is contingent on the development of zero-carbon alternatives that are not commercially available today

Planning Reserve Margin Sensitivities

Planning reserve margin conventions

+ E3 has quantified the planning reserve margin using the "ICAP" and "PCAP" conventions

- The installed capacity ("ICAP") PRM convention counts thermal resources at their nameplate capacity values and counts other resources based on their ELCC
- The perfect capacity ("PCAP") PRM convention counts all resources, including thermal resources, based on their ELCC
- The planning reserve margin is higher for the ICAP convention to account for forced outages at thermal plants, but the reliability is the same when using the ICAP or PCAP PRM convention



Standard Reliability Metric Definitions

- **E3 has quantified the planning reserve margin using different reliability targets:**
  - 24 hours every 10 years, or 2.4 LOLH
  - 12 hours every 10 years, or 1.2 LOLH
  - 6 hours every 10 years, or 0.6 LOLH
  - “1 day in 10 years” standard, or 0.1 LOLE

Reliability Metric	Units	Definition
Loss-of-Load Hours (LOLH)	hours/year	Average number of hours per year where system demand exceeded available generation capacity
Loss-of-Load Expectation (LOLE)	days/year	Average number of days with loss of load (at least once during the day) due to system demand exceeding available generation capacity
Expected Unserved Energy (EUE)	MWh/year	Average quantity of unserved energy (MWh) over a year due to system demand exceeding available generation capacity

PRM at different reliability targets

- The ICAP PRM ranges from ~15% for a 2.4 LOLH reliability target to ~21% for a 0.1 LOLE reliability target

Less Stringent →

Reliability Target	0.1 LOLE days/year	0.6 LOLH hours/year	1.2 LOLH hours/year	2.4 LOLH hours/year
PCAP PRM	13.0%	9.9%	8.2%	6.4%
ICAP PRM	21.1%	18.0%	16.3%	14.5%
EUE%	0.0001%	0.0004%	0.0009%	0.0018%

LOLE = Loss-of-Load Expectation; LOLE = Loss-of-Load Hours; PCAP = Perfect Capacity; ICAP = Installed Capacity; EUE = Expected Unserved Energy

Energy+Environmental Economics

Thank You

New Mexico Portfolio

Development of New Mexico REA Compliant Portfolio

- **Identify NM portfolio to address REA targets**
- **Evaluate options for 2045 REA zero carbon goal**
  - Hydrogen fueled combustion turbines
  - Assess options for no combustion turbines

Next Modeling Steps

Modeling Scenarios

- **Pending scenarios**
  - High DSM scenario
  - High DG scenario
- **Load forecast update**
- **Unit lifetime extension update**
- **Re-run of base case and optimal portfolio compliant with NM REA**
- **Carbon tax sensitivities**