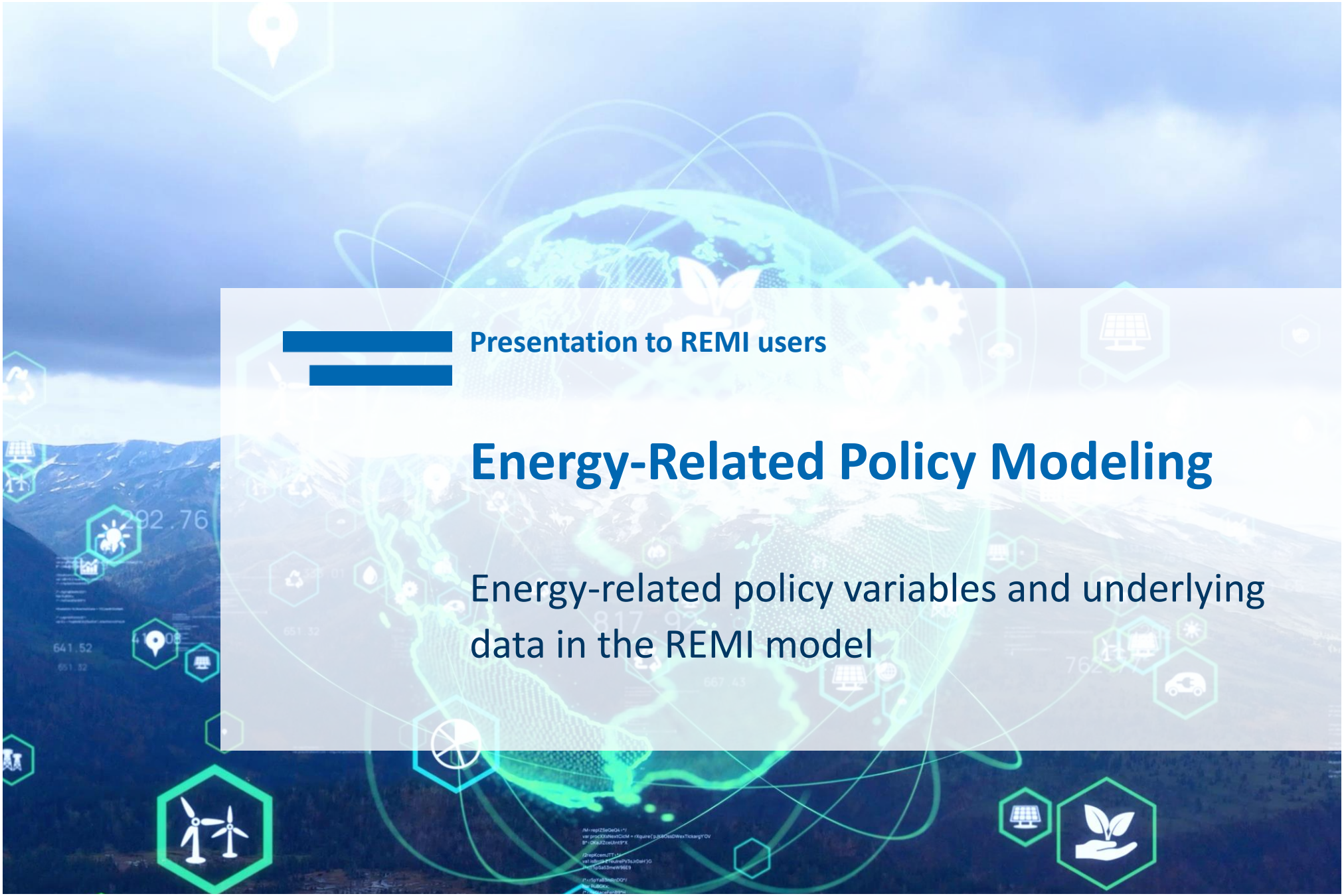


Presentation to REMI users

Energy-Related Policy Modeling

Energy-related policy variables and underlying data in the REMI model

FTI CONSULTING™

Tuesday, January 25, 2021

Disclaimer

The views in this presentation do not reflect the views of FTI Consulting. The analysis contained in this presentation are for illustrative purposes only and are subject to uncertainty.

Overview

FTI Consulting | Overview

FTI Consulting ("FTI") is an independent global business advisory firm dedicated to helping organizations manage change, mitigate risk, and resolve disputes. Due to our unique mix of EXPERTISE, CULTURE, BREADTH OF SERVICES, and INDUSTRY EXPERIENCE, we have a tangible impact on our clients' most complex opportunities and challenges.

Definitive Expertise

- **Who's Who Legal: Consulting Experts (Most Recognized),** *Law Business Research Ltd.* (2016 – 2019)
- **Best Of National Law Journal: Hall of Fame** *National Law Journal* (2017 – 2019)
- **#1 Restructuring Advisor,** *The Deal* (2007 – 2019)
- **Gold SABRE Award, Healthcare Providers,** *The Holmes Report* (2019)

A Culture That Delivers

- **Practical** in our communication and approach to outcomes
- **Judicious** in complex, multi-party situations
- **Collaborative** with clients and colleagues
- **Professional** in our commitment to work with the highest caliber

5,700+ Employees	**570+** SMDs	**$4.7B** Market Cap.[1]
82 Cities		**27** Countries
Advisor to **96** of the world's top **100** law firms	**53** of Fortune Global **100** corporations are clients	Advisor to **8** of the world's top **10** bank holding companies

Comprehensive Services

- Financial
- Operational
- Reputational

Industry Experience

- Aerospace & Defense
- Agriculture
- Automotive
- Construction
- Energy, Power & Products ("EPP")
- Environmental
- Financial Institutions
- Healthcare & Life Sciences
- Hospitality, Gaming & Leisure
- Insurance
- Mining
- Public Sector & Government Contracts
- Real Estate
- Retail & Consumer Products
- Telecom, Media & Technology
- Transportation

Economic Impacts Group ("EIG") | Overview

EIG is a functional group within FTI Consulting that answers "What If?" questions about the economy and public policy. We prefer to use third-party, documented models, not proprietary tools.

ECONOMIC IMPACTS GROUP OVERVIEW

- EIG examines how the wider economy and markets react to changes in public policy:
  - **Economy** – employment, business sales, gross product, household income, government tax revenues, demographics, and cost of living
  - **Markets** – impacts to supply, demand, prices, profitability, and rates of growth
- Our deliverables formulate clients' strategic plans and educate stakeholders, including policymakers, regulators, the media, and the public

MARKET AND ECONOMIC IMPACT MODELS

- Input-output model showing linkages across 550+ sectors including households and governments down to the zip code level.
- Long-term computable general equilibrium (CGE) model of demand and supply for labor and commodities as well as demographics.
- Commodity and sectoral CGE model of production, consumption, and international trade and financial transactions.

ISSUE AND SECTORAL COVERAGE

- Agriculture and Resources
- Banking and Finance
- Construction
- Demographics
- Energy and the Environment
- Fiscal Policy
- Healthcare
- Insurance and Pensions
- International Trade
- Manufacturing
- Retail and Wholesale
- Transportation and Infrastructure

Energy Markets Advisory Team | Overview

The Energy Market Advisory team is part of FTI's Energy, Power & Products group, providing the analytical insights required to make the right strategic decisions in business planning, disputes, policy design, and transactions.

OVERVIEW

- Team with extensive biofuels, electricity, coal, oil & gas, renewables, and emissions expertise
- Clients range from law firms, trade associations and think tanks to merchants, utilities, shippers, and renewables offtakers
- Deliverables often are data intensive and include an expert report, market report, or presentation
- Recent projects include:
  - Economic harm if a pipeline were to cease operation
  - U.S. market landscape study for biomass with carbon capture
  - White paper on the closure of two coal-fired plants in NJ
  - Independent market report for a wind farm sale in SPP

ENERGY MARKET MODELS

PLEXOS BY ENERGY EXEMPLAR — Electricity & Coal

- Unit generation, emissions, additions, and retirements
- Zonal energy, REC, and capacity prices
- Zonal transmission/ interchange flows
- Coal basin production, transport, and prices

PLEXOS BY ENERGY EXEMPLAR — Global Gas & LNG

- Represents more than 20 supply countries
- Includes more than 20 demand regions / countries
- Accounts for long-term contracts
- Simulates monthly LNG trade and prices

ENELYTIX

- Cloud-based, nodal security-constrained economic dispatch model
- Simulates day-ahead and real-time nodal, hub, and zonal prices and transmission flows

SERVICES PROVIDED

Business Strategy

Emissions Forecasting

Energy Policy Studies

Expert Testimony

Market Landscape Studies

Monte Carlo Modeling

Price Forecasting

Resource Planning

Revenue Due Diligence

Scope 1, 2, and 3 Accounting / Strategy

Stochastic Modeling

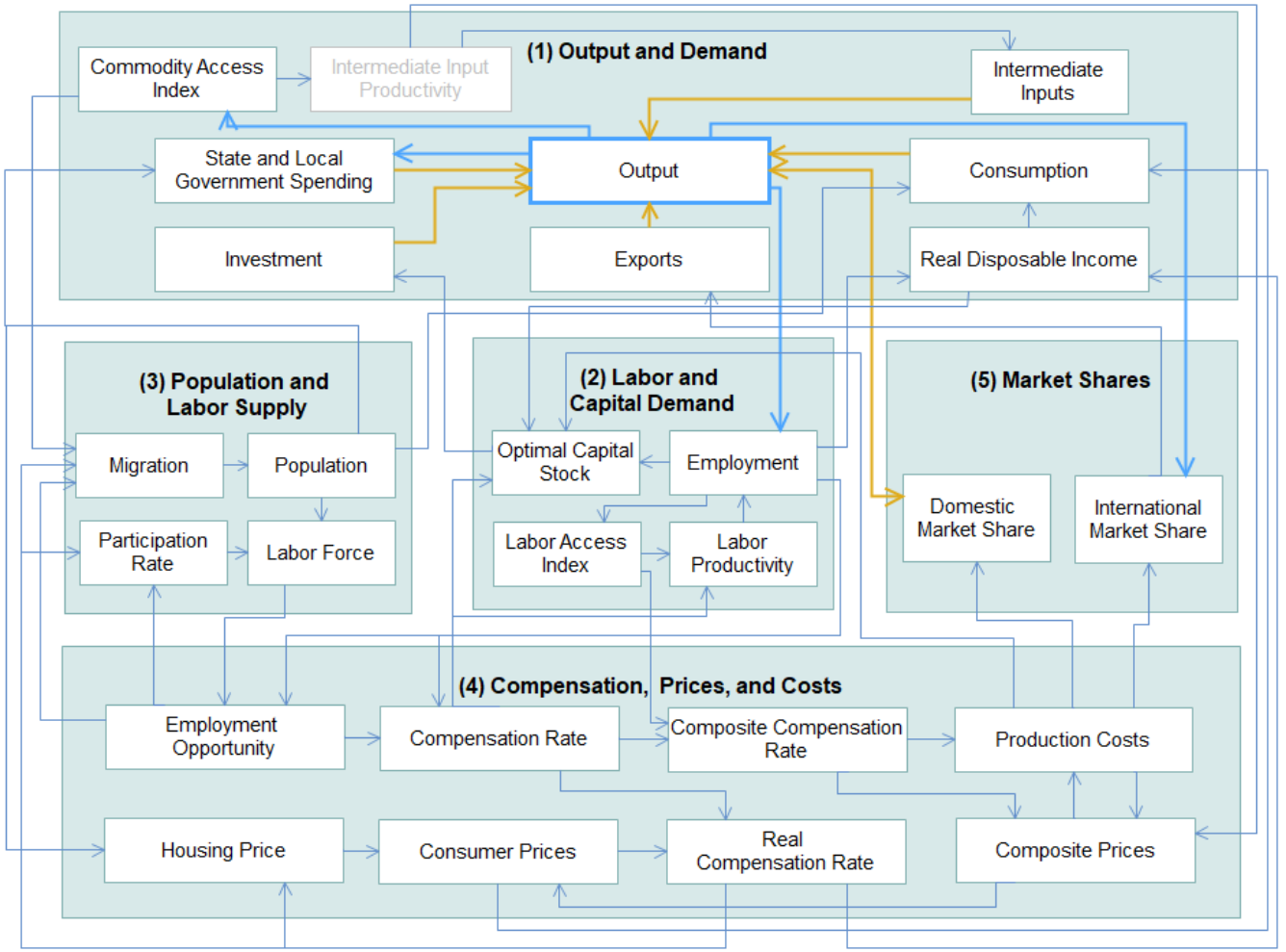
Supply and Demand Forecasting

Presentation

FTI CONSULTING

REMI Model Structure

REMI is a dynamic, computable general equilibrium ("CGE") model of regional economies. The outputs of the PLEXOS® modeling became input variables for the REMI model simulations.



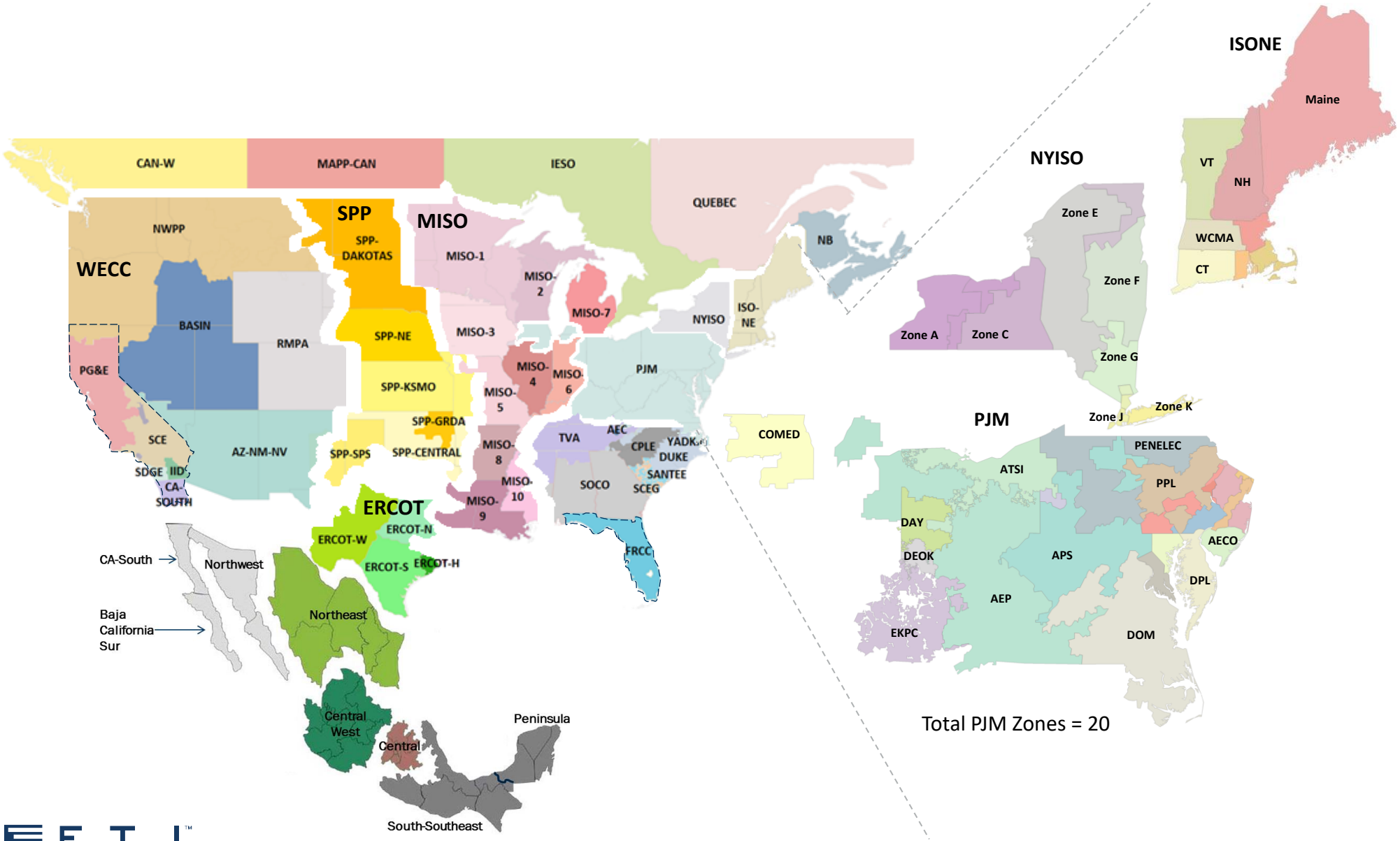
Policy Variables Most Relevant to Energy

- **Block 1 – Output and Demand**
  - Exogenous final demand
  - Detailed industry sales
  - Detailed farm output
- **Block 2 – Labor and Capital Demand**
  - Industry employment
- **Block 3 – Population and Labor Supply**
  - Nonpecuniary amenity aspects
- **Block 4 – Compensation, Prices, and Costs**
  - Responding to price changes
    - Consumer prices
    - Fuel costs
  - Responding to preference changes
    - Consumer spending
    - Consumption reallocation

Economic Sectors Most Relevant to Energy

- **Mining**
  - Coal mining
  - Oil and natural gas extraction
  - Metals mining
  - Nonmetallic minerals mining
- **Utilities**
  - Electric power
  - Natural gas
  - Water and wastewater
- **Construction**
- **Manufacturing**
- **Transportation and Warehousing**
- **Farm**

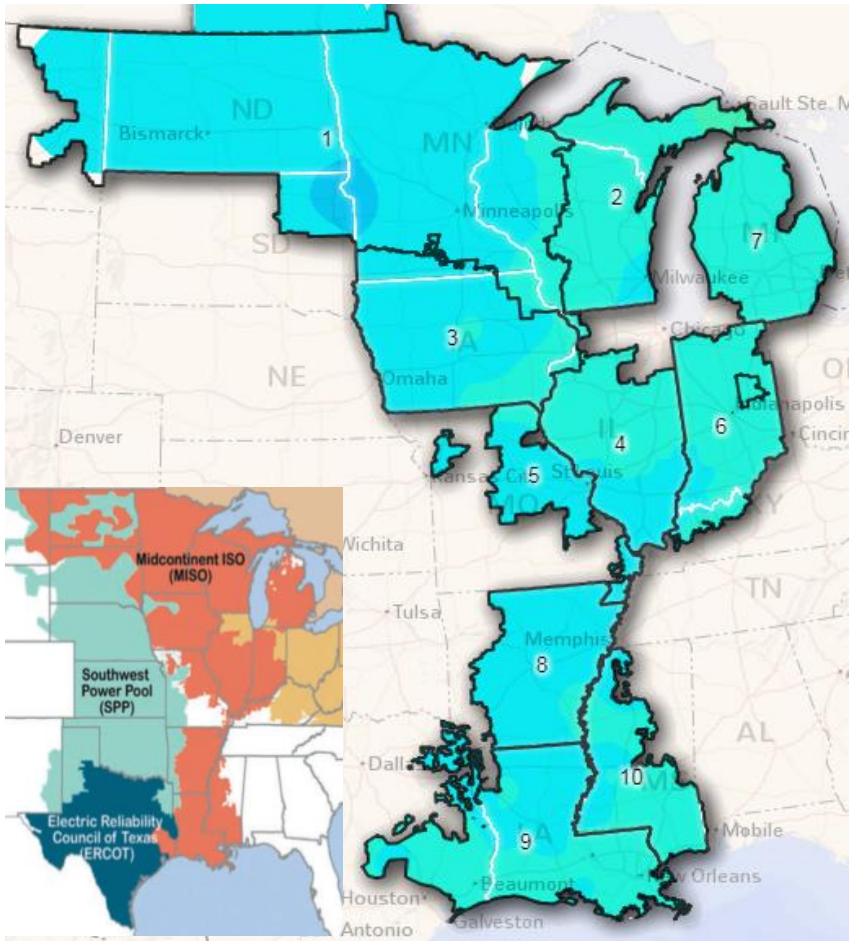
PLEXOS® Model Zonal Map



Total PJM Zones = 20

MISO Market Overview

Modeled Hubs and Load Zones



MISO consists of 10 load zones with a large seam across 36 local balancing authorities.

Market Overview – 2022 Snapshot

Generation

- Total Installed Capacity: 175.1 GW[1]
- Wind: 26.5 GW[1]
- Utility-Scale Solar: 3.5 GW of total

Load & Reserve

- Peak Load: 115.5 GW[2]
- 10-yr Load Growth: 0.71% p.a. CAGR
- Anticipated Reserve Margin: 24.1 % > 18.3 % (NERC reference margin)[2]

Transmission

- Transmission upgrades in the south
- MISO is not currently planning any significant upgrades in its northwest
- Highly interconnected with SPP and PJM

Market Prices

- Illinois Hub Day Ahead Prices:
  2020: Average: $22.98/MWh; Max: $81.95/MWh
  2021 Average: $38.85/MWh; Max: $498.89/MWh

Notes:
1. Ventyx capacity data as of January 12, 2022;
2. NERC Long Term Reliability Assessment 2021

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Regional Disparities Drive Resource Challenges Across Markets

SPP

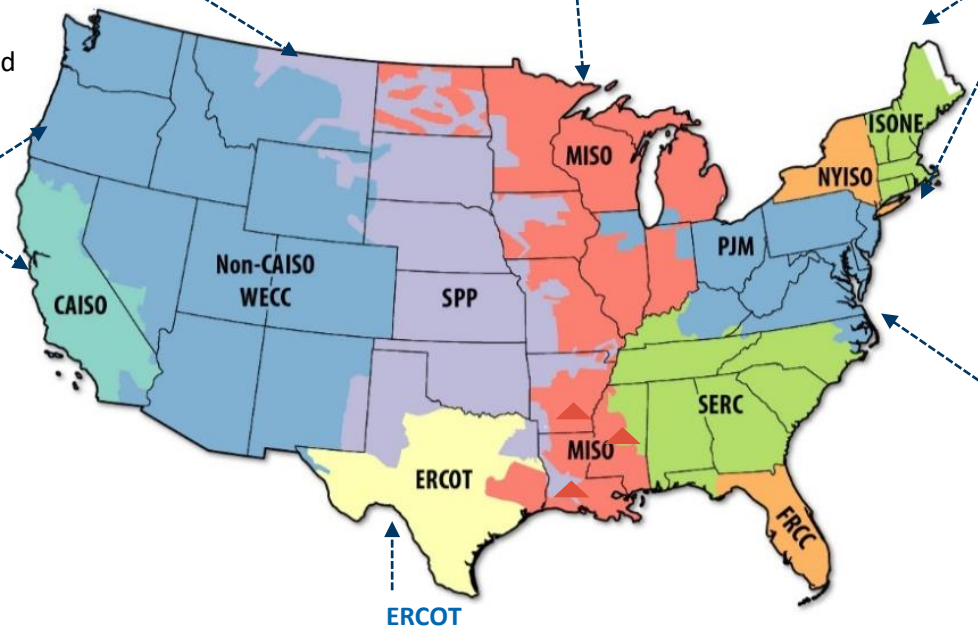
- **High reserve margin** (~33%) contributes to reliability but exerts downward pressure on prices
- **New Western Energy Imbalance Services ("WEIS")** enhances services along the seam between the eastern and western interconnects.
- **High reliance on fossil resources**
- **Growth in wind resources** expected

WECC

- Deepening **duck curve** calls for resources with flexible ramping capability
- Risk of **operating reserve shortfalls** in CAISO
- Aliso Canyon curtailment impacts CAISO and WECC
- **Expanding EIM** improves renewable integration, grid reliability and economic benefits
- CA, NV and NM's increased RPS goals impact resource investments

MISO

- Weak capacity construct with **vertical demand curve**
- Low energy prices accelerate retirement of uneconomic units
- **Renewable (wind and solar)** continue to dominate new builds
- Major transmission projects designed to access renewables
- Reserve margin likely to decrease with resource retirements and export capacity to PJM



NYISO/ ISONE

- Natural gas infrastructure constraints and **fuel-security risk** is a pressing concern
- **Pay-for-Performance** market design in ISONE provides incentives for capacity
- High reserve margin (~30% ISONE; ~22% NYISO)
- High growth in distributed PV
- Unsustainable high-capacity factors in NYISO peaking units.
- **High renewable standards** have long term market impacts

ERCOT

- **Post-Uri market reform** to address reliability and resiliency
- Deregulated electricity market with high liquidity
- Coal plants closures herald **resource adequacy issues** with tightening reserve margin
- Absent of a capacity market, **Operating Reserve Demand Curve (ORDC)** is vital in supporting new builds
- Co-locating storage, solar PV and wind to enhance **grid value and profitability**

PJM

- Long-term load growth under 0.7% per year
- Large scale coal retirements
- Abundant gas driving aggressive combined cycle builds in Marcellus/Utica
- **Measured renewables development**; offshore wind likely by mid decade
- **Robust capacity market** but uncertain future

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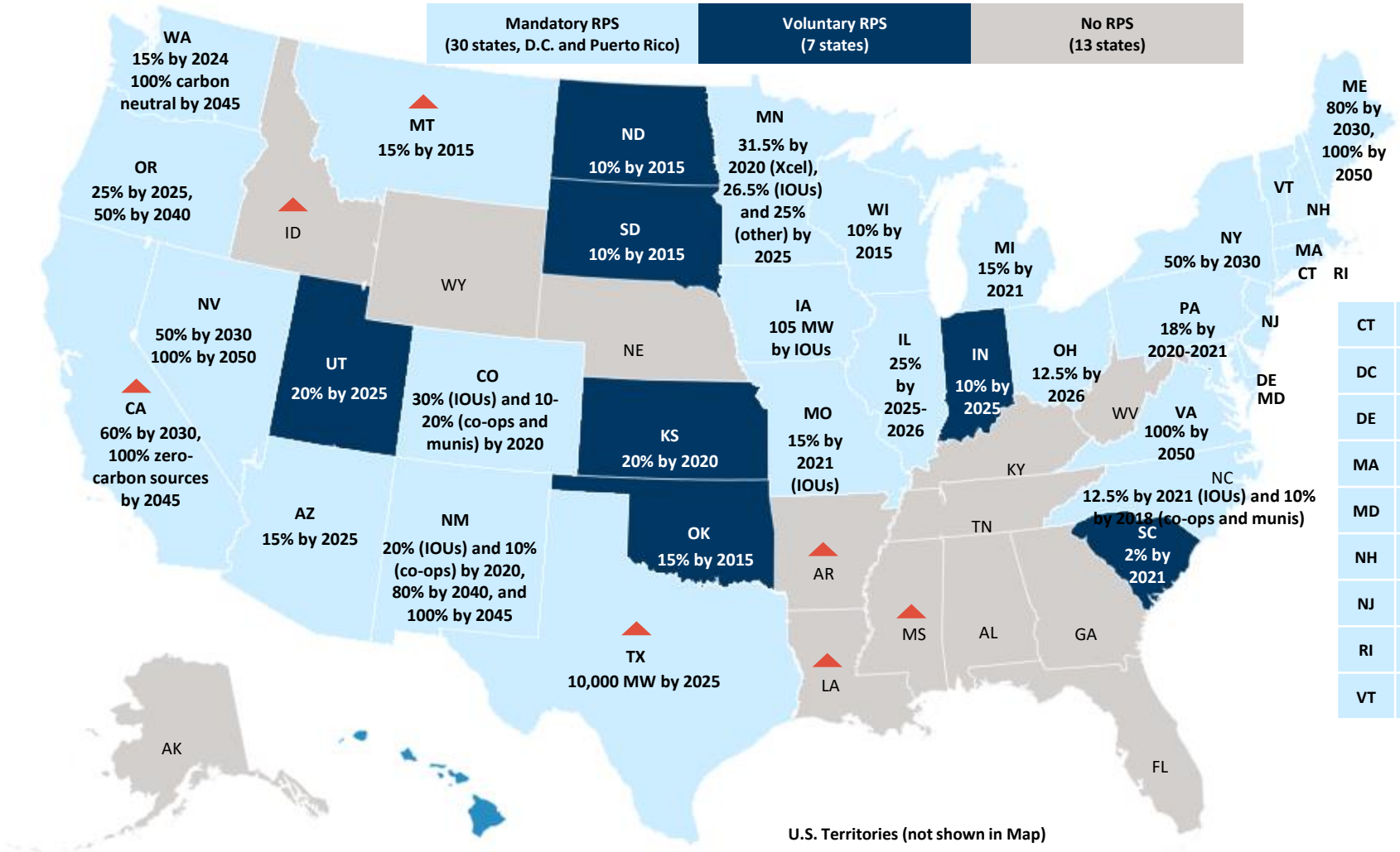
Renewable Portfolio Standard ("RPS")

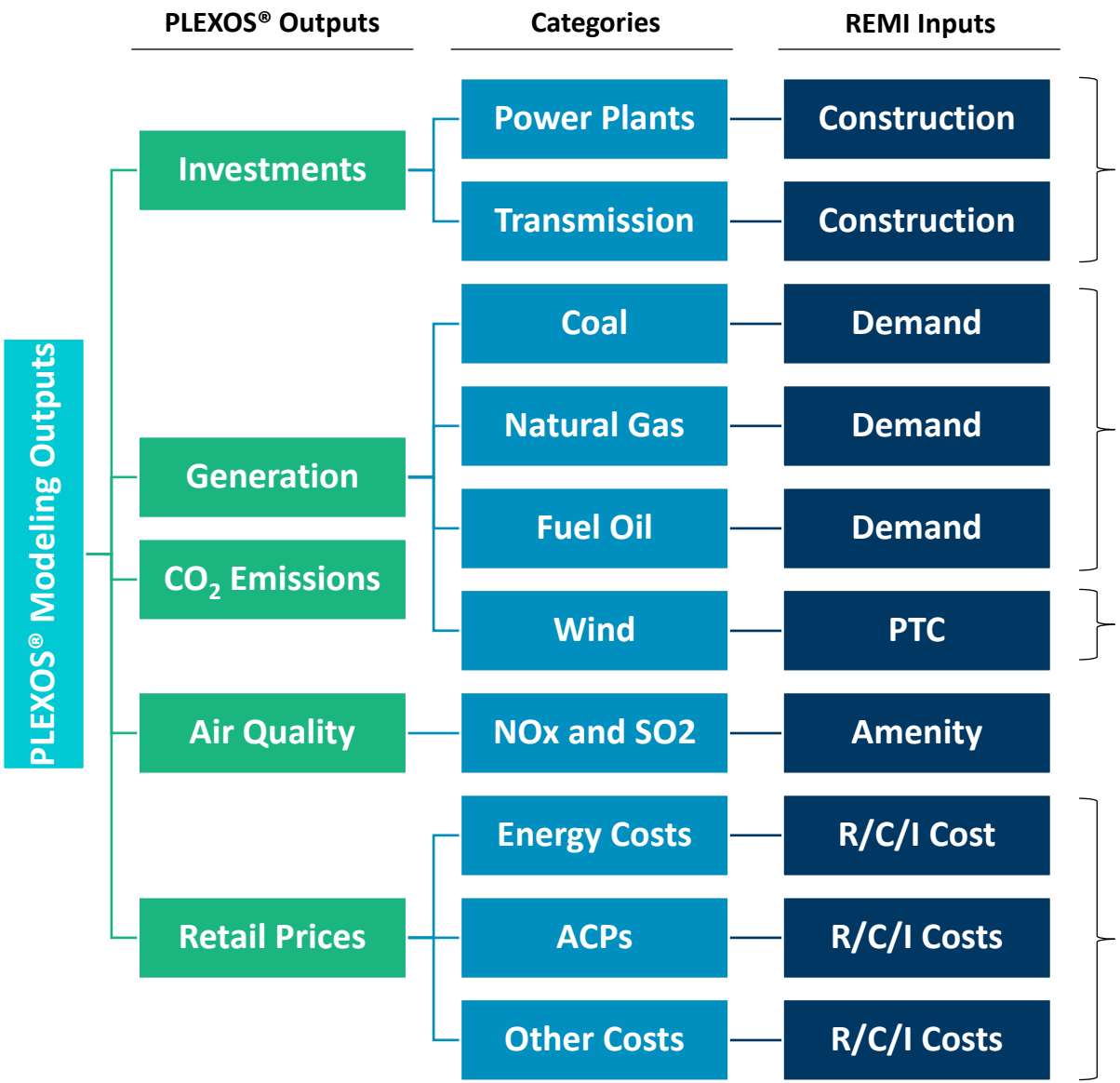


CT	48% by 2030
DC	100% by 2032
DE	25% by 2025-2026
MA	35% by 2030 + 1% each year after
MD	50% by 2030
NH	25.2% by 2025
NJ	50% by 2030
RI	14.5% by 2019, 38.5% by 2035
VT	75% by 2032

U.S. Territories (not shown in Map)

Guam	25% by 2035
Northern Mariana Islands	20% by 2016
Puerto Rico	20% by 2016, 100% by 2050
Virgin Islands	20% by 2015, 25% by 2020, 30% by 2025

Integrating PLEXOS® Outputs into REM



Economic benefits for regions with additional renewable investments, such as wind-heavy midwestern or solar-heavy southwestern states

RPS would change generation by technology type, influencing demand for fossil fuel extraction activities

The federal government pays roughly $18 per MWh for wind generation, which would likely increase under a RPS and increase these costs

The increase in low- and zero-cost dispatch technology (e.g., wind and solar) would reduce energy costs, though ACPs and other costs would offset this (or more) in some regions of the country in most years

Q&A

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