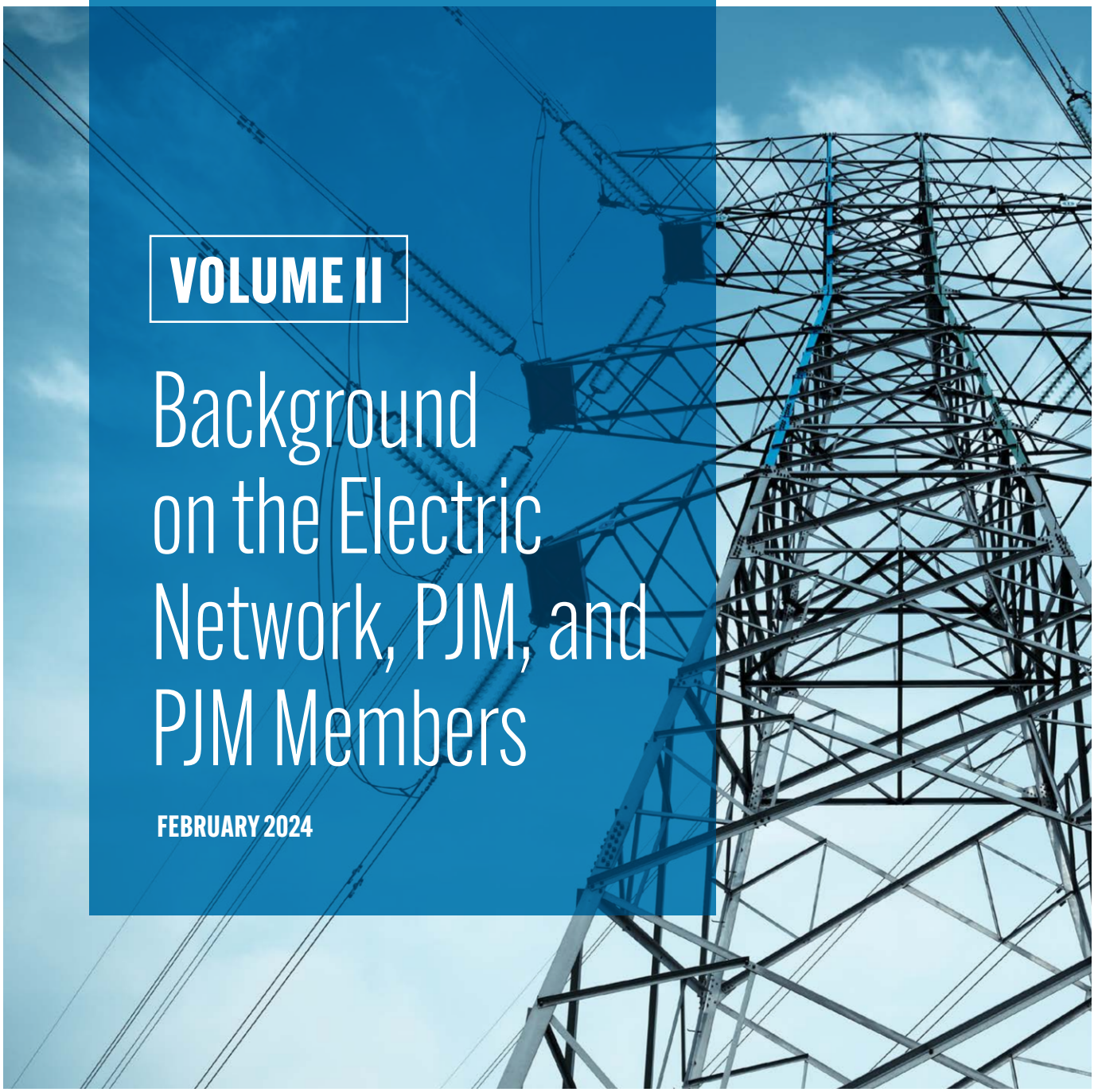

VOLUME II

Background on the Electric Network, PJM, and PJM Members

FEBRUARY 2024

CONSUMER ADVOCATES OF THE PJM STATES' TRANSMISSION HANDBOOK

D|G/A
David Gardiner and Associates

INTRODUCTION

The Consumer Advocates of the PJM States (CAPS) commissioned this guide to help consumers, their advocates, and others better understand how transmission is developed and paid for in the PJM region. Read the executive summary in Handbook Volume I to learn more about PJM and CAPS.

Handbook Volume II provides:

- background information on the physical structure of, and policies governing, the U.S. electric network;
- an explanation of how transmission and distribution lines differ from one another and of the importance of a balanced transmission system;
- the history of PJM's formation;
- a description of how PJM's organizational structure has changed over time;
- an overview of the membership categories within PJM; and
- a list of general opportunities to stay engaged in PJM's work.

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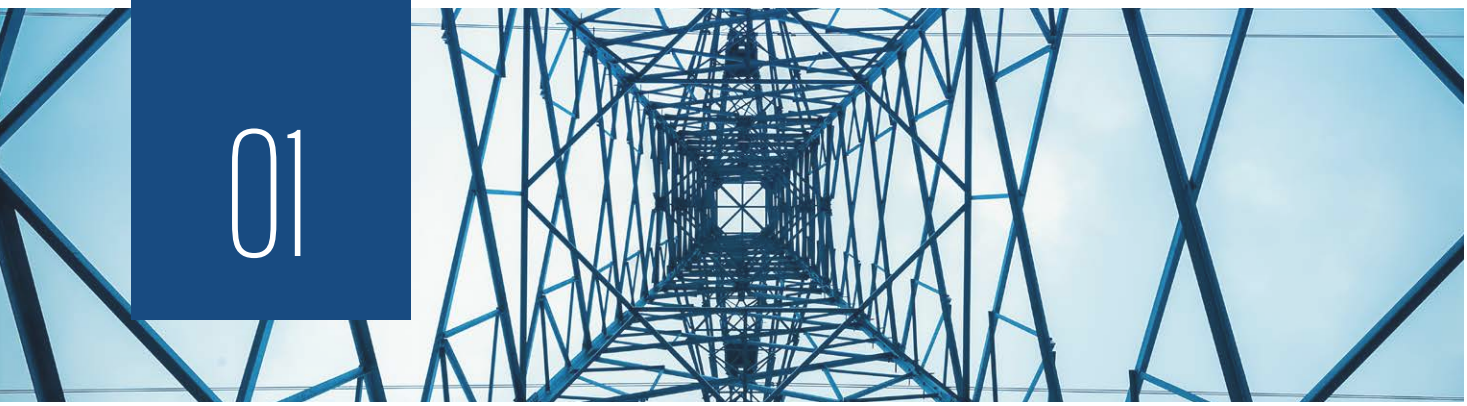

01

The Electric Network

A. Electric Network Basics

A reliable electric system operates on a delicate balance where the amount of injected power (supply) must equal the amount of power being drawn from the grid (demand). If supply and demand are not in balance, the system is at risk of failing—through power outages, generation failures, equipment damage, or other disruptions. To maintain this balance, operators of the three main components of the electric system—generation, transmission, and distribution—must work in a cooperative manner.

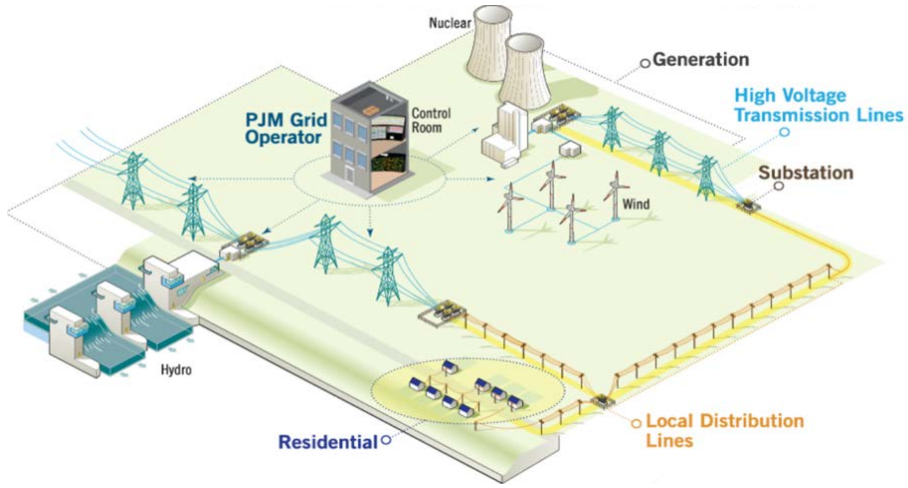

FIGURE 1. Diagram of the Electrical Power System

(Credit: DiCicco, Frank & Mark Saiget, "PJM Interconnection Dispatch Interactive Map Application (DIMA)," PJM Interconnection LLC, slide 5, 2016).

To balance supply and demand, electric networks must be designed to serve the highest expected energy loads, also known as peak loads. Historically, each electric utility operated as an independent vertically integrated entity and was responsible for:

(1) balancing power supply and demand over its own system; and

(2) building and maintaining sufficient generation, transmission, and distribution capacity to serve the entirety of its customers' electric needs.

Today, some utilities pool their resources and allow regional organizations like PJM to operate their systems, as this guide will discuss in more detail below (see Section 2).

B. What is the difference between distribution and transmission lines?

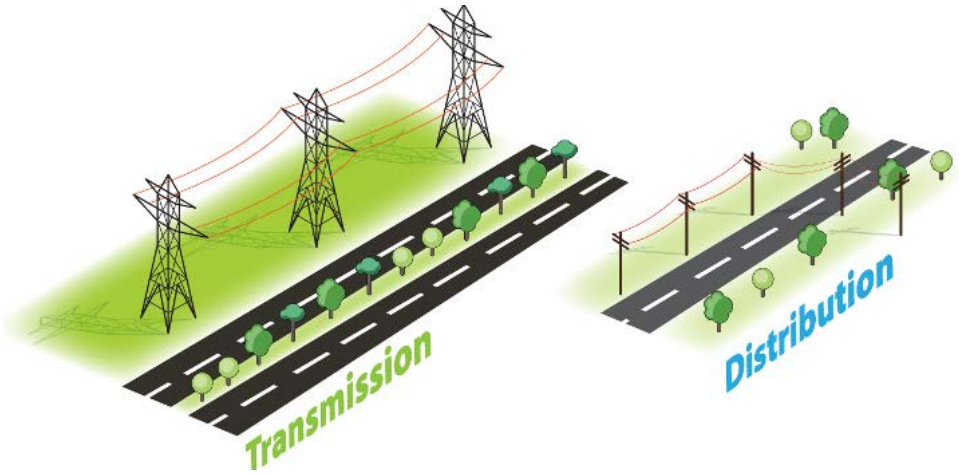

FIGURE 2. Illustration of Transmission and Distribution Power Lines in the US

(Credit: PJM Learning Center, "Transmission & Distribution," 2023).

The North American Electric Reliability Corporation (NERC) defines transmission as "an interconnected group of lines and associated equipment for the movement of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems."[1] Transmission lines serve as the electric interstate highway, facilitating the bulk transfer of electricity from a generating station to the substations and the local distribution network that directly serves customers. Transmission lines consist of structural frames, conductor lines, cables, transformers, circuit breakers, switches, and substations. Because electricity in North America is generally produced at 5-34.5 kilovolts (kV), generator step-up transformers are used to increase power voltage to match the much higher voltage of the transmission lines that the power will flow over.

The distribution system is the final stage in electric power delivery. Operating at lower voltages than transmission lines, distribution lines carry electricity from the local substations that link the transmission and distribution networks to the end use customer.

1 NERC, "Glossary of Terms Used in NERC Reliability Standards," updated March 8, 2023.

FIGURE 3. Voltage Classes for Power Lines

POWER LINE CLASSIFICATION	VOLTAGE RANGE [KV]	PURPOSE
Ultra High Voltage (UHV)	>765	High Voltage Transmission > 765 kV
Extra High Voltage (EHV)	345,500,765	High Voltage Transmission
High Voltage (HV)	115, 138, 161, 230	
Medium Voltage (MV)	34,46,69	Subtransmission
Low Voltage (LV)	< 34	Distribution for residential or small commercial customers, and utilities

(Source: U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, "United States Electricity Industry Primer," at 15, 2015.)

C. Is voltage the only indicator of whether a line is transmission or distribution?

While voltage is a strong indicator, it is not the sole deciding factor between whether a line is distribution or transmission. In Order No. 888, the Federal Regulatory Energy Commission (FERC) explained that it has the jurisdiction to classify a line based on the factual circumstances.[2] FERC uses the following seven-factor test as a starting point to determine whether a facility is considered transmission or local distribution:

1. Local distribution facilities are normally in close proximity to retail customers;
2. Local distribution facilities are primarily radial in character;
3. Power flows into local distribution systems, and rarely, if ever, flows out;
4. When power enters a local distribution system, it is not recognized or transported onto some other market;
5. Power entering a local distribution system is consumed in a comparatively restricted geographic area;
6. Meters are based at the transmission/local distribution interface to measure flow into the local distribution system; and
7. Local distribution systems will be of reduced voltage.

FERC also takes into account "other case-specific factors in particular situations."[3] For instance, in *SoCal Edison*, the utility sought a FERC determination that some of its 115 kV facilities were "used in local distribution." FERC found that under the seven-factor test, the facilities all satisfied the metrics to be considered distribution facilities; however, additional considerations—primarily reliability concerns—merited a finding that certain segments of the line were not "used in local distribution."[4]

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2 *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission on Servs. by Pub. Utils.; Recovery of Stranded Costs by Pub. Utils. & Transmitting Utils.,* Order No. 888, 61 Fed. Reg. 21,540, 21,619-20, 21,620-21 (May 10, 1996), FERC Stats. & Regs. ¶ 31,036, at 31,760-763 (1996) (cross-referenced at 75 FERC ¶ 61,080)(Order No. 888), *order on reh'g*, Order No. 888-A, 62 FR 12274 (Mar. 14, 1997),FERC Stats. & Regs. ¶ 31,048(cross-referenced at 78 FERC ¶ 61,220), *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in relevant part sub nom. Transmission Access Pol'y Study Grp. v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. N.Y. v. FERC,* 535 U.S. 1 (2002).

3 *Southern Cal. Edison Cmpy*, 153 FERC ¶ 61,384, at PP 3-4 (2015).

4 *Id.,* PP 33-37.

D. Why do we need transmission service? Can't power be interconnected directly to distribution lines?

When electric power was first introduced to urban American customers in the 1870s and 1880s, it was generated locally in small power plants and distributed via direct current (DC) circuits.[5] But over time, increasing electric demand required a larger and more efficient electric system. Rather than building numerous small electric generators, the energy industry found it was more cost-effective and reliable to invest in larger, centralized, power plants. These plants, generally fired by fossil generation, were located away from the customer centers. Higher-voltage transmission lines were developed to carry the power over long distances from the centralized generation locations to the urban and rural areas where customers are located.

Generators can be interconnected to distribution lines, and even directly to customers' homes behind the distribution meter. Though **distributed generation** plays an important role in a modernized electric system, studies have shown that distributed generation alone will not produce sufficient power to serve the ever-increasing electric demands.[6] Longer-distance and higher capacity transmission lines continue to play an integral role in ensuring a cost-effective and reliable network.

5 U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, "United States Electricity Industry Primer," 2015.
6 *See*, e.g. Clack, C. *et al.*, "Why Local Solar for All Costs Less," Vibrant Clean Energy, December 2020.

02

Background on the Integrated Network

A. History of Electric Network Growth

Electric demands and the electric system grew exponentially in the 20th century—leading to more extensive interconnections between utilities, a broader integrated network, and a greater need for utilities to coordinate power flows between their own network and neighboring utilities.[7]

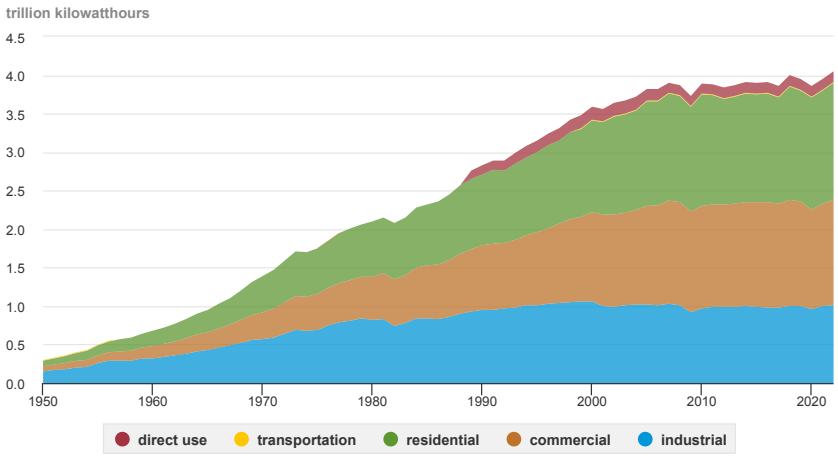

FIGURE 4. U.S. Electricity Retail Sales to Major End-Use Sectors and Electricity Direct Use by all Sectors 1950-2022

(Credit: Energy Information Administration, "Electricity Explained: Use of Electricity," 2023).

7 For more information on the transition from local power networks to the integrated grid see the background section of the seminal Supreme Court case *New York v. FERC*, 535 U.S. 1 (2002).

While some utilities continued to operate their own system independently and manually coordinate power flows with their neighbors, others determined that by jointly operating their transmission systems, they could dispatch generation more efficiently and improve reliability. Accordingly, these utilities pooled their resources together and transferred transmission system operations to an independent system operator (ISO) or a regional transmission organization (RTO). In so doing, the utilities still retained *ownership* of the transmission infrastructure. Figure 5 provides a map of the RTO/ISO operations in North America.

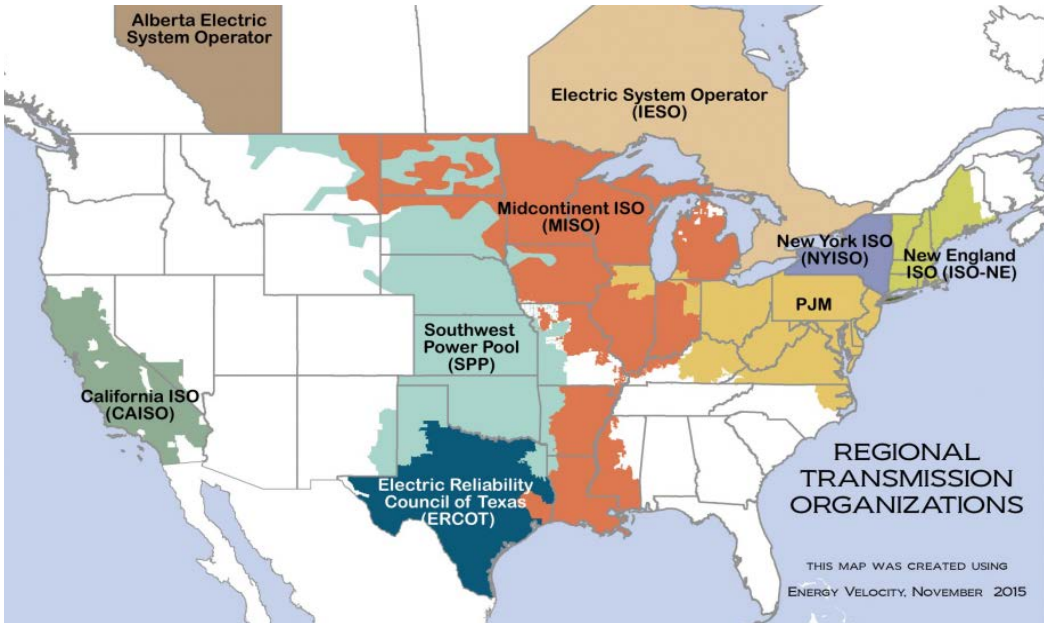

FIGURE 5. Independent System Operators and Regional Transmission Organizations

(Credit: Energy Innovation, "ISO RTO Map," 2018).

B. What is an RTO/ISO?

RTOs/ISOs operate transmission facilities independent of the transmission owners and other market participants. RTOs/ISOs are responsible for balancing load and supply on the system and managing non-discretionary access to transmission services. They also conduct open regional transmission planning processes to determine when new transmission lines are needed; theoretically, this process includes an opportunity for non-incumbent developers, known as merchant developers, to build facilities too. Some ISO/RTOs also facilitate resource competition by operating power markets for capacity, energy and/or ancillary services.

C. Does the United States have one giant electric grid?

Not yet. The U.S. electric grid is made up of two large and one minor power grids: the Eastern Interconnection, Western Interconnection, and Texas Interconnection (see Figure 6). There are numerous advantages that would come from developing a larger macrogrid,[8] but there are currently only seven direct current (DC) interties between the Eastern and Western Interconnections, and two DC interties between the Texas and Eastern Interconnections.

8 *See, e.g.* A. Bloom *et al.*, "The Value of Increased HVDC Capacity Between Eastern and Western U.S. Grids: The Interconnections Seam Study," in *IEEE Transactions on Power Systems*, vol. 37, no. 3, pp. 1760-1769, May 2022, doi: 10.1109/TPWRS.2021.3115092.

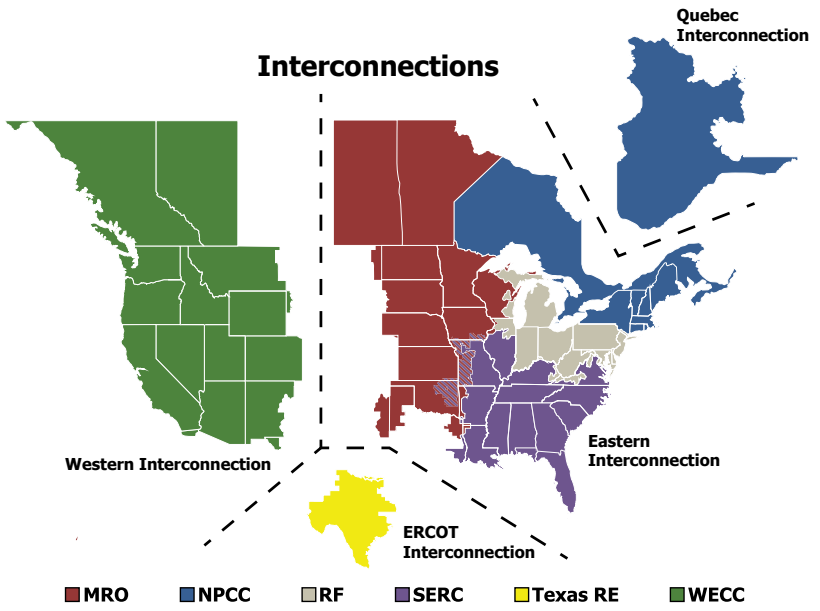

FIGURE 6. North American Bulk Power System Interconnections Map with Electric Reliability Organizations (EROs)

(Credit: North American Electric Reliability Corporation, "Interconnections," 2023).

Note on Reliability

The North American Electric Reliability Corporation (NERC) proposes and the Federal Energy Regulatory Commission (FERC) approves and enforces standards to provide for the reliable operation of the bulk electric system.[a] The FERC-approved definition of the bulk electric system encompasses all facilities operated at or above 100kV, as well as certain other configurations of facilities (e.g. blackstart resources, transformers, and dispersed power producing resources). The definition excludes certain other configurations (e.g. radial systems, local networks, and reactive power devices).[b] The reliability standards cover planning, operations, communications, and physical and cyber security, but do not require construction of specific facilities.

NERC works in concert with six regional Electric Reliability Organization (EROs) to ensure compliance with its standards: Midwest Reliability Organization (MRO), Northeast Power Coordinating Council (NPCC), Reliability First (RF), SERC Reliability Corporation (SERC), Texas Reliability Entity (TRE), and Western Electricity Coordinating Council (WECC). These not-for-profit entities may develop region-specific reliability standards for NERC review and approval. They also conduct compliance assessments to monitor performance.

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a 16 USC § 824o (Federal Power Act Section 215(b)(1); see also *North American Reliability Corp.*, 116 FERC ¶ 61,062 (2006), *order on reh'g and compliance*, 117 FERC ¶ 61,126 (2006), *aff'd sub nom Alcoa Inc. v FERC*, 564 F.3d 1342 (D.C. Cir 2009)

b *Revisions to Electric Reliability Organization Definition of Bulk Electric System and Rules of Procedure*, Order No. 773, 141 FERC ¶ 61,236 (2012), *order on reh'g and clarification*, Order No. 773-A, 143 FERC ¶ 61,053 (2013); and N. Am. Elec. Reliability Corp., 146 FERC ¶ 61,199 (2014) (approving the revised definition and implementation plan).

03

Transmission Benefits

Transmission provides many benefits for electric consumers, including the following:

A. Transmission helps minimize grid strain and prevent dangerous power outages.

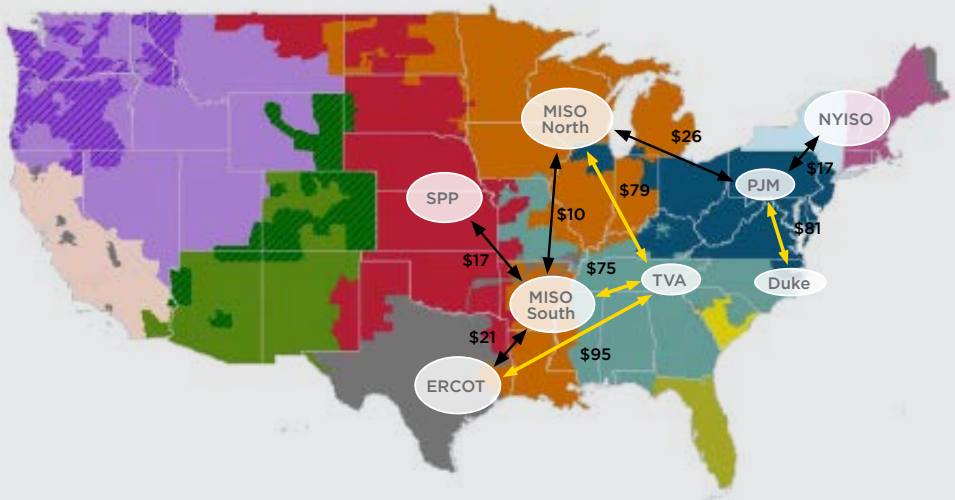
Severe weather events, like heat waves, fires, or winter storms, can threaten generation equipment and cause major spikes in energy demand. A White House report estimates that between 2003 and 2012, power outages linked to weather cost the economy between $18 billion and $33 billion, adjusted for inflation.[9] When severe weather strikes any given area, transmission lines allow grid operators like PJM to bring in resources from areas located outside the crisis conditions. PJM has 325 inter-zonal transmission ties that link its footprint together.[10] It also has connections with neighboring regions, like the Southeast and New England, that allow it to import and export energy. For example, PJM has an agreement with the Northeast Power Coordinating Council (NPCC) which allows either entity to seek reserves from the other in the event of generation losses greater than 500 megawatts.[11]

9 President's Council of Economic Advisers and the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability, "Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," Executive Office of the President, 2013.
10 PJM Interconnection, "The Benefits of the PJM Transmission System," at 4, 2019 (PJM Benefits).
11 PJM Benefits, at 5.

Note on Interregional Transmission

A recent study from the Natural Resources Defense Council and GE Energy Consulting highlights the reliability benefits of interregional transmission.[a] In a simulated East Coast polar vortex (based on real-world conditions from 2014), energy demand increased by 40%. Under the modeled storm conditions, the cold weather took out roughly 15% of generators and knocked out electricity for two million customers on the East Coast. According to the study, greater interregional transmission ties would have completely prevented those outages.

Similarly, a report from Grid Strategies found that during Winter Storm Elliott in December 2022, one additional gigawatt of transmission between MISO North and PJM ComEd could have saved $26 million. An extra gigawatt of transmission between the New York ISO and PJM Dominion could have saved $17 million.[b]



a Tandon Manz, Sheila, "Economic, Reliability, and Resiliency Benefits of Interregional Transmission Capacity," NRDC and GE Energy Consulting, 2022.

b Goggin, M. and Zachary Zimmerman, "The Value of Transmission During Winter Storm Elliott," at 7, ACORE, 2023.

B. Transmission provides access to lower-cost resources, leading to customer savings.

Transmission plays a vital role in keeping energy costs down by ensuring that grid operators, such as PJM, can take full advantage of the lowest-cost resources on the market, including those located far from load centers. As it directs energy flows, PJM starts with the lowest-cost power resources and incrementally adds more expensive sources based on demand. Beginning in 2002, PJM integrated several smaller utility transmission systems, including Allegheny Power and Dominion, into its footprint. This additional load diversity helped reduce the total energy capacity needed to power PJM's system.[12] **A recent study found that transmission ties**

12 PJM, "PJM History," last accessed December 2023.

between zones reduce the need for additional generation capacity in PJM by $3.78 billion annually.[13] The completion of several new transmission lines in 2015 along with other lower-voltage transmission enhancements has increased the overall transfer capability across PJM's Eastern Interface.

Severe weather events can also increase the need for power in short periods of time, thus driving up costs. When a Bomb Cyclone hit the Mid-Atlantic in late 2017/early 2018, PJM relied on its transmission system to import energy from neighboring regions, like the Tennessee Valley Authority. During the Bomb Cyclone, every additional gigawatt of transmission ties between PJM and its western neighbor, the Midcontinent Independent System Operator, consumers could have saved an estimated $38 million.[14]

C. Transmission provides access to cleaner energy resources, reducing greenhouse gas emissions and supporting U.S. climate goals.

The U.S. is rapidly expanding its production of domestic clean energy, including wind and solar. But when built at a utility scale, these resources require large physical footprints. Further, the areas with the greatest generation potential are often located far from major load centers.

At the same time, electricity consumption is projected to increase significantly in the U.S. with the adoption of electric vehicles and heat pumps, the proliferation of data centers, and efforts to electrify major industries.[15] Additional transmission capacity is needed to interconnect the hundreds of gigawatts of new generations sources required to meet these demands.

To reach net-zero carbon emissions in a timely manner, the U.S. will need to double or triple its transmission capacity.[16] Further, a 2022 report from Princeton University found that if the U.S. fails to increase the rate of transmission expansion, greenhouse gas emissions could rise substantially because fossil-fired plants would be forced to increase production to meet growing demand from electrification.[17]

13 PJM Benefits, at 1.

14 Goggin, Michael, "Transmission Makes the Power System Resilient to Extreme Weather," ACORE, 2021.

15 *See*, e.g. Wilson, J. and Zach Zimmerman, "The Era of Flat Power Demand is Over," 2023.

16 See, e.g. Department of Energy, "Biden-Harris Administration Announces $1.3 Billion to Build Out Nation's Electric Transmission and Releases New Study Identifying Critical Grid Needs," Oct. 30, 2023; Department of Energy, "National Transmission Needs Study," 2023.

17 Jenkins, Jenkins D. *et al.*, "Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act," REPEAT Project, Princeton University, September 2022.

D. Transmission supports economic growth.

Transmission helps make the U.S. energy system more cost-effective. When power prices go down, households and businesses can direct their money to other places, spurring job growth and stimulating local economies. Power outages and blackouts also have serious economic consequences, disrupting business, education, and recreation.

E. Transmission protects national security.

Physical or cyber-attacks on the grid have the potential to knock out power and disrupt critical services. Several high-profile attacks on the grid—including physical attacks on substations in North Carolina and Washington State in 2022, and the Colonial Pipeline ransomware attack in 2021—have heightened attention on the issue of grid security.[18] Transmission lines improve system resilience by allowing PJM to move energy within its zones or import power from neighboring regions. Layering redundancy into the system ensures no single piece of grid infrastructure is overly critical to its performance.

By unlocking new pathways for energy delivery, transmission also ensures the U.S. can take full advantage of its domestic energy production. This flexibility helps minimize reliance on often volatile foreign energy sources.

18 Walton, Robert, "Puget Sound Energy, Tacoma Power substations damaged in Christmas Day attacks," Utility Dive, December 26, 2022; Walton, Robert, "FBI called to investigate firearms attacks on Duke Energy substations in North Carolina; 40K without power," Utility Dive, December 4, 2022; Sanger, David, *et al.*, "Cyberattack Forces a Shutdown of a Top U.S. Pipeline," New York Times, May 8, 2021.

04

Policies Governing U.S. Electric Network

A. Who regulates the components of the U.S. electric network?

In the United States, electricity is regulated under a system of cooperative federalism in which the federal and state governments share power. Under the Federal Power Act, Congress assigned the federal government authority over "the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce," but it declared that such federal regulation "extend[s] only to those matters which are not subject to regulation by the States."[19] In practice, this means the federal government, specifically the Federal Energy Regulatory Commission (FERC),[20] regulates the rates, terms, and conditions of service for transmission lines owned by FERC-jurisdictional utilities in states with interconnected systems (i.e. the lower 48 states with the exception of most of Texas). FERC also regulates the rates, terms, and conditions of power sales by electric utilities to wholesale customers (i.e., customers who resell the power to end users).

States govern everything else, including the kinds of generation that should be built, the siting of generation and transmission lines, and the rates, terms, and conditions for the distribution system and distribution power sales—i.e., the sales from the public utilities to the end use customer. These jurisdictional categories are not black and white, and several recent court decisions have further blurred distinctions between which issues fall under state versus federal jurisdiction.[21]

19 16 U.S. Code § 824, 16 USC § 824e.

20 FERC is an independent regulatory agency in the Executive Branch of the government that consists of five commissioners serving staggered five-year terms, appointed by the President, and confirmed by the Senate. In 1920, Congress established the Federal Power Commission (FPC) under the Federal Power Water Act to regulate interstate aspects of electric power and gas industries. In 1977, Congress passed the Department of Energy Organization Act, transferring FPC's responsibilities to the newly formed FERC.

21 *See, e.g., Fed. Energy Regulatory Comm'n v. Elec. Power Supply Ass'n, 577 U.S. 260 (2016); Hughes v. Talen Energy Marketing*, 578 US 150 (2016).

B. How have electric regulations and policies evolved over time?

The mid-20th century structural expansion of the U.S. electric network, from locally operated, non-integrated transmission facilities to an integrated, and sometimes jointly operated grid, was followed by a late 20th century evolution of state and federal policies aimed at increasing equitable access to electricity. This evolution included a series of pivotal FERC orders that directed:

- utilities under FERC jurisdiction to functionally unbundle their generation and transmission services and provide non-discriminatory transmission access to wholesale customers on conditions comparable to those which the utility provides itself (Order No. 888);[22]
- transmission providers under FERC jurisdiction to create an Open Access Same Time Information System, or OASIS, to provide real-time information about capacity availability on transmission systems (Order No. 889);[23] and
- transmission providers under FERC jurisdiction to conduct open and transparent transmission planning processes and to plan on a regional basis (Order Nos. 890 and 1000).[24]

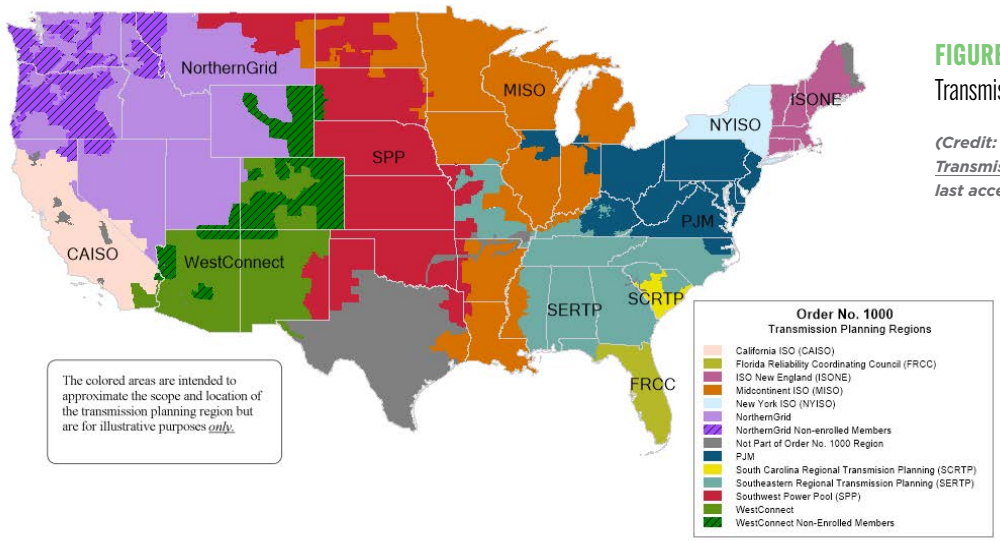


FIGURE 7. Order No. 1000 Transmission Planning Regions

(Credit: FERC, "Order No. 1000 Transmission Planning Regions," last accessed Dec. 13, 2023).

Several states also adopted deregulation policies authorizing customers to elect their own generation service providers. Deregulation opened competition among power providers, and the FERC orders invited competitive transmission development, but the rates, terms, and conditions of service over transmission and distribution lines continue to be regulated. Distribution and transmission services are considered **natural monopolies** because it would not be in the public interest to have multiple companies build duplicative (and often massive) infrastructure over the same service path.

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22 See n. 2, *supra*.

23 *Open Access Same-Time Information System and Standards of Conduct*, Order No. 889, 61 Fed. Reg. 21737 (May 10, 1996), FERC Stats. & Regs. ¶ 31,035 (1996), *order on reh'g*, Order No. 889-A, FERC Stats. & Regs. ¶ 31,049 (1997), *reh'g denied*, Order No. 889-B, 81 FERC ¶ 61,253 (1997).

24 *Preventing Undue Discrimination & Preference in Transmission Serv.*, Order No. 890, 118 FERC ¶ 61,119, 72 Fed. Reg. 12,226, *order on reh'g*, Order No. 890-A, 121 FERC ¶ 61,297 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228, *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009); *Transmission Planning & Cost Allocation by Transmission Owning & Operating Pub. Utils.*, Order No. 1000, 76 Fed. Reg. 49842 (Aug. 11, 2011), 136 FERC ¶ 61,051 (2011), *order on reh'g*, Order No. 1000-A, 77 Fed. Reg. 32184 (May 31, 2012), 139 FERC ¶ 61,132, *order on reh'g and clarification*, Order No. 1000 -B, 141 FERC ¶ 61,044 (2012), *aff'd sub nom. S.C. Pub. Serv. Auth. v. FERC*, 762 F.3d 41 (D.C. Cir. 2014).

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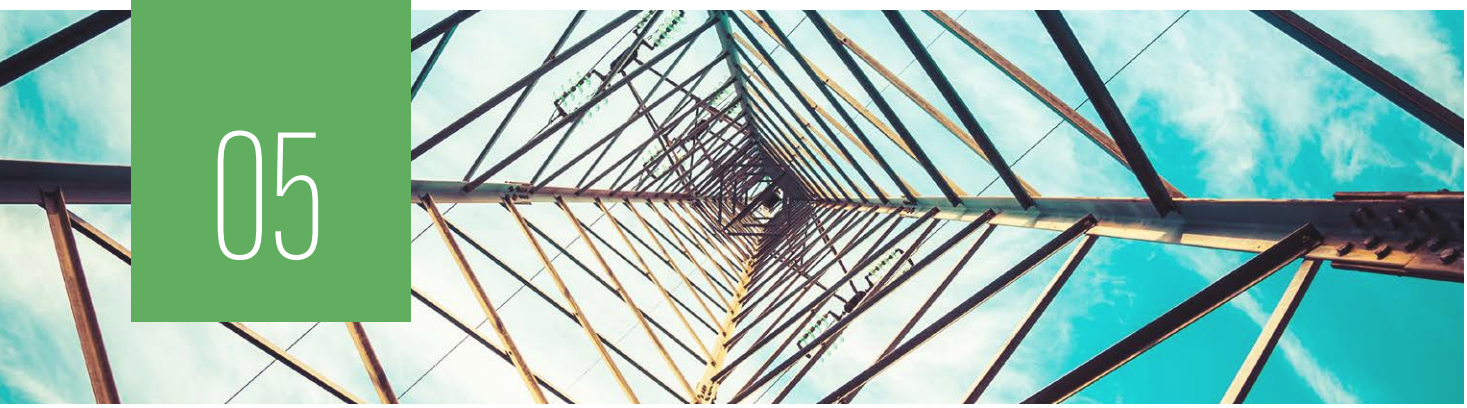

Background on PJM and its Transmission Owners

A. How did the PJM organization come to be?

PJM was originally formed in 1927 as the Pennsylvania-New Jersey Interconnection by three neighboring utilities[25] whose systems were electrically interconnected and who were interested in pooling and dispatching their generating resource to increase efficiency. In 1956, as more utilities joined the pool,[26] the group changed its name to the Pennsylvania-New Jersey-Maryland Interconnection, or PJM. Throughout the early stages of the organization, one of the member utilities operated the pool.

The organization's structure changed in 1997 when the members formed PJM Interconnection Association—an independent limited liability company with its own Board of Managers—to administer the power pool. In so doing, the utilities opened membership to other non-utility stakeholders, such as independent generation owners. That same year, FERC authorized PJM to function as an independent system operator (ISO) to operate the grid and provide open access to the member entities' transmission lines.[27] In 2002, FERC approved PJM's status as the nation's first Regional Transmission Organization (RTO).[28]

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25 Public Service Electric and Gas Company (PSEG), Philadelphia Electric Company (now PECO), and Pennsylvania Power & Light Company (PPL). Original map available at: Smithsonian Institution, National Museum of American History Map, "Pennsylvania/New Jersey Interconnection, 220kv," Image No. 801656.

26 Baltimore Gas and Electric Company (BGE), and General Public Utilities (now FirstEnergy).

27 *Pennsylvania, New Jersey, Maryland Interconnection*, 81 FERC ¶ 61,257 (1997), *on reh'g*, 92 FERC ¶ 61,282 (2000).

28 This authorization was granted pursuant to the Commission's directives in Order No. 2000. *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089 (1999), *order on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000), *aff'd sub nom. Pub. Util. Dist. No. 1 of Snohomish Cty. v. FERC*, 272 F.3d 607 (D.C. Cir. 2001).

Over the years, PJM's footprint has grown exponentially as more interconnected utilities have joined its system. While PJM operates the transmission lines, the utilities and developers that build these lines retain ownership of them.

Who's Who in PJM?

PJM is made up of five member sectors:[a]

- **Transmission owners (TOs)**—companies that own, or lease with rights equivalent to ownership, to Transmission Facilities and are signatories to the PJM Transmission Owners Agreement. This category includes investor-owned utilities, public power utilities, electric cooperatives, and merchant transmission developers.
- **Generation owners (GOs)**—companies that own, or lease with a right equivalent to ownership, a Capacity Resource or an Energy Resource within the PJM footprint. This category includes generation sources owned by investor-owned utilities and independent merchant companies.
- **Electric distributors (EDs)**—organizations that (1) own, or lease with rights equivalent to ownership, electric distribution facilities that provide electric distribution service to electric load within the PJM Region; or (2) are a generation and transmission cooperative or a joint municipal agency that has a member that owns electric distribution facilities used to provide electric distribution service to electric load within the PJM Region. These members are also referred to as distribution utilities or load serving entities (LSE).
- **End-use customers (EUCs)**—the retail end-user of electricity within the PJM Region. This category includes consumer advocates, and large industrial and commercial customers.
- **Other suppliers (OS)**—entities that are (1) engaged in buying, selling or transmitting electric energy, capacity, ancillary services, financial transmission rights or other services available under PJM's governing documents in or through the Interconnection or has a good faith intent to do so, and; (2) do not qualify for the Generation Owner, Electric Distributor, Transmission Owner or End-Use Customer sectors. This category includes, among others, gas suppliers and financial traders.

Companies that qualify for one or more sectors must select (or are assigned) the one that best represents their voting interest. Other parties—including environmental non-profits, other public interest groups, and tribal, state, or local governments—may participate in PJM processes as non-members.

a A searchable list of PJM's Members can be found on PJM's website.

B. How many transmission owners are there in PJM?

There are currently 38 transmission owners in the PJM region, some of whom are affiliates of the same parent organization.[29] Most are comprised of incumbent utilities, though some independent companies, known as

29 PJM, "Transmission Owners Agreement," at Attachment A (effective 4/27/21).

merchant transmission developers, also own lines in PJM. The PJM footprint is subdivided into 21 transmission zones, each of which corresponds with a separate utility and transmission rate (see Figure 8 for the zones, and Handbook Volume VII for more on transmission rates).

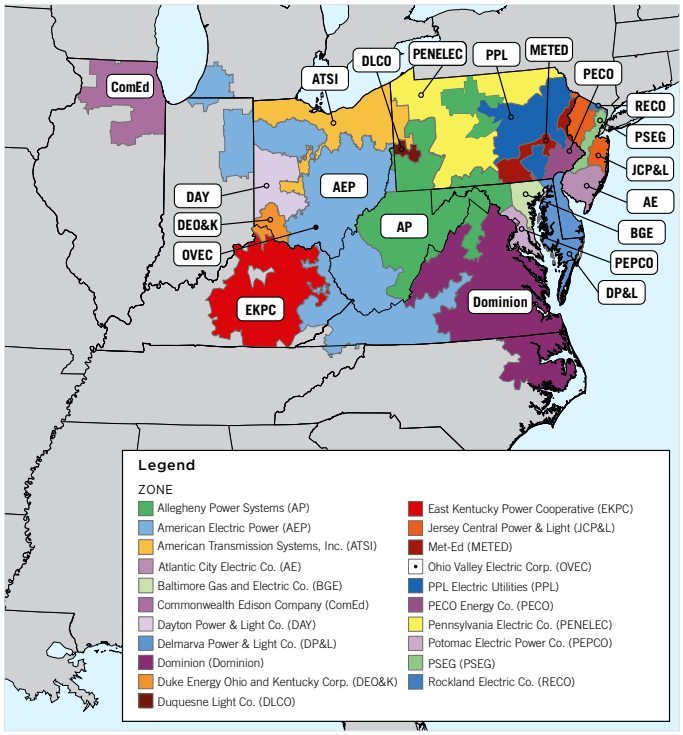
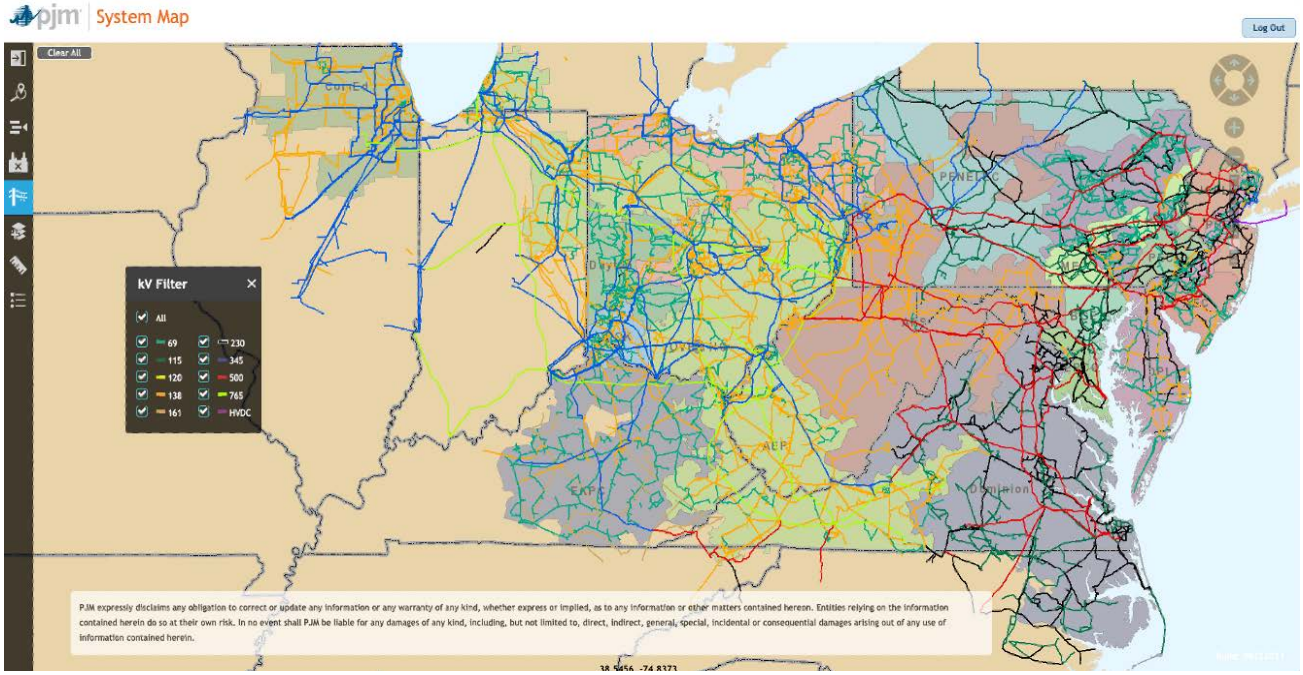


FIGURE 8. PJM Transmission Zones

(Credit: PJM, "PJM Transmission Zones," last accessed Dec. 13, 2023).

FIGURE 9. Existing PJM System Map by Voltage



(Credit: PJM, "PJM System Map by Voltage," last accessed September 5, 2023).

C. What happens when a transmission owner joins PJM?

The relationship between the transmission owners and PJM—as the transmission operator—is codified in the Consolidated Transmission Owners Agreement (TOA).[30] As a condition of joining PJM, each member transmission owner must execute the TOA and transfer the following rights to PJM:

- Authorization to provide transmission service over its Transmission Facilities in the PJM Region (Section 4.1.1);
- Responsibility to direct the operation of the Transmission Owner's Transmission Facilities, though that transfer of rights is not intended to require any change in the physical operations or control over the Transmission Facilities (Section 4.1.2);
- Responsibility for administering the PJM Tariff (4.1.3); and
- Responsibility to prepare a Regional Transmission Expansion Plan (Section 4.1.4).

The transmission owners further agree to:

- Provide information reasonably requested by PJM to prepare the Regional Transmission Expansion Plan (RTEP) (Section 4.1.4). (See Handbook Volume IV for more information about the RTEP and transmission planning in PJM);
- Provide data, information, and related technical support to enable PJM to monitor and analyze system conditions and affirmatively determine that PJM complies with NERC standards (Section 4.1.5);
- Provide PJM with "reasonable advance notice" before permanently taking any Transmission Facilities within the PJM region out of service (Section 4.4); and
- Operate and maintain their Transmission Facilities in accordance with the TOA, regional and national reliability standards, PJM manuals, PJM's directions, and "Good Utility Practice" (Section 4.5).

D. In transferring the operation of their facilities to PJM, what rights did the transmission owners retain?

Much of the Transmission Owners Agreement is devoted to spelling out the Transmission Owners' rights, including the following:

Section 4 addresses the development of transmission lines, stating that:

- "Subject to: (i) the requirements of applicable law, government regulations and approvals, including, without limitation, requirements to obtain any necessary state or local siting, construction and operating permits; (ii) the availability of required financing; (iii) the ability to acquire necessary right-of-way; (iv) the right to recover, pursuant to appropriate financial arrangements and tariffs or contracts, all reasonably incurred costs, plus a reasonable return on investment; and (v) other conditions or exceptions set forth in the Regional Transmission Expansion Planning Protocol, [the Transmission Owners] designated as the appropriate entities to construct and own or finance enhancements or expansions applicable to the PJM Region specified in the Regional Transmission Expansion Plan or required to expand or modify Transmission Facilities pursuant to the PJM Tariff shall construct and own or finance such facilities or enter into appropriate contracts to fulfill such obligations" (Section 4.2.1.). (See Handbook Volumes IV and VI for more information about building and recovering costs of transmission lines).

Section 5 provides the general reservation of the Transmission Owners' retained rights, including:

- The "right to adopt and implement procedures [the TO] deems necessary to protect its electric facilities from physical damage and to prevent injury or damage to persons or property" (Section 5.1);

30 For information on the history of PJM's Consolidated Transmission Owner's Agreement see *American Transmission Systems v. FERC*, DC Cir Case Nos. 14-1085 and 14-1136, Brief of Respondent, at 10-11, filed Dec. 4, 2015.

- "[T]he right to build, finance, own, acquire, sell, dispose, retire, merge, or otherwise transfer or convey all or any part of its assets, including any Transmission Facilities," including the right to terminate the relationship with PJM after selling, disposing, retiring, merging, or transferring their facilities to another entity (Section 5.2);
- The right to take whatever actions the Transmission Owner "deems necessary to fulfill its obligation under local, state, or federal law," (Section 5.3);
- Rights pursuant to the Federal Power Act and FERC's rules and regulations (Section 5.4); and
- The right to seek enforcement of the obligation of any Party or of PJM subject to the terms and conditions of the Operating Agreement and the PJM Tariff (Section 5.5).

TOA Section 5.6 also includes a broad, overarching reservation of rights stating that: "Rights not specifically transferred by the [Transmission Owners] to PJM pursuant to this Agreement or any other agreement are expressly reserved by the [Transmission Owners]."

E. What does the Transmission Owners Agreement say about transmission rates?

Transmission rates are addressed in TOA Section 7 and explicitly reserve to transmission owners the right to file rate changes (See Handbook Volumes VI and VII for more information on costs and rates). Specifically, the section states that:

- Each Transmission Owner "shall have the exclusive right to file unilaterally at any time pursuant to Section 205 of the Federal Power Act to establish or change the transmission revenue requirement for services provided under the PJM Tariff with respect to its Transmission Facilities (regardless of whether such revenue requirement is used to support rates and charges for delivery within its Zone or outside its Zone). This right includes, but is not limited to, the right to file a transmission revenue requirement, or a revenue requirement that is based on incentive or performance-based factors." (Section 7.1.1);
- Each Transmission Owner "shall have the exclusive right to file unilaterally, at any time pursuant to Section 205 of the Federal Power Act, to change rates and charges for transmission and ancillary services (including, without limitation, incentive rates, and rates and charges for new services) for delivery within its Zone, which rates and charges are based solely on the costs of the Transmission Facilities of such Party." (Section 7.1.3); and
- "Section 205 filings to change the PJM Regional Rate Design or file for Joint Transmission Rates may only be made by the [Transmission Owners], acting collectively . . . The Transmission Owners, acting individually, shall have no authority to make any filings under Section 205 of the Federal Power Act either to change or which would be inconsistent with the PJM Regional Rate Design or Joint Transmission Rates." (Section 7.2.1). If the Transmission Owners agree upon a change to the PJM Regional Rate Design, they may file jointly under Section 205 or they can request PJM file on their behalf, but "any such filing by PJM shall be deemed for all purposes under the Federal Power Act to be a filing of the Transmission Owners." (Section 7.3.1). Section 7.3.1 also requires the Transmission Owners to consult with PJM and the PJM Members Committee no less than thirty (30) days prior to any such Section 205 filing, but makes clear that neither PJM (except as provided for in Section 7.6) nor the PJM Members Committee have a right to veto or delay the Transmission Owners' filing.

F. What documents govern PJM's operations?

In addition to the Consolidated Transmission Owners Agreement, there are three main documents that govern PJM's day-to-day operations and its interactions with members. Changes to any of these three governing

documents must be approved by FERC[31]:

- The Open Access Transmission Tariff (OATT) is PJM's main governing document and provides the rules for offering or taking transmission service in the PJM territory. Transmission owners' rate schedules are incorporated into OATT Attachment H.
- The Operating Agreement (OA) outlines PJM's management and operation protocols including the terms of PJM membership; PJM staff, Board, and Committee roles; PJM's accounting billing procedures; and PJM's regional transmission expansion planning protocols. All PJM members are signatories to the Operating Agreement.
- The Reliability Assurance Agreement (RAA) outlines the rules, roles, and responsibilities for planning and maintaining adequate Capacity Resources (including generation, demand, and energy efficiency resources), to ensure reliable operation of the grid. All Load-Serving Entities (LSEs) in PJM are parties to this agreement. The LSEs, primarily distribution utilities, are the entities that sell electric energy to end use customers in the PJM region.

In addition to the governing documents, PJM's manuals are the "administrative, planning, operating and accounting procedures of PJM."[32] The manuals provide further information on interpreting and implementing the provisions in the governing documents. Manual changes do not need to be filed at FERC.

31 PJM, "Governing Documents," last accessed December 5, 2023.
32 PJM, "PJM Structure: Governance," last accessed December 5, 2023.

06

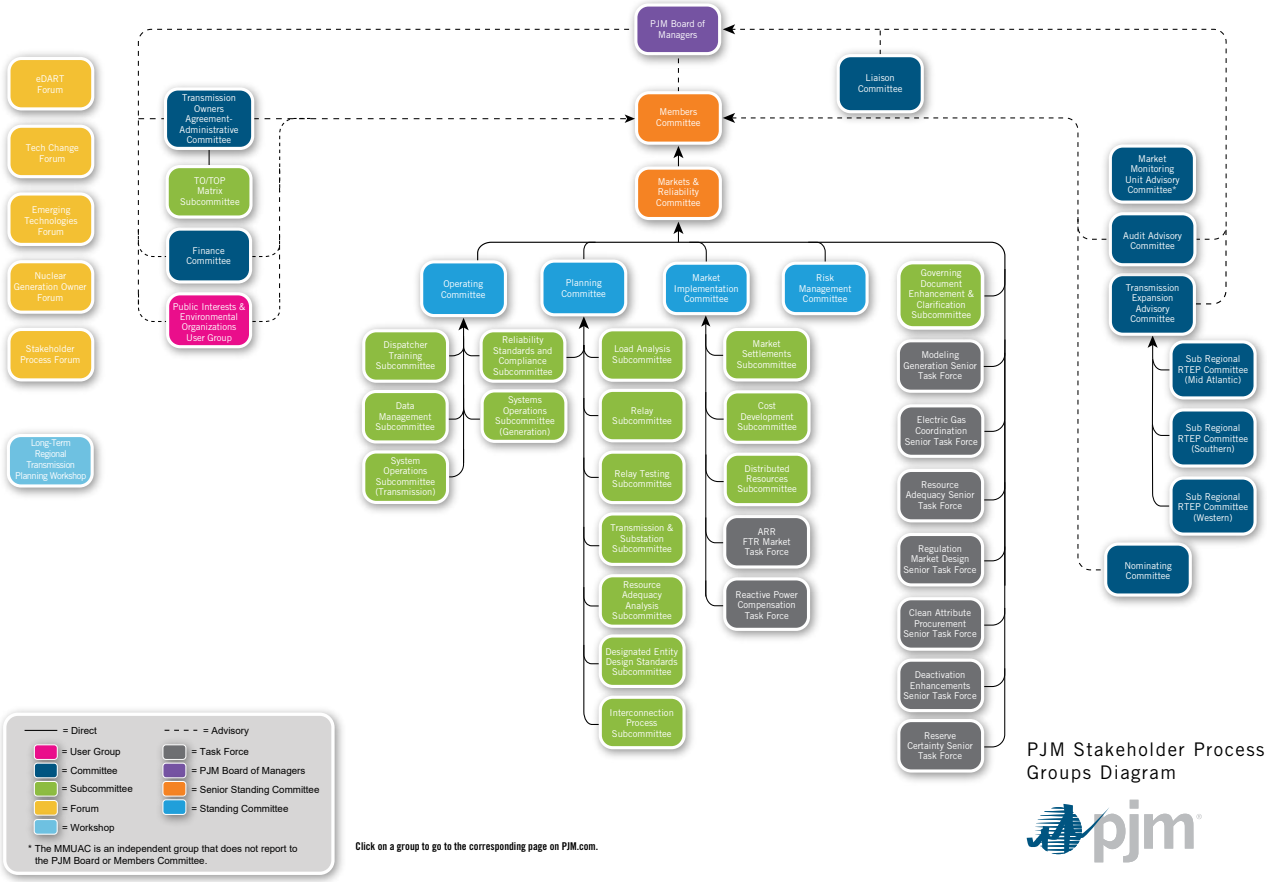
General Advocacy Opportunities

There are several avenues for advocates to get involved in shaping PJM's rules, regulations, and operations, including:

- **PJM's Members Committee and Liaison Committee:** Advocates that are PJM members have the unique opportunity to participate in the Members and Liaison committees. The Members Committee (MC): "reviews and decides upon all major changes and initiatives proposed by committees and user groups."[33] The Liaison Committee (LC) provides an opportunity for PJM members and the PJM Board to speak directly.
- **PJM's Committee and User Group Meetings and Other Stakeholder Processes:** PJM's committee meetings and other stakeholder processes are the primary way to advocate for a better-planned and more cost-effective transmission system. Meeting materials and registration information for meetings and stakeholder calls can be accessed through: (1) the PJM calendar, (2) PJM's Meeting Center, and (3) the corresponding committee/group/process webpage (links for which are in the dropdown boxes on the lefthand side of the Committees & Group page). These meetings can be time- and resource-intensive as PJM runs a full calendar of activities, often with multiple committees or subcommittees meeting at the same time. For consumer advocates, this is an area where CAPS can assist in flagging which issues are worth following more closely.

33 PJM, "Members Committee," last accessed December 22, 2023.

FIGURE 10. PJM Stakeholder Process Groups Diagram



(Credit: PJM, "Committees & Groups," At a Glance: The PJM Stakeholder Process, last accessed December 13, 2023).

- **Meetings:** Both PJM and the Organization of PJM States (OPSI), the entity that brings together regulators from each of the PJM states, hold respective annual meetings. These meetings are a good opportunity to speak informally with PJM staff and Board members, state regulators, and other stakeholders.
- **FERC Rulemakings and Federal Legislation:** Because electric transmission service is governed by FERC, and PJM is a creation of FERC's authorization, PJM must comply with FERC's rules. Similarly, FERC is a creation of statute and must comply with the laws passed by Congress. Advocates should consider commenting on any FERC rulemakings of general applicability that impact how transmission is planned, developed, operated and how transmission costs are charged in PJM. Advocates may want to monitor and engage in federal legislative processes that impact FERC. To the extent interest aligns, advocates can conserve resources by working in coalitions when engaging in FERC and/or legislative advocacy.

Handbook Volumes III through VII will provide specific advocacy opportunities to influence transmission permitting, transmission rates, and other matters.

ABOUT CAPS

Established in 2013, Consumer Advocates of the PJM States, Inc. (CAPS) is a non-profit organization whose members represent over 65 million consumers in the 13 PJM States and the District of Columbia. Regulatory rules vary greatly across jurisdictions, but in each the electricity costs paid by consumers is at least partly determined by the tariff and rules under which PJM operates. PJM and its stakeholders set those rules and CAPS' engagement is necessary to ensure that consumers' voices are heard. CAPS' mission is to actively engage in the PJM stakeholder process and at the Federal Energy Regulatory Commission to ensure that the prices consumers pay for reliable, wholesale electric service are reasonable.

ABOUT DGA

David Gardiner and Associates (DGA) was founded in 2001 to serve as a strategic advisor to organizations and businesses seeking a sustainable future. Our firm combines expertise developing research and analysis with deep understanding of clean energy markets and policy. DGA has worked for foundations, businesses, and non-profit advocacy groups to develop strategies to identify and promote policies that will advance clean energy and a low-carbon economy.

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