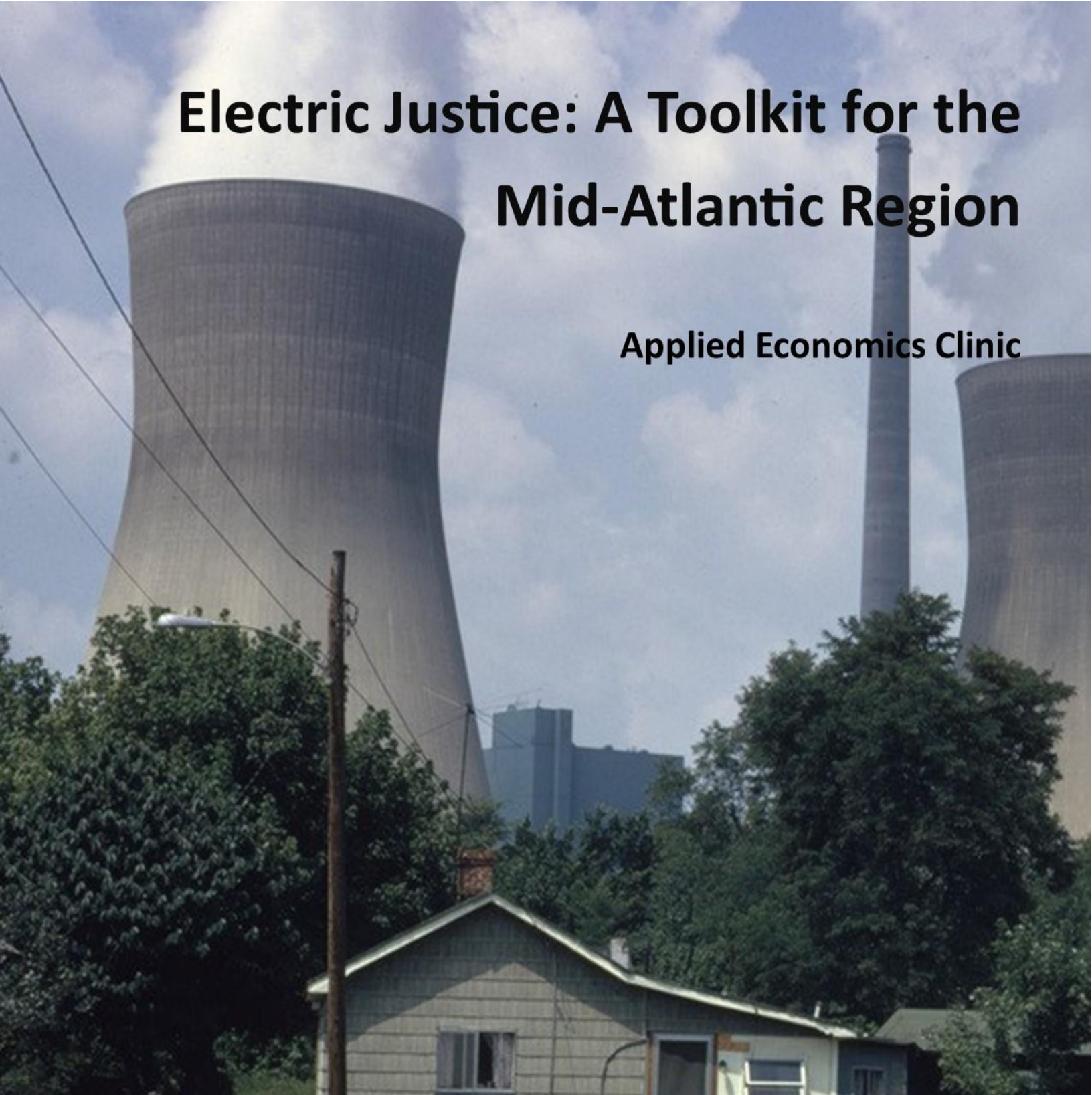


Electric Justice: A Toolkit for the Mid-Atlantic Region

Applied Economics Clinic



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Executive Summary

A lack of transparency from grid operators and utilities alike has left the everyday customer in the dark about how the energy system works, how planning decisions are made, and how these decisions impact them personally. Energy decisions—most often invisible to consumers—affect every household and every business through electric bills and pollution exposure from existing and proposed fossil fuel infrastructure like gas-, coal-, and oil-fired power plants, pipelines, and distribution facilities. This report focuses on decisions made regarding electric power in the Mid-Atlantic region (called the “PJM Interconnection”).

PJM Interconnection decision-makers make choices based on their own priorities and the priorities of electric stakeholders: electric utilities, owners of electric generation, ratepayers and, more broadly, anyone located within PJM Interconnection. Local communities and businesses are excluded from these decision-making processes because they lack the time, money, and resources to make their concerns heard. As a consequence, the assumptions and rules governing PJM’s wholesale energy markets and planning processes tend to give preference to fossil fuel resources owned by large-scale energy companies and fail to take account of the indirect equity impacts that will further burden already communities that are already overburdened from pollution exposure, climate change impacts, and pre-existing socio-economic inequities.

This Applied Economics Clinic (AEC) report, prepared on behalf of PJM Cities and Communities Coalition aims to assist coalition members and other consumer representatives in advocating for greater equity in PJM Interconnection decision-making. This resource was developed with the invaluable input of representatives of organizations that sponsored the *Fix the Grid*¹ campaign in New England, which is focused on rejecting fossil fuels and calling for a just and democratic energy grid.² Interviewees included:

- Logan Malik of [Massachusetts Climate Action Network](#)
- Phelps Turner of [Conservation Law Foundation](#)
- Alice Arena of [Fore River Residents Against the Compressor Station](#)
- John Walkey of [GreenRoots](#)
- Mireille Bejjani of [Community Action Works](#)
- Marla Marcum of [Climate Disobedience Center](#)

Meaningful engagement in electric-sector equity advocacy requires a clear understanding of who the key decision makers are both within and outside of PJM. AEC identifies nine equity concerns that fall under PJM’s main three priorities and identifies the relevant PJM decision-makers that may be able to address each concern (see ES-Table 1 below). Beyond PJM decision-makers, local agencies and community organizations will need also need to collaborate to create a more just and equitable electric grid.

¹ The *Fix the Grid* campaign is an active effort for ISO-NE to facilitate a just and democratic energy grid that supplies clean, renewable energy for all. All interviews were conducted in July and August 2022.

² The Action Network. N.d. “Fix the Grid: NO to Fossil Fuels, YES to a Just & Democratic Energy Grid.” *The Action Network*. Available at: <https://actionnetwork.org/petitions/fix-the-grid-no-to-fossil-fuels-yes-to-a-just-democratic-energy-grid>.



ES-Table 1. PJM equity concerns and key decision-makers

PJM priority	Equity concern	PJM decision-makers
Keeping the Lights On	Inadequate opportunities for stakeholder comments and third-party review	Public Interest and Environmental Organizations User Group
		Liaison Committee
	Inadequate evaluation of reliability	Markets and Reliability Committee
	Lacks consideration of climate resiliency	Risk Management Committee
Buying and Selling Energy	Barriers to engagement	Independent Market Monitor
	Lacks consideration of environmental or socioeconomic impacts	Market Implementation Committee
		Markets and Reliability Committee
	Prioritization of electric suppliers	Market Implementation Committee
Markets and Reliability Committee		
Planning for the Future	Lacks sufficient community outreach to ensure consideration of residents needs	Independent Market Monitor
	Flawed forecasting methodology and lack of transparency	PJM Resource Adequacy Planning Department
	Reliance on fossil fuels	Planning Committee
Transmission Expansion Advisory Committee		



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I. Introduction

Energy customers rarely have a voice in energy decisions. Independent System Operators (ISOs) operate the electric grid for their service territories.³ Unfortunately, those that live within an ISO territory are often left out of the discussion when it comes to energy planning decisions. As a result, ISO decision-makers make choices based on their own priorities and the priorities of stakeholders who typically have sufficient time, money, and resources to engage without facilitating meaningful input from local communities and businesses. This, coupled with a lack of transparency in planning decisions, often leaves those connected to an ISO-operated grid in the dark about how the energy system works, how planning decisions are made, and how these decisions impact them personally through electric bills and pollution exposure from existing and proposed fossil fuel infrastructure like gas-, coal-, and oil-fired power plants, pipelines, and distribution facilities.

This report serves as a resource to assist PJM Cities and Communities Coalition (PJMCCC) members, and other consumer advocates, in advocating for greater equity in grid operator decision-making. This report is comprised of three main parts:

1. A primer on the PJM Interconnection and equity in the PJM region,
2. A list of equity issues caused by and impacting electric service in the PJM region, and
3. Recommendations for strategic advocacy pathways.

This resource was developed with the invaluable input of representatives of organizations that sponsored the *Fix the Grid*⁴ campaign in New England, which is focused on rejecting fossil fuels and calling for a just and democratic energy grid.⁵ Interviewees included:

- Logan Malik of [Massachusetts Climate Action Network](#)
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- Marla Marcum of [Climate Disobedience Center](#)

³ More specifically, “ISOs operate markets for energy, ancillary services, and capacity; dispatch energy to meet demand and minimize costs; ensure sufficient resources are in place for grid reliability; oversee transmission planning; and oversee stakeholder processes to obtain input on ISO decision-making.” See: Caplan, E., Greene, Z., Womble, J., McLaughlin, K., Bird, L. 2022. “The Impacts of Wholesale Market Rules and Policies on Clean Energy Goals: A Primer for Local Governments.” World Resources Institute. Available at: <https://files.wri.org/d8/s3fs-public/2022-03/impacts-wholesale-market-rules-policies-clean-energy-goals-primer-local-governments.pdf>

⁴ The *Fix the Grid* campaign is an active effort for ISO-NE to facilitate a just and democratic energy grid that supplies clean, renewable energy for all. All interviews were conducted in July and August 2022.

⁵ The Action Network. N.d. “Fix the Grid: NO to Fossil Fuels, YES to a Just & Democratic Energy Grid.” *The Action Network*. Available at: <https://actionnetwork.org/petitions/fix-the-grid-no-to-fossil-fuels-yes-to-a-just-democratic-energy-grid>.

Section II describes the PJM service territory and shows the distribution of overburdened communities within the area. The remainder of the report is structured according to PJM's three main priorities: Keeping the Lights On, Buying and Selling Energy, and Planning for the Future.⁶ Sections III, IV, and V introduce each of these priorities in turn, describe their corresponding equity concerns, and discuss the key decision-makers that could influence PJM activities. Lastly, Section VI makes recommendations for enhancing equity in PJM decision-making.

II. Understanding PJM and its Communities

First developed in the 1990's to encourage competitive generation, U.S. ISO and Regional Transmission Organizations (which have a more limited mission) now manage 60 percent of domestic electricity supply.⁷ PJM (named for **P**ennsylvania, **N**ew **J**ersey, and **M**aryland) Interconnection is one of nine ISOs in the United States. In areas within an ISO, electricity generators typically participate in a wholesale market for energy, capacity, and/or ancillary services (PJM has all three). (See AEC's 2021 report, *PJM's Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*,⁸ for a detailed primer on PJM's capacity market.) The ISO itself oversees the electric grid to ensure reliability and economic efficiency.

PJM's current service area includes all of Delaware, Ohio, Maryland, New Jersey, Pennsylvania, West Virginia, and the District of Columbia as well as parts of Illinois, Indiana, Kentucky, North Carolina, and Virginia (see Figure 1).⁹

⁶ PJM. "Three priorities." Available at: <https://learn.pjm.com/three-priorities>

⁷ U.S. EIA. 2011. "About 60% of the U.S. electric power supply is managed by RTOs." Available at: <https://www.eia.gov/todayinenergy/detail.php?id=790>

⁸ Castigliero, J.R. Stanton, E. A., Alisalad, S., Stasio, T., and Tavares, E. 2021. *PJM's Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*. Applied Economics Clinic. Available at: <https://aeclinic.org/publicationpages/2021/10/29/pjms-capacity-market-clearing-prices-power-plants-and-environmental-justice>

⁹ PJM. n.d. "Territory Served." Available at: <https://www.pjm.com/about-pjm/who-we-are/territory-served>

Figure 1. PJM service territory



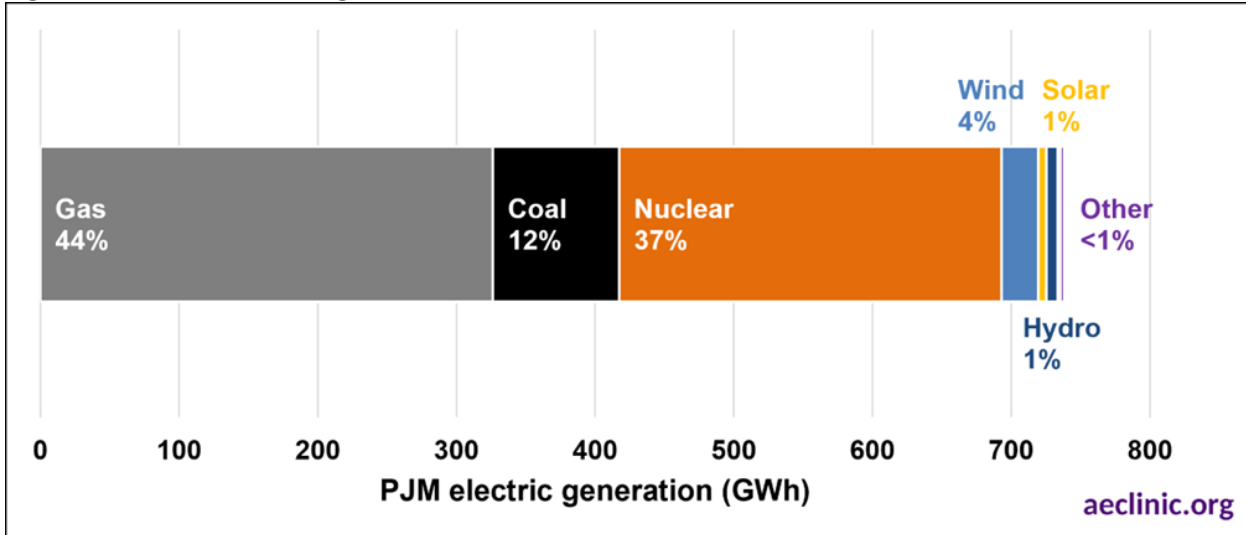
Data source: PJM. 2021. "PJM Zone Map." Available at: <https://www.pjm.com/-/media/about-pjm/pjm-zones.ashx>.

According to the U.S. Energy Information Administration (EIA), more than half of PJM's 2020 total electric generation (420 GWh out of 740 GWh) was derived from gas-, coal-, or oil-fired generators (see Figure 2). These fossil fuel plants are dispersed all across the PJM territory but with heavy clusters around major cities like Chicago, Trenton, and Harrisburg (see Figure 3). PJM's nuclear resources produced 37 percent of electric generation in 2020.¹⁰ Only 6 percent of the region's electric generation is derived from renewable sources like solar, wind, or hydroelectric.

¹⁰ While nuclear generators do not produce greenhouse gas emissions like fossil fuel-fired generators, nuclear power plants and reactors post significant safety risks and produce radioactive waste that is contained at nuclear waste storage and disposal facilities. See: (1) Congressional Research Service. October 2021. *Nuclear Energy: Overview of Congressional Issues*. Available at: <https://sgp.fas.org/crs/misc/R42853.pdf>; (2) U.S. EIA. 2021. "Nuclear Explained." Available at: <https://www.eia.gov/energyexplained/nuclear/nuclear-power-and-the-environment.php>



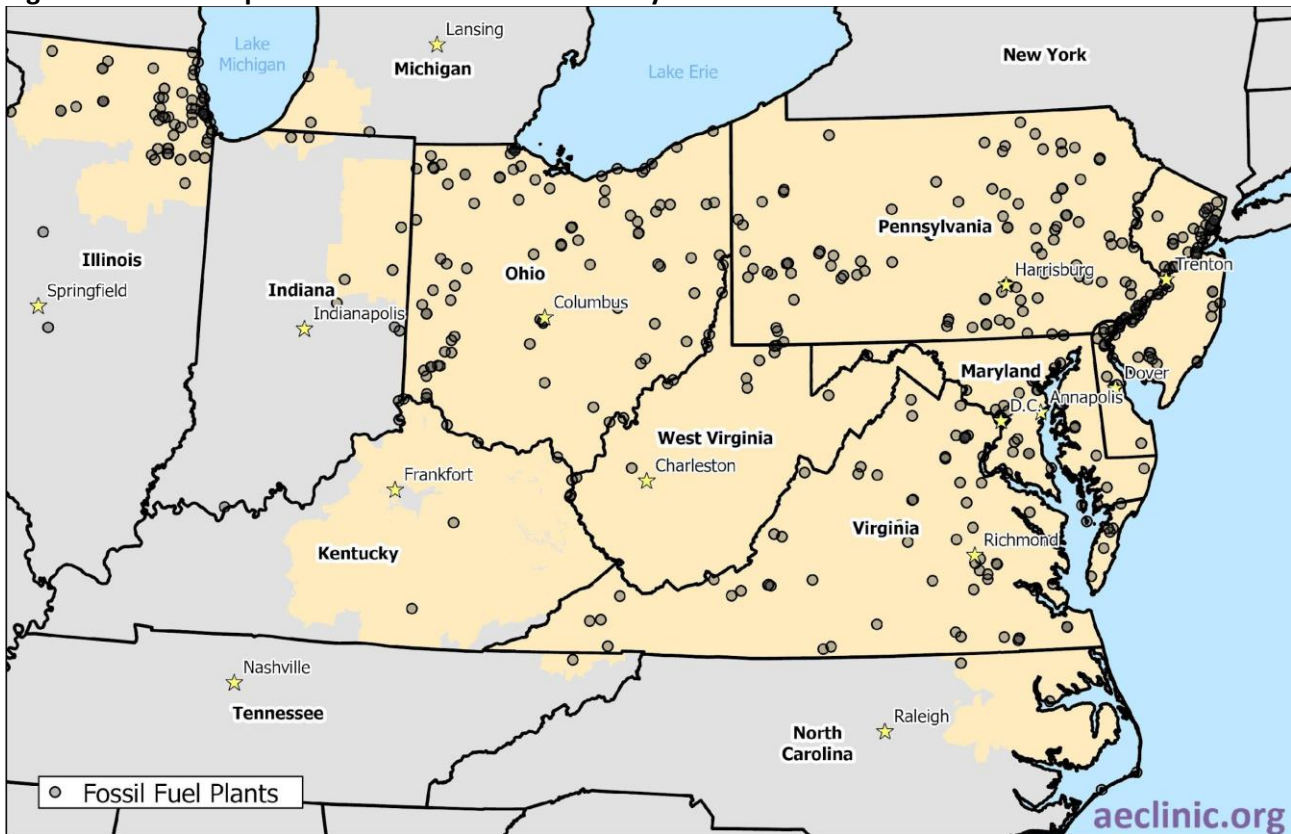
Figure 2. PJM 2020 electric generation



Data source: U.S. EIA. 2020. Form EIA-923, Power Plant Operations Report. Available at:

<https://www.eia.gov/electricity/data/eia923/>

Figure 3. Fossil fuel plants within PJM service territory



Data source: U.S. EIA. 2020. Form EIA-860 [Schedules 2,3]. Available at: <https://www.eia.gov/electricity/data/eia860/>

Communities that have been disproportionately exposed to environmental hazards, and therefore bear the brunt of climate change impacts and pollution exposure, are often termed “environmental justice” (EJ) communities. In particular, it is widely understood that Black, Indigenous, and Persons of Color (BIPOC) as well as low-income households are more likely to face excessive pollution exposure, experience environment-related illnesses, and live close to hazardous waste sites.¹¹ In a 2021 report, *PJM’s Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*, AEC found that more than half of PJM’s power plants were within one mile of an EJ community.¹² In addition, older adults and children are particularly vulnerable to the impacts of long-term exposure to air pollution.¹³ In older adults, long-term exposure to polluted air is correlated with increased risk for pneumonia, heart attacks, and strokes. Children are more likely to be exposed to air pollution because of their increased time spent outdoors. Air pollution exposure in children can lead to neurodevelopmental effects and respiratory illnesses.¹⁴

According to the U.S. Environmental Protection Agency (EPA), EJ is:

“...the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”¹⁵

Overburdened Community Index

PJM decision-makers are not directly responsible for where fossil fuel infrastructure is located; however, the assumptions and rules of wholesale energy markets and planning processes that give preference to fossil fuel resources fail to take account of the indirect equity impacts that will further burden already overburdened communities. Therefore, to address equity and EJ concerns in the PJM region, this AEC report develops an overburdened community index (OCI) that combines values from six measures of burden:

- **Older Adults:** the share of the population that is over the age of 65.

¹¹ (1) Patnaik, A., et al. August 15, 2020. “Racial Disparities and Climate Change.” *Princeton Student Climate Initiative*. Available at: <https://psci.princeton.edu/tips/2020/8/15/racial-disparities-and-climate-change>; (2) Hsu, A., et al. 2021. “Disproportionate exposure to urban heat island intensity across major US cities.” *Nature Communications*, 12(1). Available at: [https://www.nature.com/articles/s41467-021-22799-](https://www.nature.com/articles/s41467-021-22799-5)

[5.epdf?sharing_token=TY2syM94JtMXthapvKVPf9RgN0jAiwel9jnR3ZoTv0MkAvRQ0BIAVUfQF_JPxfWYvW8BXdGun-nAXFfrS5PP01PeDhVZznoBN9BCecGa840ym0uCwiskwYTzutooYT3_H9Au-c1jM7zwmz4cuswCuhq7xuVANgPLYoJUMAjPOOo%3D](https://www.nature.com/articles/s41467-021-22799-5)

¹² Castiglio, J. R., Stanton, E. A., Stasio, T., Tavares, E. 2021. *PJM’s Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*. Applied Economics Clinic. Available at: <https://aeclinic.org/publicationpages/2021/10/29/pjms-capacity-market-clearing-prices-power-plants-and-environmental-justice>

¹³ (1) U.S. EPA. n.d. “Climate Change and the Health of Older Adults.” Available at: <https://www.epa.gov/climate-change/climate-change-and-health-older-adults>; (2) U.S. EPA. n.d. “Climate Change and Children’s Health.” Available at: <https://www.epa.gov/climate-change/climate-change-and-childrens-health>

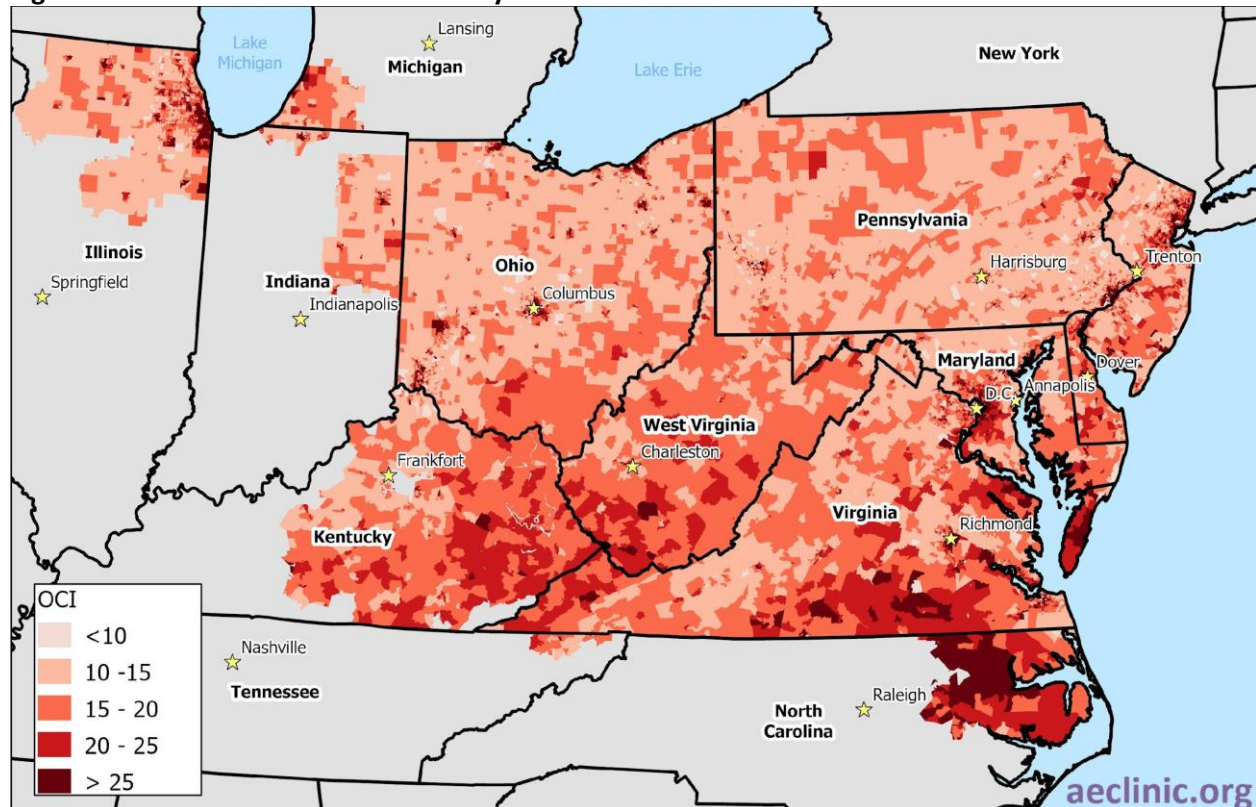
¹⁴ (1) Yazdi, M. D. et al. 2021. “Long-Term Association of Air Pollution and Hospital Admissions Among Medicare Participants Using a Doubly Robust Additive Model.” *AHA Journal of Circulation*, 123(16), 1584-1596. Available online: doi/10.1161/CIRCULATIONAHA.120.050252; (2) Environmental Protection Agency. 2019. *America’s Children and the Environment*. Available at: <https://www.epa.gov/sites/default/files/2019-10/documents/ace2019-v17s.pdf>, p. 7

¹⁵ U.S.EPA. n.d. “Environmental Justice.” Available at: <https://www.epa.gov/environmentaljustice>

- **Children:** the share of the population that is under the age of 18.
- **Limited English:** the share of households that speak limited English.
- **BIPOC:** the share of the population that identifies as Black, Indigenous, or Persons of Color.
- **Disabled:** the share of the population that is disabled.
- **Low-to-no Income:** the share of the population that earns 150 percent or less of the federal poverty level.¹⁶

Creating indices such as this allow decision-makers to pinpoint locations where equity efforts can be directed to support communities that are especially burdened. A higher OCI indicates a greater degree of burden, or in other words, a higher overlap among these measures.¹⁷ While high OCI areas exist in all PJM states, areas with the highest combined burdens (an OCI score of 25 or greater) are located most predominantly in Illinois, Kentucky, New Jersey, North Carolina, and West Virginia (see Figure 4 where areas with the highest OCI scores are depicted in darker shades of red).

Figure 4. PJM Overburdened Community Index



Data source: AEC calculation based on American Community Survey data from the U.S. Census Bureau. See Appendix A for more details on how the OCI is calculated.

¹⁶ See Appendix A: OCI Components for information about the distribution of each of these components across PJM.

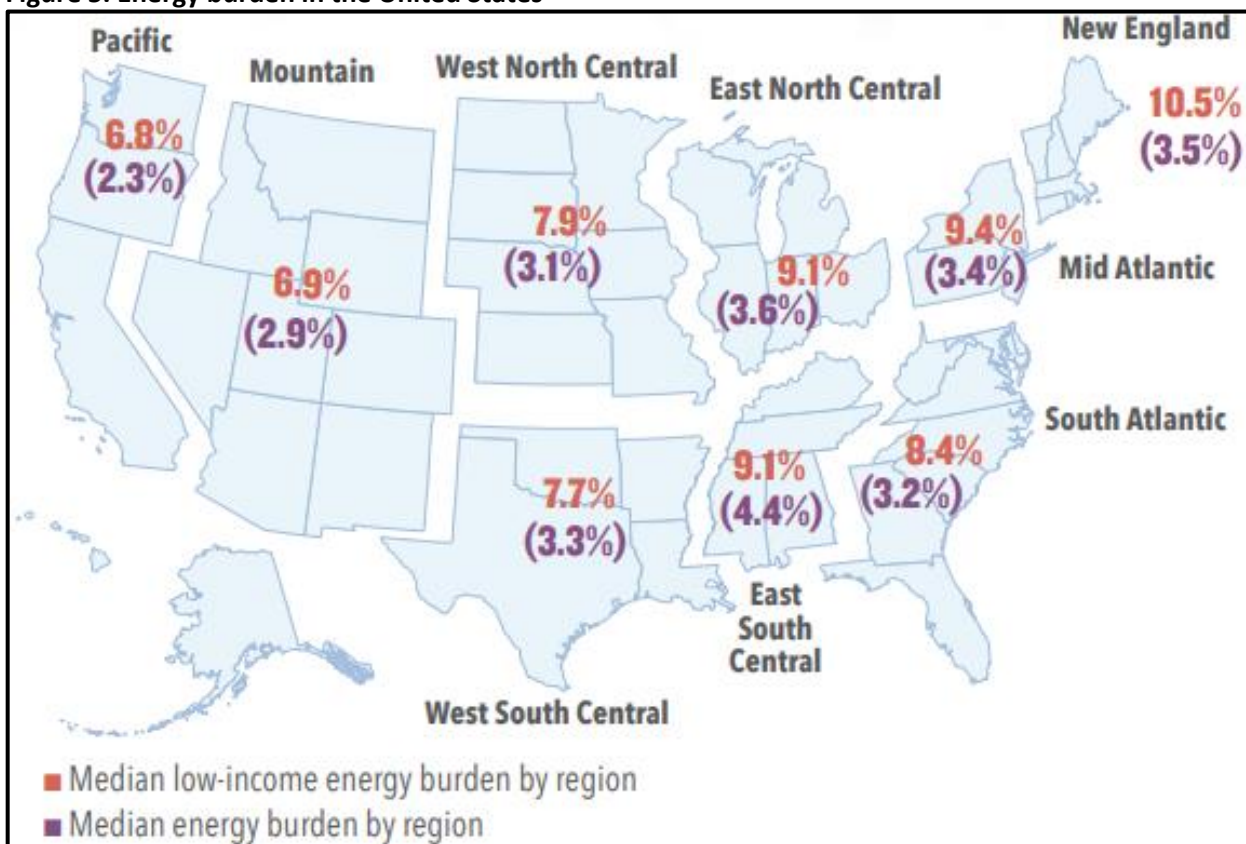
¹⁷ See Appendix A: OCI Components for more information about how the OCI is calculated.

Energy burden

PJM contributes to customer electric costs through transmission pricing and its role in capacity market overprocurement.¹⁸ Energy burden, or the share of household income spent on energy, is disproportionately higher in overburdened communities. According to a recent analysis by the American Council for an Energy-Efficient Economy (ACEEE), the median energy burden in the United States is 3 percent. For low-income households, the median energy burden is over 3 times higher than for households that are not considered low-income (8 percent of household income spent on energy costs for low-income households compared to just 2 percent for all other households).¹⁹

The median energy burden of low-income households in the United States ranges from 7 percent in the Pacific and Mountain regions to 11 percent in New England (see Figure 5). In the regions that overlap with PJM, energy burden for low-income households ranges from 8.4 to 9.4 percent.²⁰

Figure 5. Energy burden in the United States



Reproduced from: Drehobl, A., Ross, L., and Ayala, R. 2020. *How high are household energy burdens?* ACEEE. Available at:

¹⁸ Castiglio, J.R. Stanton, E. A., Alisalad, S., Stasio, T., and Tavares, E. 2021. *PJM's Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*.

¹⁹ Drehobl, A., Ross, L., and Ayala, R. 2020. *How high are household energy burdens?* ACEEE. p. 9

²⁰ PJM. 2021. *PJM's role in supporting an equitable energy transition* [PowerPoint]. Available at: <https://www.pjm.com/-/media/committees-groups/user-groups/pieoug/2021/20210930/20210930-pjms-role-in-supporting-an-equitable-energy-transition.ashx> p. 14

<https://www.aceee.org/sites/default/files/pdfs/u2006.pdf>.

In addition, ACEEE finds that BIPOC communities, older adults, and renters face higher energy burdens.²¹ On average, Native American, Black, and Hispanic households spend 4 percent of their income on energy costs while White households spend 3 percent.²² Older adults also have a median energy burden of about 4 percent, compared to the U.S. median energy burden of 3 percent, and the energy burden of renters is 3.4 percent compared to 3.0 percent for homeowners.²³ ACEEE notes that low-income households with household members that are older adults, children, or disabled, face compounding disparities and, as a result, even higher energy burdens.²⁴

III. Keeping the Lights On

PJM's first priority is "keeping the lights on": making sure that the energy grid is operating smoothly, balancing supply and demand, and monitoring the transmission of electricity to homes and businesses. For the typical resident or business within the PJM region, this means minimal service disruptions.

Unfortunately, despite capacity market overprocurement, overburdened communities in PJM experience less reliable electric power often due to investment decisions at the utility or state utility commission level. The U.S. EIA collects information about outage duration and frequency as part of their *Annual Electric Power Industry Report*.²⁵ Specifically, utilities report their System Average Interruption Duration Index (SAIDI), a measure of how long a service disruption lasts, and System Average Interruption Frequency Index (SAIFI), a measure of how many service disruptions there are. While PJM decision-makers do not directly influence reliability at the utility or local distribution network level, a lack of consideration of grid modernization technologies at the ISO level means that advanced technologies are less likely to participate in PJM's markets and benefit the electric grid through better reliability. AEC's analysis using these data shows that overburdened PJM communities with a high OCI of over 25 experienced longer and more frequent grid interruptions.²⁶

The following are key elements for enhancing equity in reliability:

ISSUE #1: Fossil fuels assumed to provide more stability than renewables

Grid operators and utilities justify the need for fossil fuel power plants over solar panels and wind turbines with claims that renewable resources' intermittency makes them less reliable. In other words, they claim that renewables are less useful for keeping the lights on because they run only when the sun is shining or wind is blowing, and not at any time with the flip of a switch. This argument, however, rests on a couple of incorrect assumptions. A single solar panel or wind turbine is intermittent and a limited asset for reliable

²¹ Drehobl, A., Ross, L., and Ayala, R. 2020. How high are household energy burdens? p. 2

²² Ibid. p. 10

²³ Ibid.

²⁴ Ibid.

²⁵ U.S. EIA. 2020. *Annual Electric Power Industry Report, Form EIA-861*. Available at: <https://www.eia.gov/electricity/data/eia861/>

²⁶ Ibid.

electric service. In contrast, a combined suite of renewables, storage resources, and/or transmission can be very reliable and add stability to the grid.²⁷

Renewable generation is intermittent but there are several technological solutions readily available to increase grid stability when relying on renewables such as using wind resources sited across a larger geographic territory, combining wind and solar, installing battery storage adjacent to renewable generators, and improving energy efficiency.²⁸ In addition, the development of advanced forecasting—for example, the International Renewable Energy Agency’s *Innovation Landscape Brief: Advanced Forecasting of Renewable Power Generation*²⁹—has improved grid operators’ ability to more accurately predict renewable energy generation.

In addition, the argument that fossil fuel-powered generation is always available, and renewables are not, misses a critical deficit in the stability of gas, oil and coal-fired power: These electric generators are only as reliable as their fuel sources. Any obstacle to fossil fuel supplies—whether physical supply chain issues or cost increases that make their prices prohibitively expensive—can cause a sudden steep increase in the cost of electric supply or can even cause a power outage.

The prioritization of fossil fuels puts overburdened communities at continued risk for air and water pollution exposure. According to research by the Clean Air Task Force, more than 6.7 million Black individuals live in a county with an oil refinery—a result of fossil fuel infrastructure being more frequently located in low-income communities and communities of color.³⁰ The proximity to fossil fuel infrastructure is linked with direct exposure to air and water pollutants, which can lead to a wide range of health issues, such as lung, heart, and respiratory diseases, as well as premature deaths.³¹

ISSUE #2: Climate resiliency is not valued

Impacts of climate change, such as increased flooding and extreme temperatures have the potential to cause power outages, threatening the reliability of the electric grid.³² Overburdened communities are disproportionately affected by climate change impacts like extreme temperatures and flooding, and tend

²⁷ Johnson, S. C., Papageorgiou, D. J., Harper, M. R. Rhodes, J.D., Hanson, K., Webber, M.E. “The economic and reliability impacts of grid-scale storage in a high penetration renewable energy system.” *Advances in Applied Energy*, 3(100052). Available at: <https://doi.org/10.1016/j.adapen.2021.100052>.

²⁸ Jacobson, M. Z. 2022. “Renewable Energy’s Intermittency is Not a Show Stopper.” *Physics*, 15, 54. Available at: <https://physics.aps.org/articles/v15/54>

²⁹ IRENA. 2020. Innovation Landscape Brief: Advanced Forecasting of Variable Renewable Power Generation. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Advanced_weather_forecasting_2020.pdf%20?%20%20la=en&hash=8384431B56569C0D8786C9A4FDD56864443D10AF

³⁰ Fleischman, L. & Franklin, M. 2017. *Fumes Across the Fence Line*. Clean Air Task Force. Prepared for the National Association for the Advancement of Colored People. Available at: https://www.catf.us/wp-content/uploads/2017/11/CATF_Pub_FumesAcrossTheFenceLine.pdf. p. 4.

³¹ Ibid. p. 3

³² Allen-Dumas, M. R., KC, Binita, Cunliff, C. 2019. *Extreme weather and climate vulnerabilities of the electric grid: A summary of environmental sensitivity quantification methods*. Oak Ridge National Laboratory. Prepared for the U.S. Department of Energy. ORNL/TM-2019/1252. Available at: <https://www.energy.gov/sites/prod/files/2019/09/f67/Oak%20Ridge%20National%20Laboratory%20EIS%20Response.pdf>

to have less reliable electric service³³ In addition, low-income and BIPOC communities are often less able to prepare for and recover from extreme weather events like flooding and heat waves.³⁴ Despite this, PJM grid operations do not include consideration of how climate change impacts from fossil fuel generation may threaten reliability, leaving communities vulnerable to outages.

Therefore, the deployment of grid modernization measures is not facilitated or prioritized in grid operator planning or decision making. Investment in renewable energy and storage resources coupled with grid modernization solutions such as distributed generation and microgrid technology can improve system reliability more sustainably, compared to continued reliance on fossil fuels.³⁵ Microgrids with the ability to “island” or disconnect from the larger power grid and operate using their own renewable energy generation and storage can significantly improve climate resilience, providing a sustainable backup plan for essential services and communities at high-risk for power outages.³⁶

IV. Buying and Selling Energy

PJM’s second main priority is buying and selling energy: facilitating a competitive market for electricity across PJM’s service area. In other words, PJM provides a way for different electric generators to compete to supply electricity to electric distributors through the grid. This competition can facilitate more affordable energy by favoring efficient, low-cost generators. However, not everyone can participate in PJM’s wholesale energy market, and market prices omit societal costs (or benefits), raising concerns about equity.

The following are key elements that preclude the integration of equity in PJM energy, capacity, and/or ancillary markets and challenge PJM’s ability to maintain competitive and fair markets:

ISSUE #1: Gate-keeping for involvement in PJM markets

PJM’s energy and capacity markets are structured in a way that hinders or even prevents participation for some generators. For example, advanced energy technologies (such as renewables co-located with battery storage, and microgrids) face substantial regulatory barriers to participation, and local governments often

³³ (1) U.S. EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. EPA 430-R-21-003. www.epa.gov/cira/social-vulnerability-report; (2) Casey, J. A., Fukurai, M., Hernandez, D., Balsari, S., Kiang, M. V. 2020. “Power outages and community health: a narrative review.” *Current Environmental Health Reports*, 7(4), 371-383. Available at: <https://pubmed.ncbi.nlm.nih.gov/33179170/>. p. 3

³⁴ Norman, J. and Kunorubwe, T. 2022. “How Climate Change Affects Socially Vulnerable Communities.” Goldman Sachs Asset Management. Available at: <https://www.gsam.com/content/gsam/global/en/market-insights/gsam-connect/2022/how-climate-change-affects-socially-vulnerable-communities.html#:~:text=There%20is%20a%20growing%20body,of%20other%20climate%2Drelated%20changes.>

³⁵ Stasio, T., Castiglio, J. R., Lala, C. Stanton, E. A. 2022. *Risk Assessment of Florida Power and Light and NextEra Energy Clean Energy Transition Plans*. Prepared on behalf of Environmental Defense Fund. Applied Economics Clinic. Available at: <https://aeclinic.org/publicationpages/2022/5/4/risk-assessment-of-florida-power-and-light-and-nextera-energy-clean-energy-transition-plans>

³⁶ Castiglio, J. R., Stasio, T., Tavares, E. 2021. *Conditional benefits of sustainable community microgrids*. Applied Economics Clinic. Available at: <https://aeclinic.org/publicationpages/2021/5/20/conditional-benefits-of-sustainable-community-microgrids>

lack staff capacity, subject knowledge, and the time required for participation.³⁷ As a result in the generators that do bid into PJM's markets tend to be older, dirtier energy sources owned by larger companies with the resources to navigate market involvement, allowing these facilities to continue polluting the air of local communities.

ISSUE #2: Markets don't value environmental and social attributes

Decisions about market structures and rules directly impact market outcomes and indirectly impact the lives of those that live in the PJM region. PJM's capacity market favors the most plants that provide energy at the lowest cost, not those that are cleaner, provide more jobs, or are best for public health and safety. Without consideration of the environmental or socioeconomic impacts of fossil fuel generation—as compared to those of renewable energy—energy markets do not accurately reflect the cost of using fossil fuel resources. As a result, fossil fuel plants are paid to remain online; their large capital expenditures combined with utility rate structures make them profitable for energy companies without consideration of the costs to the communities who live and work nearby. Moreover, aging fossil fuel plants are expensive to keep running, often driving up consumer bills on top of polluting their air and water.³⁸

ISSUE #3: Electric suppliers are given special priority

PJM is a membership-based organization that is supposed to maintain a competitive and fair energy market. At the same time, PJM's most powerful members are generation and transmission owners. Subject to limited federal or state oversight, PJM decision-making is based largely on the interests of electric suppliers rather than those of the communities and businesses that rely on their services.³⁹ This leaves the needs of utility customers, particularly those in overburdened communities, underrepresented in stakeholder processes. The communities impacted by the prioritization of fossil fuels in the region have no voice in the rules and assumptions behind PJM's markets. Instead, these rules and standards are governed by the owners of power plants themselves. As a result, decision-making within PJM often leads to outcomes that favor incumbent fossil fuel plants running, polluting the air of the overburdened communities that reside near these plants and ignoring the societal costs.⁴⁰

V. Planning for the Future

PJM's third main priority is planning for the future: anticipating the future needs of the electric grid using

³⁷ (1) Advanced Energy Economy. 2019. *Wholesale market barriers to advanced energy – and how to remove them*. Available at: <https://info.aee.net/wholesale-market-barriers-to-advanced-energy>; (2) Greene, Z. 2021. *Local government voices in wholesale market issues: engagement approaches for decarbonization*. World Resources Institute. Available at:

<https://www.wri.org/research/local-government-voices-wholesale-market-issues-engagement-approaches-decarbonization>

³⁸ Castiglio, J. R., Stanton, E. A., Stasio, T., Tavares, E. 2021. *PJM's Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*.

³⁹ Rutigliano, T. July 14, 2020. "Transforming PJM is the Key to a Clean Energy Grid." *Sustainable FERC Project*. Available at: <https://sustainableferc.org/transforming-pjm-is-the-key-to-a-clean-energy-grid/>

⁴⁰ Castiglio, J. R., Stanton, E. A., Stasio, T., Tavares, E. 2021. *PJM's Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*.

long-range planning studies to predict demand and anticipate adequate supply-side resources. In other words, PJM is responsible for estimating how much electric supply will be needed in the future to supply enough electricity to the homes and businesses within the PJM region while also maintaining system reliability (i.e., avoiding service disruptions and outages).

The following are key elements for enhancing equity in planning for the future:

ISSUE #1: Not enough community outreach

The online PJM Learning Center⁴¹ is a helpful resource offering basic information about the electric grid, PJM, and how electricity supplied to homes and businesses is impacted by the grid operator. Most electric customers, however, are unlikely to find their way to PJM’s website or to have the time (or in many cases the English-language skills, the computer and internet access, or the educational background) to learn about the grid operator and its role in providing their electric service. Community outreach efforts regarding energy decision-making may not be adequate to reach overburdened communities due to a lack of a formal stakeholder review process and a lack of avenues for communities to voice their concerns.

When communities are not prioritized in important meetings regarding energy decisions, individuals and community organizations are prevented from providing valuable input. In practice, this lack of access looks like:

- Planning and decision-making meetings held in private.
- In-person only public meetings that create a barrier for attendance for those that need to work or do not have access to transportation.
- In-person and virtual meetings that do not compensate community attendees, who may have less resources, for their time.
- Public meetings that do not facilitate engagement with attendees.
- The use of technical jargon that is not understood by the majority of the public.

Communities may not possess the expertise and knowledge base to interpret the more technical aspects of energy decisions, such as engineering and modeling of grid design. When public materials are provided only in highly technical terms, there may be misunderstandings and confusion about changes in energy operations. Moreover, if translation services are not offered, and/or materials are not provided in languages prevalent in the region, entire communities that speak limited English are left out of the conversation. Even when communities have opportunities to provide input as part of a procedural public comment period, PJM is not required to use community input in a way that influences their decisions.

ISSUE #2: Lack of transparency

The procedures, assumptions, and development of energy planning documents are either unknown or unclear to those outside of the PJM organization. Electric customers are unaware of how their local utility and utility bills are influenced by decisions made at the grid operator level. Moreover, the materials that

⁴¹ PJM. n.d. “Learning Center.” Available at: https://learn.pjm.com/?sc_site=learn.

are publicly available are not widely distributed and/or understandable for a general audience. This leaves electric customers at the will of PJM decisionmakers without the technical knowledge or opportunity to communicate their needs and concerns.

ISSUE #3: Flawed predictions of the future

PJM has historically used a flawed forecasting methodology that results in an overestimation of capacity needed for customer electric demand.⁴² In addition, PJM is required to procure capacity beyond total peak demand to ensure reliability (called the “reliability requirement”); high reliability requirements are one of several factors leading to further over-procurement of capacity resources, higher costs, and a health and safety burden on the communities where aging plants are located.⁴³ As a result, communities continue to suffer from poor air quality due to the pollution being emitted from aging fossil fuel plants while PJM member states must seek other avenues to meet their respective climate targets.

ISSUE #4: Stranded assets: footing the bill for something that is no longer useful

Electric generation within PJM is predominantly sourced from fossil fuels (57 percent of electric generation is made with gas, oil and coal).⁴⁴ As federal climate change regulations become more stringent, utilities within PJM that still rely on fossil fuels bear the risk of these polluting facilities becoming “stranded assets” by 2050; planning for and around these stranded assets will become a critical issue for PJM member-states and therefore a consideration in PJM’s own forward planning.⁴⁵ (A stranded asset is a facility that is closed before the end of its economic life because it is no longer economically viable or is considered a liability.) In the case of transitioning to cleaner forms of energy, fossil fuel-powered energy assets are particularly susceptible to becoming stranded assets as legislative and popular mandates direct investment away from fossil fuels and toward renewable sources of energy.) States throughout the nation are rethinking gas-fired power plants and exploring electrification of heating and transportation as a decarbonization pathway. If PJM member-states start to do the same, low-income households that are unable to upgrade their home energy systems will be left shouldering the costs of a dying gas system as richer households flee to modern, all-electric energy systems.⁴⁶ Without policies in place to address this risk, low-income and BIPOC communities will face higher energy bills, increasing the already disproportionately high energy burdens seen in overburdened communities.

⁴² Castiglio, J. R., Stanton, E. A., Stasio, T., Tavares, E. 2021. *PJM’s Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*.

⁴³ Castiglio, J. R., Stanton, E. A., Stasio, T., Tavares, E. 2021. *PJM’s Capacity Market: Clearing Prices, Power Plants, and Environmental Justice*.

⁴⁴ U.S. EIA. 2020. Form EIA-923, Power Plant Operations Report. Available at: <https://www.eia.gov/electricity/data/eia923/>

⁴⁵ Matikainen, S. 2022. “What are stranded assets?” *London School of Economics and Political Science*. Available at: <https://www.lse.ac.uk/granthaminstitute/explainers/what-are-stranded-assets/>

⁴⁶ Spees, K., O’Loughlin, M. 2021. “Stranded Fossil Fuel Infrastructure” [PowerPoint]. Brattle Group. Available at: <https://www.brattle.com/wp-content/uploads/2021/08/Stranded-Fossil-Fuel-Infrastructure-How-Big-is-the-Stranded-Asset-Problem-and-What-Should-We-Do-About-It.pdf>



VI. Recommendations for Strategic Advocacy

Meaningful engagement in electric equity advocacy requires a clear understanding of who the key decision makers are both within and outside of PJM. Creating a more just and equitable electric grid will take collaborative efforts from PJM members, local agencies, and community organizations. According to the PJM Cities and Communities Coalition, consumers want to be more involved in grid operator decision making but there is a need for additional community outreach and support to facilitate more collaborative and equitable planning.

PJM committees

PJM member committees influence the grid operator's rules, policies, and processes; they form the center of PJM's stakeholder process. Similarly, ad hoc user groups are made up of five or more voting members to address specific issues that are not being resolved through the typical stakeholder process. Identifying the PJM decision-makers that are most relevant to each of the main equity concerns discussed in the previous section can be an important tool for advocacy (see Table 1).



Table 1. PJM equity concerns and key decision-makers

PJM priority	Equity concern	PJM decision-makers
Keeping the Lights On	Inadequate opportunities for stakeholder comments and third-party review	Public Interest and Environmental Organizations User Group
		Liaison Committee
	Inadequate evaluation of reliability	Markets and Reliability Committee
	Lacks consideration of climate resiliency	Risk Management Committee
Buying and Selling Energy	Barriers to engagement	Independent Market Monitor
	Lacks consideration of environmental or socioeconomic impacts	Market Implementation Committee
		Markets and Reliability Committee
	Prioritization of electric suppliers	Market Implementation Committee
		Markets and Reliability Committee
		Independent Market Monitor
Planning for the Future	Lacks sufficient community outreach to ensure consideration of residents needs	Independent Market Monitor
	Flawed forecasting methodology and lack of transparency	PJM Resource Adequacy Planning Department
	Reliance on fossil fuels	Planning Committee
		Transmission Expansion Advisory Committee

PJM’s main committees and user groups relevant to equity issues are:

- **PJM’s Board of Managers** ensures grid reliability, market competitiveness, and, more broadly, that PJM meets all of its business-related and regulatory requirements.
- **Public Interest and Environmental Organizations User Group** brings public-interest and

environmental issues of common interest to discussion with the PJM Board of Managers.

- **Liaison Committee** provides direct communication between the members and the PJM Board.
- **Markets and Reliability Committee** ensures viable and fair markets and reliable grid operation and planning.
- **Risk Management Committee** recommends changes to address PJM’s credit risk and associated market-driven and financial risk management issues.
- **Market Implementation Committee** develops proposals that advance and promote competitive wholesale electricity markets in the PJM region in line with consideration of the Markets and Reliability Committee.
- **Planning Committee** makes recommendations regarding PJM bulk power system, generating capacity reserve requirement, and demand-side valuation factors to ensure that the member companies can operate reliably and economically in a competitive market environment.
- **Transmission Expansion Advisory Committee** provides advice and contributes to the development of the Regional Transmission Expansion Plan.
- **Independent Market Monitor** works independently from PJM staff and members. Responsible for monitoring and assisting the maintenance of competitive and nondiscriminatory markets in the PJM region.⁴⁷

The equity concerns highlighted in this report toolkit (such as lack of transparency and an absence of collaboration) are directly linked to PJM’s own mission statement and to the activities of existing decision-making committees in PJM. These equity concerns also present opportunities for collaboration between existing committees in PJM (see Table 1 above).

PJM’s Markets and Reliability Committee has a direct stake in issues of reliability, and the Risk Management Committee has a clear interest in ensuring climate risks. The Markets and Reliability Committee also, along with the Market Implementation Committee, is responsible for addressing engagement barriers ensuring consideration of socioeconomic and environmental impacts in PJM’s market decisions. The Market Implementation and Markets and Reliability Committees share a fundamental interest in facilitating engagement, along with the Independent Market Monitor, whose activities directly address insufficient community outreach in decision-making processes for the future. Finally, the Planning Committee has a vested interest in addressing PJM’s flawed forecasting methodology and lack of transparency, and both the Planning Committee and the Transportation Expansion Advisory Committee share a key interest in the curtailment of PJM’s reliance on fossil fuels.

In the absence of intentional collaboration, individual committees are likely to operate in siloed spaces without coordination of their activities with PJMCCC and other public interest groups. As demonstrated by

⁴⁷ (1) PJM releases an annual Regional Transmission Expansion Plan that summarizes PJM-wide reliability, market efficiency and operations. For more information, see: PJM. 2021. “Regional Transmission Expansion Plan.” Available at: <https://www.pjm.com/library/reports-notices/rtep-documents.aspx>; (2) PJM. n.d. “Committees and groups.” Available at: <https://www.pjm.com/committees-and-groups>



their overlapping and cross-issue interests, however, PJM’s various committees have a direct role not only in organizing activities with one another, but also in collaborating with coalitions like PJMCCC that share their equity-oriented interests.

Decision-makers outside of PJM Interconnection

States within the PJM service territory must comply with both federal regulations and their respective state policies. Advocacy efforts to improve equity in the energy sector at the federal level and within PJM member states, therefore, are another avenue for improving equity in PJM as a whole. The governing bodies that establish PJM’s standards and regulations are industry standards organizations (i.e., the North American Electric Reliability Corporation, the North American Energy Standards Board, and ReliabilityFirst Corporation), state and federal government agencies, and consumer advocacy groups. These entities have roles to play in improving electric system reliability, facilitating learning, and decarbonizing the electric supply (see Table 2 and Table 3). (Additional PJM-specific groups and organizations with a stake in the energy industry that may be able to influence PJM committee members and user groups are included in Table 2 in Appendix B: Additional PJM-related Organizations.)



Table 2. Other groups that can influence PJM decisions

	Agency/Organization	Primary Function
Industry Standards Organization	North American Electric Reliability Corporation	Operates to improve the reliability and security of the bulk power system in North America by developing and enforcing reliability standards, monitoring systems, and training industry personnel
	North American Energy Standards Board	Serves as an industry forum for the development and promotion of standards to create a seamless market place
	ReliabilityFirst Corporation	Not-for-profit with the goal to preserve and enhance electric service reliability and security for the interconnected electric systems within its territory
Federal Government	Department of Energy	Responsible for establishing and maintaining energy standards and practices across the country to maintain security and prosperity
	Environmental Protection Agency	Responsible for maintaining and administering environmental laws designed to protect the environment
	Federal Energy Regulatory Commission	Regulates the transmission and wholesale sales of electricity in interstate commerce as well as administers accounting and financial reporting regulations and conduct of jurisdictional companies
	Nuclear Regulatory Commission	To regulate civilian use of nuclear materials
State Government	National Association of Regulatory Utility Commissioners	Mission is to improve the effectiveness of public utility regulation by regulating the activities of telecommunications, energy and water utilities, through its member agencies
	National Association of State Utility Consumer Advocates	To represent the interests of utility consumers before state and federal regulators and in the courts
Consumer Advocates	National Association of State Energy Officials	To facilitate peer learning among state energy officials, serves as a resource for and about state energy offices, and advocates the interests of the state energy offices to Congress and federal agencies
	Consumer Advocates of the PJM States	To engage in the PJM stakeholder process and at the Federal Energy Regulatory Commission to ensure that the prices we pay for reliable, wholesale electric service are reasonable
	PJM Cities and Communities Coalition	To pursue solutions to climate change, reducing carbon emissions, and removing barriers to decarbonization in their regional wholesale electricity market

Data source: (1) PJM Learning Center. N.d. "Industry Groups." Available at: <https://learn.pjm.com/electricity-basics/industry-groups>; (2) Consumer Advocates of the PJM States. 2017. "Who We Are." Available at: <http://pjm-advocates.org>; (3) PJM CCC. 2021. "PJM Cities and Communities Coalition." Available at: <https://files.wri.org/d8/s3fs-public/2021-08/3-pager-PJM-cities-communities-coalition.pdf>



Table 3. State decision-makers

Governing Body	Relevant Responsibilities
State Legislatures	State legislatures can create offices and departments that are responsible for administering and enforcing law, and are able to pass state climate policy
Governors	State governors have the power to establish the overarching legal and regulatory framework for electricity sector operations in their states, allowing for states to regulate private entities that provide a service for the public good
Utility Commissions	Utility commissions have jurisdiction over electric utilities providing service within the boundaries of the state
State Energy Offices	State energy offices can facilitate the development of policies and programs that ensure an adequate, reliable, diverse, and cost-effective energy supply for residents and businesses alike
Environmental Department	A state's environmental department is tasked with protecting the environment and public health through the provision of laws and the issuance of permits that regulate environmental activities
Municipal Governments	Local governments can collaborate with utilities, state energy offices, and other third party organizations to develop energy efficiency and financial support programs for residents and businesses

Actions for community organizations

Community organizations have an important role to play in enhancing equity in grid operator decision-making. For example, the *Fix the Grid* campaign—aimed at making the regional grid operator in the Northeast region more just, transparent, and renewable—has grown over the years as more people are choosing to be more proactive, rather than reactive, about their electric sector needs. The campaign has gone from ad hoc meetings to making plans to educate residents on what is happening at a regional level.

Here are things that community organizations can advocate for to increase community engagement in PJM decisions:

1. **Change the membership structure of PJM:** who is making the decisions, who has a seat at the table



2. **Change the resource mix of PJM:** shift the regional grid away from dirty power sources, new policy mandates from state governments
3. **Provide resources to community members:** provide financial support when overburdened communities participate in stakeholder processes; explain the electric grid, the relationship between their utility and the grid operator, how to participate in decision-making processes, and how to advocate for particular policies
4. **Hold workshops for electric utility representatives:** advise on community engagement, improve equity in their service areas, and support both the customer and the utility in understanding knowledge gaps
5. **Create a database of relevant consumer advocate/non-profit organizations:** for access by utilities and community members
6. **Make your voices heard at every opportunity:** more and better stakeholder/community engagement; accessibility (in person and online, multiple languages, well publicized, one-pager resources in mail)
7. **Contribute to language accessibility:** provide translation services, technical assistance, and background knowledge to enhance the understanding of important meetings and decisions
8. **Meet with decisionmakers:** work with organizations in the region that also can influence PJM, support community groups in partnering with labor unions to negotiate with decisionmakers

In collaboration with community-based organizations and advocates, ACEEE developed an equity framework that can be used as a tool for achieving equitable energy systems.⁴⁸ This framework identifies four main types of equity:

- **Structural Equity:** redress of historic and ongoing institutional, economic, and social decisions that have actively created disproportionate harms for overburdened communities.
- **Procedural Equity:** inclusive processes to actively solicit input from all stakeholders, including and especially disenfranchised and overburdened communities.
- **Distributional Equity** benefits and costs of energy decisions are spread equitably, accounting for historic and ongoing burdens facing specific communities.
- **Transgenerational Equity:** decisions made today do not place an unfair burden on future generations.⁴⁹

Table 4 provides examples of actions and metrics that could be used to improve all forms of equity within PJM.

⁴⁸ Ayala, R., Dewey, A. M. 2022. *Energy Equity Metrics: Lessons Learned and Priority Actions from ACEEE's Leading with Equity Initiative*. ACEEE Summer Study on Energy Efficiency in Buildings, 13-103.

⁴⁹ Ibid.



Table 4. Addressing structural, procedural, and distributional equities in the PJM region

Equity Category		Structural	Procedural	Distributional
Keeping the Lights On	Example Actions	Collaboration with PJM states to identify climate vulnerable areas to begin a series of modernization upgrades	Open forum meetings to gather community input on reliability and affordability issues to inform system reliability investments	Energy efficiency incentives, support for low-income retrofit upgrades, HVAC volunteer program
	Key Metrics	Community microgrid tracking and targets	Community support for different reliability upgrades, outage and upgrade tracking	Low-income energy burden reduction tracking and targets
Buying and Selling Energy	Example Actions	Simplified summary materials, annual community awareness survey	Development of an app for customers to view energy mix, local events, and information guides	Support for local governments, prioritize distributed and renewable generation
	Key Metrics	Community understanding and involvement tracking and targets	App usage data and community involvement tracking and targets	Renewable generator market participation tracking and targets
Planning for the Future	Example Actions	Open forum meetings for community organizations and public interest groups	Fact sheet distribution, in-person and virtual meetings, collaboration with local organizations	Conduct ongoing outreach and long-term energy system planning with overburdened communities
	Key Metrics	Workforce development and PJM member composition tracking and targets	Meeting participation and engagement tracking and targets	Long-term targets and tracking for emissions reductions, microgrids, distributed/renewable generation, etc.

There is no one-size fits all solution, or one entity to target that can address all of the energy equity concerns laid out in this report. The PJM Interconnection electric grid covers all or part of 13 states and the District of Columbia and contains over 20 different electric utilities servicing over 65 million residential, commercial, and industrial electric customers.⁵⁰ There are, however, opportunities to address these

⁵⁰ PJM. 2022. PJM – At a Glance. Available at: <https://www.pjm.com/~media/about-pjm/newsroom/fact-sheets/pjm-at-a-glance.ashx>



concerns from both within and outside of the PJM organization. For example, actionable changes that would be feasible in the short term for utilities within the PJM region could include: training and collaboration with staff members to expand accessibility of materials and meetings and/or development and distribution of simple coursework to help advance the education of ratepayers.

This report serves as a resource for advocates working towards greater equity in PJM Interconnection decision-making by identifying nine equity concerns and the relevant PJM decision-makers that may be able to address each concern. Beyond PJM decision-makers, local agencies and community organizations will also need to collaborate to create a more just and equitable electric grid.

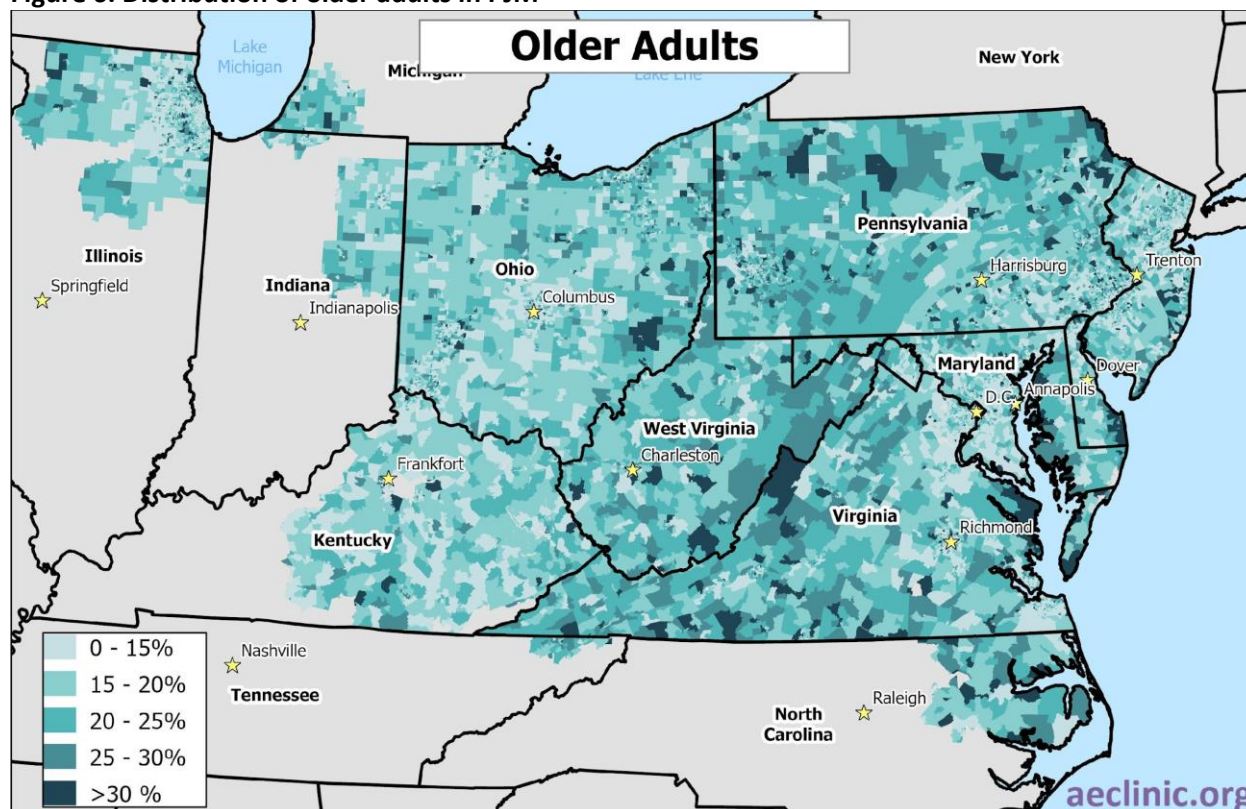
Appendix A: OCI Components

To calculate the Overburdened Community Index (OCI) for each census tract,⁵¹ population shares for the six groups discussed above are converted into six component indices, each ranging from 0 to 100/6 (or 16.7) in value. For example, the low-to-no income group is one of the six component indices used to calculate the OCI with shares of population in PJM census tracts ranging from 0 to 100 percent. The OCI score is the sum of these component indices. For instance, for a particular census tract in Kent County, Delaware, the metrics for each of the six component indices—low-income (4.9 out of a possible 100), BIPOC (3.3), Older Adults (2.2), Children (4.5), Limited English (0.7), and Disabled (3.7)—add up to 19.3. The OCI range across census tracts in the PJM service area is 1.7 to 54. This section describes the distribution of each overburdened group across PJM.

Older Adults

The share of the population that is over 65 years old living in the PJM service territory ranges from 0 to 100 percent. Areas with a share of older adults over 30 percent are scattered throughout every state (see Figure 6).

Figure 6. Distribution of older adults in PJM



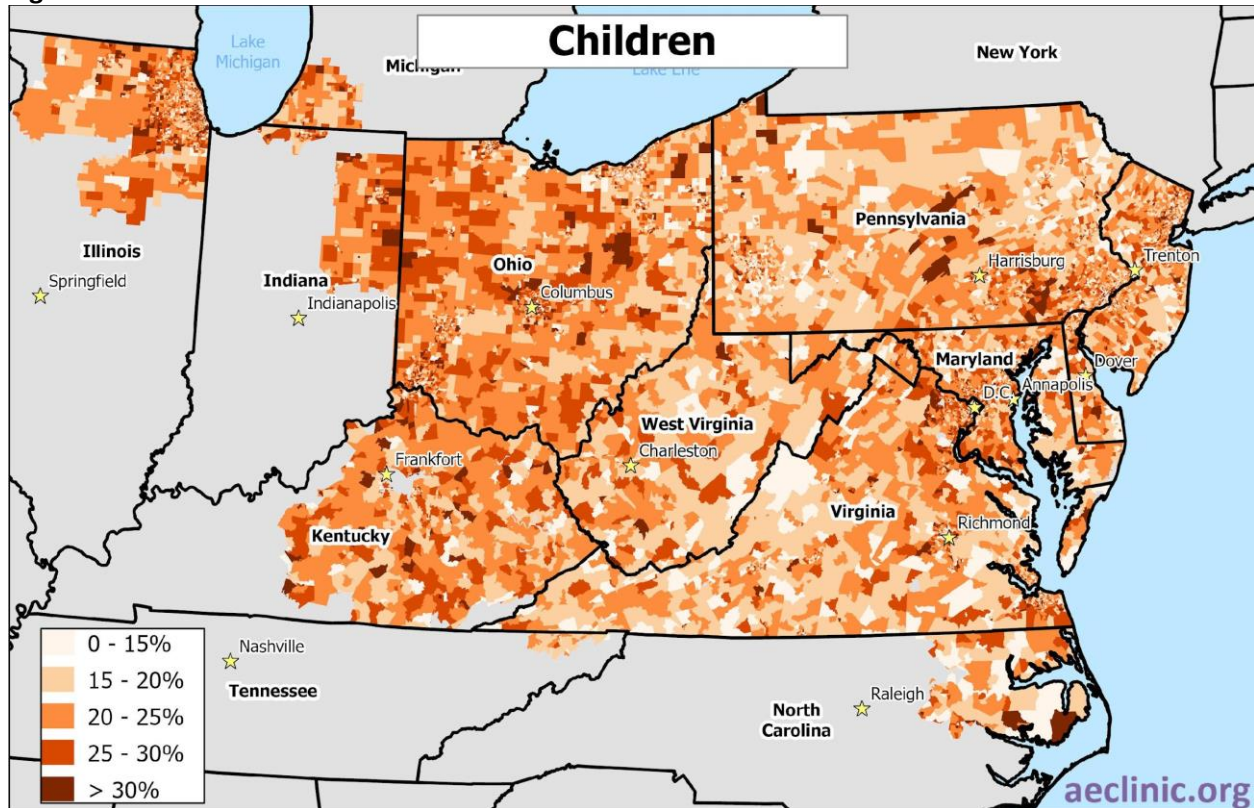
Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: B01001].

⁵¹ A census tract is a geographic unit used by the U.S. Census to tabulate data. Census tracts contain between 1,200 and 8,000 people.

Children

Like older adults, the share of the population composed of children, or youths under 18 years old, living in the PJM service territory ranges from 0 to 72 percent. Areas with a share of children over 30 percent are scattered throughout the states (see Figure 7), but are highest in Indiana, where children make up 23.3 percent, followed by Kentucky, where children make up 22.5 percent. The District of Columbia has the lowest composition of children at 19 percent.

Figure 7. Distribution of children in PJM

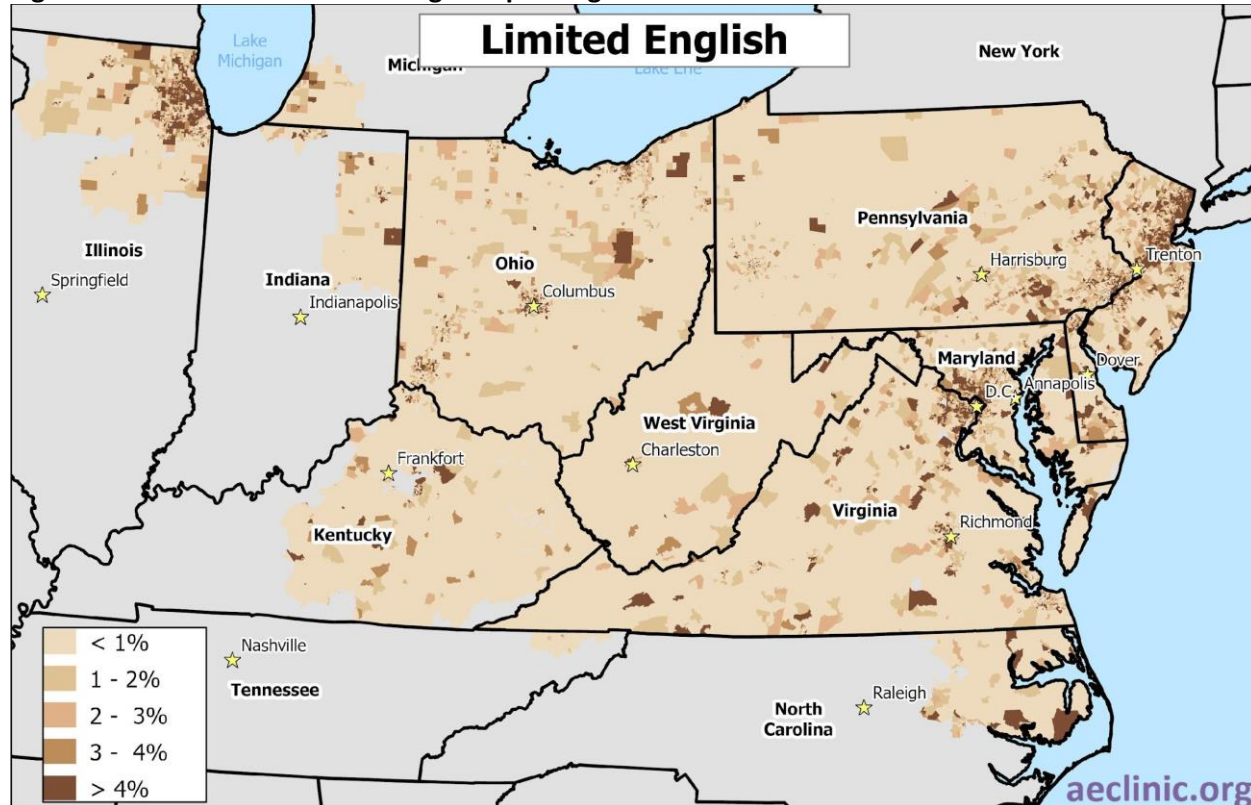


Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: B01001].

English isolation

The percentage of English-isolated households—households where all individuals 14 years of age or older in a household speak a language other than English and no member speaks only English⁵²—within a census tract range from 0 to 79 percent. Areas where more than 4 percent of the population consists of limited English-speaking households are scattered throughout each of the states (see Figure 8).

Figure 8. Distribution of limited English-speaking households in PJM



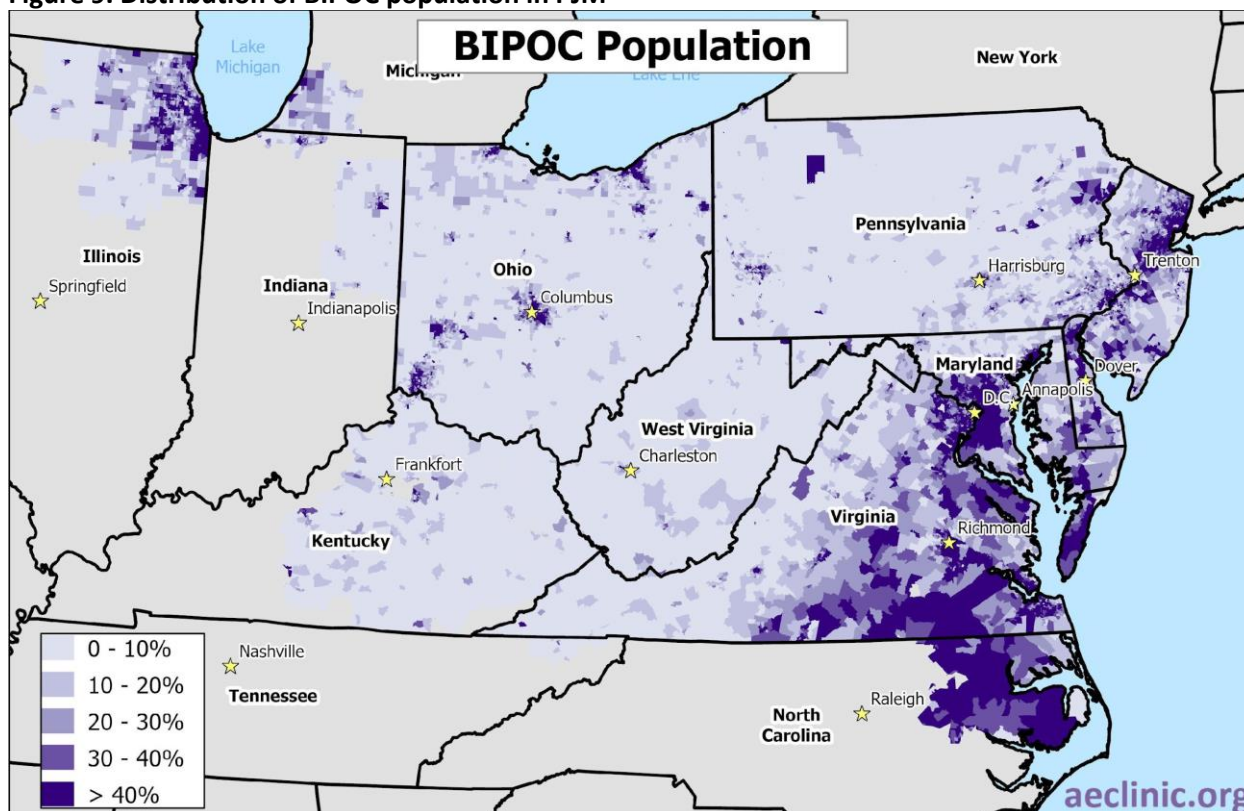
Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: S1602].

⁵² U.S. Census Bureau. 2021. “Frequently Asked Questions (FAQs) about Language Use.” Available at: <https://www.census.gov/topics/population/language-use/about/faqs.html#:~:text=By%20definition%2C%20English%2Donly%20households,%22>

BIPOC populations

The percentages of BIPOC populations, defined as non-White and/or Hispanic individuals, located in the PJM service territory range from 0 to 100 percent of a census tract. Areas where BIPOC populations are most densely concentrated are located within Virginia, North Carolina, Maryland, the District of Columbia, New Jersey, Delaware, and Illinois (see Figure 9).

Figure 9. Distribution of BIPOC population in PJM

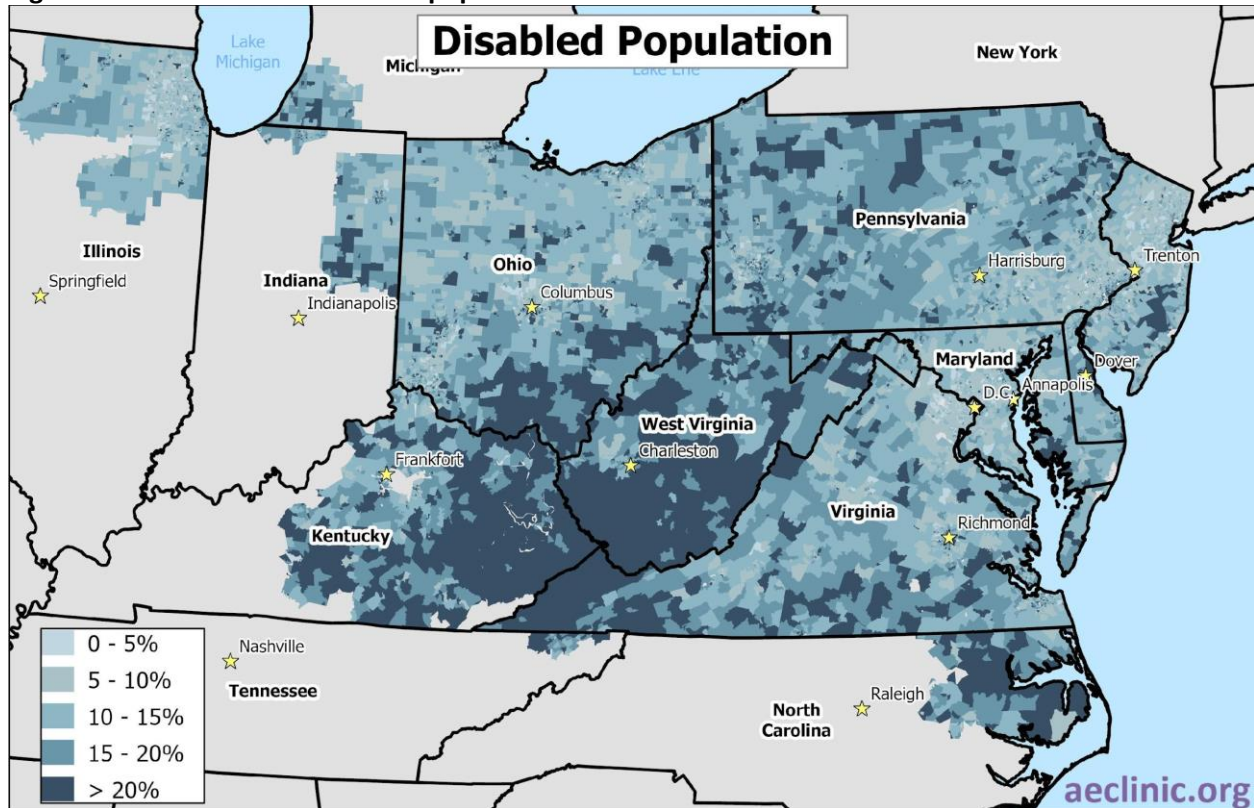


Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: B03002].

Disabled population

In the PJM service territory, the share of disabled persons—an individual with one of the six following disabilities: hearing difficulty, vision difficulty, cognitive difficulty, self-care difficulty, and independent-living difficulty⁵³—within a census tract ranges from 0 to 80 percent. Areas where the share of disabled persons exceed 20 percent are most predominantly located within Kentucky and West Virginia (see Figure 10).

Figure 10. Distribution of disabled population in PJM



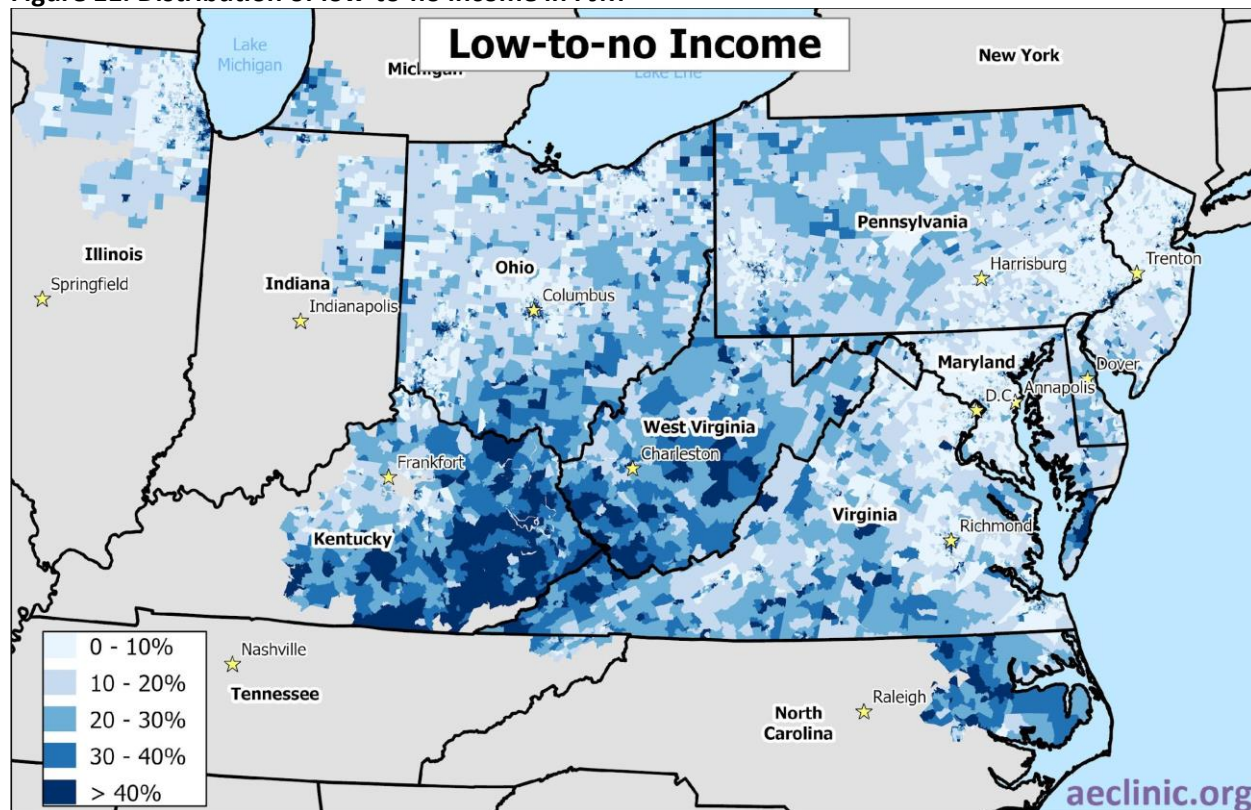
Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: B18101].

⁵³ U.S. Census Bureau. 2021. "How Disability Data Are Collected from The American Community Survey." Available at: <https://www.census.gov/topics/health/disability/guidance/data-collection-acs.html#:~:text=All%20three%20surveys%20ask%20about,Each%20survey%20has%20unique%20advantages.>

Low-to-no income

The share of low-to-no income⁵⁴ population within a census tract ranges from 0 to 100 percent within the PJM service territory. Areas where the share of the population is considered low-to-no income are most predominantly located in Kentucky and West Virginia (see Figure 11).

Figure 11. Distribution of low-to-no income in PJM



Data source: U.S. Census. 2020. American Community Survey 5-Year Estimates [Table: S1701].

⁵⁴ The share of the population that earns 150 percent or less of the federal poverty level.



Appendix B: Additional PJM-related Organizations

	Agency/Organization	Primary Function
PJM Company	PJM Connex	Provide consulting, training and operational services to global energy industry
	PJM Environmental Services	Provide reporting and data tracking services of renewable energy certificates
	PJM Settlement	Public utility affiliate of PJM that handles market settlements, billing issues, credit managements and financial settlements for whole sale electricity market and other transactions conducted by PJM members
PJM Related	Eastern Interconnection Planning Collaborative	Coalition of regional planning authorities that work together to plan the transmission systems on a broader basis than their individual jurisdictions
	ISO/RTO Council	10 Independent Systems Operators and Regional Transmission Organizations that serve two-thirds of electricity consumers in United States and 50 percent of Canada's population
	GO15	Initiative of world's 19 largest power grid operators that Investigates fundamental issues of common interest to develop joint improvement of power system security
	Smart Grid Interoperability Panel	Not-for-profit organization that promotes framework to accelerate standards harmonization and advancing interoperability of Smart Grid devices and systems
	Joint and Common Maket	Addresses issues associated with the operation of the markets at the seam of MISO and PJM's regions, with the goal of achieving the benefits of complementing system operations and one robust, non-discriminatory wholesale electricity market
	Monitoring Analytics	Independent market Monitor of PJM, produces market related reports
	Organization of PJM States	Organization of statutory regulatory agencies that coordinates data collection, issues analyses and policy formulation related to PJM, its operations, its market monitor and matters related to FERC

Data source: PJM. n.d. "Industry Groups." Available at: <https://learn.pjm.com/electricity-basics/industry-groups>