FERC ORDER 2222 & DER POLICY AND IMPLEMENTATION REPORT

November 2024

CURRENT NEWS AND NEW DEVELOPMENTS

Summary of the latest developments in FERC Order 2222 and DER policy implementation

Several states took action on distributed energy resource (DER) policy, the implementation of virtual power plants (VPPs), and FERC Order 2222 in the last several months. A summary of the actions are listed below.

RTO/ISO Order 2222 Implementation:

- PJM submitted its third FERC Order 2222 compliance filing in response to direction provided in FERC's July 2024 order on compliance. Of particular note, PJM proposes to delay implementation of FERC Order 2222 from February 2026 to February 2028. [LINK]
- NYISO reports that they will file a proposal to allow DER aggregations to provide operating resources, and that they are on target to fully implement their FERC Order 2222 implementation by the end of 2026. [LINK]

State FERC Order 2222 Implementation:

- Maryland is working on FERC Order 2222 in the Interconnection Work Group within MD PSC's PC44 Grid Modernization proceeding. [LINK]

- Pennsylvania [LINK] and New Jersey [LINK] initiated proceedings on FERC Order 2222 implementation, but as of November 2024, no further action has been taken.
- Wisconsin launched an investigation in September 2024 to review aggregation of retail customers to form demand response load reduction resources. The Wisconsin PSC requested comment on several questions, including a question specific to aligning processes with Wisconsin law and MISO compliance with FERC Order 2222. [LINK]
- Michigan conducted several workshops on DER aggregation over the last year. These workshops were directed by the Michigan PSC in its December 1, 2023 Order in Case No. U-21297. The most recent workshop on October 29, 2024 focused on the status of utility demand response management systems (DERMS). [LINK]

Other DER Policy Developments:

- Maryland has been active in DER policy in the last year:
  - The Maryland legislature passed the Distributed Renewable Integration and Vehicle Electrification (DRIVE) Act in April. Among other things, the DRIVE Act requires the development of bidirectional electric vehicle and virtual power plant programs. [LINK]
  - Since April, various work groups within the Maryland Public Service Commission's (MDPSC) PC44 Grid Modernization proceeding have been working diligently to develop regulations and programs by 2025.
  - The MDPSC has issued two orders for the implementation of the DRIVE Act:
    - The first order, Order No. 91218, issued July 11, 2024, takes a number of actions to implement MD's the DRIVE Act, including deadlines for establishing pilot programs and temporary tariffs related to time-of-use, and virtual power plant (VPP) and vehicle-to-grid (V2G) programs to provide distribution services; setting reporting requirements, and directing PC44 workgroup activity. [LINK]
    - The second order, Order No. 91391, issued October 25, 2024, takes the following actions: 1) authorizes utilities or other entities to propose incentive programs for renewable on-site generating systems in the future; 2) states that its authority to regulate DERAs is clear, and aims to regulate DERAs and protect customers without an onerous impact on the market; 3) in order to exercise this authority, directs staff to propose amendments to the Maryland's current curtailment service provider (CSP) license application form and adapt it for DERAs; 4) authorizes MDPSC staff to propose any amendments to implement parts of DOE's DERA Code of Conduct; and 5) establishes Case No. 9761 to serve as a repository for all filings related to the DRIVE Act implementation. [LINK]
- The New York Public Service Commission (NYPSC) opened a Grid of the Future proceeding (Case 24-E-0165) on April 18, 2024. The objective of this proceeding is to unlock innovation and investment to deploy flexible resources – such as DERs and virtual power plants (VPPs) - to achieve clean energy goals at a manageable cost and at the highest levels of reliability. This

proceeding will establish a clear set of needed grid capabilities, establish targets for deployment of those capabilities, identify required investments to effectuate those targets, and identify the anticipated customer benefits and savings achievable from meeting those targets. [LINK]

HISTORY OF FERC ORDER 2222

Overview and Status

FERC issued Order 2222 in September 2020[1], revising the Commission's regulations to remove barriers to the participation of DER aggregations in the capacity, energy, and ancillary services markets operated by RTOs and ISOs. FERC's rationale for issuing FERC Order 2222 was that "by removing barriers to the participation of distributed energy resource aggregations in the RTO/ISO markets, this final rule will enhance competition and, in turn, help to ensure that the RTO/ISO markets produce just and reasonable rates."[2] FERC further stated that the "final rule will help enable the participation of distributed energy resources in the RTO/ISO markets by providing a means for these resources to, in the aggregate, satisfy minimum size and performance requirements that they may not meet on a stand-alone basis."[3]

Order 2222 requires each RTO/ISO to (a) develop tariff provisions that ensure that its market rules facilitate the participation of DER aggregations, (b) allow DER aggregations to participate directly in RTO/ISO markets, and (c) establish DER aggregators as a type of market participant that can register DER aggregations. Compliance with FERC Order 2222 was required within 270 days of the publication of the rule in the Federal Register.

As displayed in Figure 1, two RTOs and ISOs (CAISO and NYISO) submitted their compliance filings within the specified 270-day deadline. The remaining four requested extensions and the last RTO/ISO compliance filings were

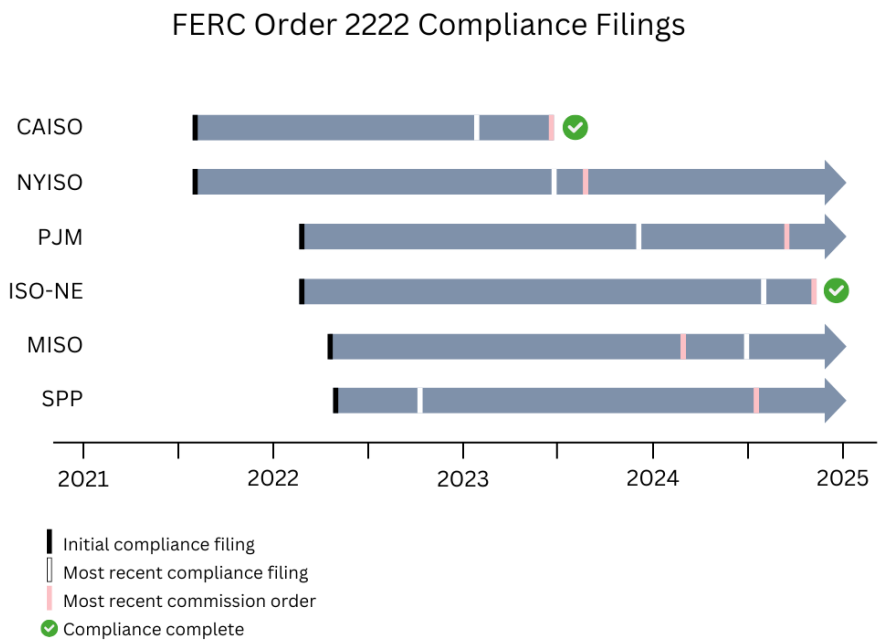

Figure 1: Status of compliance filings

submitted over a year after FERC Order 2222 issued. Due to multiple contentious issues and deficiencies identified in the filings, most of the RTO/ISO compliance filings required multiple rounds of compliance (e.g., ISO-NE submitted eight compliance filings) and four of the RTO/ISO FERC Order 2222 compliance changes are not yet complete – after more than three years, compliance is not yet complete at NYISO. As of November 2024, FERC Order 2222 compliance is now complete and approved at the California ISO and ISO New England. RTO/ISO stakeholder discussions continue at MISO and SPP. Earlier, not fully FERC Order 2222 compliant implementations of DER aggregation are in place at CAISO and NYISO.

The key FERC Order 2222 compliance issues that led to lengthy compliance timelines include:

- **Metering and Telemetry** – Metering and Telemetry requirements differed across the RTOs/ISOs and were especially difficult to resolve at the ISO-NE. The most difficult issue to resolve is the ability of DER aggregators to use submetering or device-level measurement to collect DER operation and performance information.
- **Aggregation Registration and Review** – FERC Order 2222-A clarified that the length of the distribution utility review period could not exceed 60 days and clearly stated that distribution utilities did not have the ability to veto the capability to fully reject individual DERs from participation in DER aggregations. Several RTOs and ISOs proposed to extend this period and limit the review solely to reliability concerns, and FERC has generally rejected these proposals.
- **Locational Requirements** – The geographical breadth of an aggregation of a DER aggregation differs across the RTOs and ISOs. Three RTOs/ISOs (CAISO, ISO-NE, and NYISO) proposed that aggregations could extend across multiple pricing nodes, while the remaining three proposed single-node aggregations. FERC approved the multi-node proposals but has required additional justification and support from the single-node RTOs/ISOs.
- **Double Counting** – FERC Order 2222 clearly indicates that there should not be double compensation for the provision of the same service at the retail and wholesale levels. Most of the RTOs and ISOs complied, but the ability for net energy metered DERs to provide wholesale services in several RTOs, like PJM, proved difficult to resolve.

In addition, discussions continue on the following issues that need to be resolved prior to full implementation:

- **Coordination** – Coordination between RTOs/ISOs, DER aggregators, and distribution utilities is still not fully developed. A particularly tricky area of coordination is the process for distribution utilities to inform DER aggregators of needed or unanticipated curtailment of DERs during the operating day.

- **Communications and Data Sharing Protocols** – Similarly, rules, protocols and standards for sharing of information and collecting information on DER operation and DER aggregator performance is generally needed at all the RTOs and ISOs.

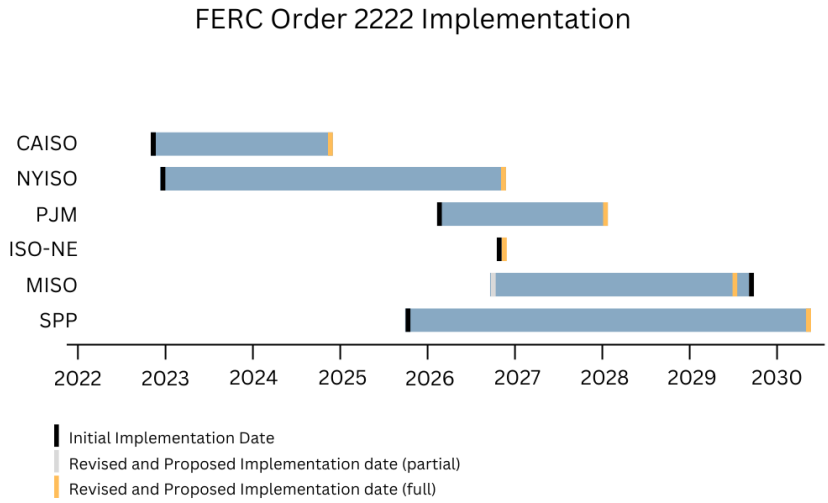

Figure 2: Proposed implementation dates for FERC Order 2222

As shown in Figure 2, each of the RTOs and ISOs have proposed different implementation dates for FERC Order 2222. Initial FERC Order 2222 implementation dates for the RTOs/ISOs spanned between early 2024 and 2030. However, implementation dates for MISO, PJM and SPP may be revised and shifted – MISO has proposed an earlier more limited implementation in 2026 and a slightly earlier fully implementation in 2029, PJM proposes delaying implementation until February 2028 in its latest compliance filing, and SPP announced that it intends to ask for a delay of their implementation until 2030. CAISO implemented its FERC Order 2222 program on November 1, 2024, and NYISO implemented an earlier approved DER aggregation program in April 2024.

In response to FERC Order 2222, multiple states began proceedings on implementation of Order 2222. These state proceedings can be divided into two groups. The first group, which includes Indiana, Michigan, Minnesota, Missouri, and Wisconsin, focused on whether the third-party demand response and DER aggregators enabled by Order 2222 can operate within their states. Of these states, Michigan and Missouri regulators decided to partially open their states to third-party demand response aggregators. The scope of the proceedings in the second group of states has been broader. Due to FERC approval and implementation of earlier non-FERC Order 2222 DER aggregation proposals in California and New York several years ago, these two states are further along on necessary regulatory approvals. Maryland, Pennsylvania and New Jersey have initiated proceedings to implement Order 2222. Of these three states, Maryland is the furthest along – stakeholders in Maryland PSC's Interconnection Workgroup are currently reviewing draft regulations to implement Order No. 2222.

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[1] Final Rule, Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators, Docket No. RM18-9-000, 172 FERC ¶ 61247 (September 17, 2020) (FERC Order 2222) https://elibrary.ferc.gov/eLibrary/filedownload?fileid=020A059C-66E2-5005-8110-C31FAFC91712.

[2] FERC Order 2222, P3

[3] FERC Order 2222, P5

KEY ISSUES ANALYSIS

An in-depth examination of key FERC Order 2222 and DER policy issues.

Data Access and Privacy

Access to data is a fundamental issue that can make or break the development of efficient and effective DER and VPP policy and the implementation of FERC Order 2222. In particular, data access rules, policies and tools enabling the ability of all stakeholders (Electric Distribution Companies (EDCs), Transmission Owners (TOs), RTO/ISOs, Balancing Area Authorities, Scheduling Coordinators, Retail Electric Providers, Customers, Aggregators, Regulators) to have appropriate access to information about DERs and DER aggregations will be required to effectively enable DERs for utility programs and RTO/ISO market products. Data privacy rules are also necessary to ensure appropriate access and effective information exchange for customers, aggregators, and other appropriate users of data. Such privacy rules should acknowledge that customers, not utilities, aggregators, or anyone else, own this DER data, and customers are opting into sharing necessary data when they choose to participate in a DER aggregation for a utility program or RTO/ISO market product.

The proliferation of DERs on the grid may be new to most of the U.S., but places like Australia and Germany have been living with the reality of high penetrations of DERs for quite some time, offering lessons learned for the U.S. Clearly documented cases of sub-standard equipment that cannot be effectively integrated to the grid, lack of standards, inadequate interconnection process structure, ineffective data management/sharing, and the inability of any existing utility/grid systems to track and manage all of these new grid injecting resources have demonstrated mistakes that U.S. regulators should avoid repeating. The primary issue identified in these high DER penetration markets that must be addressed in the U.S. to ensure successful DER integration is ensuring appropriate access to relevant DER data by energy stakeholders. Ultimately, this need is most effectively served through a single, shared DER Registry. As the U.S. grid is predicted to be 100GW short of power in the next decade, it is critical that the industry collectively gets this right to create the opportunity for DERs to help close the gap on needed power supply and avoid mistakes others have already made in other jurisdictions.

With the increase in the number of DERs on the grid in general, and a some portion of those seeking to directly participate in wholesale markets, FERC Order 2222 came at a perfect moment to allow the industry to collaborate and work together to enable DERs. With the increase in the number of DERs on the grid in general, and some portion of those seeking to directly participate in wholesale markets, FERC Order 2222 came at a perfect moment to allow the industry to collaborate and work together to enable

DERs. The implementation of FERC Order 2222 requires that RTOs/ISOs have access to data regarding DERs to support wholesale market products and settlement, while EDCs and DER providers also need access to DER data for retail programs as well as system reliability studies. FERC has ordered that RTOs/ISOs coordinate with utilities and regulators to establish protocols for sharing DER, metering and telemetry data in a manner that minimizes costs and addresses privacy and cybersecurity. [4]

For RTOs/ISOs that cover multiple states, an approach that allows each utility to host its own DER database and have its own authority over DER data is likely to result in hundreds of conflicting systems that require RTOs/ISOs to create hundreds of communications points that will not be able to operate in a cohesive manner. The U.S. has already trodden this path with the creation of multiple approaches to managing Renewable Energy Credits (RECs). Over time, states combined their efforts, and we are now down to approximately ten REC registries, but we still have conflicting registries operating in the same state and/or same ISO. This hodgepodge approach undermines the ability of market participants to trade RECs efficiently. But in the case of DER data and the administration of DEARs and DERAs, such balkanization is a recipe for failure.

History also provides additional guidance regarding critical elements required to avoid the failures already experienced in other markets. In particular, a standardized way to represent and manage information about devices and applications across different vendors in an information technology (IT) environment is imperative. Approximately 30 years ago, the electric industry began utilizing software-based Energy Management Systems (EMS). The industry was struggling with custom interfaces to every generator/turbine manufacturer and even specific machines for each manufacturer. EPRI took up this challenge and determined that the electric industry needed a Common Information Model (CIM), an open standard with which all generators must comply to ease implementation and operational coordination of the generators with the electric industry's new systems. CIM concepts are even more important today as the industry must now contend with data exchange for millions of DERs rather than just a few thousand generators.

It is critical for DER deployment in general, and as previously quoted from FERC Order 2222, that industry addresses these issues "in a manner that minimizes costs and addresses privacy and cybersecurity." The most efficient and cost-effective implementation of FERC Order 2222 will require CIM data structures be used for data management and sharing among relevant stakeholders. Without the regulatory community leading effectively and requiring CIM principles be implemented for DERs and all systems that need DER data, the IT costs just for data interfaces could exceed more than $100 Billion. Therefore, State Commissions should consider adopting policies that require any utility systems to utilize CIM data exchange to eliminate unnecessary software interface costs. By fully implementing data layer exchange

through known CIM structures, the electric industry and its consumers will save billions of dollars that would otherwise be transferred to IT vendors.

In addition to requiring use of CIM data exchange, it is critical to incorporate a comprehensive and holistic data collection and secure sharing strategy. The following diagram (Figure 3) illustrates this need for multiple entities to access a common source of DER data:

Figure 3: Multiple entities need access to a common source of DER data.

Starting at the top of the chart in Figure 3, DER data is created for the first time in the permitting process. Proceeding clockwise, a portion of this data is then needed in the interconnection process. Utilities and RTOs/ISOs use the submitted data for planning and modeling in their systems to approve or reject the interconnection request.

If approved, Geographic Information Systems (GIS) systems need the DER data to show where these resources are both geographically and electrically on their system. Once a utility and/or the RTO/ISO establishes a DER program or market, an aggregator (utility or competitive entity) needs the data to create their aggregations and submit them for review and approval to a utility program or RTO/ISO market product.

At this point, each utility program or RTO/ISO market product will have established rules for the appropriate stakeholders to review and approve the aggregation. At this point, each utility program or RTO/ISO market product will have established rules for the appropriate stakeholders to review and approve the aggregation. This process will include the DER owner, aggregator, electric distribution company, competitive retail supplier, scheduling coordinator, transmission owner and operators, and RTOs/ISOs, all with appropriate regulatory oversight.

All stakeholders will need access to appropriate portions of the DER data, but regulators must also consider data privacy. Fundamentally, data associated with a customer and that customer's DER belongs to the customer, and adopting policies that explicitly recognize this right of ownership and control by the

customer would be beneficial. Customers that agree to have their DERs participate in a utility program or RTO/ISO market product will need to assign the DER to an aggregator, "opting in" to allow an aggregator to access appropriate customer and DER information to create aggregations, and then allow all appropriate stakeholders to review and approve the aggregation.

Once approved, the EMS operational and market systems will require access to DER, DER aggregation, and DER aggregator data. Utilities will need to be able to present planned and unplanned outages on their system via a "distribution oasis" like currently exists for the transmission system as the distribution system will now have market resources embedded within it. Over time, customers will move in and out of houses with DERs installed on them, add batteries to their solar arrays, add and sell electric vehicles (EVs), and change aggregators or programs and products. Further, new programs and market products will be created, grid operators will reconfigure their networks or market zones/nodes/regions, aggregators will go out of business, utilities will change names, and so on. Operational systems will need to verify performance. Settlement systems will need access to the DER data for billing and payment. And, finally, regulatory and government agencies will require reporting that depends on all of this data. Attempting to consider any aspect of this process in isolation is very problematic and costly.

If a data-centric approach is utilized to define the necessary data elements for each step in this process and these data elements are appropriately "mapped" to CIM data structures, then existing industry systems (such as CIS, GIS, ADMS, EMS, planning and modeling, etc.), will be able to effectively share the data through a secure data application programming interface (API) based on the CIM data structures of the existing industry systems, thereby eliminating costly software interfaces. This approach allows DER data to conform to existing systems in the electric industry rather than modifying potentially hundreds of industry systems to attempt to conform to DER data. This approach also helps protect customer privacy by avoiding the need for manual transfers of customer data through paper documents and spreadsheets.

Ensuring a DER "Single Source of Truth" with a Shared DER Registry

To address the multi-faceted need for DER data, a "single source of truth" for all stakeholders is needed, and regulators can achieve this by requiring adoption of a single, shared DER Registry.

As shown in Figure 4, the structure of a DER Registry needs to securely provide the necessary information to stakeholders and effectively facilitate the entire administrative process to register a DER and DEAR, interact effectively with the DERA, while efficiently bringing DERs to the grid and market, automatically provide any required reporting, and effectively manage any changes along the way.

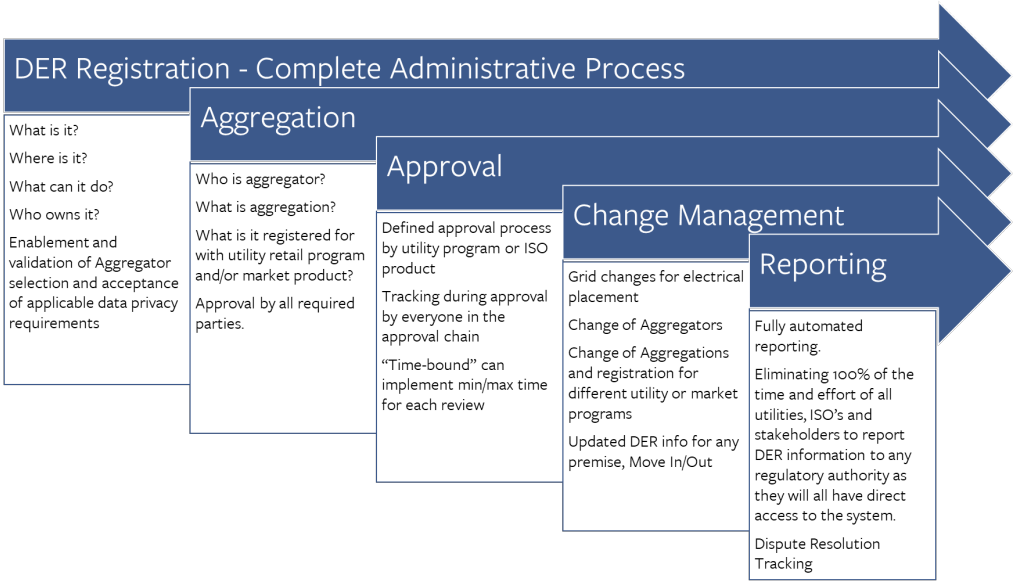

Figure 4: DER Registry secure, collaborative structure

Regulators should consider imposing strict cybersecurity standards that protect both information and system function and integrity. Practices that include a well-defined (and implemented) Security Development Lifecycle (SDL), Zero Trust architecture and governance, and active security monitoring leveraging intelligent threat detection are vital to minimizing risks. These standards should include mitigation and recovery for worst case scenarios. This is effectively outlined in the NERC white paper, "Cyber Security for Distributed Energy Resources and DER Aggregators".

Use of a single, shared DER Registry makes any required privacy rule or process much simpler for everyone to adopt by securely managing and sharing only necessary data with each appropriate stakeholder according to the rules of each specific regulator, utility and RTO/ISO. Relying on a "single source of truth" in a shared DER Registry also facilitates better dispute resolution processes between DERAs and utilities (and all other stakeholders) by ensuring that everyone who needs access to the relevant information will have that access to the same data.

FERC Order 2222 was initially viewed as a burden, but more recently people have begun to recognize that it represents a significant opportunity for regulators, utilities and RTOs/ISOs to collaborate to control ever-escalating IT costs, not only for DERs but also for other collaborative solutions, such as a statewide common meter authority, shared/common communication systems for utility (gas, water, electric) AMI, etc. Implementation of a single, shared DER Registry should be a first step towards rejecting isolated and specific systems that significantly and unnecessarily increase costs for consumers. It is imperative that there be proactive regulatory leadership to guide industry policy for the effective and efficient

enablement of these DERs for our grid and markets. FERC Order 2222 is an opportunity to make better, more collaborative decisions state by state and RTO/ISO by RTO/ISO.

[4] FERC Order 2222, P270

TRACKER TIPS AND HIGHLIGHTS

The Policy Tracker is now live at FERC2222.org [LINK], and we encourage everyone to give it a test drive. The Tracker allows users to filter and search for content within a database of content pertaining to DER Policy, with emphasis on implementation of FERC Order 2222. The keyword search functionality includes review of the source documents within the database, while the filters allow users to narrow their searches based on issue topic, RTO/ISO, and state or federal regulators.

The data library has been aggregated by Collaborative Utility Solutions and new material continues to be added regularly. If you would like to recommend content for the Tracker or provide feedback, please contact us.

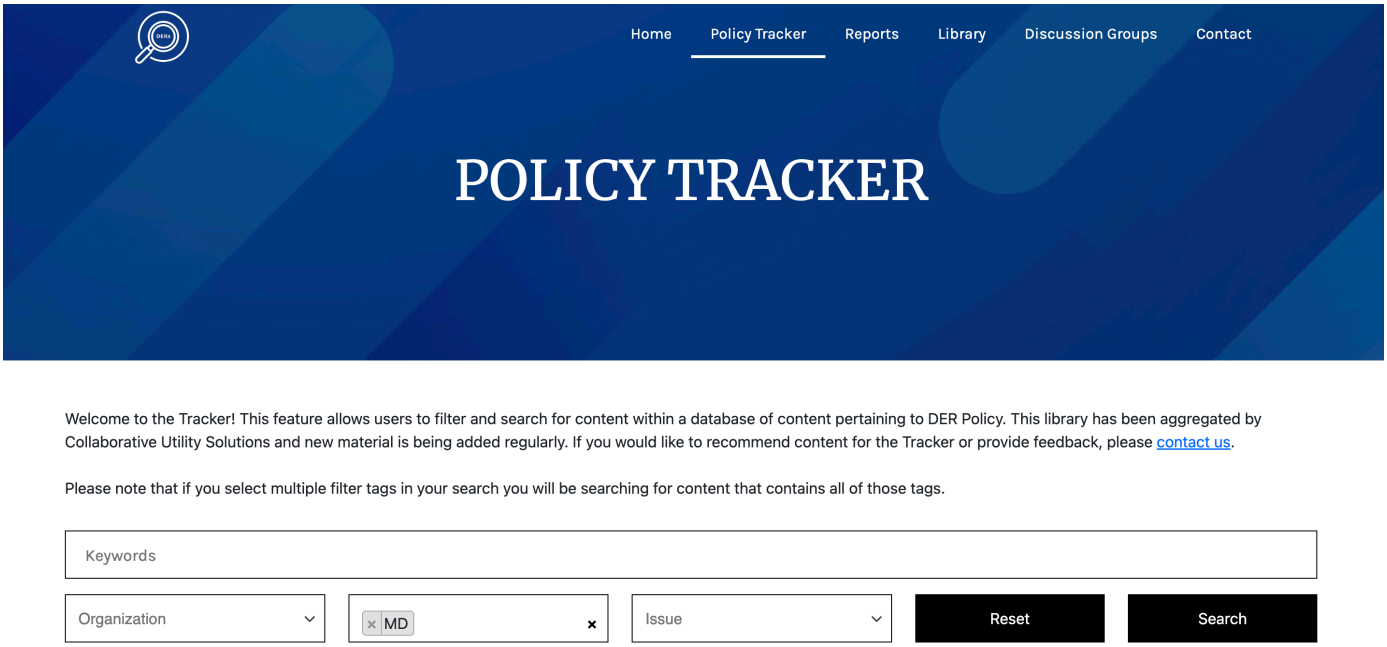

Figure 5: Screen capture of the FERC2222.org Policy Tracker feature

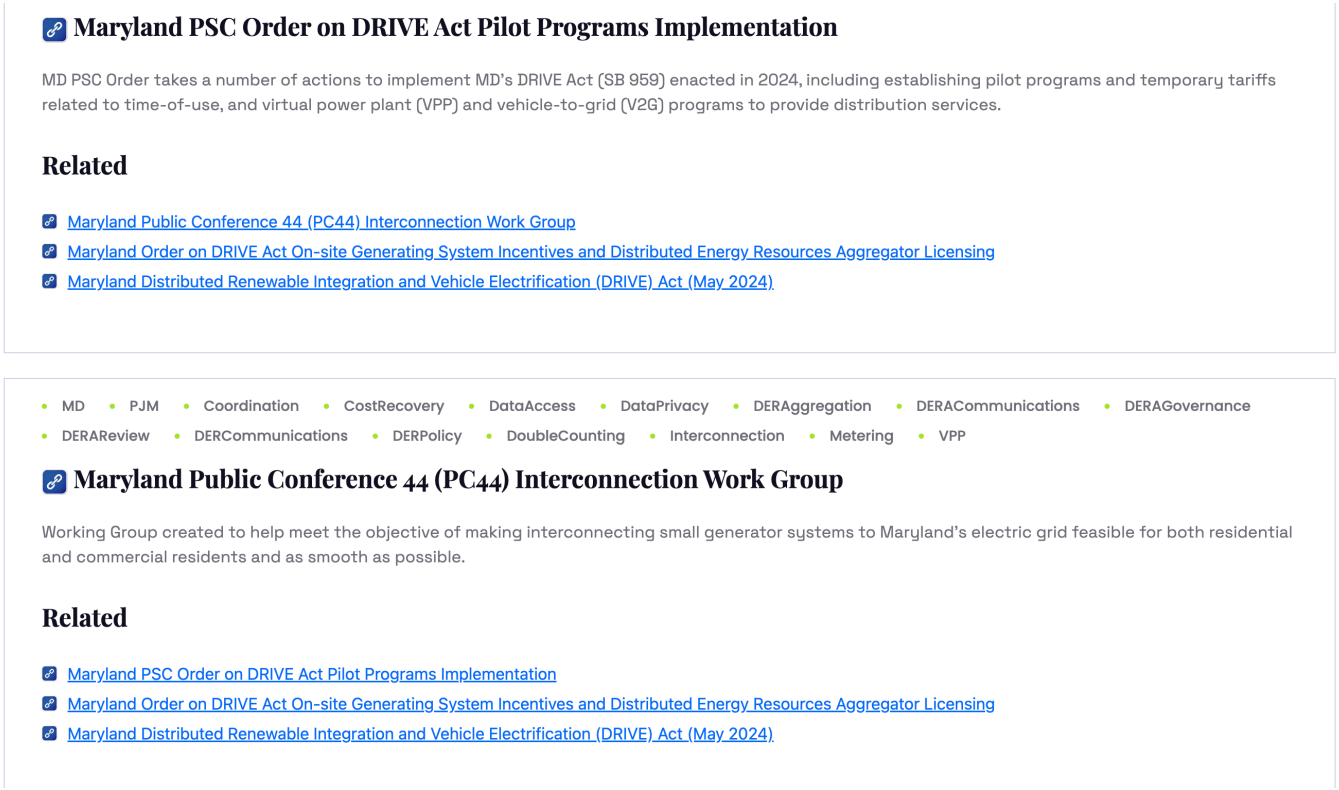

Figure 6: Screen capture of search results from the FERC2222.org Policy Tracker Feature

DISCLAIMER