July 13th South Carolina EMRM Study Committee Meeting

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SOUTH CAROLINA EMRM STUDY COMMITTEE

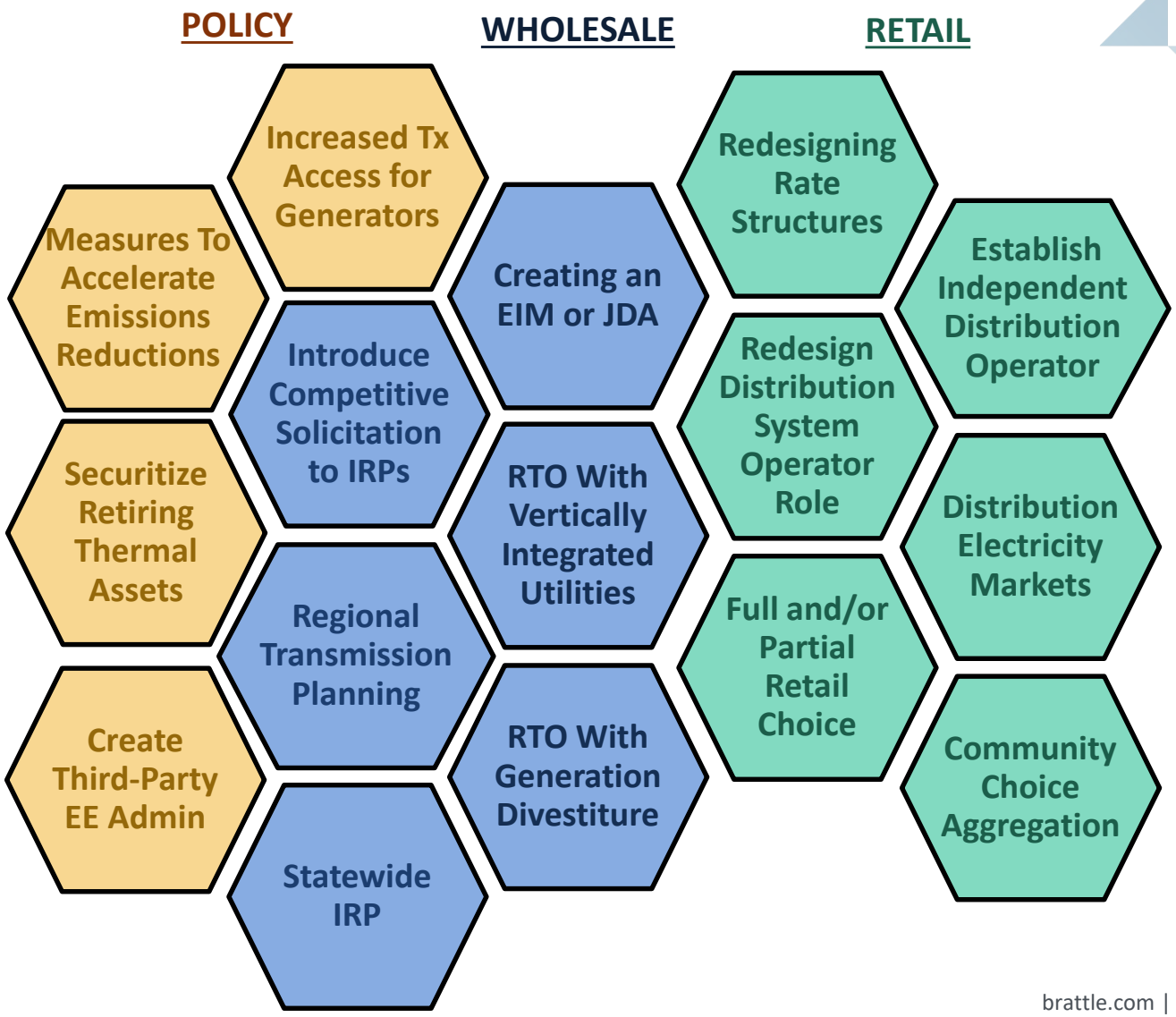
JULY 13, 2022

Brattle

Potential Market Reform Options

In the study, we will explain and discuss various options for market reform, including all the options listed in Act 187 and other reform options

However, it is not practical or worthwhile to study all of these options



Narrowing Down the Reform Options

We recommend modeling market reform options that illustrate the potential costs and benefits of incremental steps along part of the spectrum of market reform

- At this time, we do not recommend studying generation divestiture or full retail choice
- Furthermore, we cannot explicitly model each option;
  - Certain market reform options do not lend themselves to quantitative analysis, nor would it be possible or fruitful to study every reform option
  - Therefore, we propose developing a model of the power system in the Southeast that will allow us to quantitatively analyze a set of market reform options, and also study several other options qualitatively and by drawing on the experience in other jurisdictions
- Recommend analyzing a mix of reform options that South Carolina can implement unilaterally and options that would require participation of utilities in other states

Recommended Market Reform Options

We recommend studying four different market reform options that represent part of the spectrum of possible reform options

Recommended Market Reform Options

- **Joint Dispatch Agreement in the Carolinas**
- **Energy Imbalance Market in the Southeast**
- **Southeast RTO (w/ Vertically Integrated Utility)**
- **Carolinas in PJM RTO (w/ Vertically Integrated Utility**

The analysis will need to start with an assessment of the Status Quo, including the SEEM

- To study the SEEM we would develop a model of the power system in the entire Southeast
- We would simulate one scenario for each option and compare against the Status Quo
- We recommend studying one near-term future year
- We will ask the Advisory Board to provide data and information to build and accurate model

Recommended Market Reform Options *(continued)*

Our recommendation would be analyze the first incremental options along the spectrum of market reform; further reform options can be analyzed later if initial reforms provide benefits

Enhanced Bilateral Market	Joint Dispatch Agreement	Energy Imbalance Market	RTO w/ Vertically Intergrated Utilities	RTO w/ Generation Divestiture	RTO w/ Gen Divestiture and Full Retail Choice
Status Quo w/ SEEM	Duke JDA	Western EIM	SPP/MISO/PJM*	ISO-NE/NYISO/PJM*	Texas

Recommended Market Reform Options to Model

**PJM contains a mix of vertically integrated states and restructured states*

Recommended Market Reform Options *(continued)*

There are several other market reform options that do not lend themselves to modeling, but we still recommend studying the costs and benefits of these options for South Carolina

Our analysis of these options would draw on previous analyses, and the experience in other jurisdictions (if applicable to SC)

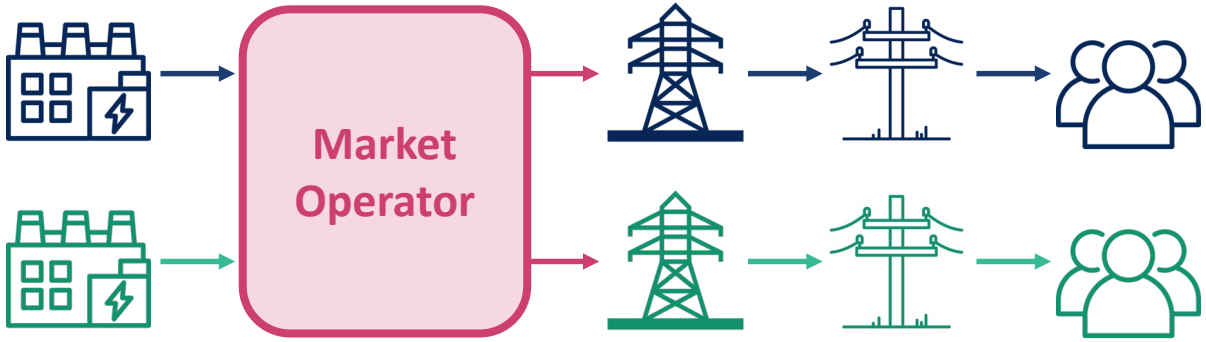
Additional Market Reform Options to be Analyzed

- Partial Retail Choice (large C&I Customers)
- Alterative Retail Rate Design Options
- Increased Tx Access for Generation
- Third Party Energy Efficiency Admin
- Securitization of Retiring Assets
- Competitive Solicitation in Existing IRPs
- Regional/State Transmission Planning
- Statewide IRP Process

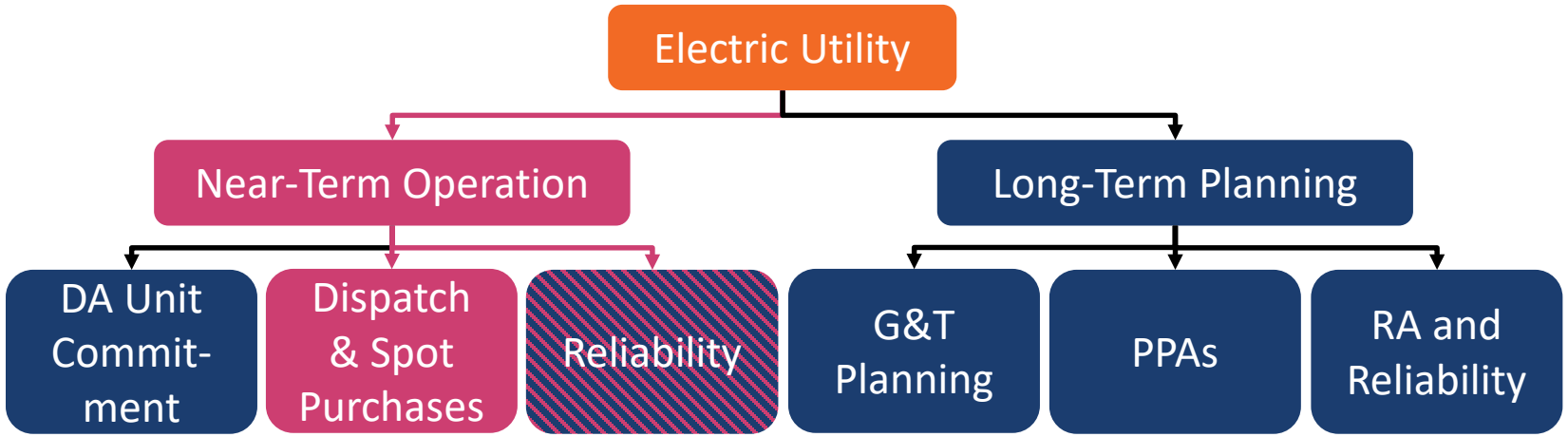
In EIM/JDA, Utilities Pool Resources During Real-Time Operations

- Market operator optimizes real-time (RT) dispatch to serve demand with lowest-cost resources available (EIM also optimizes "nodal" transmission limits)
- Available transmission used in RT without fees
- Day-ahead operations and planning activities remain the same
- Transparent RT EIM prices provide clear operational and investment signals

Ownership and Operational Impacts



Functional Impacts

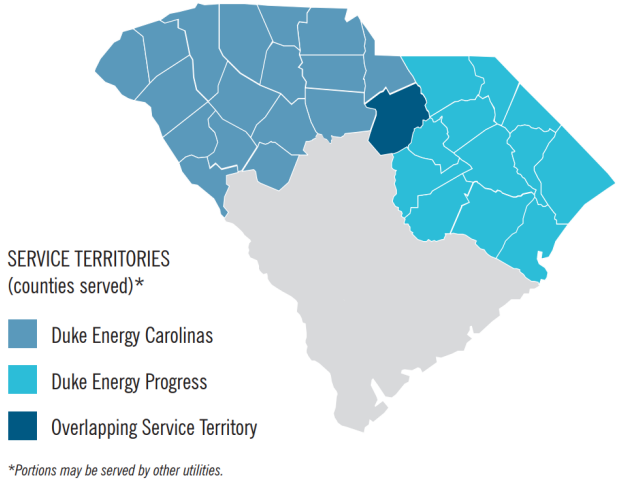


EIM and JDA Examples

Duke Energy Carolinas and Progress Energy Operate a JDA in the Carolinas.

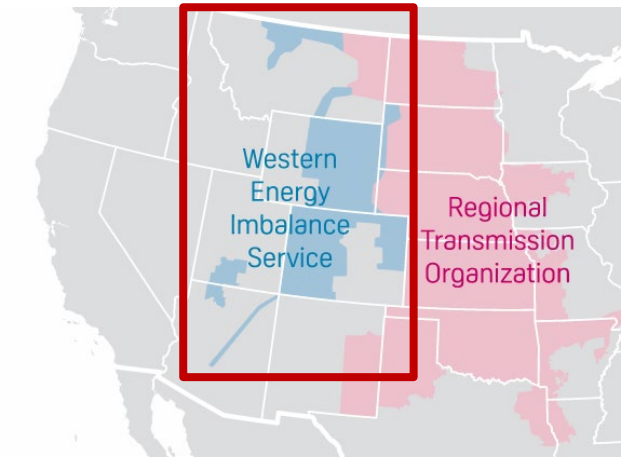
The SPP-administered WEIS and the CAISO-administered WEIM are two nodally-optimized imbalance markets in the western U.S.

Duke Energy JDA in South Carolina



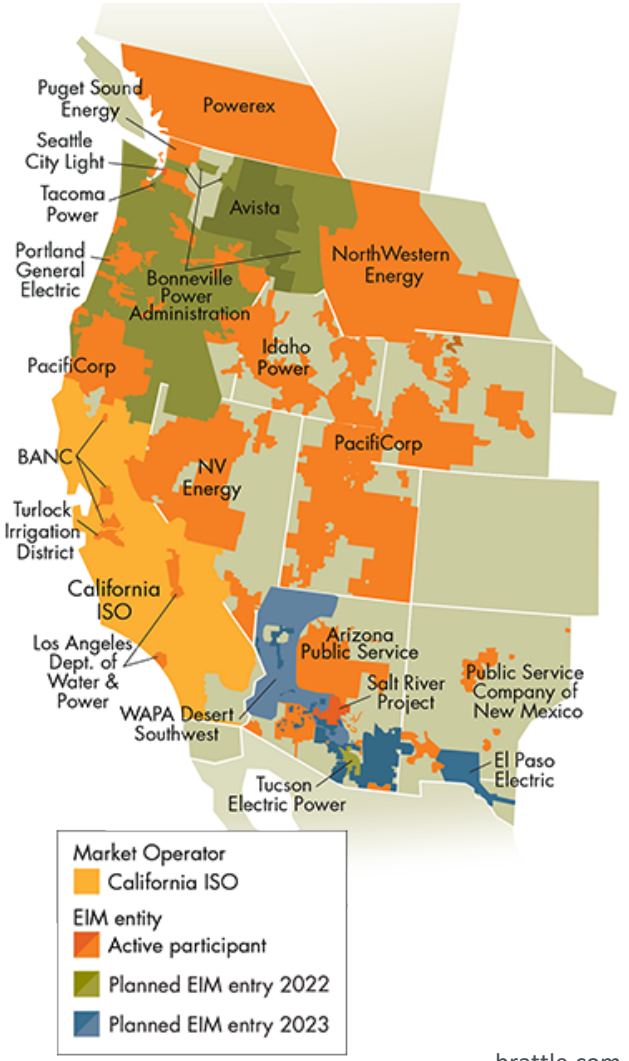
Source: energy.sc.gov

SPP Western Energy Imbalance Service (WEIS)



Source: S&P Global

Western Energy Imbalance Market (WEIM)

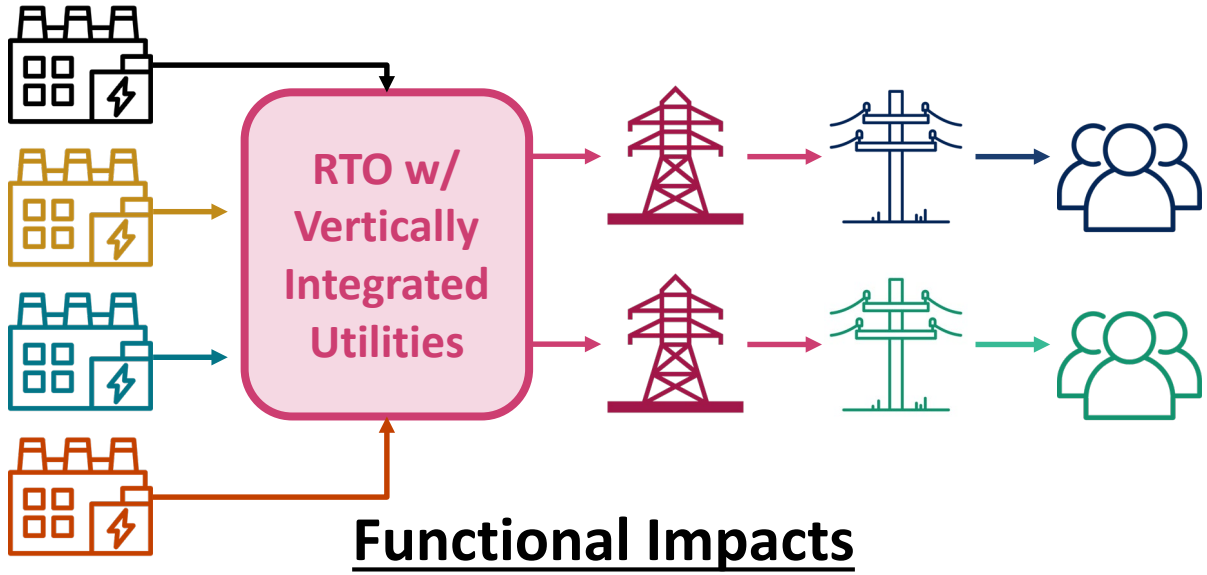


Source: westerneim.com

RTOs Regionally Optimize Generation and Transmission Usage

- Unit commitment, dispatch, and transmission fully optimized across day-ahead (DA) and RT
- Joint transmission tariff between members
- Transparent market pricing in DA and RT sends clear operational and investment signal
- Regionally-planned transmission investment

Ownership and Operational Impacts



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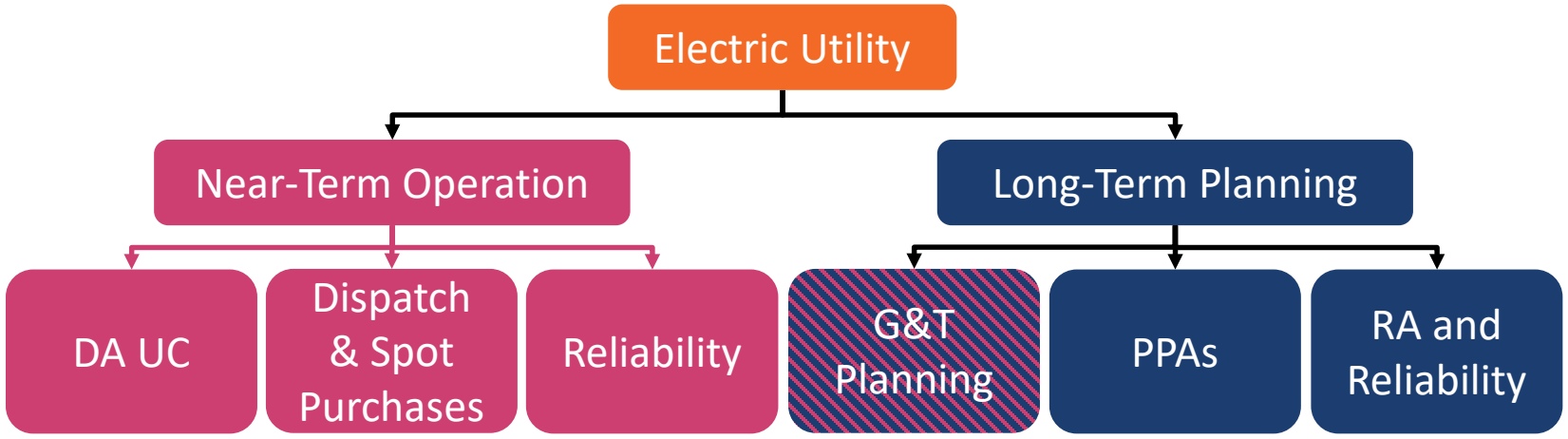


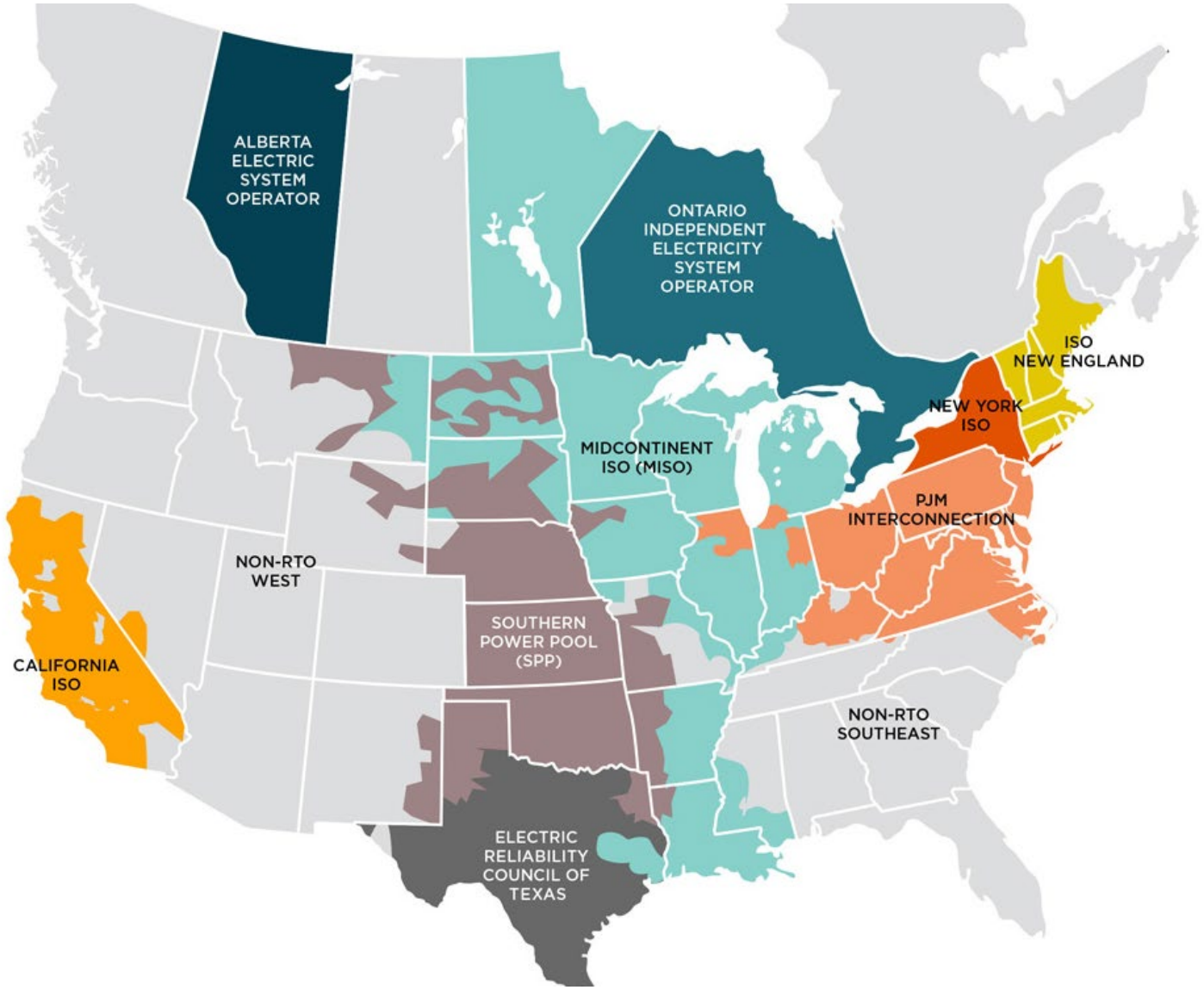
North American RTOs

Most of the North American grid is operated by RTOs

SPP and MISO are the U.S. RTOs with mostly vertically-integrated utilities

PJM, NYISO, ISO-NE include states with retail access and divested generation

In California generation is contracted based on long-term planning conducted by the state commission



Source: FERC