



HORIZONS ENERGY NORTH AMERICAN OUTLOOK

June 17th, 2020

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YOUR SPEAKERS FOR TODAY

Greg Turk

Managing Partner and
Executive Consultant of
Horizons Energy



Kathy Jones

Executive Consultant of
Horizons Energy



AGENDA

- Who we are and what we do
- Market drivers
- Results overview
- Key takeaways
- Advisory service content
- Q&A

WHAT WE DO

- North American Advisory Outlook
 - Fundamental forecast of energy markets
 - Nine scenarios
 - Interactive dashboard of results
- EnCompass National Database
- EnCompass Ready Data
 - Scenarios and inputs directly importable into EnCompass
- Custom Scenarios
- Consulting

ADVANTAGES OF THE HORIZONS ADVISORY

- Independent assessment
- Years of experience
- Multiple scenarios
- Interactive dashboard to review results
- Expanded content delivery
- Proven back cast

ENCOMPASS POWER PLANNING MODEL

Capital Projects



Capacity



Environmental Programs



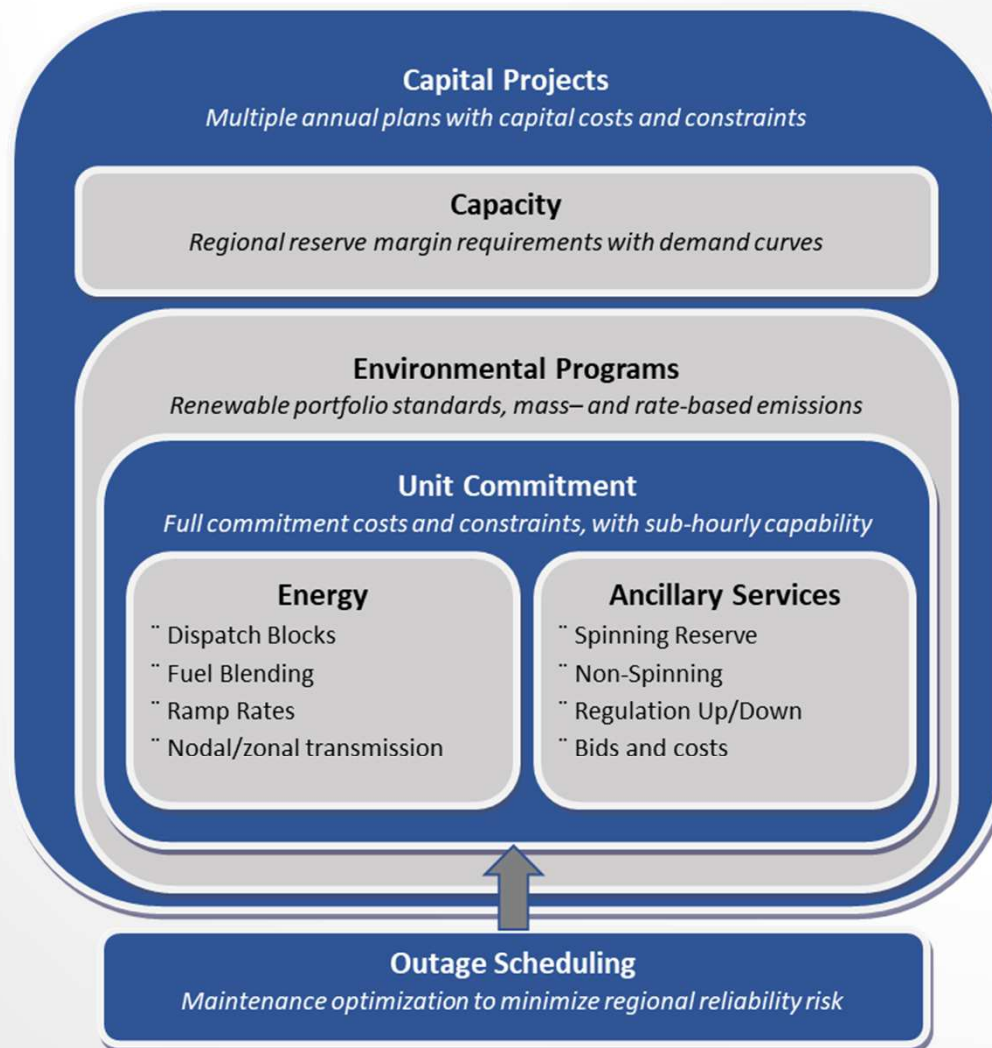
Unit Commitment



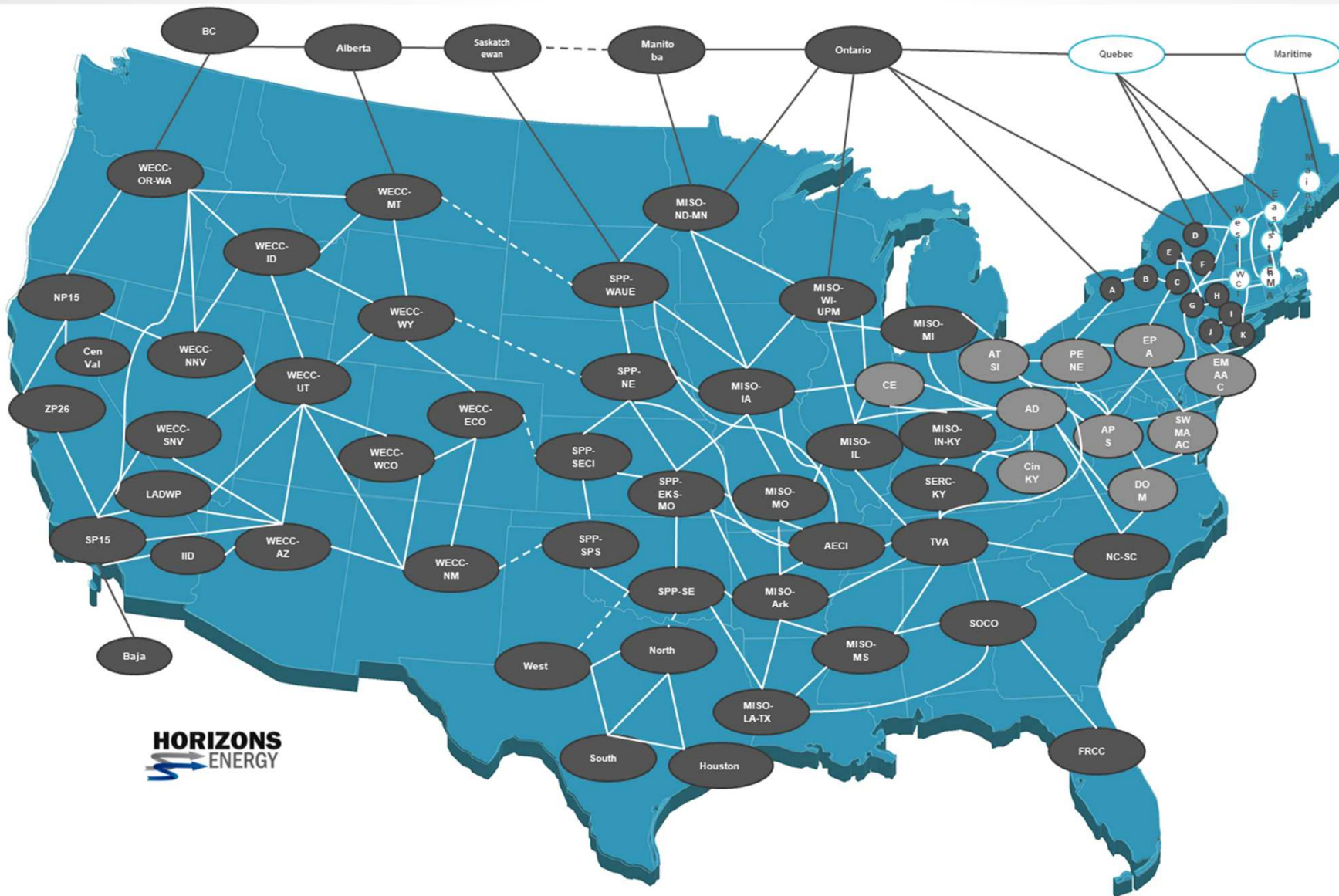
Energy and Ancillary



Outage Schedule



MARKET AREAS



CURRENT SCENARIOS

- Base
- High Natural Gas
- Low Natural Gas
- High Demand
- Low Demand
- Carbon Limit with High Natural Gas
- Carbon Limit with Low Natural Gas
- National Carbon Tax
- Zero Carbon Additions Only

MARKET DRIVERS

CHANGES FROM FALL 2019

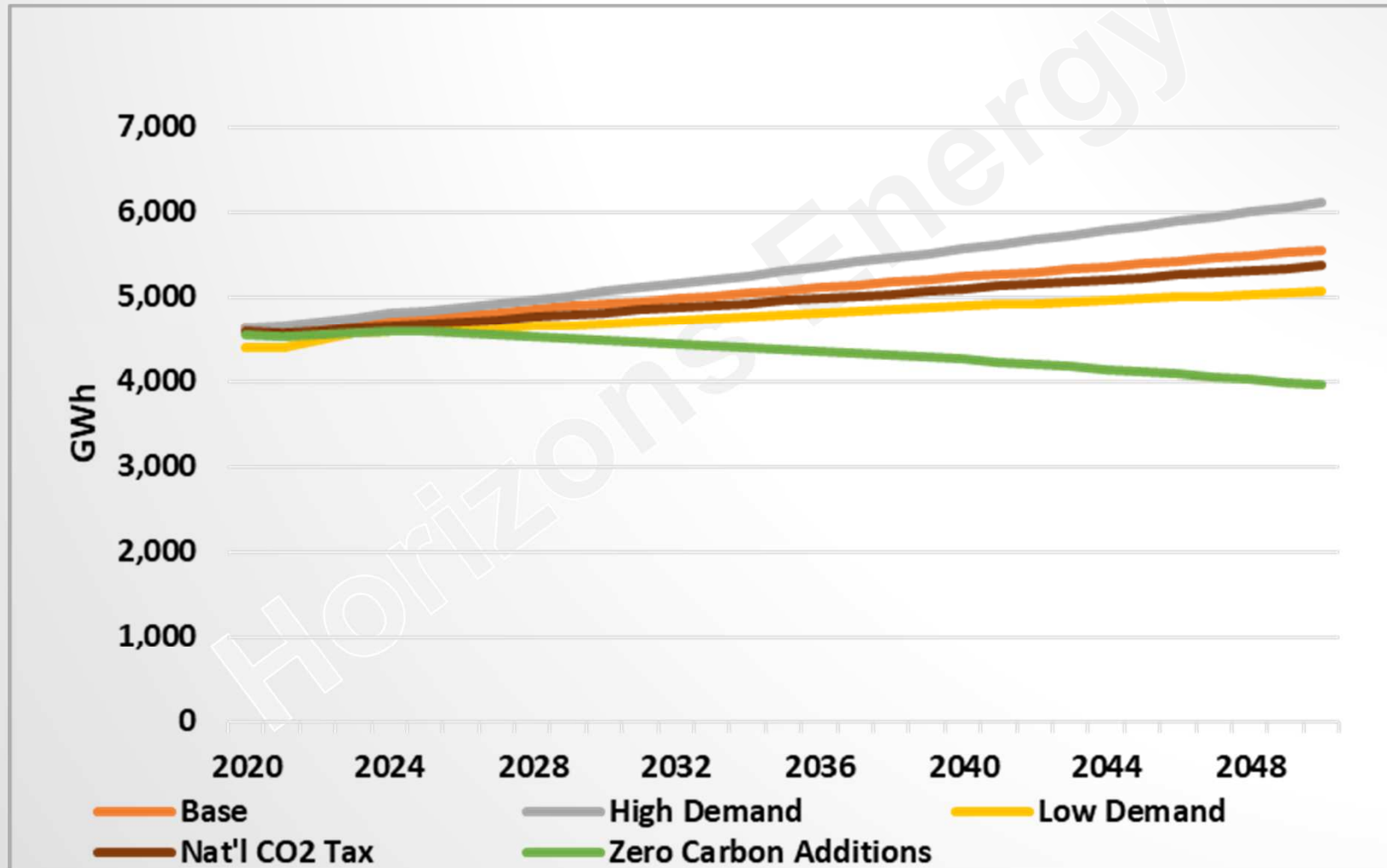
- Demand forecast
 - 0.7% lower through 2035 and 0.5% higher with a change in CAGR of 0.61% compared to 0.55%
- Fuel prices
 - Henry Hub 13% lower overall
 - Henry Hub floor price of \$1.50/MMBtu
 - Coal basin prices 3% lower on average
 - Lower oil prices
- Renewable portfolio standard changes
- Carbon prices for AB32 and RGGI
- Capital cost assumptions
- Topology change
 - PEAK Reliability Coordinator closure

SCENARIO MATRIX

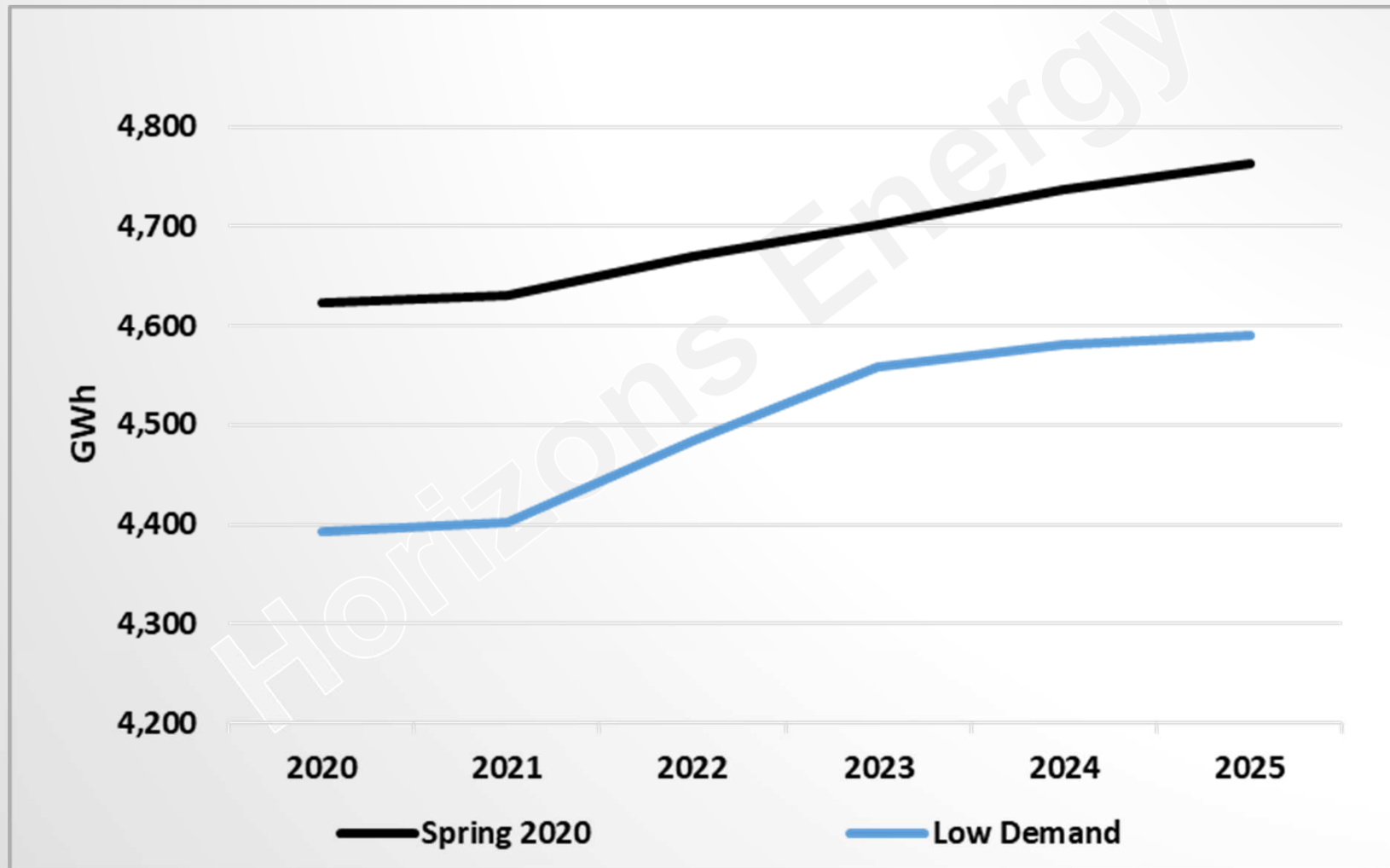
	Base	High NG	Low NG	High Demand	Low Demand	Nat'l CO2 Tax	CO2 Limit High NG	CO2 Limit Low NG	Zero Carbon Additions
Load	➡	➡	➡	⬆	⬇	➡	➡	➡	⬇
Natural Gas Price	➡	⬆	⬇	➡	➡	➡	⬆	⬇	➡
Coal Price	➡	⬆	⬇	➡	➡	⬆	⬆	⬇	➡
Technologies									
Nuclear Economic Retirement	Staggered beg. 2022					None			
Nuclear License	60 Years					80 Years	60 Years		
Coal Economic Retirements	Staggered beg. 2022					All eligible beg. 2021			Unlimited
Natural Gas Additions	CA Limited								Limited
Natural Gas Retirements	Staggered beg. 2022					All eligible beg. 2021	All eligible beg. 2025		Unlimited
Hydro	Existing								
Geothermal	Existing								
Other Renewables	Existing								
% of Generation Additions									
Solar	48%	↔	⬇	➡	⬇	↔	⬆	↔	➡
Wind	8%	↔	⬇	➡	⬇	↔	⬆	↔	➡
GT	11%	➡	⬆	↔	⬇	⬇	➡	➡	⬇
CC	28%	➡	↔	⬆	⬇	⬇	⬇	➡	⬇
IC	1%	➡	↔	↔	⬇	⬇	➡	⬆	⬇
Storage	4%	↔	⬇	➡	⬇	↔	↔	↔	⬆
Distributed Generation	➡	↔	⬇	⬇	➡	↔	⬆	↔	↔
Carbon	State/Province					Tax	Limit	Limit	State/Province

Medium
 Higher
 Really High
 Low
 Really Low

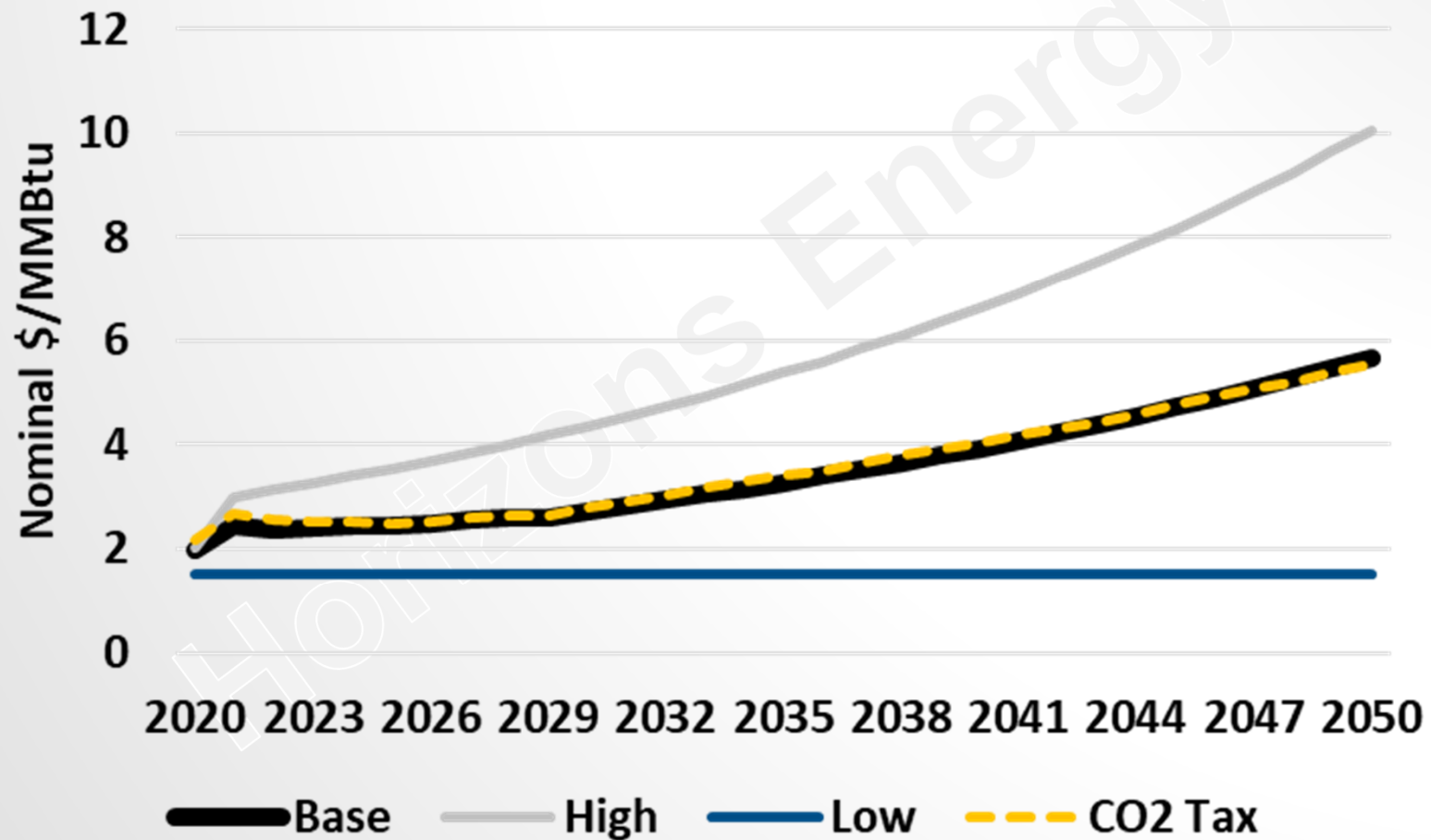
DEMAND OUTLOOK



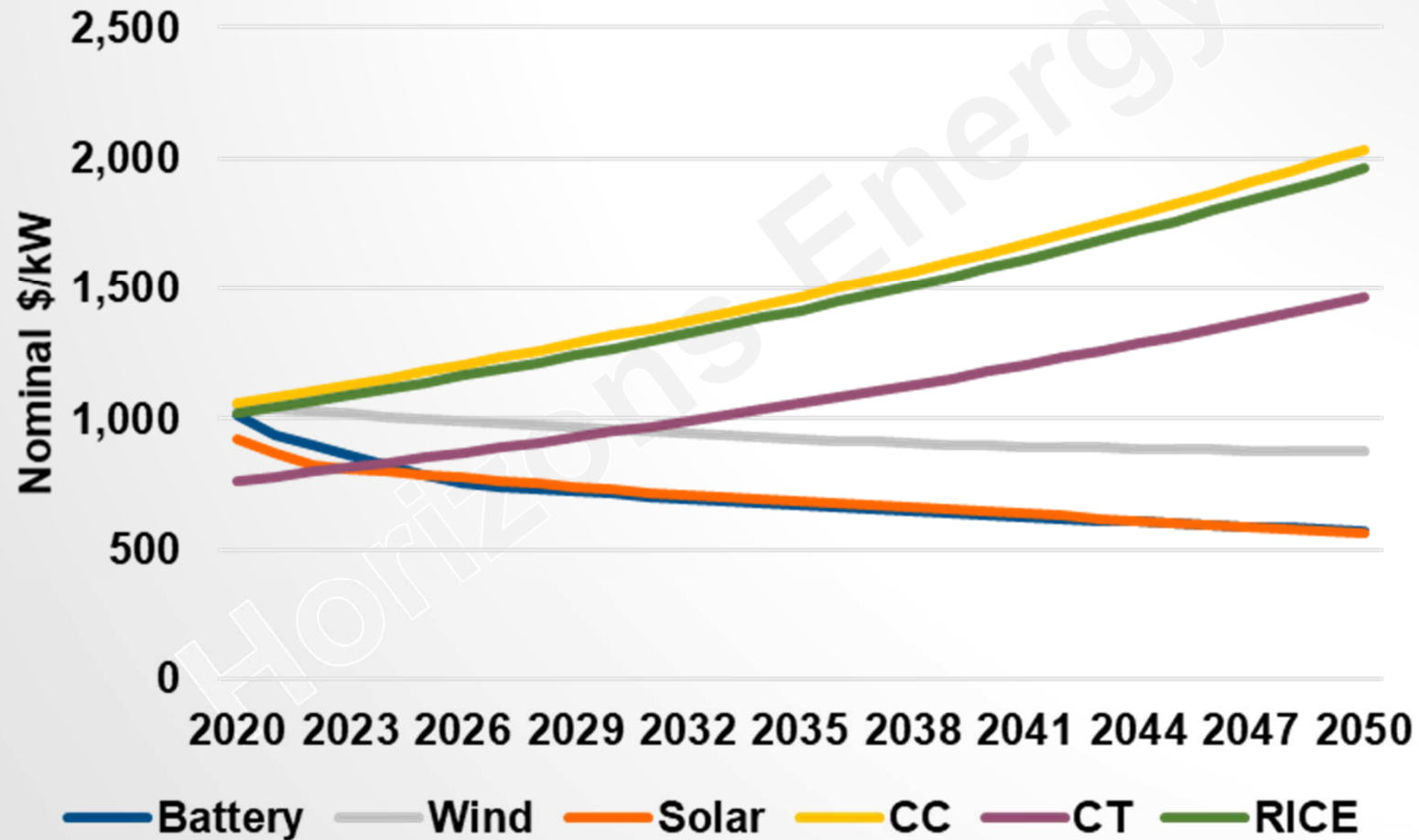
LOW VERSUS BASE | SPRING DEMAND



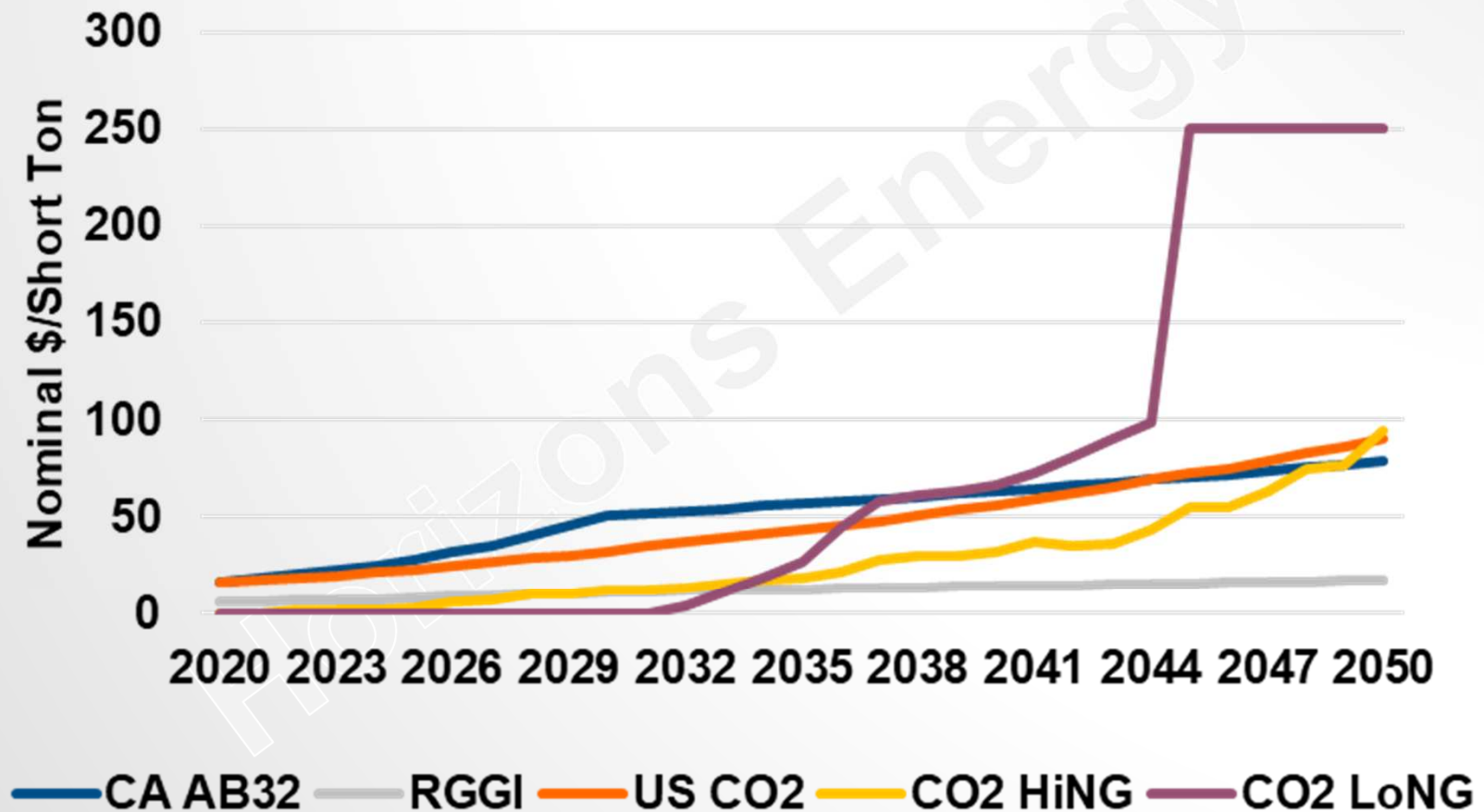
NATURAL GAS PRICE OUTLOOK



OVERNIGHT CAPITAL COST



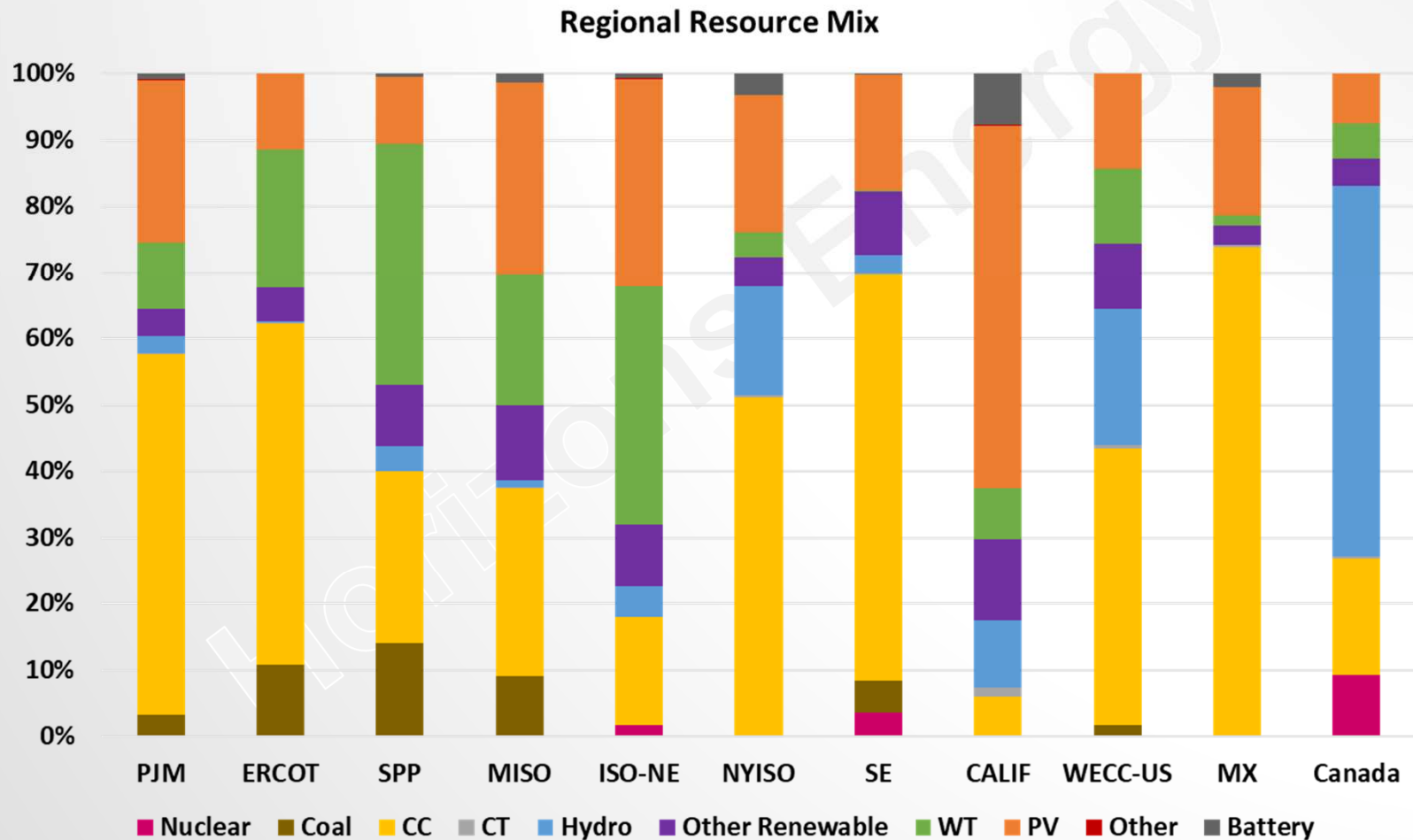
CARBON ASSUMPTION



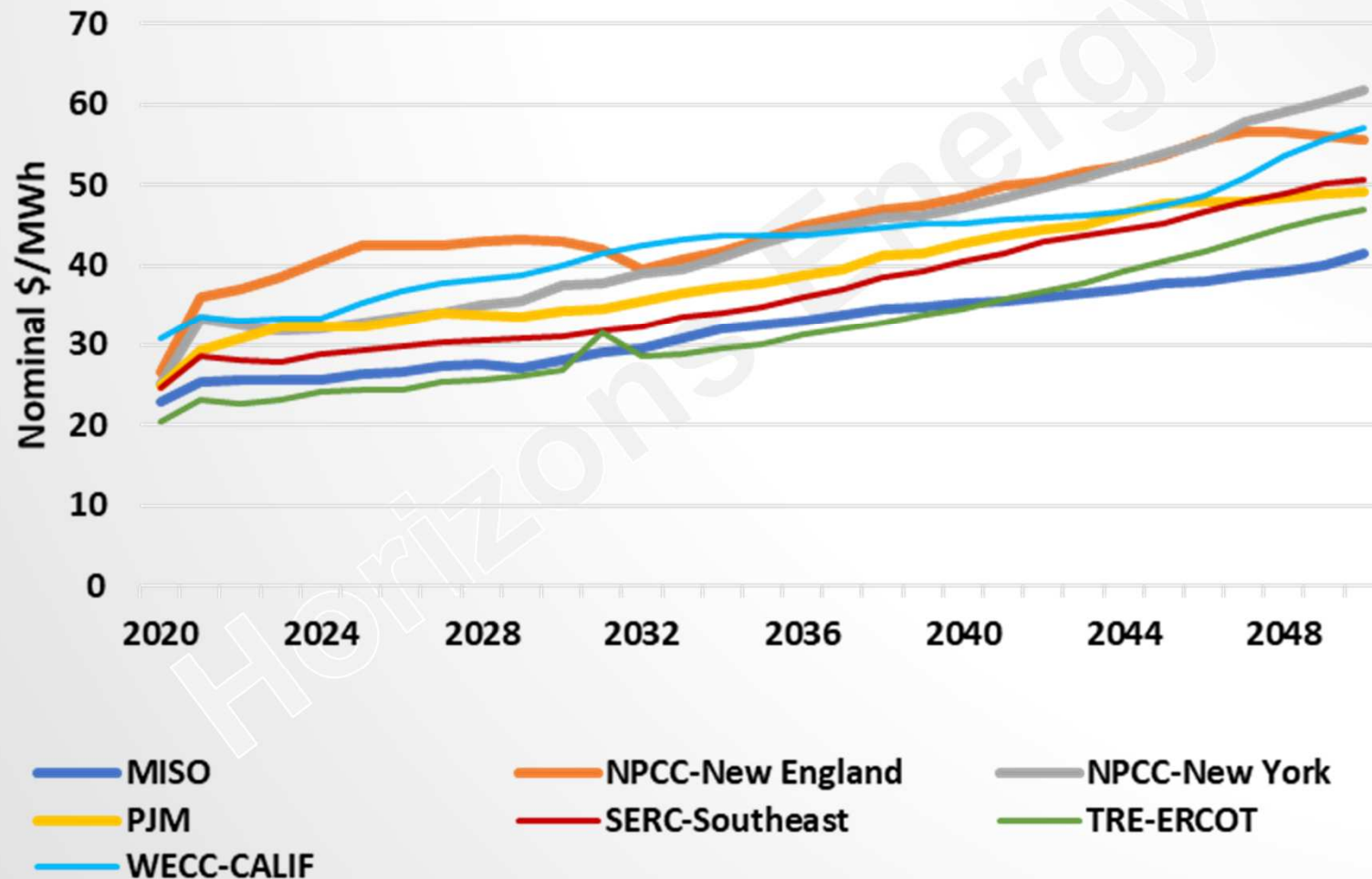
National and Regional

RESULTS OVERVIEW

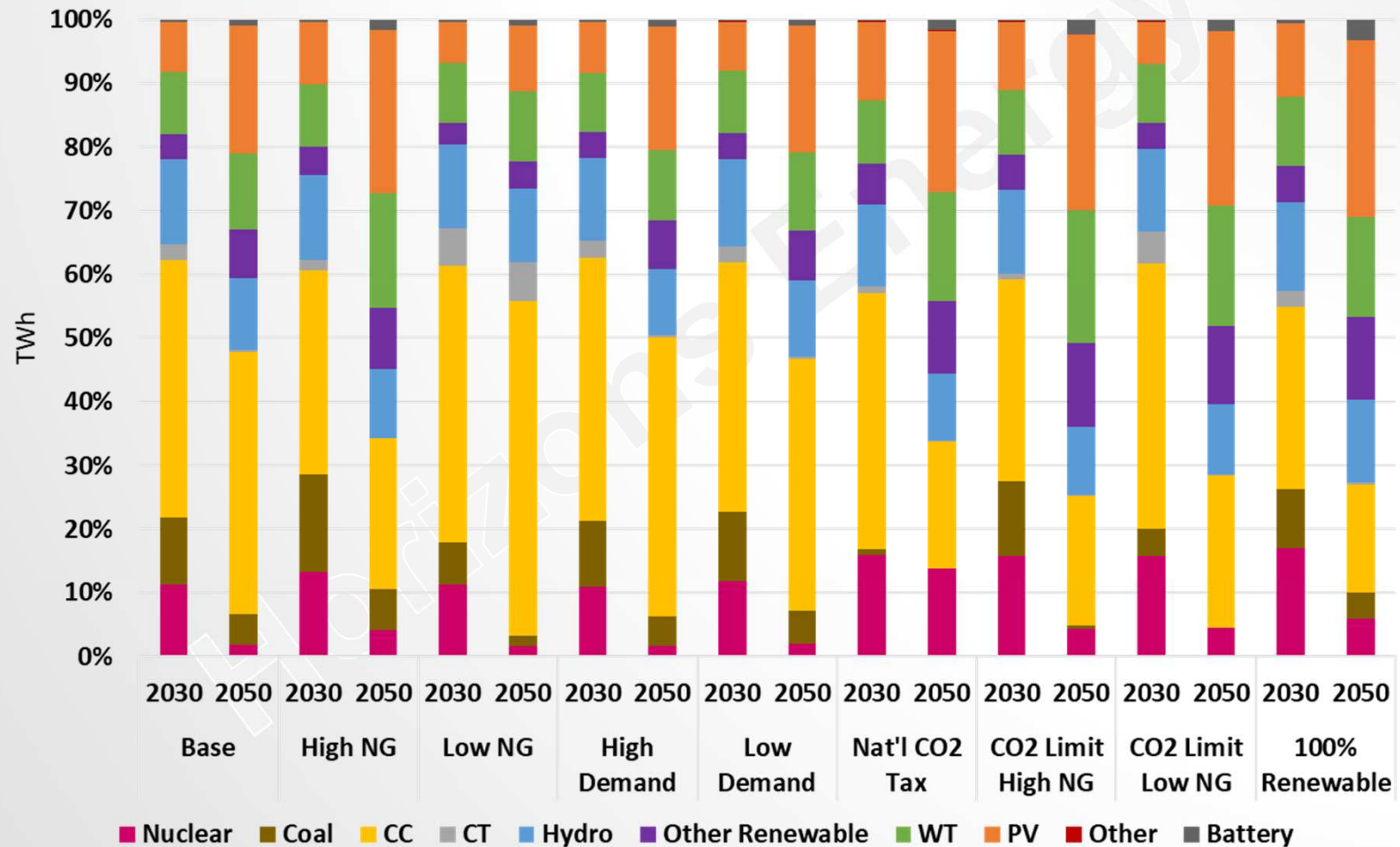
2050 GENERATION MIX BY REGION



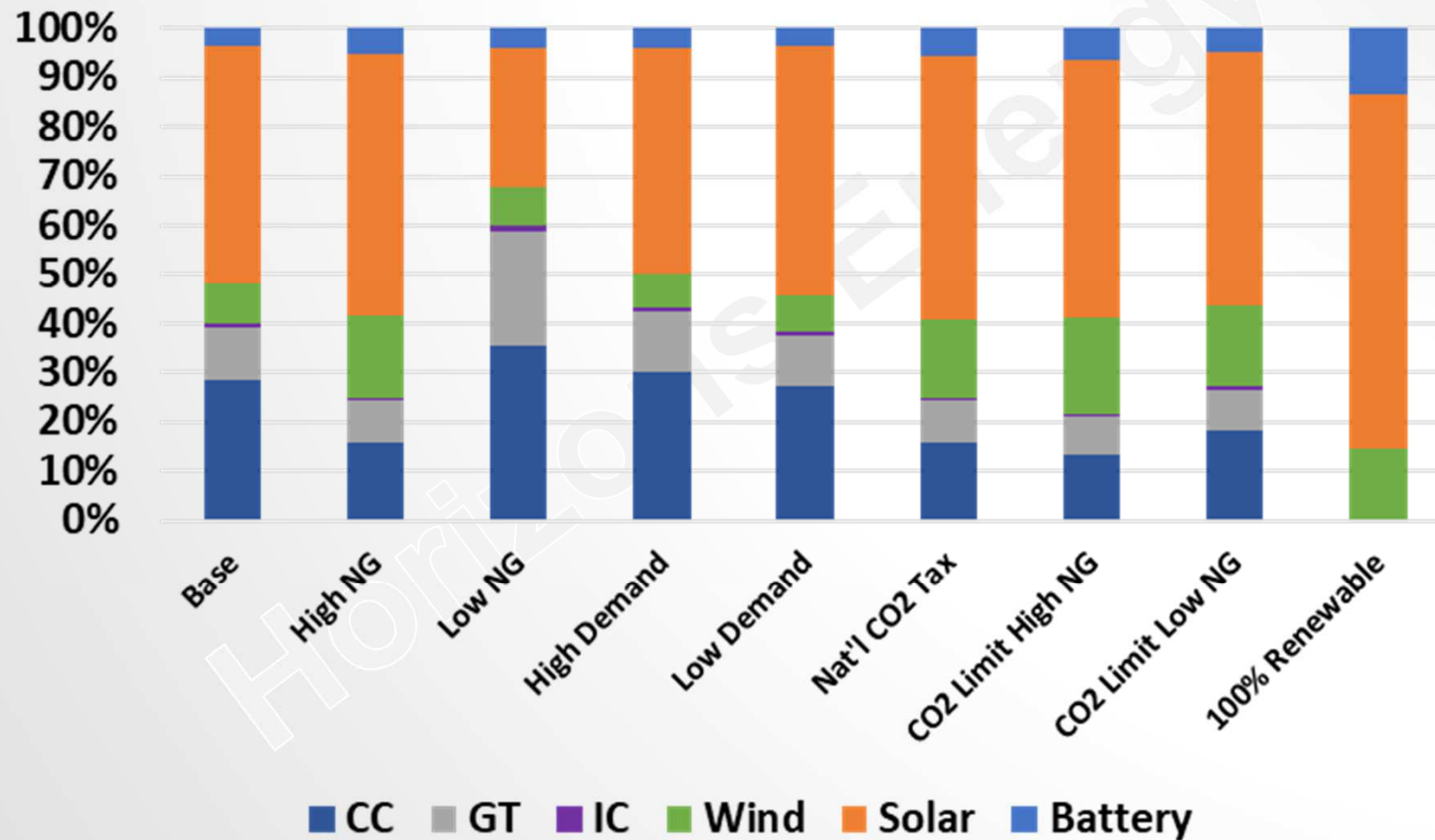
AVERAGE BASE ENERGY PRICE



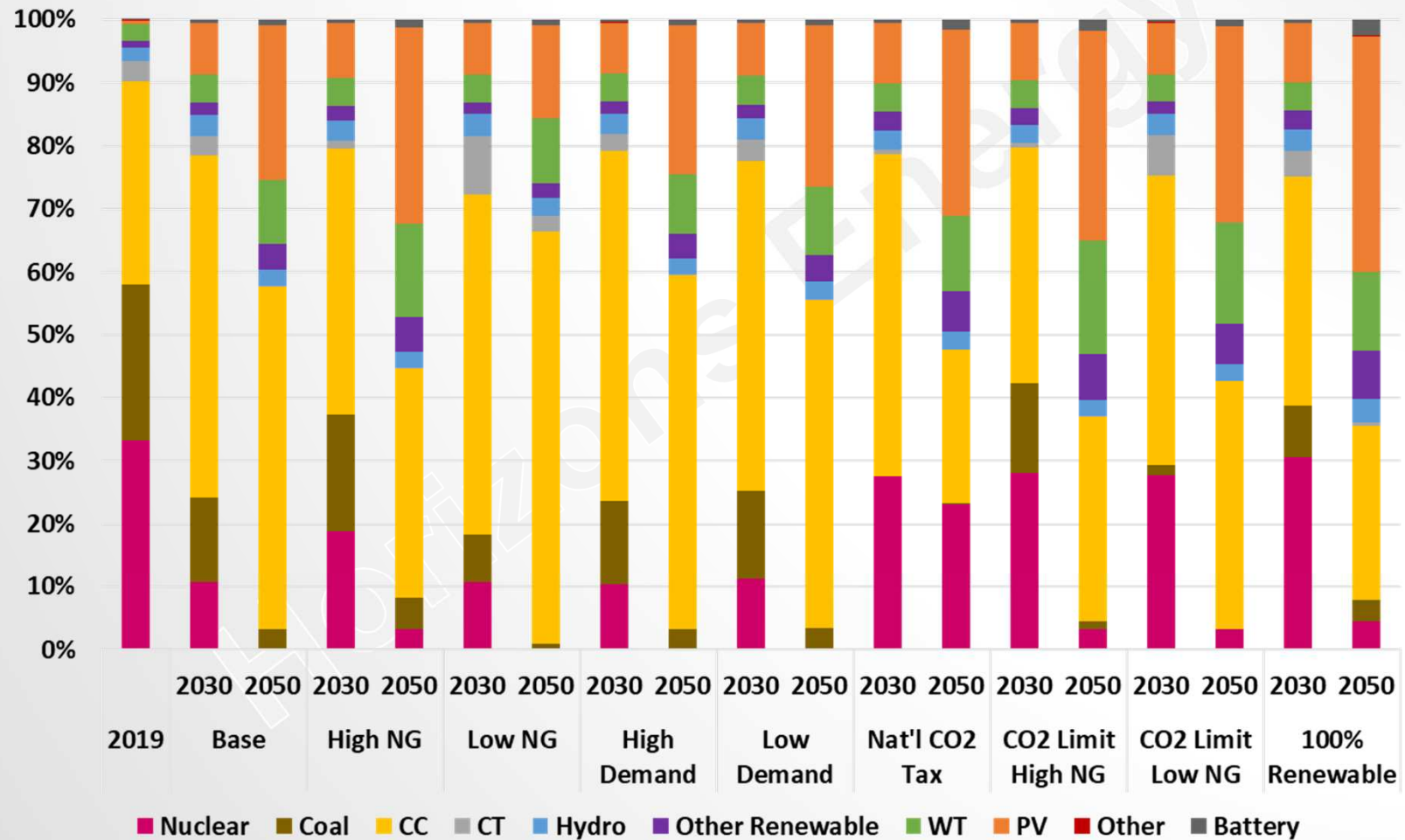
NATIONAL GENERATION MIX BY SCENARIO



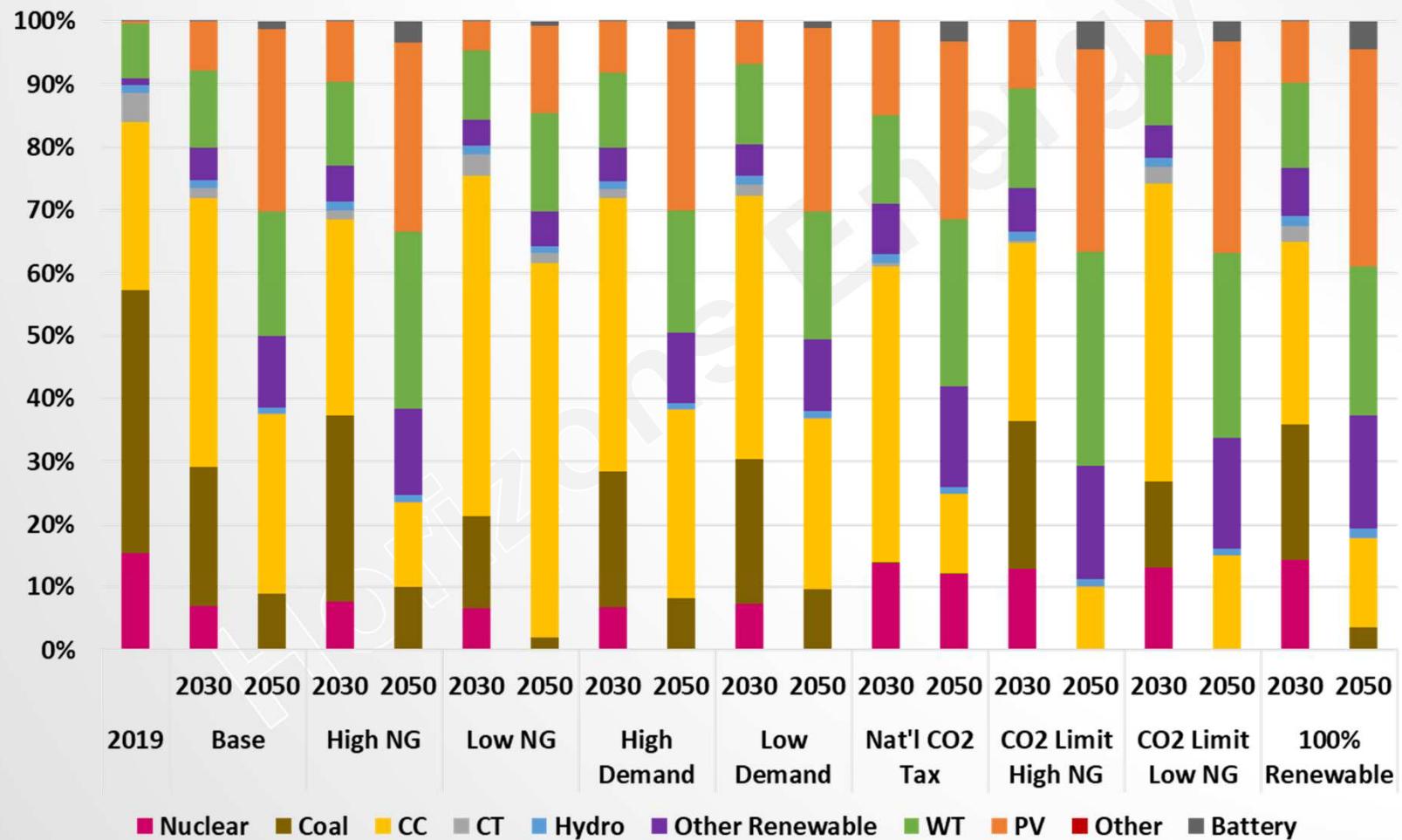
NATIONAL NEW BUILDS



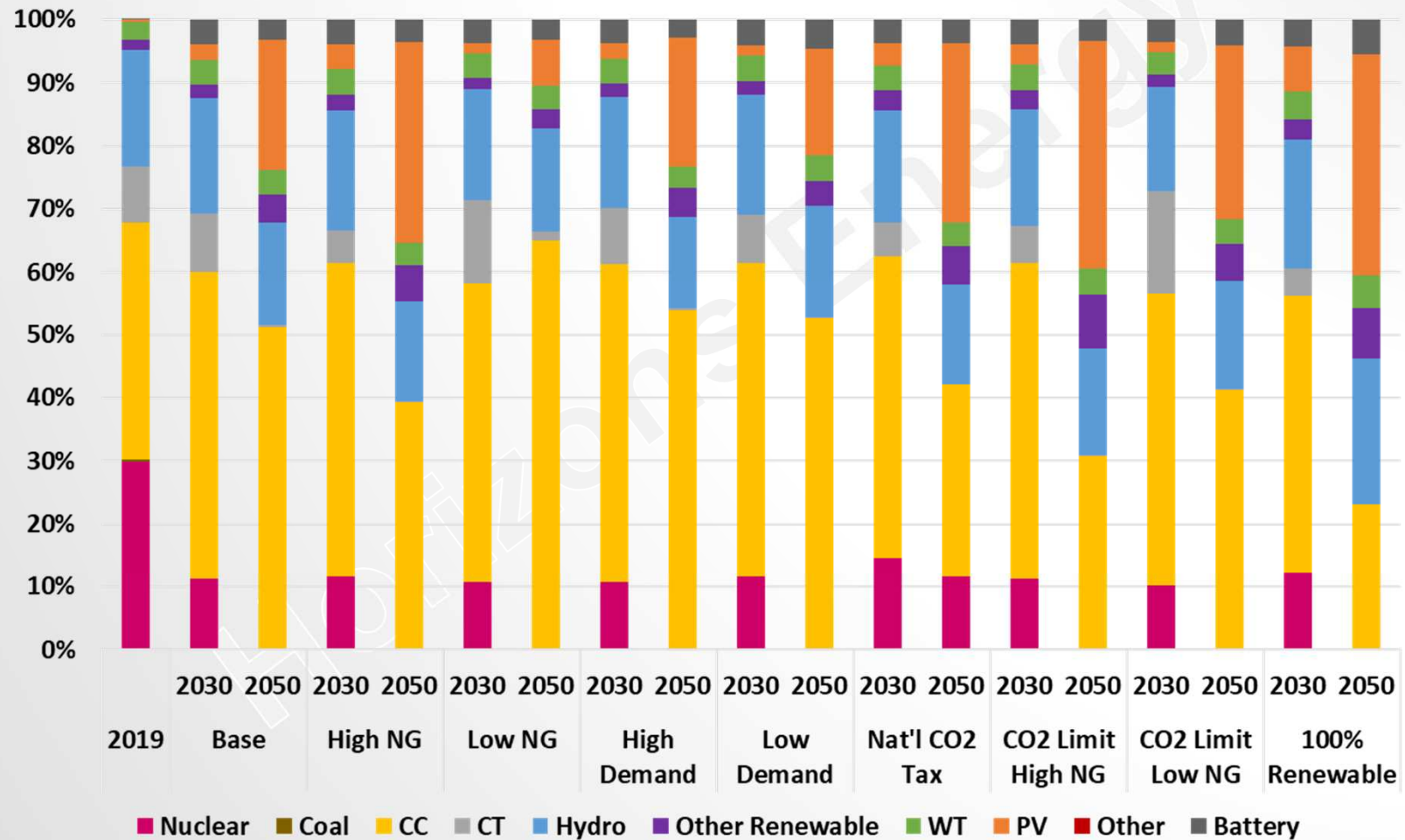
PJM GENERATION MIX



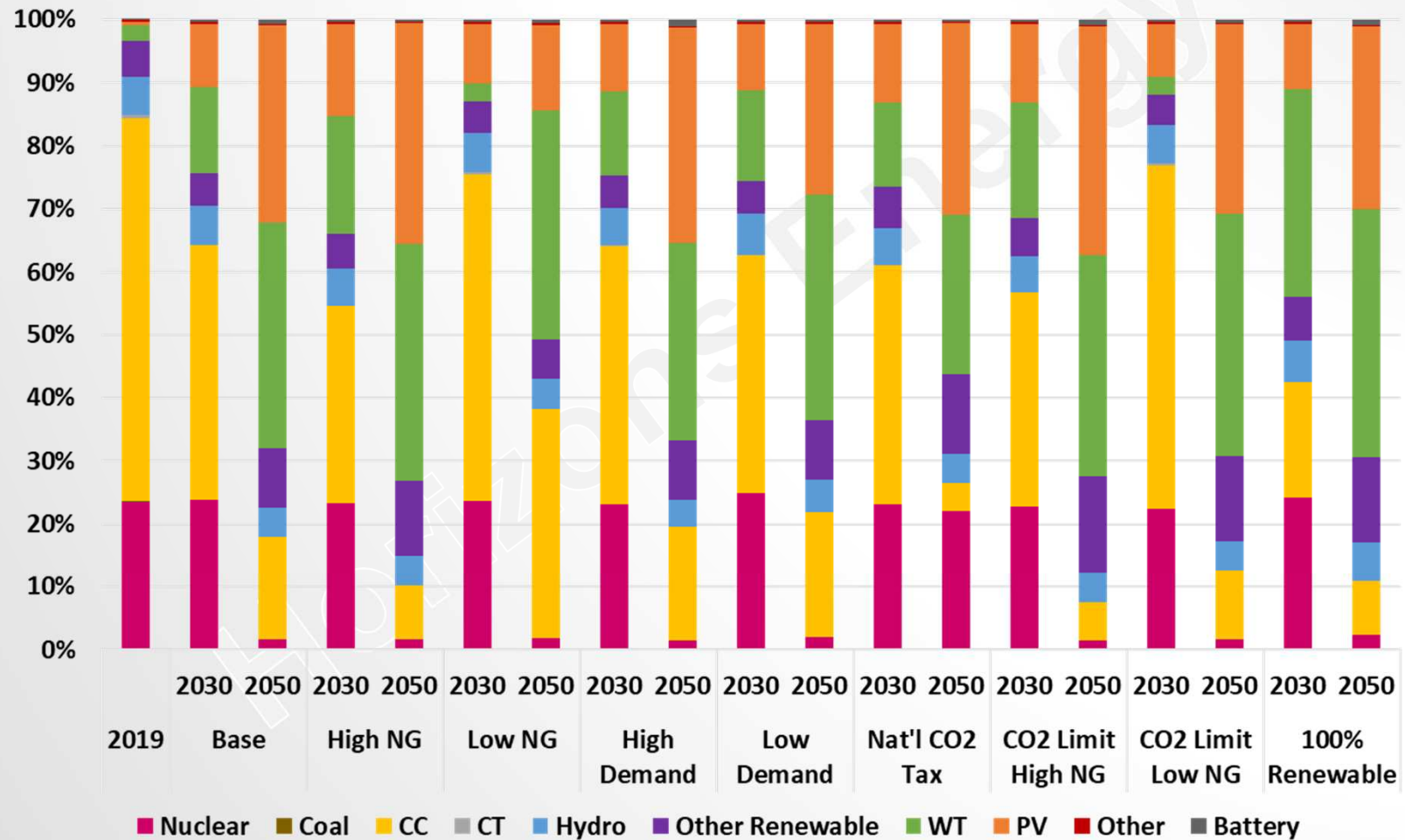
MISO GENERATION MIX



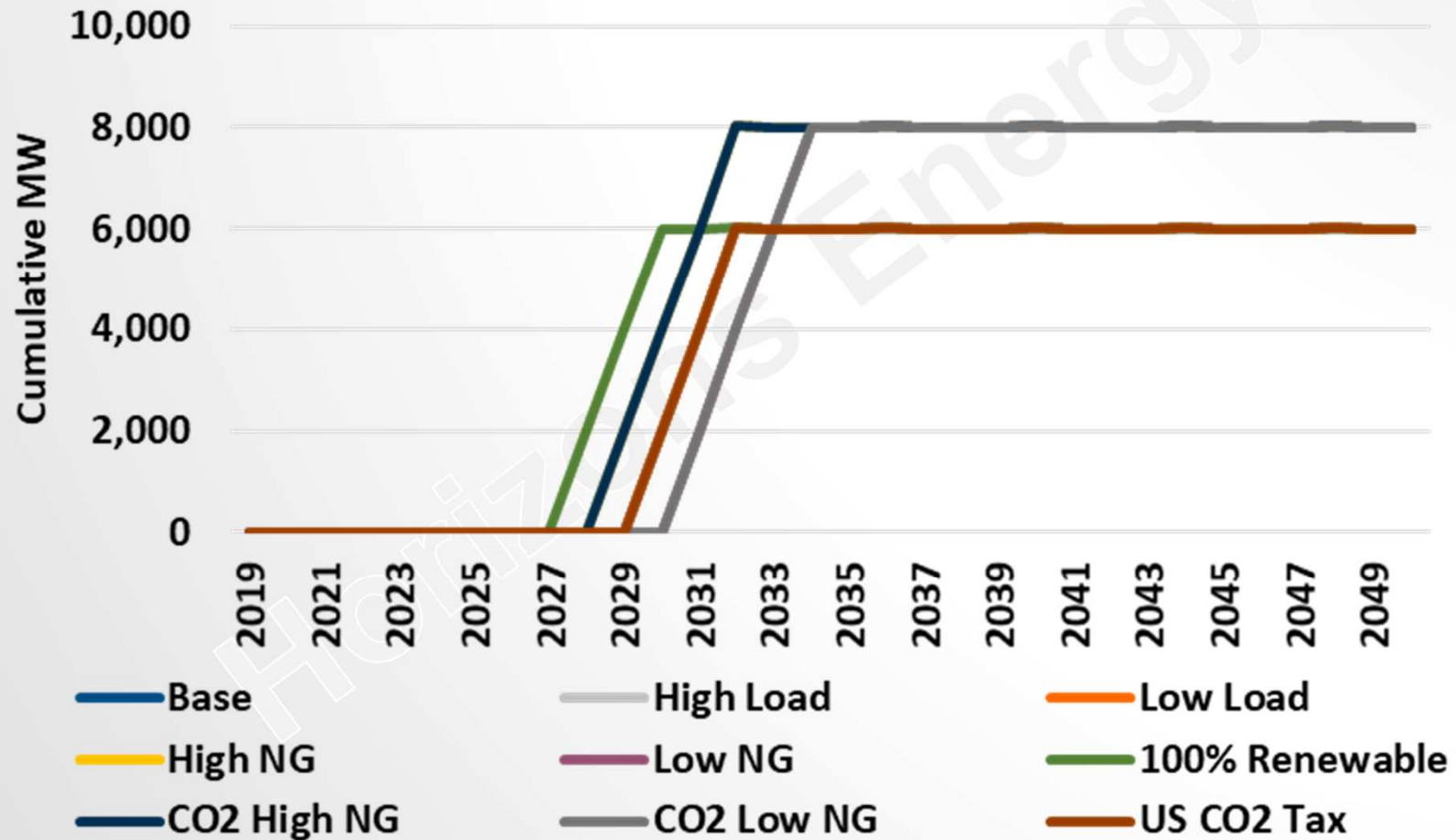
NYISO GENERATION MIX



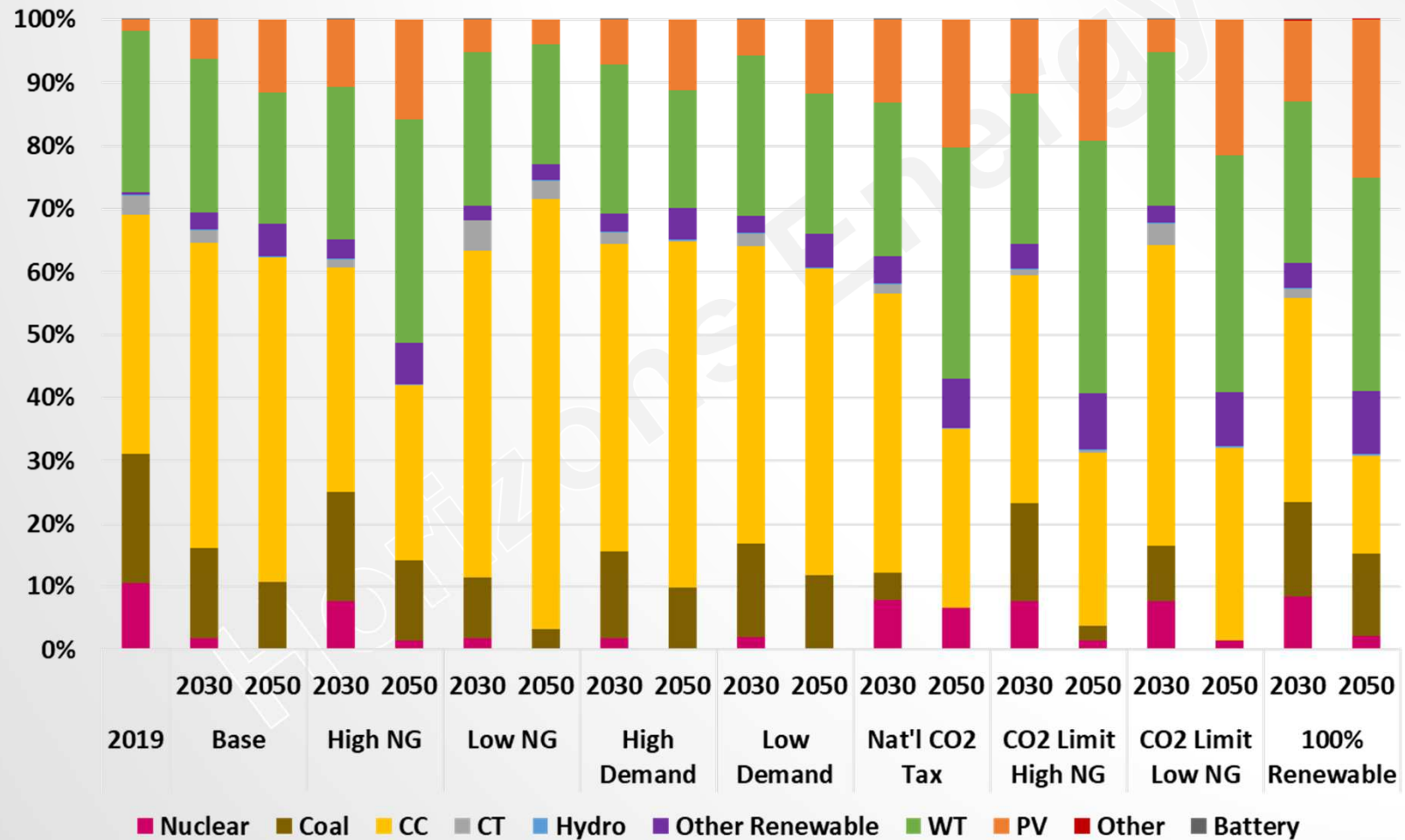
ISO-NE GENERATION MIX



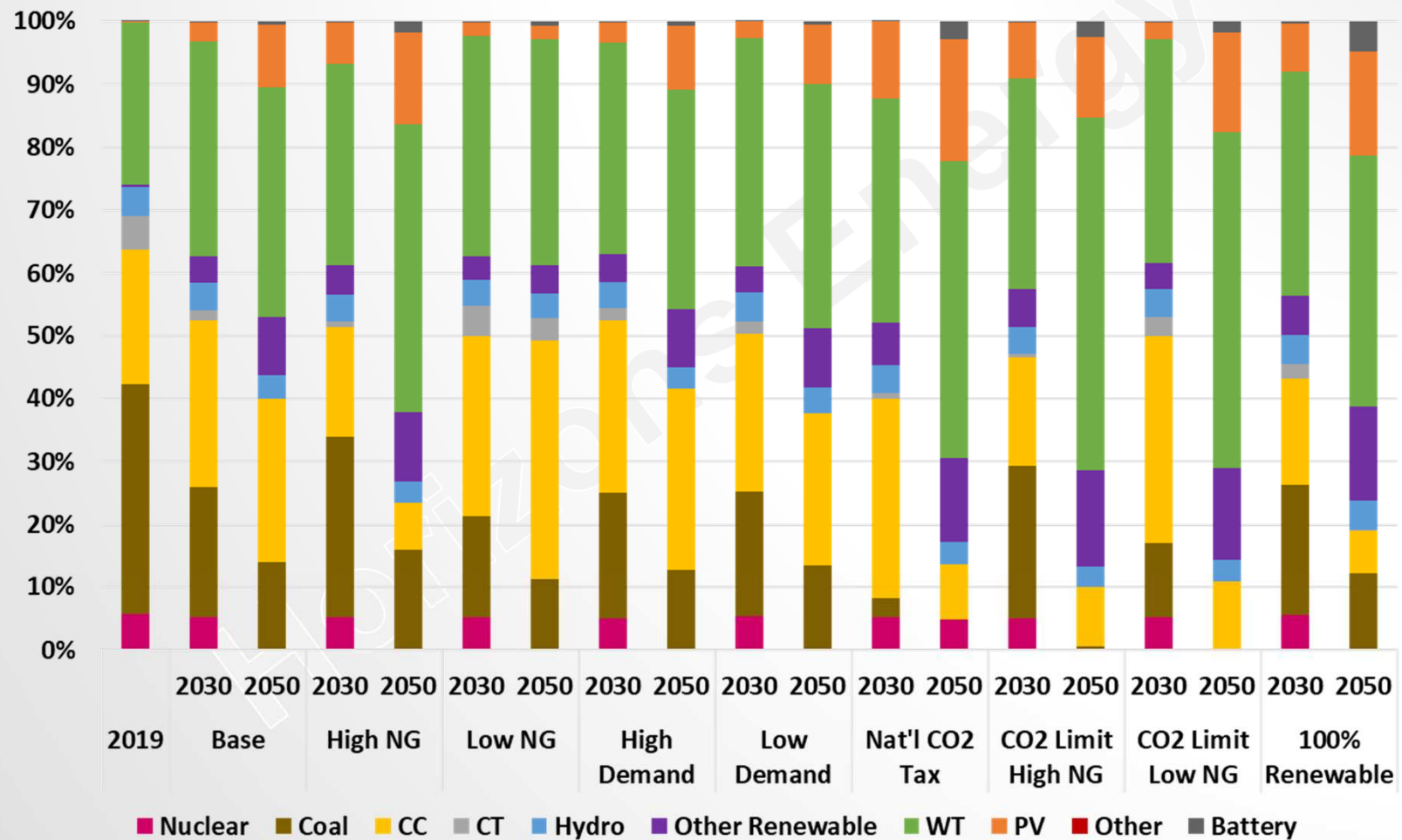
ISO-NE OFF-SHORE WIND



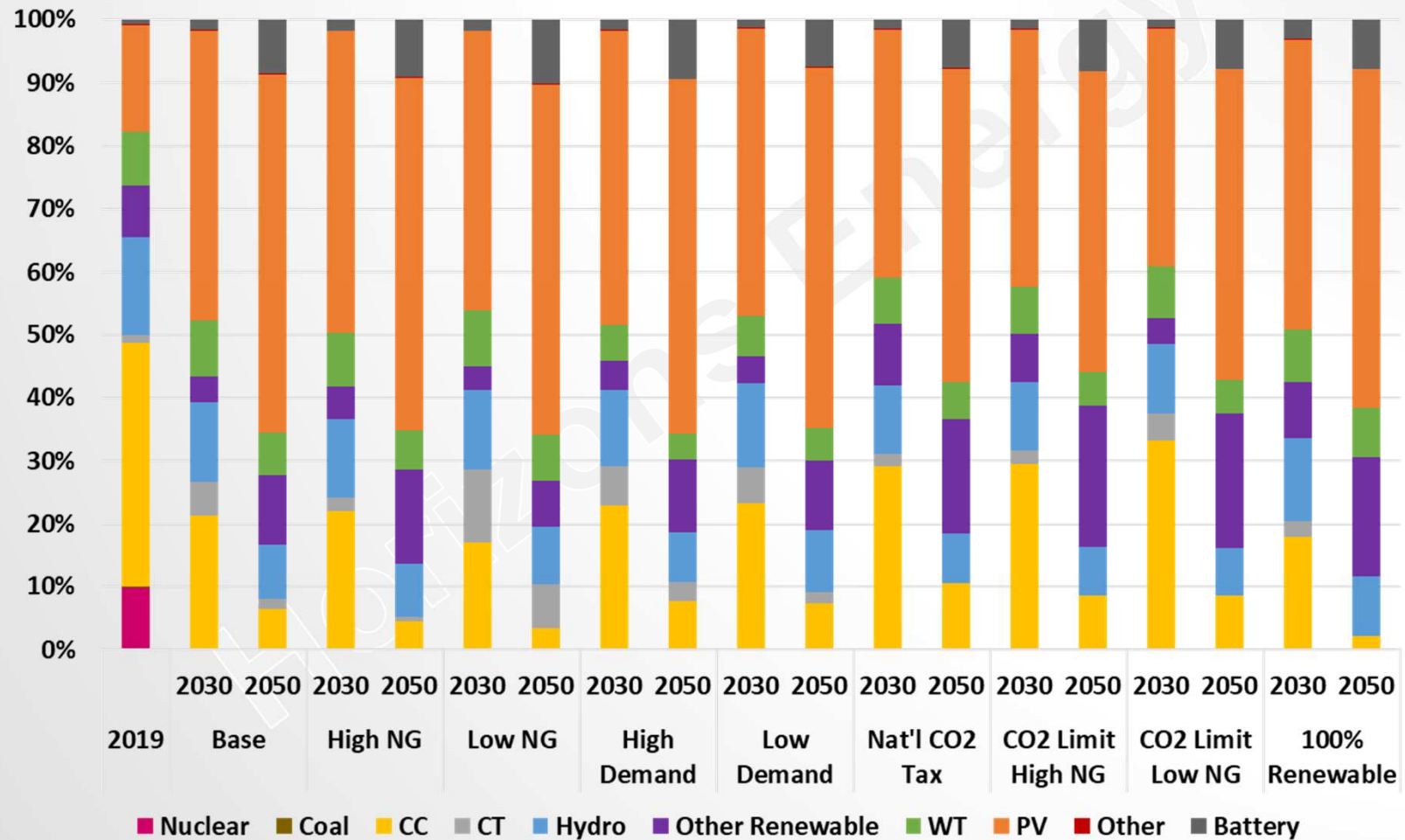
ERCOT GENERATION MIX



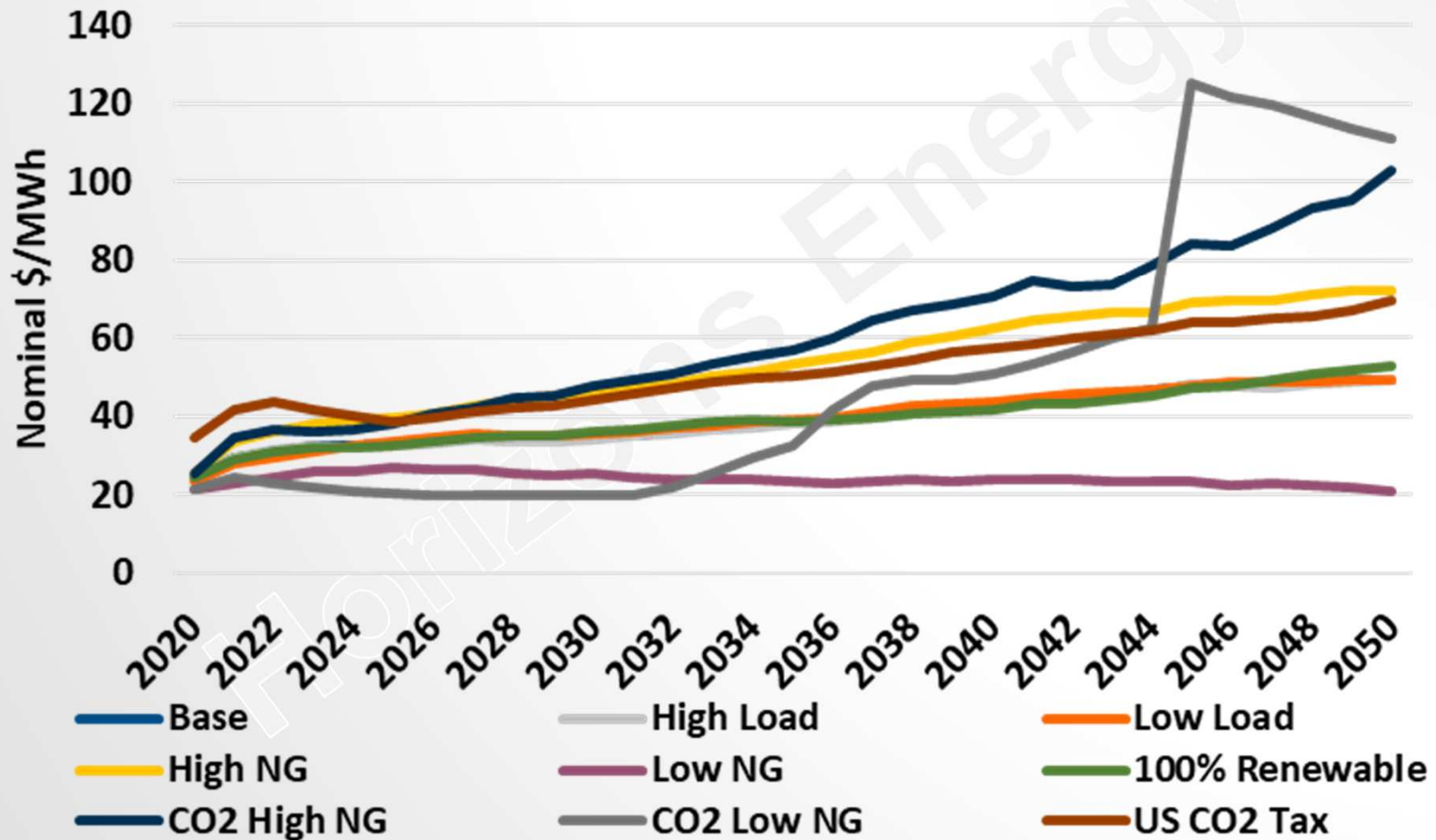
SPP GENERATION MIX



WECC-CALIF GENERATION MIX



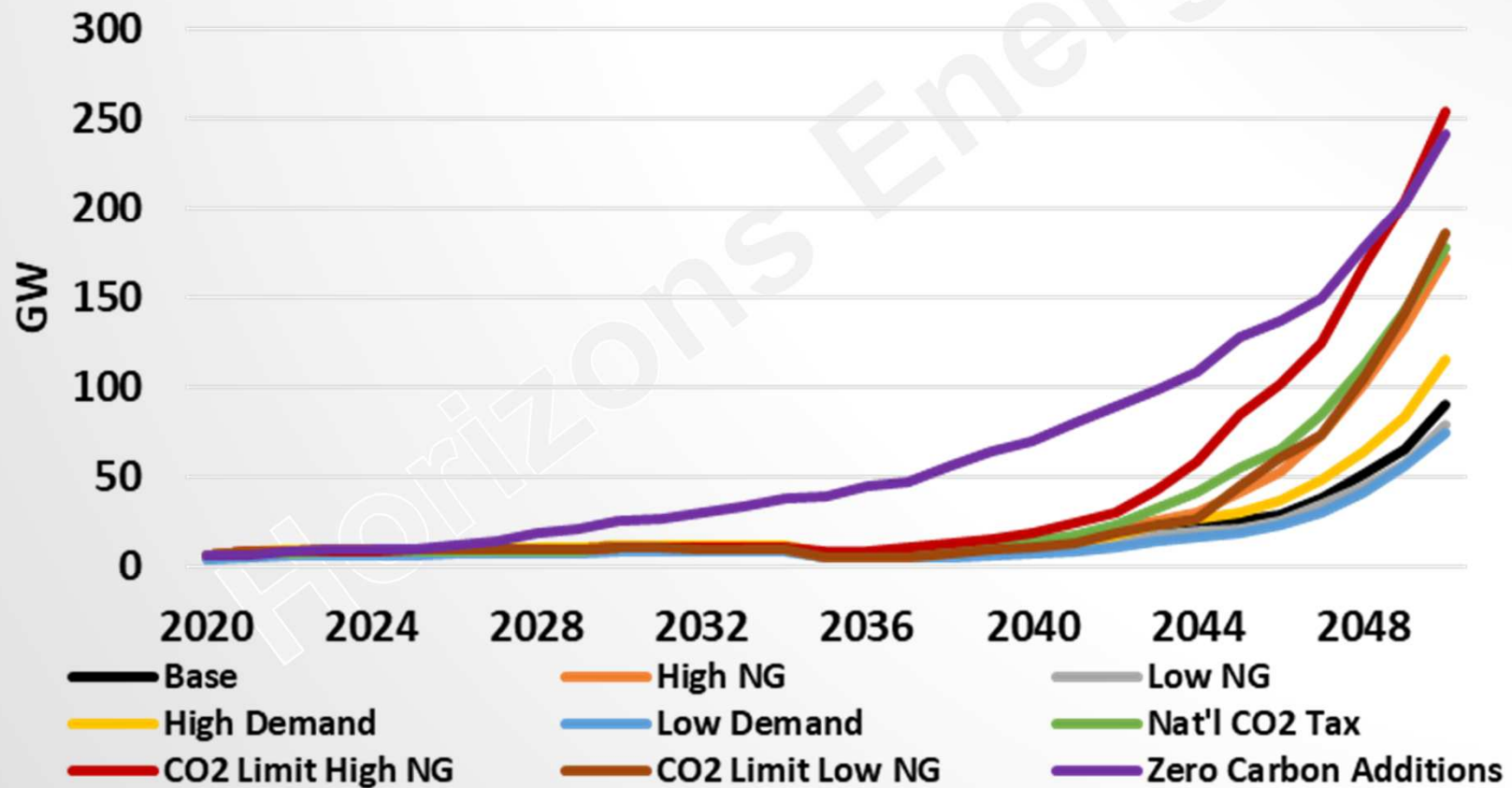
AVERAGE PJM ENERGY PRICE



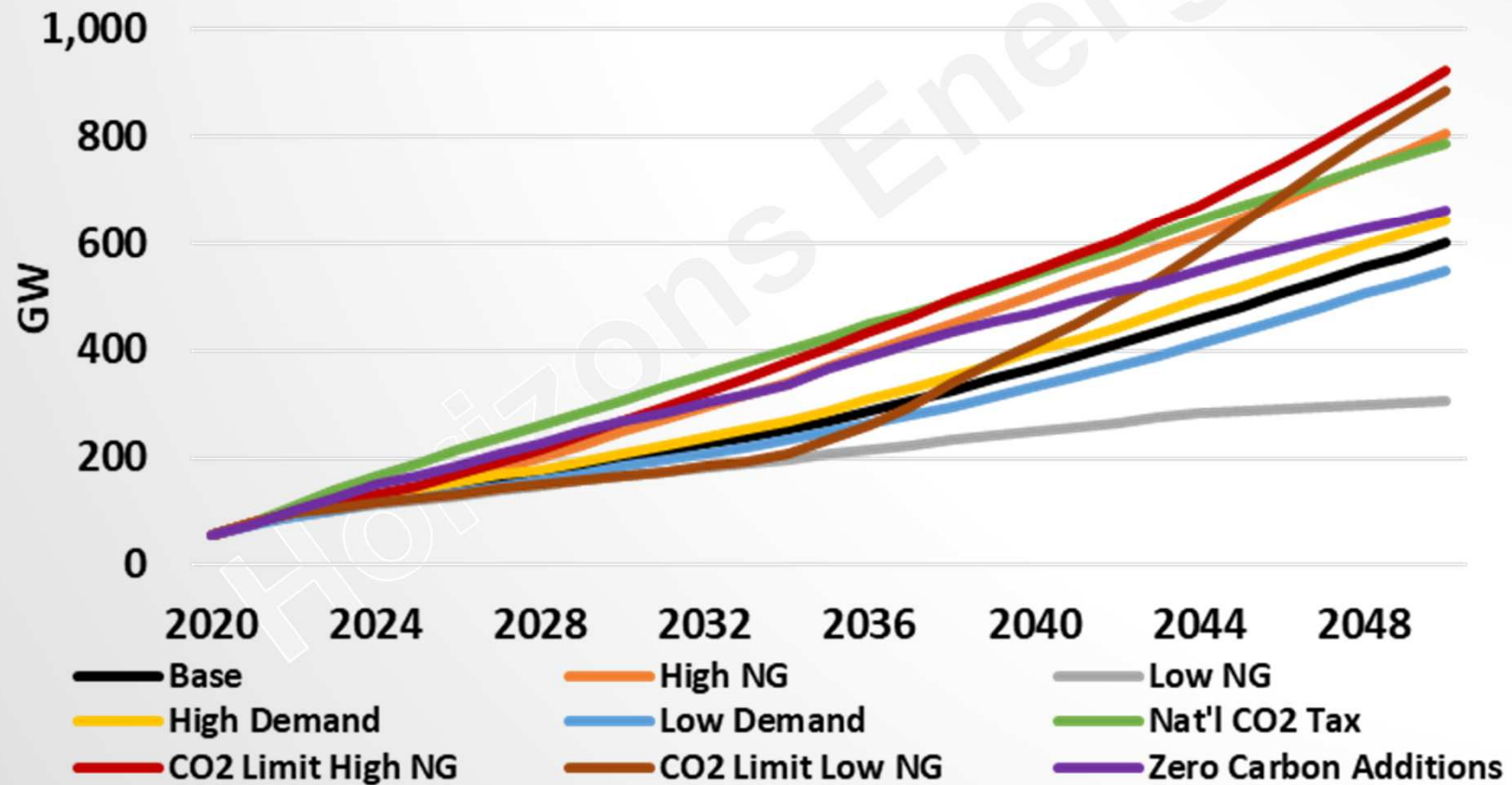
KEY TAKEAWAYS

- Battery penetration
- Wind and solar penetration
- Traditional resources perform best when?
- Carbon trends

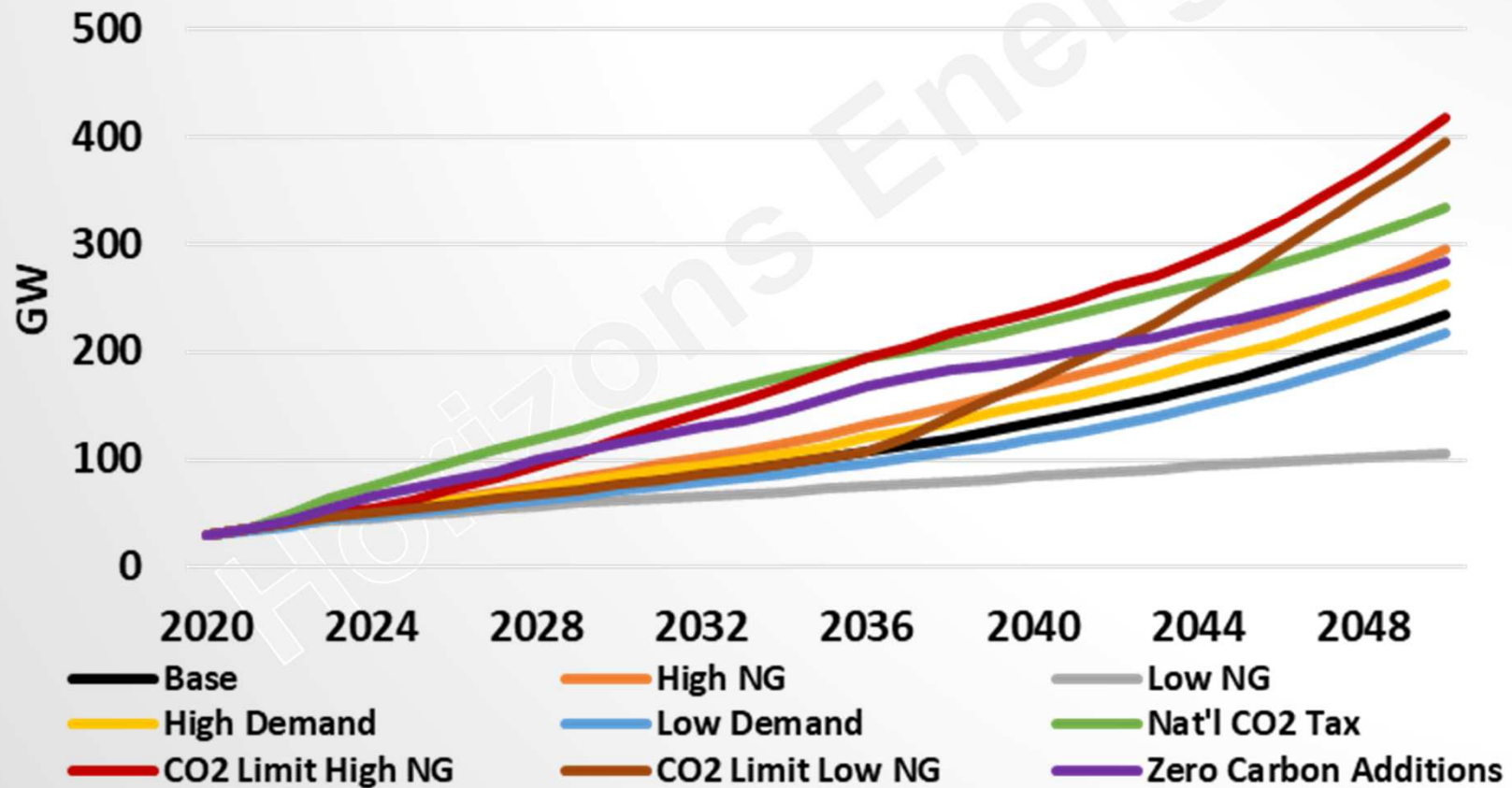
UTILITY SCALE BATTERY PENETRATION



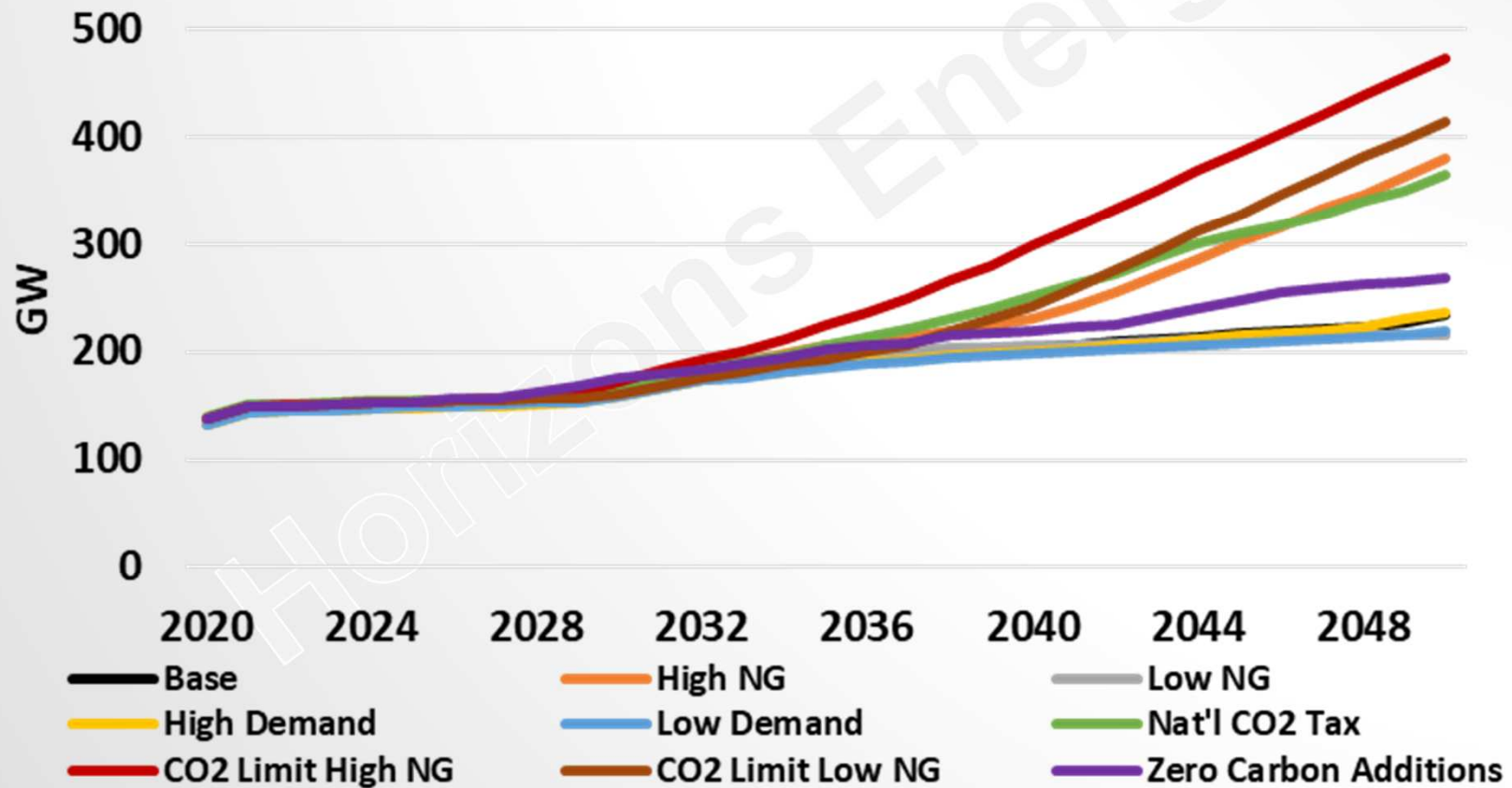
SOLAR PENETRATION



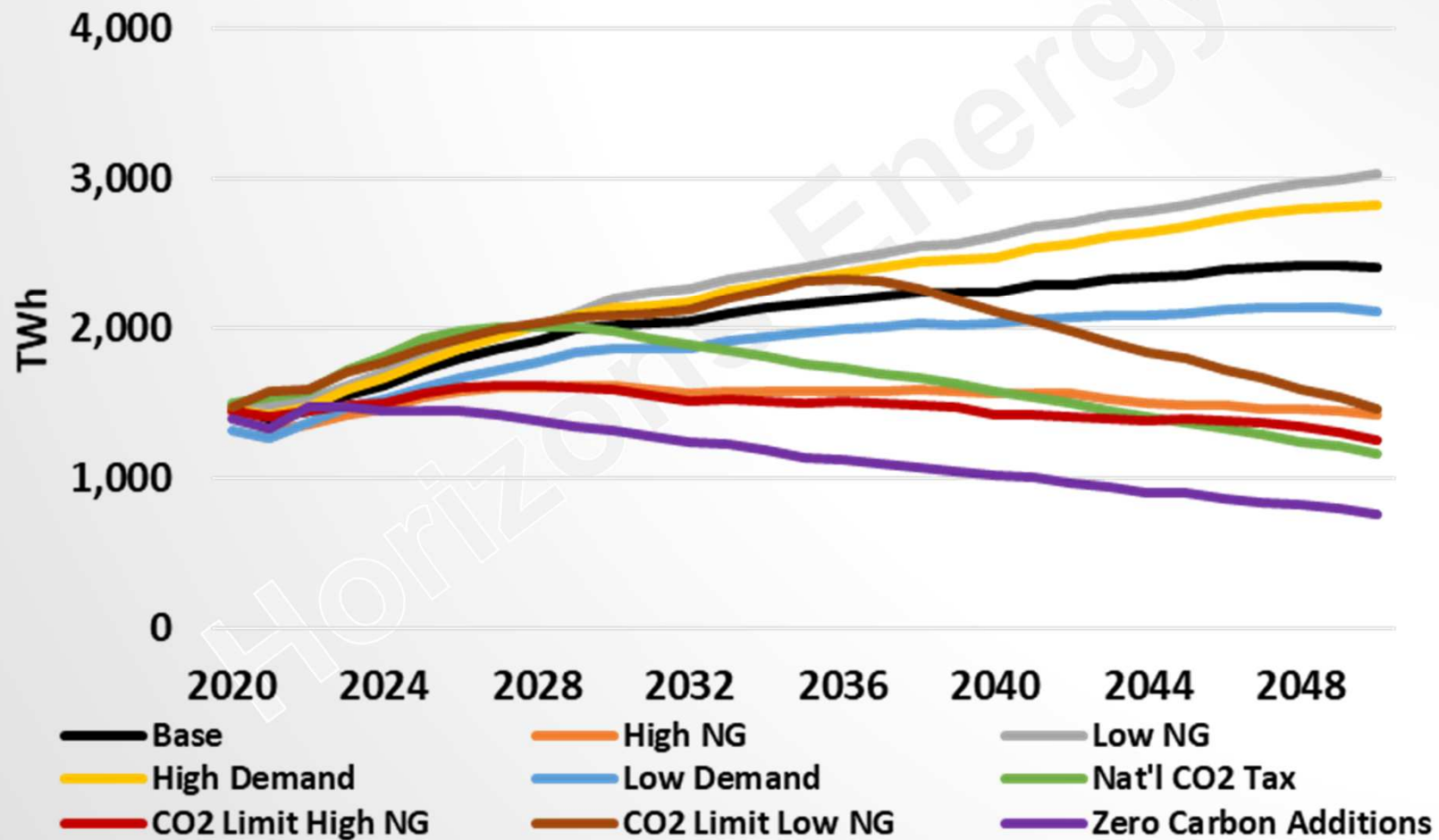
BTM ROOFTOP AND STORAGE PENETRATION



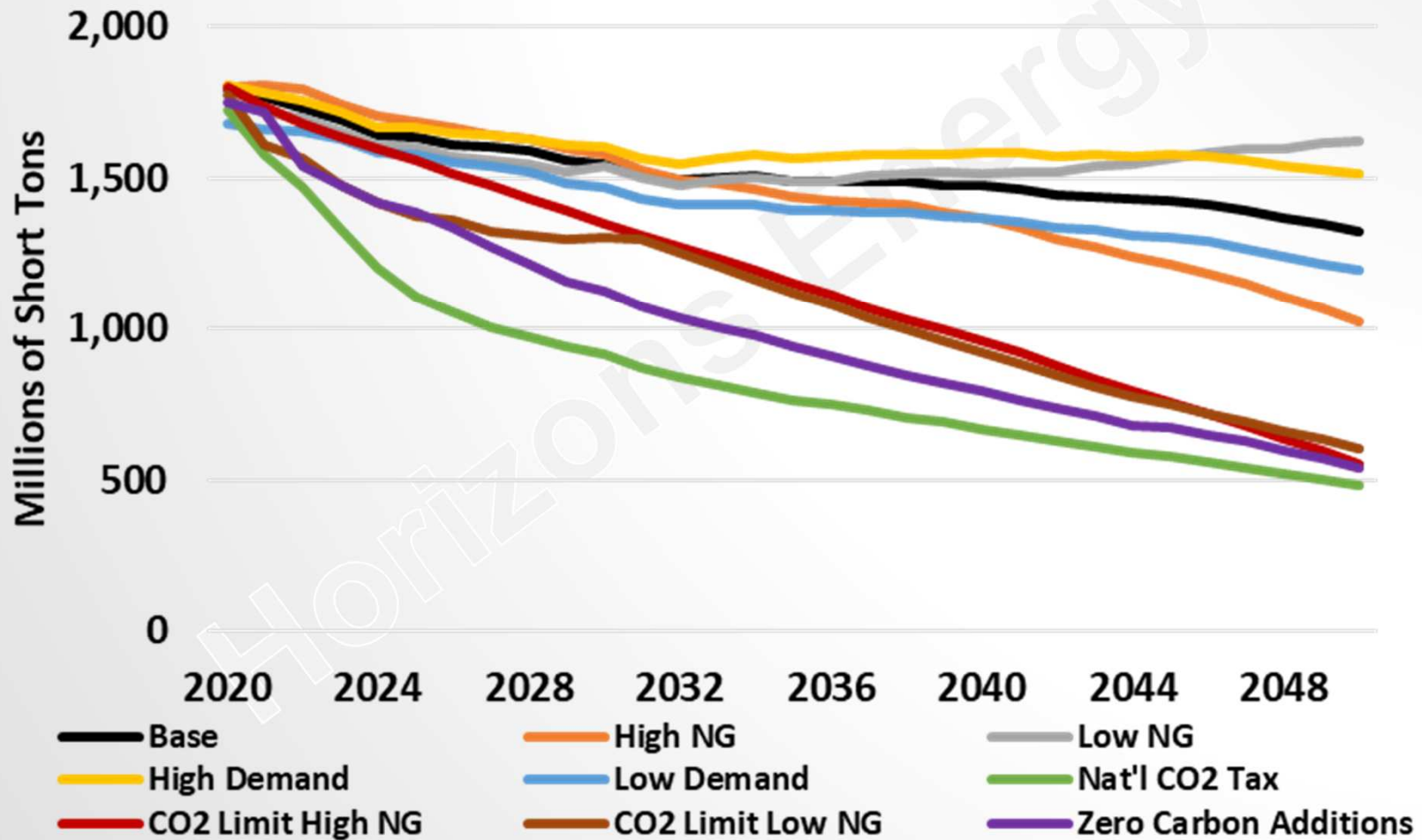
WIND PENETRATION



COMBINED CYCLE GENERATION

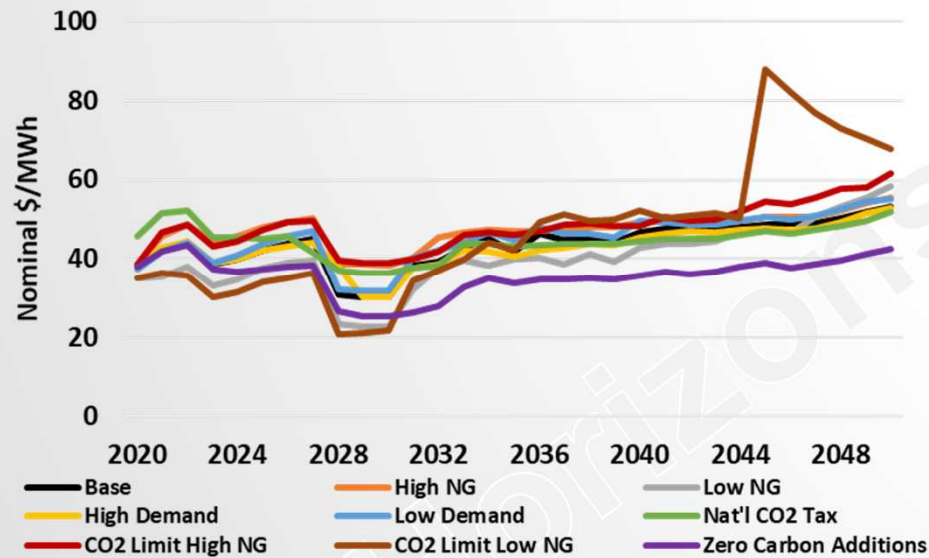


NORTH AMERICA CARBON EMISSIONS

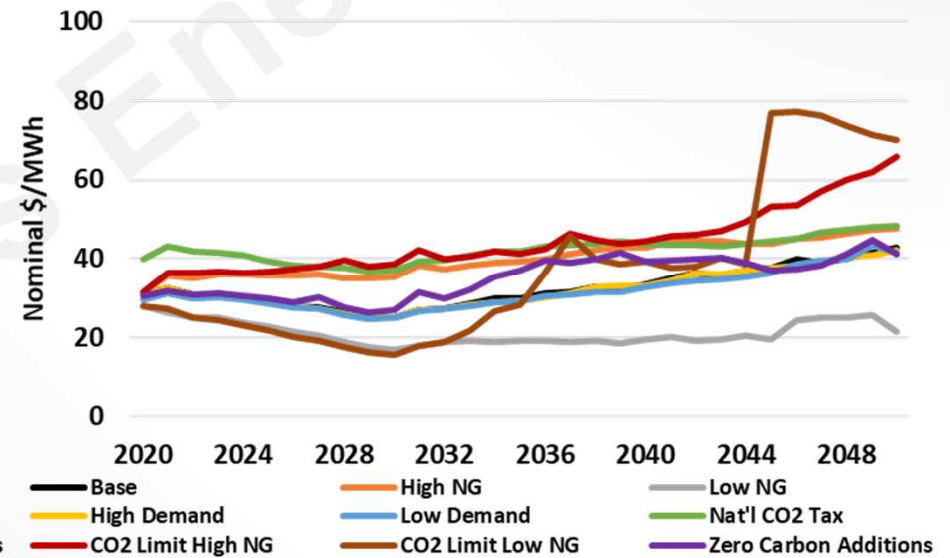


OPERATING MARGIN

Solar



Wind

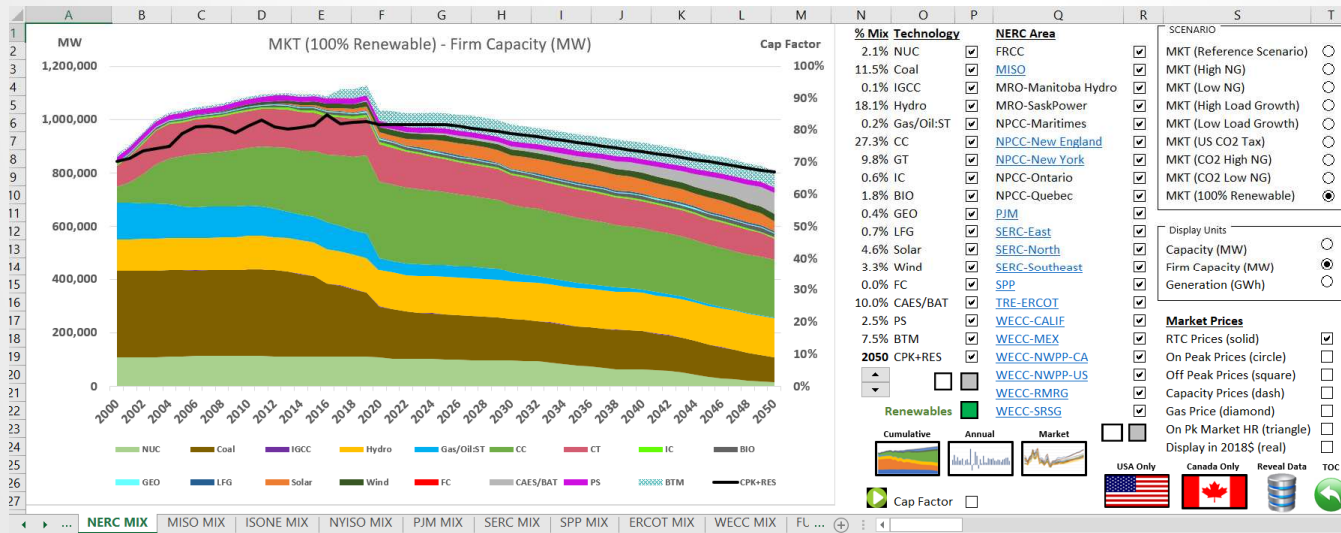




ADVISORY SERVICE CONTENT

An abundance of information

INTERACTIVE DASHBOARD RESULTS



By NERC region, market area, technologies

- Cumulative capacity
- Firm capacity
- Generation
- Energy and capacity prices
- Delivered natural gas price
- On-peak implied heat rate
- Fuel consumption and prices
- Cumulative capacity
- Generation
- Operating margin
- Energy and capacity prices
- Emissions and cost

CURRENT SCENARIOS

- Base
- High Natural Gas
- Low Natural Gas
- High Demand
- Low Demand
- Carbon Limit with High Natural Gas
- Carbon Limit with Low Natural Gas
- National Carbon Tax
- Zero Carbon Additions Only



QUESTIONS?

Contact info@horizons-energy.com

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