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Consumer Protections & Common Information Model (CIM)

FERC2222.org

Facilitating Collaboration Among Policy Makers on DER Integration

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Collaborative UTILITY SOLUTIONS

Empowering the Energy Transition

Pacific Northwest NATIONAL LABORATORY

U.S. DEPARTMENT OF ENERGY OFFICE OF ELECTRICITY

DOE Project Information

This is a project in collaboration with PNNL sponsored by the DOE Office of Electricity. The view and opinions expressed in this presentation are CUS' alone and do not necessarily reflect those of DOE or PNNL.

FERC Order 2222 & DER Policy Tracking

Bi-Monthly Report	With the first report in September 2024 and every other month thereafter, each report includes: ***Current News and Events***, ***Key Issues Analysis*** and ***Tracker Tips and Highlights***.
Bi-Monthly Webinar	Beginning October 2024, bi-monthly webinars are being held to present current information and allow discussion on topics. ❖ Today – **Double Counting and Double Compensation**
FERC2222.org website & Policy Tracker	Launched November 2024, providing access to Policy Tracker that aggregates information related to FERC Order 2222 and DER policy that is shared with Collaborative Utility Solutions. This information is 'tagged' by state, ISO, and key issue to allow effective searching.
White Papers	David Kathan is leading an effort to create a series of white papers relating to DER topics over the next year.
Discussion Groups	The website includes secure chat rooms allowing policy makers a forum to discuss key issues.
Library	Includes key DOE, NARUC, NERC or other papers relevant for policy makers. Not seeking to find every paper; attempting to highlight industry leading efforts to support policy decision and implementation.

Bi-Monthly Reports

- The Bi-Monthly Reports contain three primary sections:
  - Current News and New Developments
  - Key Issue Analysis
  - Tracker Tips and Highlights
- The most recent bi-monthly report follows this structure
- Each of these reports will be posted to the FERC2222.org website

FERC2222.org – Chat Rooms live

Recent FERC Order 2222 Developments

- On June 2, 2025, FERC approved by letter order MISO's third compliance filing to FERC regarding the removal of a 10 MW minimum threshold in the review of physical withholding by market monitors, and the addition of a requirement that Electric Distribution Companies (EDCs) must inform DER aggregators when DER operation is overridden by the EDC.
- MISO submitted an additional compliance filing on May 16 in response to the remaining outstanding directives in FERC's order on MISO's second FERC Order 2222 compliance filing. This filing reflects FERC's acceptance of a June 1, 2029, implementation date and removes an earlier implementation date option proposed by MISO to use the DRR-Type I participation model. On July 10, 2025, FERC rejected Voltus' rehearing request arguing FERC's approval of the removal of a DRR Type-I earlier implementation date and the approval of the June 1, 2029 was unjust and unreasonable.

Recent FERC Order 2222 Developments

- On July 22, 2025, FERC approved by letter order PJM's fourth compliance filing to FERC moving its Order 2222 implementation date to February 1, 2028.
- On May 29, 2025, Indiana URC staff hosted a stakeholder meeting regarding rules that may be needed for a registration and study process of DER aggregations participating in wholesale markets via distribution systems in Indiana.
- The D.C. Department of Energy and Environment (DOEE) issued a Request for Information (RFI) regarding DER aggregations and FERC Order 2222 implementation in the District of Columbia. The purpose of the RFI was to gather insight into market interest and potential next steps that District agencies, utilities, and industry groups could consider taking to advance the deployment of virtual power plants and DER aggregations in D.C. Responses were due August 1, 2025.

Other DER Policy Developments

- On June 6, 2025, the Maryland PSC issued Order No. 91674, approving Commission Staff's modified proposed application for a License to Operate as a Distributed Energy Resource Aggregator (DERA). The effective date for the application was July 1, 2025.
- On June 11, 2025, the Maryland PSC approved V2G regulations as part of its DRIVE Act implementation. The new rules were effective July 7, 2025.
- In New York's Grid of the Future proceeding (Case 24-E-0165), stakeholder comments were due July 15, 2025, concerning the Grid of the Future Plan filed March 31.
- In the Commonwealth of Virginia, stakeholder comments were due June 9, 2025, on Proposed Rules relating to interconnection for small electrical generators and storage. Commission Staff filed its recommendations in response to stakeholder comments on July 16.

Consumer Protections

- Consumer protections need to be incorporated into the implementation of FERC Order 2222.
- FERC Order 2222 explicitly directs actions designed to promote consumer protections.
- State and local regulators need to take action to ensure that consumers are protected.
- Consumer protections should be embedded in a DER Registry.

FERC Order 2222 Consumer Protections

- FERC Order 2222 incorporated the following provisions designed to protect consumers:
  - **Double Compensation:** FERC Order 2222 sets requirements to remove the potential for double counting resources (e.g., claiming the same DER capacity simultaneously in multiple services) or compensating resources for providing the same service twice.
  - **Market Participation Agreements:** FERC Order 2222 requires the execution and existence of Market Participation Agreements signed by DER aggregators. A key provision designed to protect consumers is the requirement that market participation agreements must include an attestation that the distributed energy resource aggregator's aggregation is compliant with the tariffs and regulations.
  - **Coordination Requirements:** Coordination requirements are designed to ensure that DER owners and retail consumers are not subject to discrimination and abuse.
- All RTOs/ISOs complied with these requirements

Needed State Actions

- **DER Aggregator Licensing:** Should consider the licensing of DER aggregators to operate in a state or local jurisdiction. Licensing rules can protect consumers by requiring DER aggregators to file various important information such as corporate structure and DER aggregation approach, along with key legal attestations that the DER aggregator will comply with codes of conduct, state rules and state tariffs.
- **Information Sharing Rules:** The sharing of information about DER assets, DER owners, customer usage and tariff participation will be critical to the effective implementation of FERC Order 2222. Nevertheless, to preserve and protect the DER owner and customer privacy, cybersecurity, and critical infrastructure information, detailed rules on who can access and authorize access to this information will be needed.
- **Electric Distribution Company DER Review:** DER review processes should be designed to not allow a DER site to be included in an aggregation without proper documentation from a customer to validate their participation. State and local regulators should consider setting rules or conduct oversight on how this DER review is conducted.
- **Dual Participation Rules:** While FERC Order 2222 is focused on wholesale market participation, each regulatory authority should consider the value streams their distribution companies could capture with DERs and determine appropriate structures to allow both the distribution grid and the wholesale market to benefit from DERs.
- **Customer Selection and Switching Rules:** To protect customers from fraud and abuse, processes should be implemented that support customer selection of aggregators and allow customers to switch to a different aggregator at a future time.

Consumer Protections Within the DER Registry

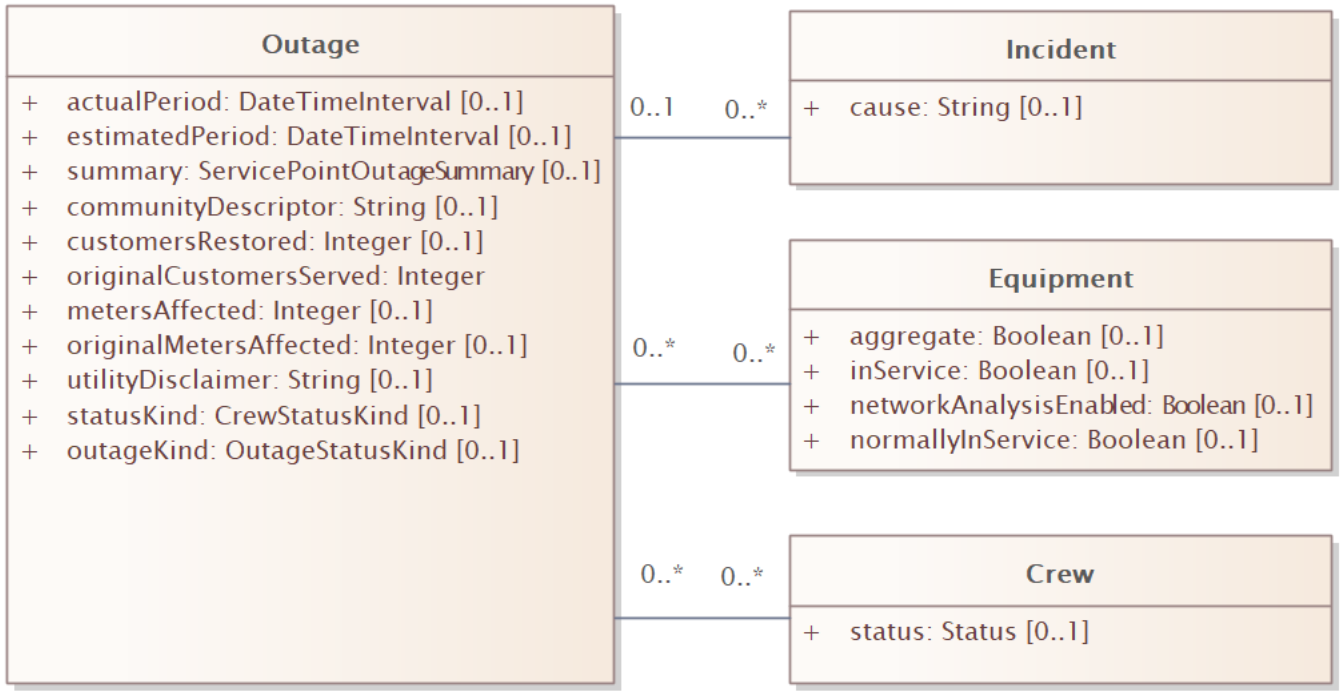
- Consumer protections should be embedded in a DER Registry.
- Approval procedures in a DER Registry should require customer approval to:
  - Select their aggregator
  - Sign and agree to data privacy and security rules
  - Allow customer switching to a different aggregator
- Information should be provided to the customer in a DER Registry to:
  - Show them their current aggregator selection
  - Show them the retail programs or market products they are currently enrolled in with links to details on the programs if they desire more information
  - Explain when they can switch. If enrolled in a program currently, and the program does not allow them to switch until a certain date, customer should have this information readily available to them to make informed decisions and limit negative impacts from bad faith players.
- Overall, process should not allow a DER site to be included in an aggregation without proper documentation from a customer to validate their participation.

What is CIM?

- The CIM was developed by electricity industry experts for use by the electricity industry
- It covers data used from the largest investor-owned utility to the smallest rural cooperative
- It contains representations related to generation, transmission, distribution, metering and meter data, customer data and even distribution-connected customer energy devices.

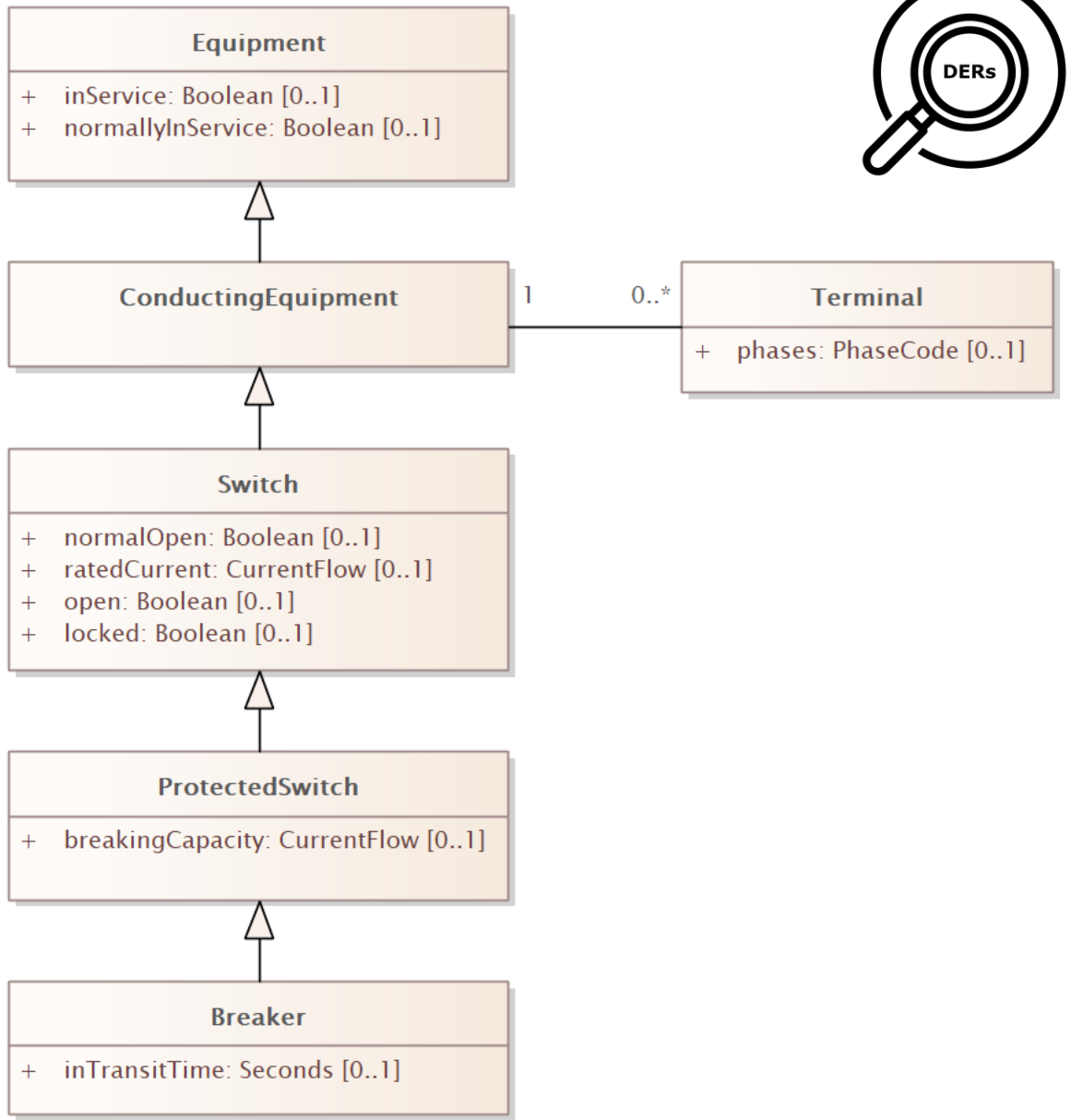
What is CIM?

- The CIM is expressed in Unified Modeling Language (UML) and has over 2,000 different utility data objects
- Each object is represented by a UML class and has a well-defined definition along with typically multiple data attributes and several relationships to other objects



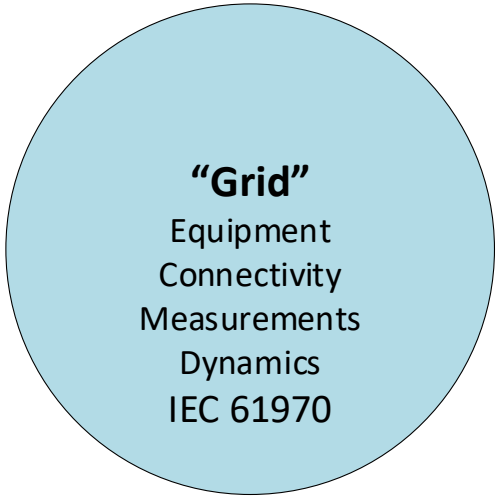
CIM: Inheritance

- The model is hierarchical
- Most objects are specializations of other objects
- Specialization inherit:
  - Attributes
  - Associations



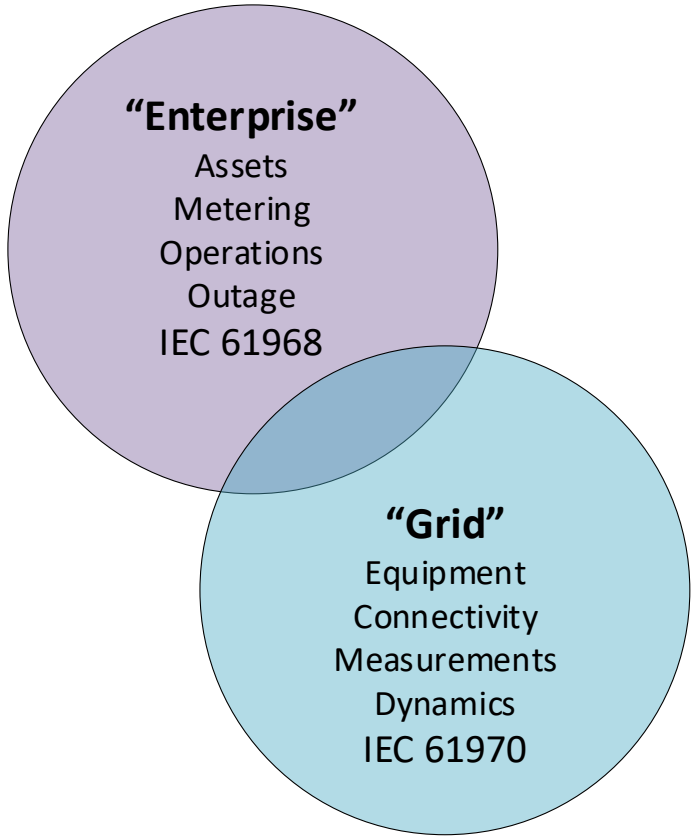
The “Grid” Package

- The ability to create a representation of the power grid was the motivation behind the original CIM development work and the core of many interoperability successes around the world
- Any power grid can be described and used as the basis for many utility software solutions, such as planning analysis simulators and real-time grid management tools



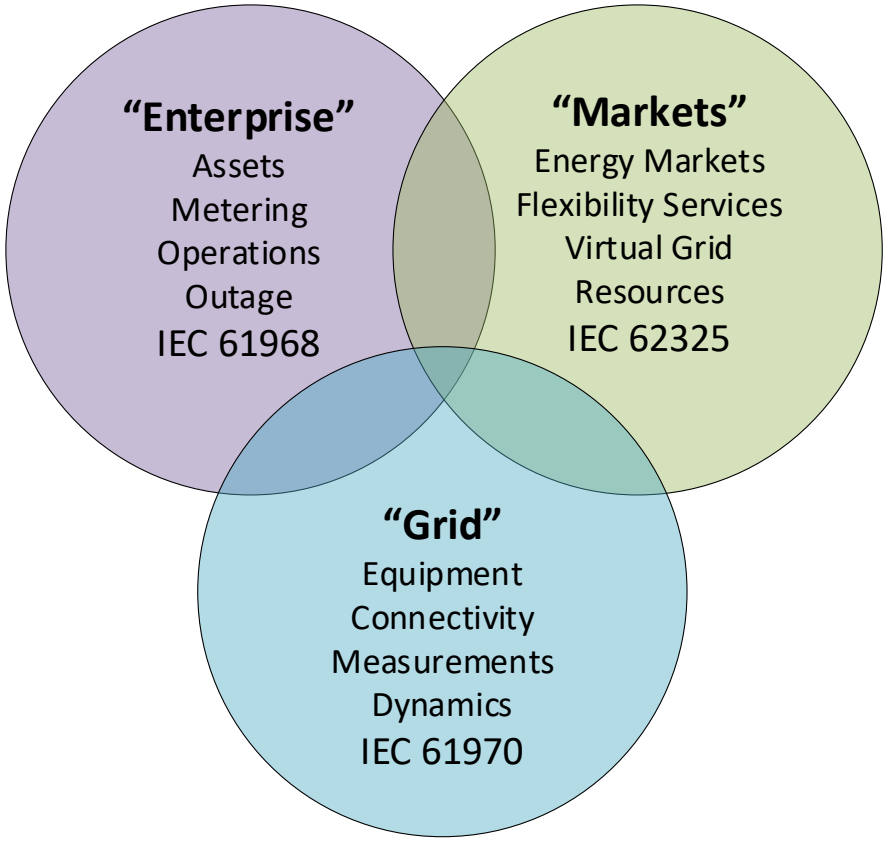
The “Enterprise” Package

- The “Enterprise” Package covers many functions across the utility including customer information management, metering and payment, asset management, planned and unplanned outage management, switching operations, and work management.
- Tracking individual transactions among utility systems, all with unique identifiers, allows for data correlation and orchestration.



The “Markets” Package

- Transactions like bids and offers, clearing results, dispatches, and settlement information are all modeled to support energy, capacity, and Essential Reliability Service markets.
- Includes the concept of locational marginal pricing and, not surprisingly, ties directly to the “Grid Package” so that financial transactions can be aligned with the physics of the power system.



A Case Against CIM?

Standards Are Slow and Rigid

- Yes, it takes months – sometimes years – to develop standards and gain international approval
- However the underlying CIM model is open-source and can be used for a variety of uses without needing to wait for that process to play out.
- Standards exist for common “use cases” of the CIM.
  - IEC 61970 standards implement standard exchanges for the Grid Package
  - IEC 61968 for the Enterprise Package, and
  - IEC 62525 for the Markets package

A Case Against CIM?

Every Grid is Unique

- There are different ways to construct grids (networked, radial, looped, etc.)
- There are many different topologies that can be implemented inside substations
- Utilities implement different terminologies and different processes for things that are quite similar across all utilities.
- Variations can be modelled since the CIM has the individual elements available in the library and it is up to the user at each utility to map them to their terminologies (or update their non-standard terminology).

A Case Against CIM?

Change is Expensive

- Change is costly. And radical change can be extremely costly.
- This is why those who have implemented CIM often recommend a gradual implementation.
- Implementing CIM in conjunction with specific interfaces during system upgrades is often the best approach.

The Case For CIM: Data Needs

There are many different stakeholders who currently would like more model data about distribution grids

- Bulk Power System Operators to improve system planning studies, optimize short-term and long-term outage planning, and improve the reliability of system operations including congestion management.
- Electricity Market Operators to enable the coordination of services at both transmission and distribution to support FERC Order 2222 and improve market forecast for distribution-connected resources
- External Stakeholders to perform wide-areas studies across regions as well as explore the impacts of new technologies on the costs of energy and the levels of reliability and to streamline interconnection processing for proposed developments

The Case For CIM: Volumes!

- Bulk Power System
  - Number of Wholesale Market Operators = 7
  - Transmission Owners/Operators ~500
  - Generation facilities =~10,000
- Distribution System
  - Distribution Utilities ~3,000
  - Electricity Customers ~160,000,000
  - Rooftop Solar ~5,000,000
  - Electric Vehicles ~5,000,000
  - Grid Device "Ceiling" **~500,000,000** (estimated using 3x Customers)

Looking Ahead

The future power system looks radically different from today:

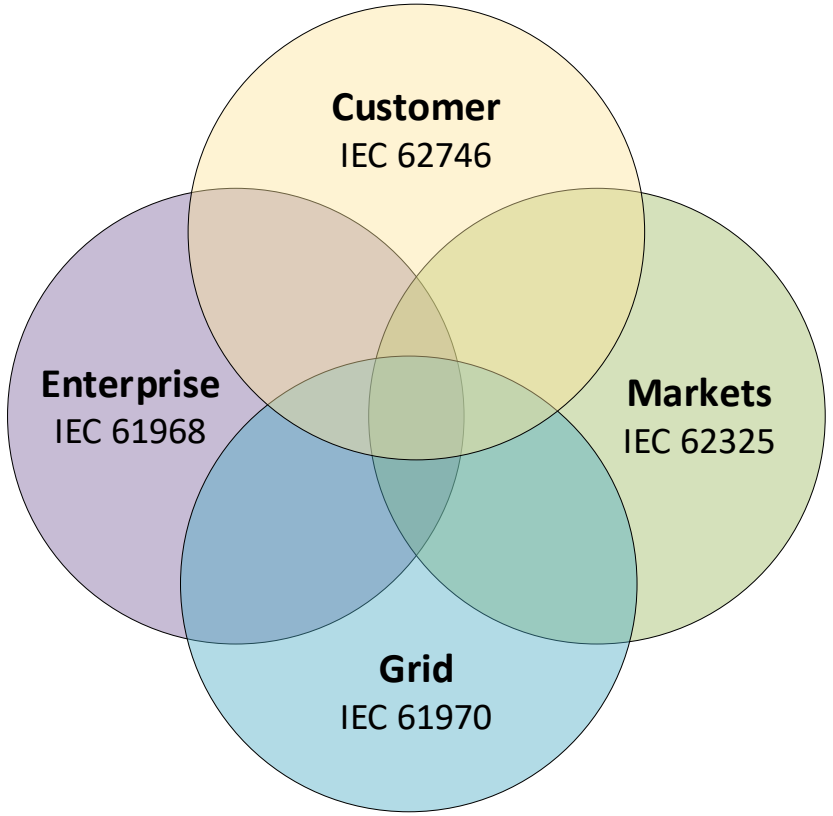
- The majority of the bulk power coming from **intermittent renewable resources**
- Large amounts of **local power production** from smaller installations
- Need for more **grid support services** to keep such a chaotic system in balance

Recent CIM enhancements to meet the challenge

- **Grid Package**
  - Support for low-voltage, unbalanced networks
  - Support for steady state and dynamic analyses with inverter-based devices
  - Ability to track IEEE 1547 settings with native IEC 61850 instruction delivery
- **Enterprise Package**
  - Support for grid device "data sheet" to track manufacturer's make/model data
  - Extend asset management to track changes to grid-edge devices
- **Markets Package**
  - Support for Virtual Power Plants (aggregations of physical resources)

IEC 62746: The Customer Interface

- IEC 62746 is the newest CIM series which manages information exchanges between utility systems and customer systems
- First release covers:
  - Resource Definitions
  - Offers & Schedules
  - Clearing Awards & Instructions
  - Time-Series Data Submission
  - Price-Based Service/Dispatch



Industry Costs in Transition

The CIM was originally developed in the 1990s as the industry transitioned from analog “mimic panels” to Energy Management Systems in the operations center.

- **Saving = Millions $**

The CIM was enhanced in the 2000s to support wholesale markets and to improve utility operations.

- **Saving = Many Millions $**

The IEC CIM for DERs is robust and available if appropriately adopted and implemented by the industry.

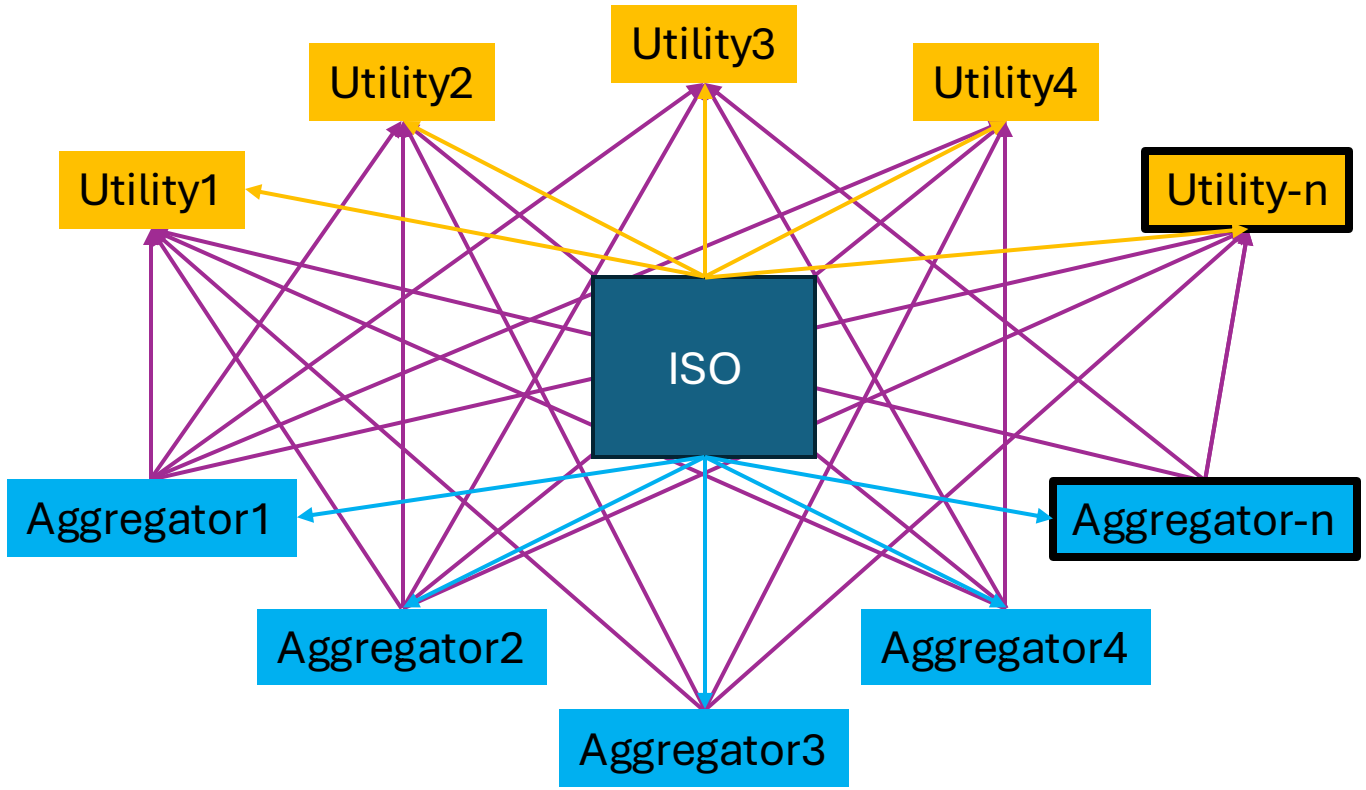
- **Saving = Many Billions $**

Industry Cost in Transition – DER Registry

ISO - Utility Interface
$150M + $30M/yr

ISO - Aggregator Interface
$25M+$5M/yr

Aggregator – Utility Interface
$3.75B + 750M/yr



Internal ISO/Utility Systems Interface
$5.2B + $1.05B/yr

First cost of building Systems
$3B + 750M/yr

The Cost of Business as Usual:

$12BN + $2.6BN/yr

- Over 3,000 utilities, the RTOs/ISOs and Aggregators will have to independently create and maintain their own systems. Functionality limited to 'their scope'.
- DER Enablement to utility programs and market products inhibited by administrative processes of interface and information exchange
- Provides no direction for existing utility system software vendors to improve their systems for DER data use and exchange
- Costs are significant and escalating

We Need Your Help!

Tracking a wide range of key policy issues related to DER integration across the U.S. is no small task. To that end, state commissions and RTOs/ISOs are invited and encouraged to assist Collaborative Utility Solutions in crowdsourcing information to be included in the Policy Tracker. The value the Policy Tracker can provide will be largely dependent on policy makers sharing information with CUS each month proactively. Specifically, CUS welcomes the opportunity to periodically meet with Commissioners or key staff members at state utility commissions and RTOs/ISOs to hear from you regarding your FERC Order 2222 and DER implementation activities, key dockets, rulemakings, or other proceedings.

Please email **Suzanne Bertin (suzanne.bertin@cusln.org)** with any updates for your states or organizations that you would like to have included in the Policy Tracker, or to arrange a meeting to discuss your states or organization's implementation policy.