

PJM's Role in the Energy Transition:

Holistic planning for efficient entry, exit,
and the grid of the future

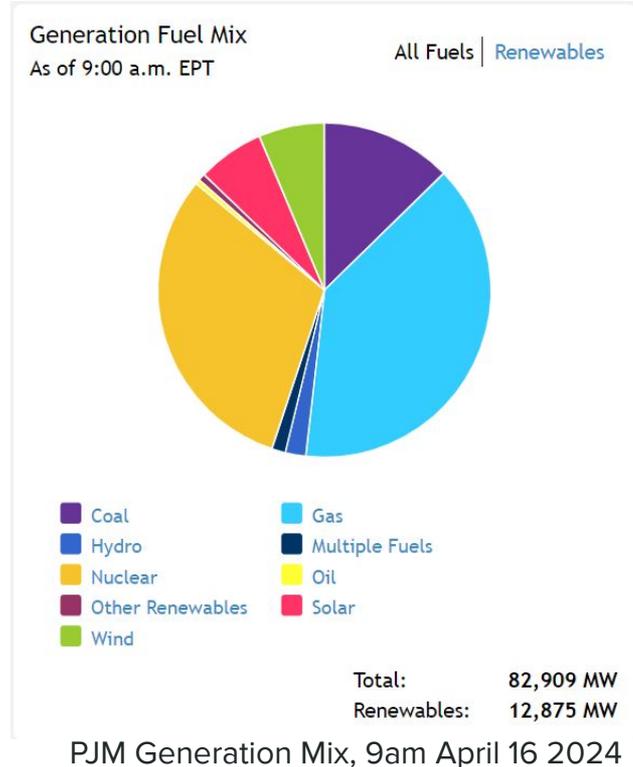
Public Interest Environmental Organizations User Group

May 8, 2024



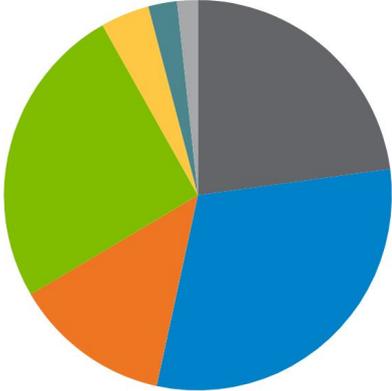
PJM is in the early stages of the energy transition and has ample room for clean energy growth.

- Currently, PJM relies mainly on gas, coal, and nuclear generation.
- “Wind and solar generation was 4.9 percent of total generation in PJM for 2023.”
IMM, State of the Market Report for 2023.
- On a recent, sunny spring morning, PJM reached roughly 15.5% renewable energy.



Other RTO/ISOs are reliably operating with far more clean energy.

16-Apr-2024 - Interval 10:05 EST

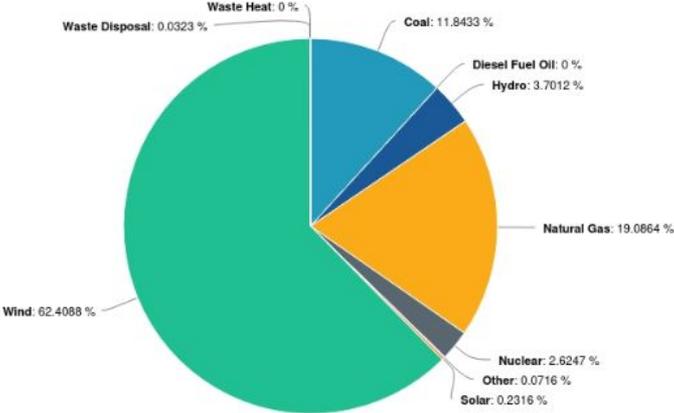


Total Megawatts
72,685

- Coal (16,643 MW)
- Natural Gas (22,243 MW)
- Nuclear (9,550 MW)
- Wind (18,408 MW)
- Solar (2,963 MW)
- Imports (1,742 MW)
- Other (1,255 MW)

MISO: 29.3% renewable

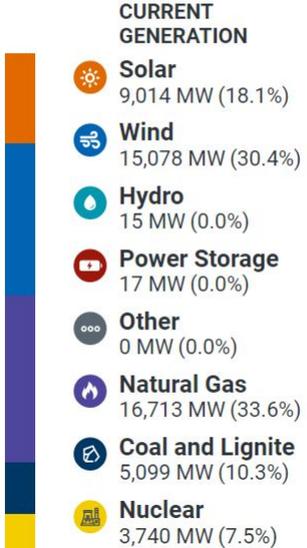
GENERATION MIX for 04/16 at 09:50 (Central Time)



SPP: 62.6% renewable

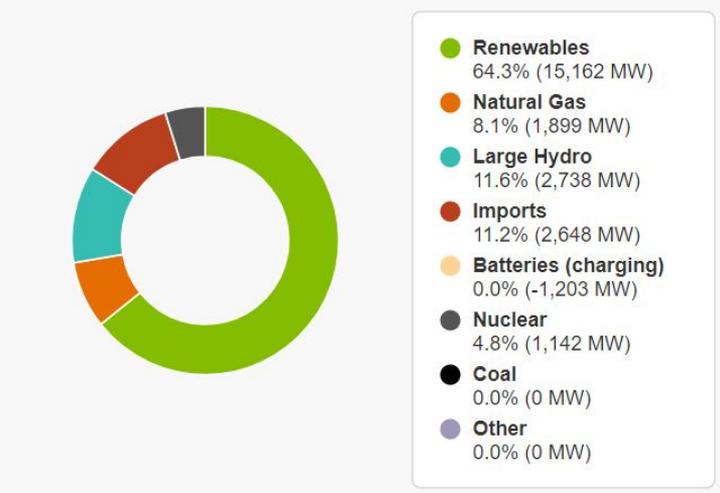
Fuel Mix

Last Updated: Apr 16, 2024 10:09 CT

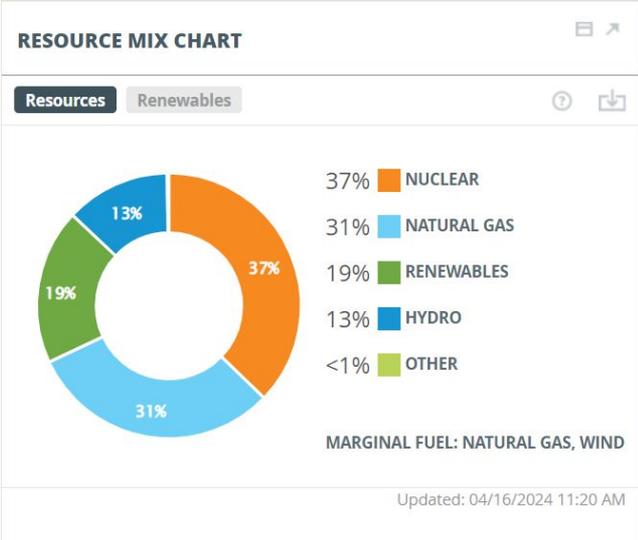


ERCOT: 48.5% renewable

Other RTO/ISOs are reliably operating with far more clean energy.



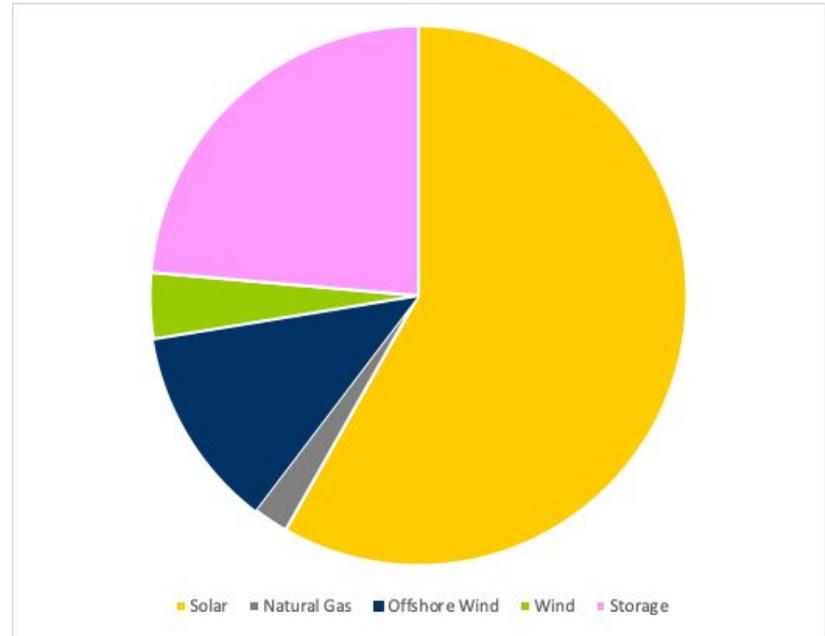
CAISO: 64.3% renewable



ISO-NE: 19% renewable

PJM faces an urgent need for a swift transition.

- Demand is likely to grow.
- Old resources will retire.
- State and federal governments will continue to develop policies that shape the generation mix.
- PJM can keep up; it has done it before:
 - PJM anticipates up to 40 GW of retirements by 2030.
 - From 2015 to 2022, over 30 GW of new generation entered PJM.
 - Reforms can unlock a vast amount of clean energy in this region.



238 GW of clean energy is now in PJM's queue.

PJM can facilitate a swift, reliable transition.

- PJM does not need to reinvent the wheel; solutions exist for many immediate issues.
- The energy transition will move as quickly as PJM can modernize its processes and developers can build infrastructure.
- Specific reforms are needed for:
 - Efficient entry of new generation
 - Efficient exit of old generation
 - Planning the transmission grid of the future.

Enabling efficient entry of generation resources

Presenter: Katie Siegner
Manager, RMI

Facilitating efficient new entry is core to a reliable, least-cost, decarbonized system

Efficient new entry can be achieved by...

Order 2023 compliance

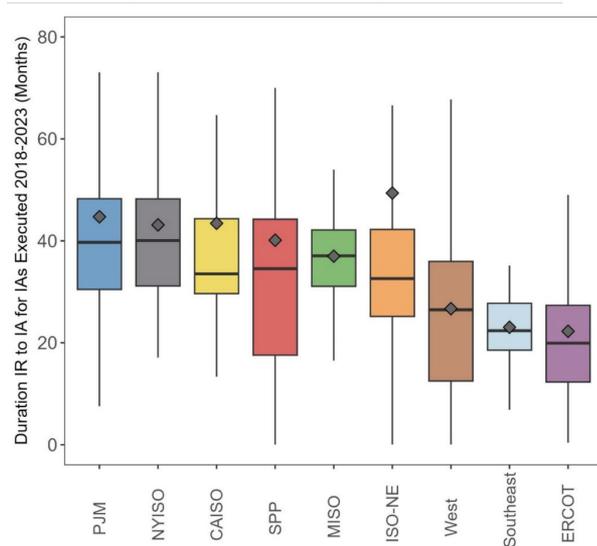
Evaluating GETs in interconnection studies

Establishing a generator replacement interconnection process

More work remains to be done on interconnection, and PJM has clear next steps

PJM's interconnection study process has been among the longest in the country

It is too soon to tell how well PJM's reformed interconnection process is working, but we know it does not fully solve all the problems

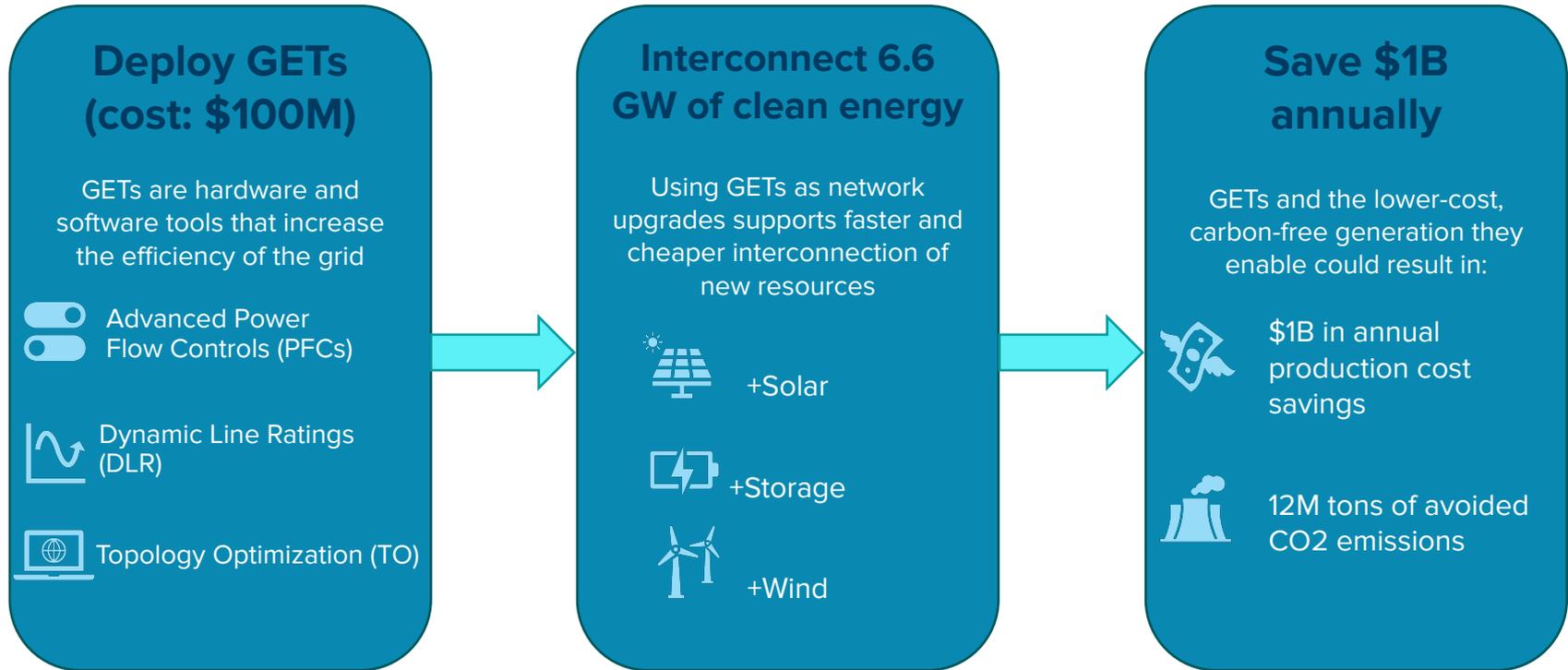


Source: LBNL, [Queued Up: 2024 Edition](#)

PJM can use Order 2023 compliance as an opportunity to incrementally improve its process

Interconnection reform	PJM's current queue process	Order 2023
Study deadlines	Study phase durations vary; some are 180 days	150 calendar day cluster study deadline
Study penalties	Reasonable efforts standard for compliance with study deadlines	Imposes study delay penalty structure
Modeling of storage	Not specified	Requires study assumptions for storage to reflect operational realities
Consideration of ATTs	Not routinely evaluated or deployed by PJM or third parties	Requires evaluation of listed ATTs, including advanced power flow controls and advanced conductors (and does not preclude evaluation of additional technologies)

RMI report: A \$100M deployment of GETs in PJM could lead to \$1B in annual savings that flows to ratepayers



PJM can use a generator replacement process as a key tool to promote efficient entry (and exit)

Creating a pathway for resources to be developed at the site of a retiring generator:

- ✓ Minimizes network upgrades associated with both the new resource and retiring generator
- ✓ Enables a significantly faster development timeline for the new resource
- ✓ Provides more certainty that the new resource will reach COD
- ✓ Maintains reliability and affordability
- ✓ Lowers emissions (presuming the new resource is carbon-free)



Projects seeking to add new generation at existing POIs are in development nationwide, and growing*



*spurred in part by federal funding and programs in the IRA

Developers are building projects in PJM, and continued work on interconnection will pave the way for many more

Wind farm construction under way on Dan's Mountain

Cumberland Times-News
Apr 23, 2024



70-MW solar project interconnects in PA in April 2024



Enabling efficient exit of generation resources

Presenter: Casey Roberts
Sierra Club, Senior Attorney

Opportunity: Over the next decade, 20-50 GW of generation may exit the PJM system

- This change is not unprecedented – PJM experienced a turnover of similar magnitude in the 2010s.
- Generation retires for many reasons: it has become unreliable, it has become uneconomic, or it poses unacceptable risks to public health and/or the climate.
- PJM's markets and policies should facilitate efficient exit of resources that fall into any of these categories.
 - Recent capacity accreditation changes are an important step towards sending signals for efficient exit of resources that contribute relatively little to reliability

PJM needs systems to ensure that are RMRs are a last resort

- RMRs perpetuate the operation of often polluting power plants long past the time the community has expected them to close.
- Prevent the reuse of transmission system capacity, or redevelopment of power plant sites.
- Not necessarily the most effective or cost-effective solution to a short-duration reliability issue, just the *only one that PJM can pursue*.



Stuby, James. Retrieved from [Wikimedia](#)

Brandon Shores & Wagner RMRs will cost almost as much as the permanent transmission solutions, but for only 3.5 years of benefit.

PJM's current approach to deactivation needs an overhaul

- Better planning for likely deactivations
 - Scenario-based transmission planning should anticipate end-of-life and economic retirements, as well as “policy-driven” ones.
 - Longer notice periods for deactivation provide time to plan and build solutions
 - More transparency for states, consumers, and the market
- Better toolbox for responding to deactivations that create reliability issues
 - Energy storage and grid-enhancing technologies can address reliability violations, and may be able to be built quickly, thus avoiding RMRs.
 - Examine alternatives to support reliability while long-lead-time transmission is being built
 - Solution should be competitively determined
 - Accelerated interconnection, CIR transfers likely needed

Holistic short-term reliability process will require new ways of thinking and more agility

- Sierra Club recently collaborated with technical consultants to examine whether energy storage could help to mitigate reliability violations PJM has observed with the Brandon Shores deactivation.

800 MW 4-hour battery

Reconductoring of select lower-voltage power lines in area

Accelerated implementation of planned voltage control technologies

- PJM analyzed *some* components of this solution, concludes it won't work under circumstances that appear to surpass even Brandon Shores' ability to support the system. Need a consistent framework to compare RMRs to other solutions.
- RMR ideal v. reality

Consolidated Transmission Owners Agreement

Presenter: Ari Peskoe
Director of the Electricity Law Initiative,
Harvard Law School Environmental and Energy Law Program

“PJM is not a mere agent of the Transmission Owners.”

-PJM, January 1998 (filed in FERC Docket OA97-261)

The utilities’ new CTOA jeopardizes that commitment:

1. The PJM Board can pursue a better deal with the Members to obtain section 205 filing authority over the RTEP rules.
2. The utilities’ new CTOA provisions would undermine PJM’s independent transmission planning.

Proactive long-term transmission planning for the future

Presenter: Tom Rutigliano
Senior Advocate, NRDC

PJM faces an urgent need to more proactively plan its transmission system for the energy transition

- PJM's current transmission planning processes are reactive and not suitable to address emerging challenges.
- FERC has made a preliminary finding that “**regional transmission planning on a sufficiently long-term, forward-looking basis to identify and plan for transmission needs *driven by changes in the resource mix and demand***” is necessary for just and reasonable rates.

Resolving the issues raised today depends on effective transmission planning

- Procedural reforms can only get us part of the way to an interconnection process that can keep pace with the need for new generation. Timely and cost-efficient entry of new resources will only occur when the network transmission projects needed to support them are planned well in advance.
- Current and proposed generator retirement procedures do not provide nearly enough time to develop transmission solutions, resulting in costly RMRs, delayed retirements, and raising the cost of reaching policy goals.

Time is of the essence

LTRTP has built the foundation for needed reforms

- Acknowledging these issues, last year PJM started an effort to develop scenario-based Long Term Regional Transmission Planning.
- The effort has been productive: PJM has clarified its current authority to engage in scenario-based planning and created a solid framework for planning efforts.
- PJM staff faced a difficult task in negotiating study parameters acceptable to stakeholders with diverse, sometimes opposing interests.
- Compromises made limit LTRTP's potential: though LTRTP utilizes scenario-based planning and benefits modeling, the current proposal fails to fully consider market efficiency planning, economic-based generator retirements, or interregional planning. We are particularly concerned that limited consideration of economic factors will prevent the region from seeing the full benefits of the IRA.
- Stakeholders have decided to delay a vote on LTRTP until after FERC is expected to issue its transmission planning order.

PJM must leverage the work done on LTRTP to immediately implement aspects of the FERC order.

- The forthcoming FERC rulemaking will likely contain important guidance on benefits modeling, scenario structures, and incorporation of public policies.
- This will most likely pre-empt many of the decisions made regarding LTRTP scenario development.
- Work done to date on LTRTP creates an opportunity: PJM has established that it already has authority to engage in scenario-based planning and to define the scenarios. The FERC order is expected to mandate PJM do so.
- Rather than voting on a planning process that may already be moot, PJM should update LTRTP scenarios to comply with the FERC order to the maximum extent possible with existing authority, and begin the scenario development phase of LTRTP within months.
- LTRTP has created a framework adaptable to new scenario requirements. PJM must be prepared to integrate all required planning inputs into scenarios, including all policies, utility plans, generator retirements, and interconnection queue entries.

Further improvements to LTRTP can be made on compliance with the FERC order

Other aspects of transmission planning reform will require tariff changes, and are better addressed on the compliance timeline specified by FERC. Fortunately, these aspects do not impact scenario development, which can proceed in parallel:

- PJM must be prepared to fully account for all benefits, even if FERC does not require a minimum list of benefits
- PJM must be prepared to consider Grid-Enhancing Technologies (GETs) and advanced conductors as part of planning solutions
- Cost allocation reforms are likely to be needed, with or without a FERC mandate

And beyond...

- **Interregional**
- **Offshore wind infrastructure**

Thank you!

