

Integrating an Open Power Systems Data Repository and an Open Modeling Framework – eGridData.org and OMF.coop

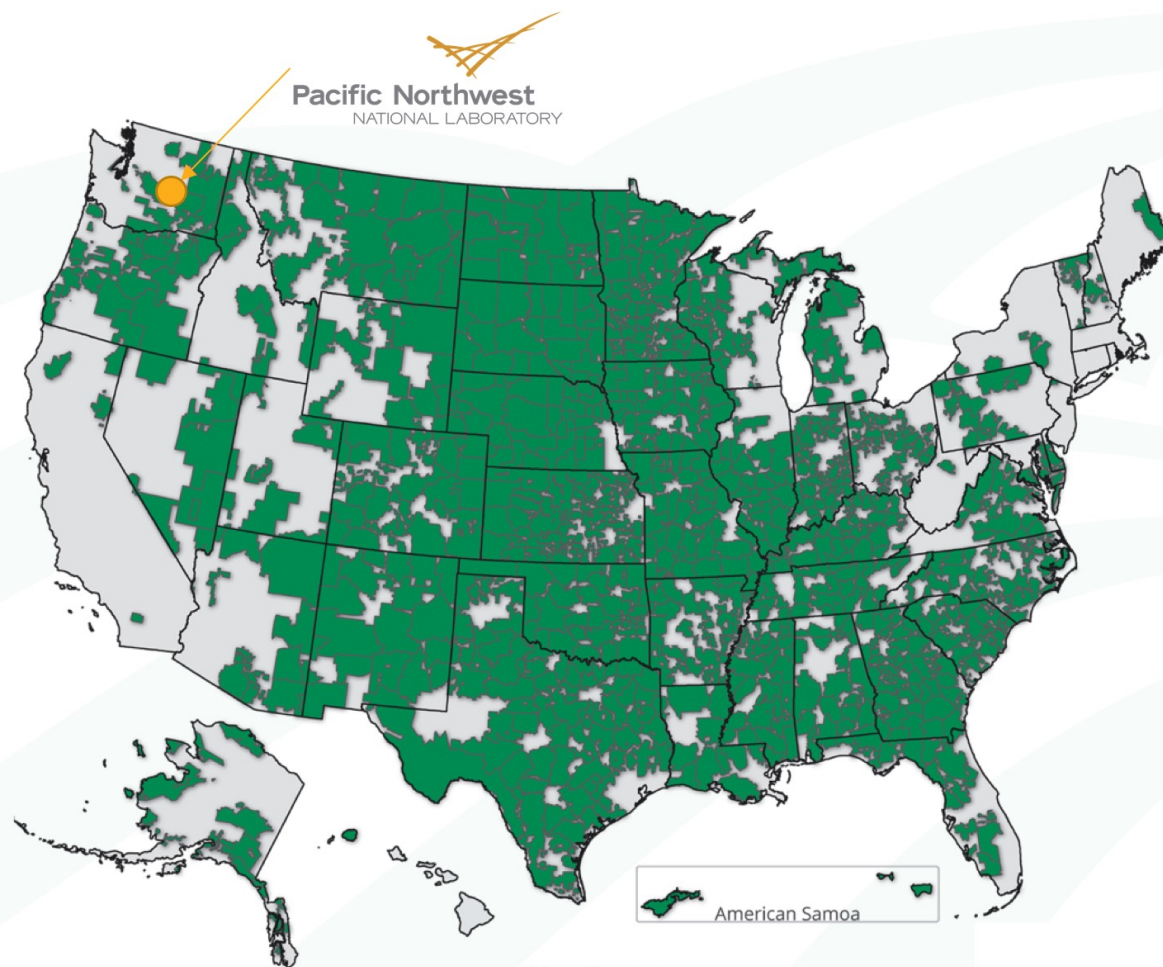
FERC Technical Conference: Increasing Real-Time and Day-Ahead Market Efficiency and Enhancing Resilience through Improved Software
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Team and America's Electric Cooperatives

- NRECA, national service organization for America's Electric Cooperatives.
- Serve 42 million people in 47 states through 65 generation & transmission (G&T) co-ops and 840 distribution co-ops
- Average 7.4 consumers per mile of distribution line
- Teamed with PNNL on this project.



BTS Strategic & Economic Analysis
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ARPA-E Grid Data Program

- “Accelerating the development, evaluation, and adoption of new grid optimization algorithms will require more realistic, detailed public datasets.”
- Existing public R&D datasets are not adequate: “too few, too small, too easy, incomplete, and unrealistic.”
- Transmission models from U Michigan, U Wisconsin, U Illinois; distribution models from NREL; hybrid models from PNNL
- Running 2016-2018.
- 2 data repositories and...

**Increasing
Realism of
Current Data Sets**

**Increasing
Complexity &
Completeness
Of New Data
Set**

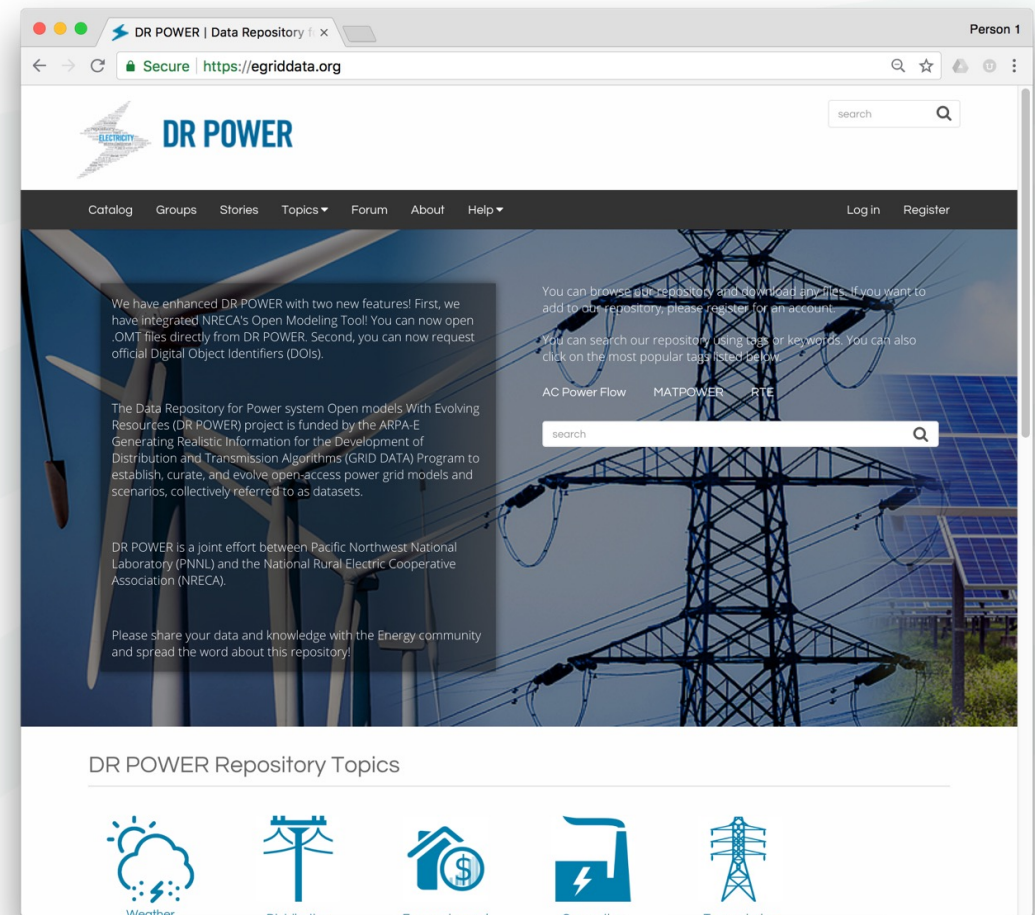
Network Connectivity
Line Thermal Limits
SS Generator Characteristics
Generator Cost Curves
Time Series Load Data (by bus)
Contingency Lists
Bus shunt/transformer tap settings
Normal/Emergency Ratings
Dynamic Generator Characteristics
Maintenance Outages
Automated Local Controls
Protection Settings/Coordination
Power Market Design Details
Operator actions (intuition)

“Realistic but not Real”



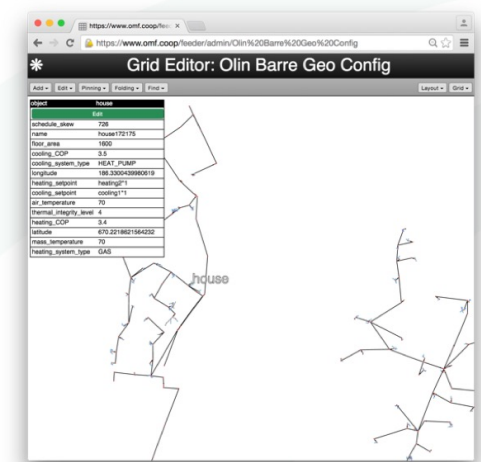
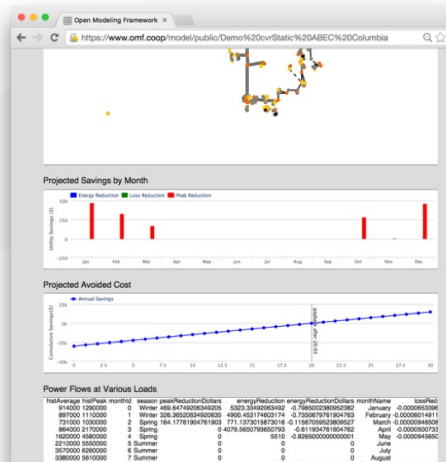
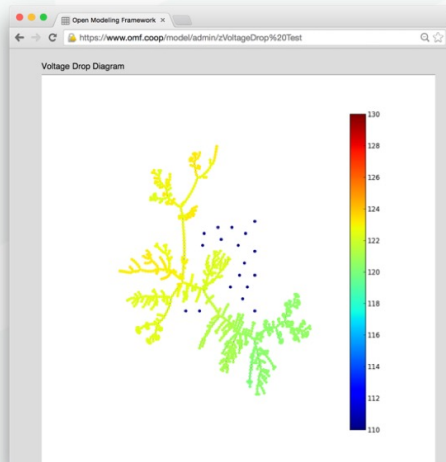
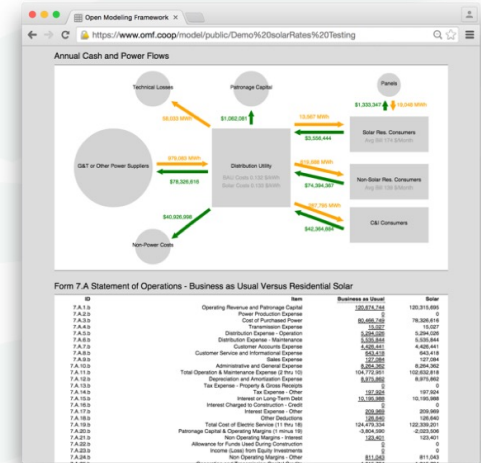
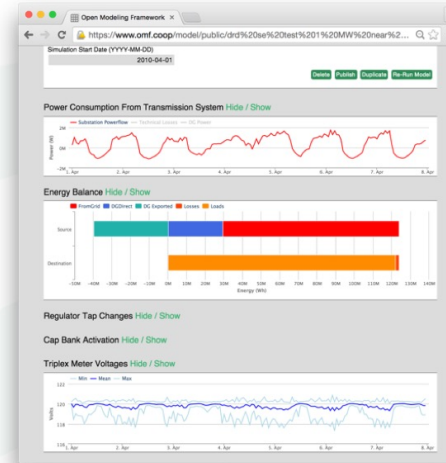
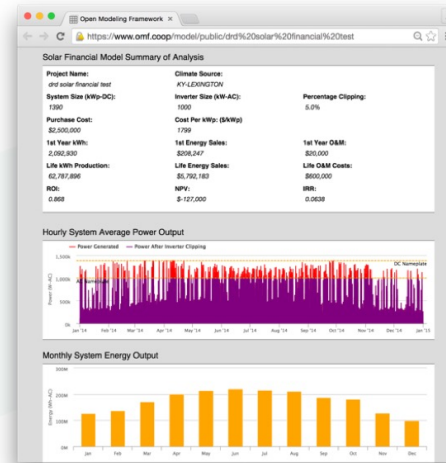
DRPOWER and eGridData.org

- DRPOWER's mission: to design, develop and host a data repository and web portal to
 - Provide open-access power grid datasets and the capability to review, annotate, verify and search submitted datasets
 - Ensure sustainable model and dataset dissemination and evolution through user-defined dataset creation and validation
 - Ensure data quality through curation model based on Digital Curation Center Lifecycle Model
 - Add functionality through open source integrations (CKAN , GridOptics, OMF)
- Website operational, initial data sets populated



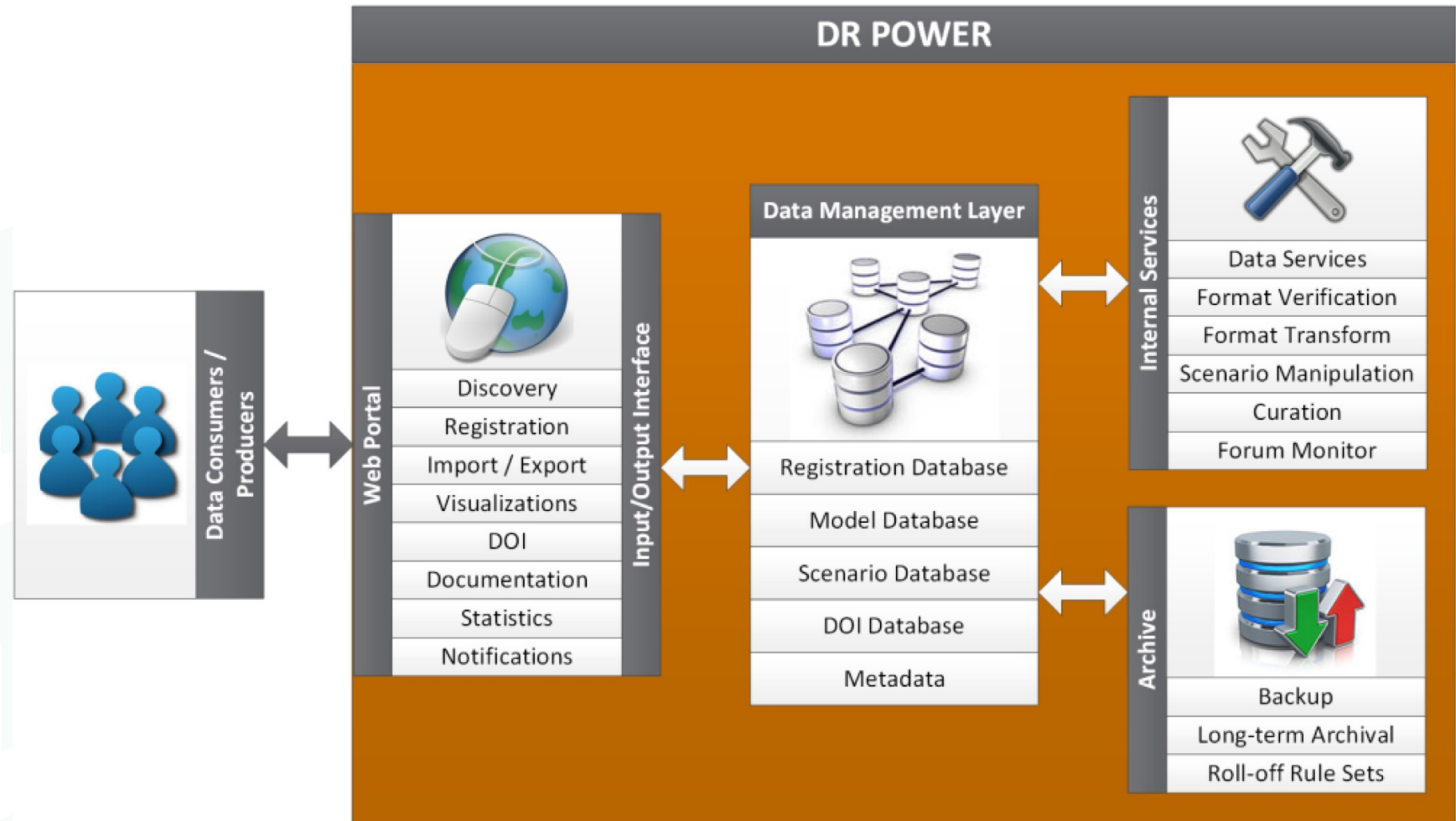
Open Modeling Framework – <https://www.omf.coop/>

- Free and open source electric utility modeling software, Python based
- Built by the co-ops and the US Department of Energy
- Offers models to determine:
 - Benefits of energy storage for arbitrage, peak reduction and asset upgrade deferral
 - Cashflow and engineering impacts of distributed generation
 - Full distribution dynamic powerflow simulation (for the ambitious)
- Users from 176 organizations (utilities, vendors, universities) as of June 2017.



Why Integrate?

1. Instant visualization and powerflow
2. Curation power tools
3. Data conversion
4. Proven open source tools
5. Repository experience



Demonstration – PEGASE on eGridData.org

The screenshot shows the eGridData.org website interface. At the top, there is a search bar and navigation links for Catalog, Groups, Stories, Topics, Forum, About, and Help. The main content area displays the dataset title "CASE1354PEGASE Power flow data for medium part of European system" with a "View published" button. Below this, there is a "License" section with "Creative Commons Attribution" and an "OPEN DATA" button. An "Other Access" section provides information about the dataset's availability in various formats. The description states that the network contains 1,354 buses, 260 generators, and 1,991 branches, operating at 380 and 220 kV, and notes that the data are fictitious.

The screenshot displays a network visualization tool interface. The main area shows a dense network of nodes and edges representing a power grid. On the right side, there is a "Bus" table with 903 entries. The table includes columns for bus name, value, and a status indicator (green 'x'). The table is titled "Bus 903" and has "Move", "Delete", and "Save" buttons. The data in the table is as follows:

Bus	Value	Status
Va	-12.907246	x
Gs	0	x
zone	5	x
Vmin	0.9	x
area	0	x
Vm	1.000545	x
Qd	0	x
Pd	0	x
Bs	58.990785	x
Vmax	1.1	x
baseKV	380	x
type	1	x

Conclusions

- Researchers, check out eGridData.org for test data.
- Utility staff, consider posting data to help out the research community.
- Anyone interested in simulation and modeling, check out <https://omf.coop/> (and <https://github.com/dpinney/omf/>)

Feedback?

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