

## TRANSMISSION PLANNING

# Regional Transmission Organizations, Independent System Operators, and Traditional Wholesale Electricity Markets

### Regional Transmission Organizations and Independent System Operators

Regional transmission organizations (RTOs) and independent system operators (ISOs) arose in the 1990s and 2000s to operate competitive wholesale electricity markets. RTOs and ISOs have slightly different origins and responsibilities, but are functionally similar, and the terms are commonly used interchangeably.

### Traditional Wholesale Electricity Markets

Traditional wholesale electricity markets are characterized by utilities managing system operations and oversight, often supplying power directly to retail consumers. In these markets, utilities are typically vertically integrated.

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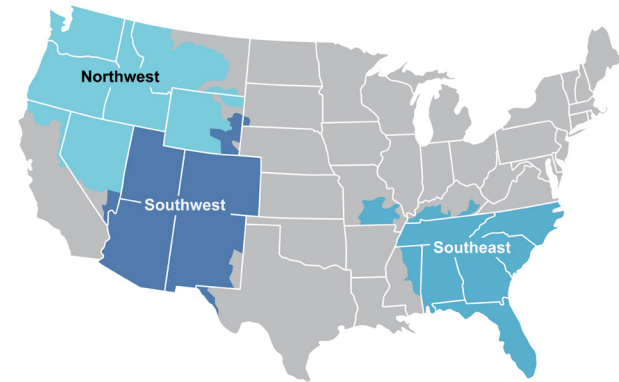
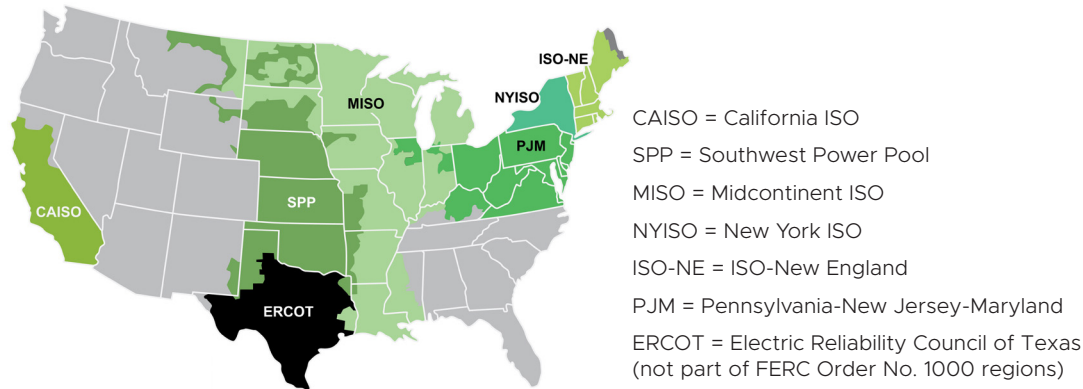
## FUNCTIONS

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- Balance supply and demand.
  - Coordinate scheduling of generation and transmission.
  - Plan the grid.
  - Operate a regional competitive wholesale electricity market, including dispatching generation resources according to their cost and the system needs.
  - Do not own infrastructure.
- Federal Power Market Administrators (PMAs) operate electric systems and sell the electrical output of federally owned and operated hydroelectric dams in 34 states.
  - Vertically integrated utilities can own and manage all levels of the electricity supply chain within their territories, from generation to transmission and distribution.
  - Set rates based on cost of service.
  - Regulated by state utility commissions.
  - Those who plan and operate also own infrastructure.

## COVERAGE

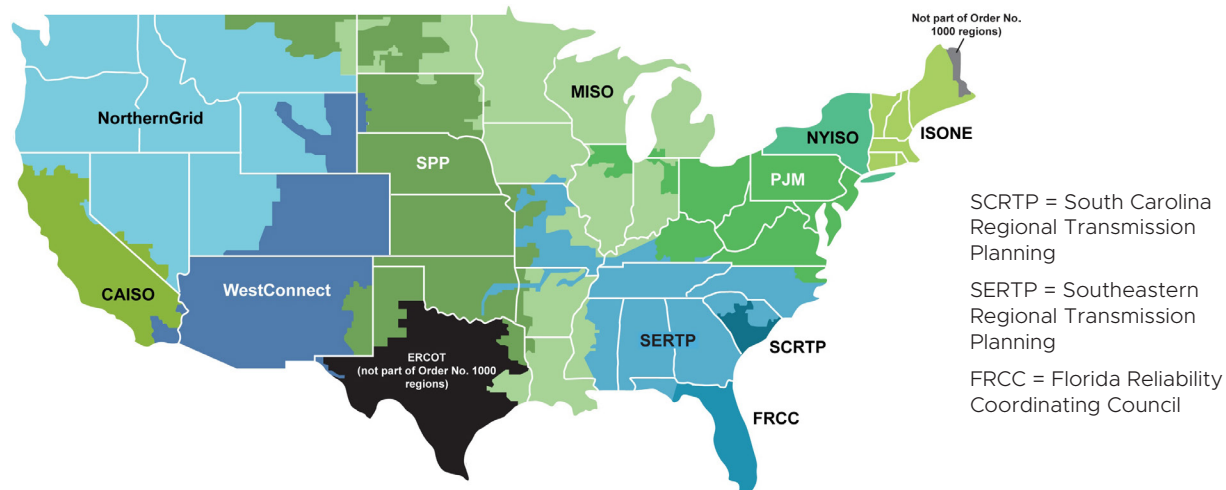
- About two-thirds of U.S. electricity consumers across defined RTO/ISO territories:
- About one-third of U.S. electricity consumers are spread across three general regions, each containing multiple electrical markets:



## TRANSMISSION PLANNING

- Conducted by RTOs/ISOs acting as Planning Coordinators—designated by FERC Order No. 1000—for their own regions.
- Subject to FERC regulation (excluding ERCOT), including Order Nos. 888, 890, and 1000.
- Conducted regionally by non-RTO/ISO Planning Coordinators designated under FERC Order No. 1000.
- Subject to FERC regulation, including Order Nos. 888, 890, and 1000.

### FERC Order No. 1000 Regions (adapted from Clean Energy Buyers Institute Grid Strategies Report)



Regional transmission planning is conducted by Planning Coordinators designated by FERC Order No. 1000. Planning approaches vary by region:

| Planning Approach | Description                                                                         | Region                                                                                     |
|-------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| RTO/ISO-led       | RTO/ISO does all the planning                                                       | CAISO, ERCOT                                                                               |
| Hybrid            | Utilities prepare initial plans, and then PC verifies and modifies                  | MISO, NYISO, SPP                                                                           |
| Joint             | Utilities do local planning, PC does network planning                               | PJM, ISONE                                                                                 |
| Utility-led       | Utilities prepare initial plans, then PC compiles and checks for regional synergies | All traditional wholesale electricity (NorthernGrid, WestConnect, SERTP, FRCC, and SC RTP) |

Significant shifts in power generation are currently reshaping the energy landscape, driven by factors such as advancements in renewable technologies and evolving market dynamics. These changes, coupled with recent regulatory directives like FERC Order No. 1920, are prompting new transmission planning strategies.

