DER Integration Software Tools
Inventory and Summary

September 1, 2025

Tom Key, Sr. Technical Executive

DER Integration Software Tools

As of September 2025

| Objective	Description (intended audience)	Acronym	Status
Manage GFOV	Inverter-based Supplemental Grounding Tool *(members)*	ISGT	Product
LV Service Adequacy	Distribution Secondary Analysis Toolkit *(members)*	DSAT	Product
Check for RVC/Flicker	VOLTage Fluctuation Evaluation and Simulation Tool *(members)*	VOLT-FEAST	Product
Analyze Settings	DER Autonomous Function and Setting Analysis in DRIVE *(members)*	DAFSA	Product
Connect to OY/OD	Connecting DER to Open-Wye/Open Delta Service *(utilities)*	OYOD	Beta in box
Assess Risk	Island Prevention Risk Assessment Tool *(public)*	IPRAT	Beta in box
Check Fault Current	DER Protection Desensitization Tool *(members)*	DPDT	Beta in box
Create Setting File	DER Settings File Creator for Common File Format, CCF *(public)*	SFC	Product
Verify Settings	DER Configuration Validation tool for CCF *(public)*	CVT	Beta in Box
Share Settings	DER Settings Database supporting CCF *(public)*	DSD	Product (website)
Test DERMS	OpenDERMS Platform: DER Simulator, DER Gateway, *(members)*	SPIDER	Service
Interconnection Education	Decision Pathways supporting integration, users guide *(members)*	CYOA	Beta on Box
Assess NWA Value	DER Grid Deferral Value module in DRIVE *(members)*	DGDV	Product
Study Device Performance	Distribution Protection Analysis Toolkit - for Cyme, for Synergi	DPAT	Product

EPRI

ISGT

- **Name:** [Inverter-based Supplemental Grounding Tool](#) (members only)
- **Developer:** Wei Ren (wren@epri.com), 174A
- **Description:** The EPRI ISGT software is intended to be an easy-to-use software tool to estimate the magnitude of ground fault overvoltage for inverter-interfaced exporting generation and assist users in selecting an appropriate supplemental ground source when necessary.
- **Input Requirements:** N/A
- **Features:**
  - Quick assessment of ground fault overvoltage
  - Conservative screening with the worst-case negative sequence parameters
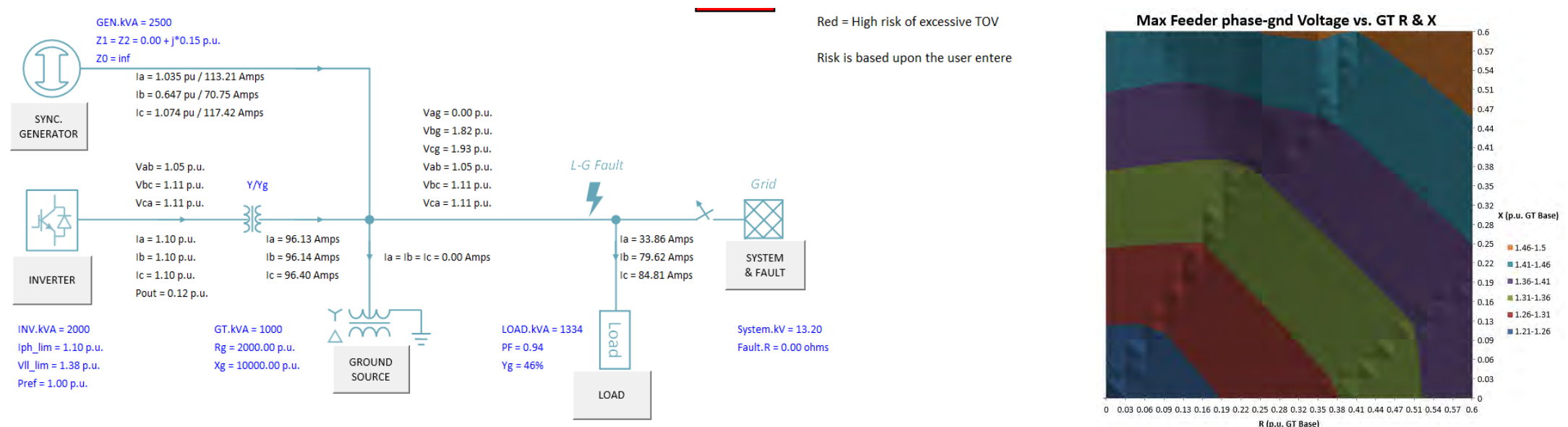
DSAT

- **Name:** Distribution Secondary Analysis Toolkit (members only)

- **Primary Developer:** Wei Ren (wren@epri.com), 174A

- **Description:** The EPRI DSAT software is intended to be an easy-to-use software tool to assess secondary circuit design by evaluating voltage and thermal conditions under different loading profiles. It incorporates smart inverter functions of behind-the-meter DERs in the analysis.

- **Input Requirements:** N/A

- **Features:**
  - Very quick assessment of secondary circuit design
  - Open structure to accept user-defined equipment data, load profiles, and DER reactive power control functions
  - Improved method of using coincidence factors on estimating the peak load condition
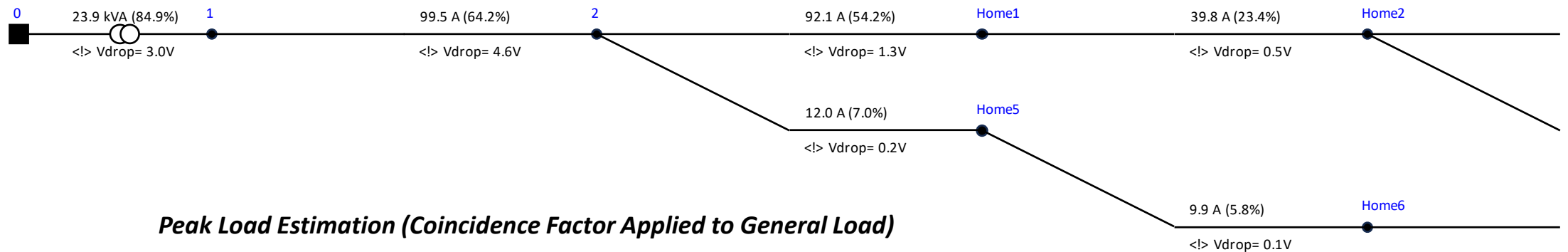

**Peak Load Estimation (Coincidence Factor Applied to General Load)**

VOLT-FEAST

- **Name:** [VOLTage Fluctuation Evaluation and Simulation Tool](#) (members only)
- **Developer:** Wei Ren (wren@epri.com), 174A
- **Description:** The EPRI VOLT-FEAST software is intended to help utility engineers to quickly assess potential voltage fluctuation issues on their feeder systems when new DER projects are interconnected.
- **Input Requirement:** N/A
- **Features:**
  - Dynamic modeling and simulation capability of DER and voltage regulating devices
  - Open structure to accept user-defined equipment data, load profiles, and DER reactive power control functions Pre-loaded high resolution PV irradiance data to simplify the synthetization of power profiles
  - Flicker meter and rapid-voltage-change detector per IEC standard to help user with quick post-processing

Snapshot Load Flow Result (Based on Given %Pwr)
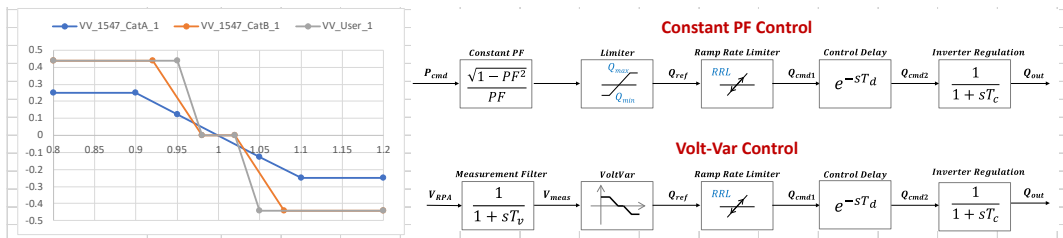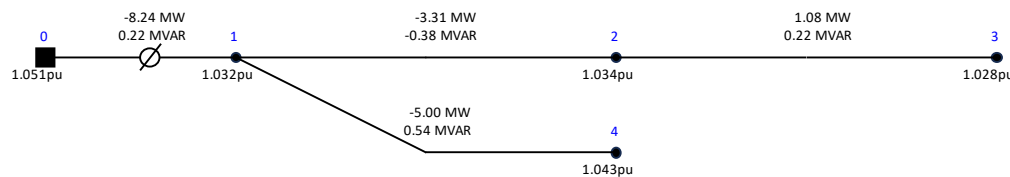
Voltage Profile and Pst Level (Max Pst = 0.007)
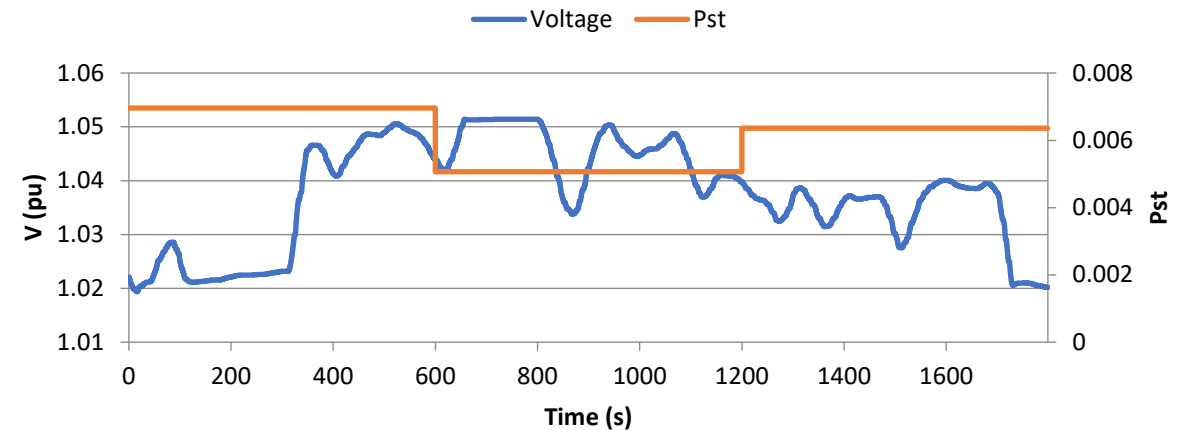
DAFSA

- **Name:** [DER Autonomous Functions and Settings Assessment](#) (members only)

- **Primary Developer:** Stephen Kerr (skerr@epri.com), 174A

- **Description:** As part of the DRIVE™ platform, the DASFA evaluates how smart inverter settings impact feeder hosting capacity.

- **Applications:** The module performs efficient review of feeder models at scale, which evaluates different advanced DER functions and settings to identify "best fit" DER settings to meet specific system objectives.

- **Input Requirements:** A subset of required DRIVE inputs.

- **Features:** Provides a quick view of the impact of a variety of DER settings on a feeder, it does not capture the more time-varying conditions seen daily or seasonally. This method provides a good first step to identifying the most likely DER settings to be considered by a utility, which can then inform a more efficient grid impact study method at a higher level of detail.

EPRI

OYOD

- **Name:** Connecting DER to Open-Wye/Open-Delta (utilities)

- **Primary Developer:** Wei Ren (wren@epri.com), 174A

- **Description:** A software tool that is developed to facilitate convenient assessment of interconnecting three-phase DER such as PV generators to an Open-Wye/Open-Delta transformer configuration (two single-phase transformers) that has been a cost-effective solution for power delivery in rural areas.

- **Applications:** Customer with 2-phase service requesting to connect 3-phase DER inverters.

- **Input Requirements:** Circuit information, DER parameters

- **Features:**
  - Excel VBA-based so no need for additional software installation
  - Graphic illustration of the circuit and load flow result
  - Import/export functions for convenient sensitivity study
  - Highlighted violation of voltage unbalance and overloading
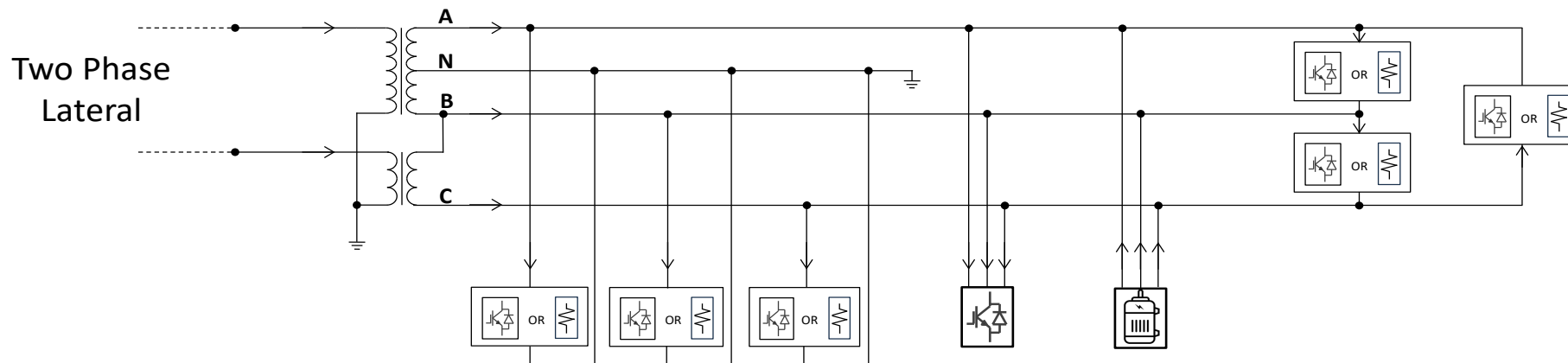
EPRI

IPRAT

- **Name:** [Islanding Prevention Risk Assessment Tool](#) (utilities)

- **Primary Developer:** Yiwei Ma (yma@epri.com)

- **Description:** A risk assessment for solar DER using time series load and generation data and delivering exposure hours and/or mean time between islands based on a non-detection zone analysis.

- **Applications:** Can be used to compare more or less risky DER deployment cases using available solar PV and load data.

- **Input Requirements:** Aggregate PV generation, geographic location, DER ride thru category, time series load including pf and range, min to max load, circuit quality (1/pf) factor and allowable island time.

- **Features:** Provides for an island risk assessment if failing the 100% of minimum load criterion and before resorting to a detailed risk of islanding study requiring more inverter and circuit details. May be complimentary with islanding screening criteria.

EPRI

DPDT

- **Name:** DER Protection Desensitization Tool (members only)

- **Primary Developer:** Tom Key (tkey@epri.com), 174A

- **Description:** Evaluates whether the time delay in tripping with >10% increase if fault current from DER is acceptable, without desensitization. Additionally, assesses if there is a chance of tripping for reverse fault current for faults on adjacent feeders.

- **Applications:** DER adding >10% fault current in 15kV class feeders.

- **Input Requirements:** Fault current seen by the relay with and without DER. Line impedance to DER and line impedance from DER to the fault.

- **Features:** Shows the effect of >10% current contribution on the performance of phase overcurrent relays. Calculates the phases overcurrent relay operate time based on the pickup, curve type, time dial settings, and fault current data entered for pre-DER connection and post-DER connection faults. If the relay desensitization is >10% but the delay in tripping for feeder end faults in not more than 0.2 seconds, it is okay, DER did not affect the feeder protection relay performance significantly.

SFC v0.0.1

- **Name:** [DER Settings File Creator](#) (public)
- **Primary Developer:** AHM Jakaria (ajakaria@epri.com), P174B
- **Description:** To address the challenges of exchanging DER settings between utilities and DER developers, EPRI and other industry stakeholders developed a standard file format for DER settings. EPRI published a report containing the specifications of the file format and plans to contribute it to the upcoming updates to the IEEE 1547 standards. The file format is a comma-separated values (CSV) format with contents formatted in a standard manner. This software tool helps users to generate CSV files in the standard format in an easy and error-free manner. It runs as an executable on Windows 7 or later.
- **Applications:** Create DER settings file in the common file format.
- **Input Requirements:** None
- **Features:**
  - This tool enables its users to prepare CSV files containing DER settings in an easy and error-free way.
  - It can generate specified settings (SS) and applied settings (AS) files.
  - It can validate existing settings file format.
  - It saves time to prepare a file.
  - It eliminates ambiguity and errors when the settings files are shared between different stakeholders.

CVT v0.1.3

- **Name:** [DER Configuration Validation Tool](#) (public)
- **Primary Developer:** AHM Jakaria (ajakaria@epri.com), P174B
- **Description:** The CVT verifies the configuration settings of DER. It can read all the IEEE 1547-specified settings from a DER and validate them against settings available in a CSV file in the Common File Format (CFF). For reading DER settings, it uses the local communication interface of a DER that supports SunSpec Modbus and/or DNP3. It is also can compare the settings in two separate CSV files that follow the CFF. CVT is a portable software tool built on the Python programming language. It runs as an executable on Windows 7 or later.
- **Applications:** Validate DER settings on site.
- **Input Requirements:** None
- **Features:**
  - Reads all "common file format" settings from a DER's local communication interface.
  - Uses the SunSpec Modbus and DNP3 (Application Note 2018) protocols.
  - Displays values of all settings in the IEEE 1547-2018 format.
  - Compares the values with a CSV file in the common file format.
  - Compares two DER settings file as an offline tool.

EP22I

DER Settings Database (DSD)

- **Name:** DER Settings Database (public)

- **Primary Developer:** AHM Jakaria (ajakaria@epri.com), P174B

- **Description:** The DSD is a public, web-based repository developed by EPRI to support the standardized exchange of DER settings required for interconnection. Authorized utility personnel can upload DER settings files, which are associated with metadata such as DER type, size, and IEEE 1547 performance categories. These files are formatted in CSV and follow standardized naming conventions aligned with IEEE P1547.1. The database enables stakeholders—DER manufacturers, installers, and utility engineers—to search, download, and apply validated settings for DER commissioning and operations.

- **Applications:**
  - Store and share utility-required DER settings profiles
  - Search and retrieve DER settings by region, utility, or DER type
  - Support DER commissioning and validation processes

- **Input Requirements:** *for uploading files*
  - DER settings files in standardized CSV format
  - Metadata including DER type, size, and performance category

- **Features:**
  - Public access for searching and downloading DER settings in the CFF
  - Upload capability for authorized utility personnel
  - Supports offline and online DER configuration workflows
  - Aligns with IEEE 1547-2018 and IEEE P1547.1 standards
  - Facilitates consistent and error-free DER settings exchange across stakeholders

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DER Simulator (SPIDER component)

- **Name:** [DER Simulator](#) (members only)

- **Primary Developer:** AHM Jakaria (ajakaria@epri.com), 174C

- **Description:** The DER Simulator emulates the physical behavior of smart solar inverters, energy storage systems, and EV/EVSE with real-world communication capabilities. The simulator can perform IEEE 1547-based smart inverter functions.

- **Applications:** Perform end-to-end testing of commercial DERMS, DER gateways, VPPs, etc., functionality and interoperability. Support DERMS software acceptance tests.

- **Features:**

  - Emulates the functional behavior of multiple PV, ES & EV inverters
    - ✓ Supports two modes
    - ✓ Live simulation with time-series data
  - Co-simulation with circuit model simulators (e.g., OpenDSS, Cyme)
  - Supports standard functions for smart inverters (IEEE1547)
  - Supports DNP3, SunSpec, IEEE 2030.5 and other open, standard communication protocols
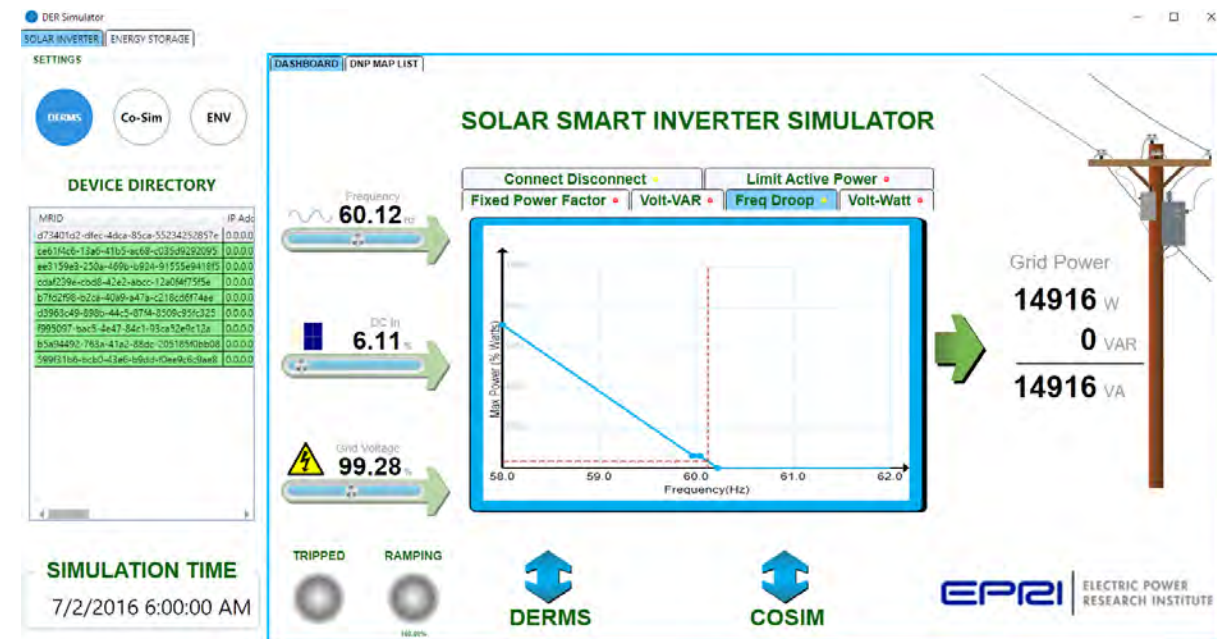
DER Gateway (SPIDER component)

- **Name:** [DER Gateway Reference Implementation](#) (members only)

- **Primary Developer:** Abrez Mondal (amondal@epri.com), 174C

- **Description:** Functional DER gateway software on SEL RTAC and other low-cost platforms for utilities to securely integrate DER with DERMS.

- **Applications:** A prototype DER gateway that can be used for benchmarking and comparison by utilities and manufacturers developing their own implementation. It can be used in field/pilot demos as an edge gateway and also in lab-scale demos to test commercial DERMS.

- **Input Requirements:** Connectivity to upstream DERMS/ADMS and downstream DER.

- **Features:**

  - Reference software developed with open-source tools for DER gateway functionalities including smart inverter operational logics, protocol translation (supports DNP3, IEEE 2030.5, SunSpec Modbus), centralized manageability and cyber security.

  - Deployed on a rugged and versatile commercial hardware; ready-to-use in pilot projects.
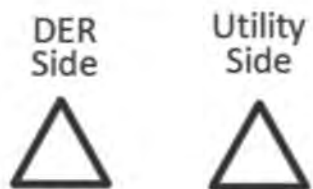
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OpenDERMS (SPIDER component)

- **Name:** OpenDERMS (public)

- **Primary Developer:** AHM Jakaria (ajakaria@epri.com), 174C

- **Description:** OpenDERMS is EPRI's in-house DER management platform that has been successfully deployed in several utility field deployments. With the latest DERMS functions, it supports a wide range of DERMS applications for utilities. The platform has interfaces to communicate with DER, utility enterprise applications (e.g., DMS), ISOs/TSOs (e.g., MMS) and third-party DER aggregators.

- **Applications:** The tool can be used for utility field demo projects, evaluating the deployment of user-defined DERMS control logics, and communication with devices via standard communication protocols.

- **Features:** OpenDERMS is a flexible DERMS with comprehensive features for aggregating and controlling DERs. Its web-based interface, integration with standard communication protocols, and support for custom control algorithms make it a versatile tool for testing, understanding, and developing DERMS functions.
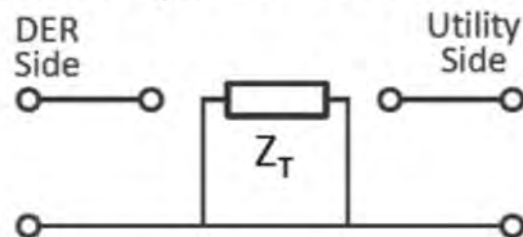
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CYOA

- **Name: DER Decision Pathways (Choose Your Own Interconnection DER Adventure)** (members only)

- **Primary Developer:** Dan Ernstmann (dernstmann@epri.com), P174D

- **Description:** CYOA provides an interface for exploring hypothetical DER configurations and scenarios to educate utility staff about how to address DER interconnection-related challenges. Based on user inputs, the alpha release of this tool produces (1) the DER Reference Point of Applicability (RPA), (2) recommended plant commissioning tests according to IEEE Std. 1547-2018, and (3) applicable fast track initial review screens.

- **Applications:** CYOA allows users to explore utility DER interconnection review processes, which rely on the identification of DER design parameters, distribution system location, topology, and coincident DER capacity. Users input various combinations of these elements to determine the appropriate screens and technical considerations used by EPS owners to establish confidence that interconnections can be made without violating system reliability or safety protocols.

- **Input Requirements:** To support learning, DER and system parameters can be selected or varied by the user to examine resulting changes.

- **Features:**
  - Identification of the DER RPA, recommended plant commissioning tests according to IEEE Std. 1547-2018, and applicable fast track initial review screens base on user-defined plant and grid system parameters.
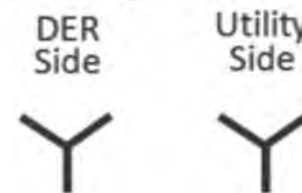 - Visualized results based on plant topology, etc.

DGDV

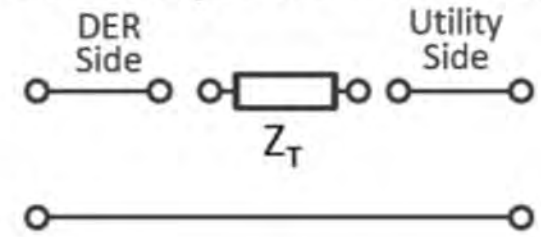- **Name:** [DER Grid Deferral Value DRIVE Module (NWA Screener)](#) (members only)

- **Primary Developer:** Russel Like (rlike@epri.com), P174D

- **Description:** Analyze utility distribution feeders to identify locations that may benefit from the addition of DERs, based on their size, operating characteristics, and other attributes. Results help utilities screen grid locations that are suitable for non-wires alternative (NWA) projects.

- **Applications:** DGDV requires the EPRI DRIVE tool, version 5.0. DGDV assesses the time and locational value of standalone PV, standalone energy storage, and PV+storage systems for deferring grid upgrades due to thermal constraints.

- **Input Requirements:** Circuit models; selection of asset type (PV, Storage, PV+Storage), load growth, DER asset parameters, and economic inputs.

- **Features:**

  - DRIVE contains 1) a DER Grid Deferral Value assessment module for setting inputs and running scenarios, and 2) a results visualization model for analyzing results.

  - Using the same input files as the DRIVE hosting capacity analysis module, alongside user-defined inputs related to load growth, capacity value of PV, capacity value of energy storage, and economics, the DGDV calculates the locational value (value per DER installed cost for deferring thermal upgrades) for every bus on a feeder as well as the corresponding optimal DER size.

  - The resulting locational value and optimal DER size for each location are exported as csv files and are also available to plot in the form of geographical feeder plots.

  - The DGDV can be used for feeder and system-wide screening of DER value.

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DPAT for Cyme

- **Name:** [Distribution Protection Analysis Toolkit for Cyme](#) (members 200D only)

- **Primary Developer:** Aadityaa Padmanabhan (APadmanabhan@epri.com), 200D

- **Description:** Enables the user to configure several performance requirements and then automatically study distribution system protection device performance under a wide range of grid scenarios and fault conditions.

- **Application:** This tool runs within CYME version 7.2 or above.

- **Input Requirements:** Circuit models with protection setting details.

- **Features:** Protection system mis-operation results in unnecessary disconnection of customers, decreased power system reliability, and may initiate or exacerbate cascade tripping and blackouts. The toolkit can be used to identify issues with protection device settings and thus help improve distribution system protection reliability and security.

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DPAT for Synergi

- **Name:** [Distribution Protection Analysis Toolkit for Synergi](#) (members of 200 D only)

- **Primary Developer:** Aadityaa Padmanabhan (apadmanabhan@epri.com), 200D

- **Description:** Enables the user to configure several performance requirements and then automatically study distribution system protection device performance under a wide range of grid scenarios and fault conditions.

- **Applications:** This tool runs within Synergi Electric version 6.3.0 or above.

- **Input Requirements:** Circuit models with protection setting details.

- **Features:** Protection system mis-operations result in unnecessary disconnection of customers, decreased power system reliability, and may initiate or exacerbate cascade tripping and blackouts. The toolkit can be used to identify issues with protection device settings and thus help improve distribution system protection reliability and security.

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TOGETHER…SHAPING THE FUTURE OF ENERGY®

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