

The DER Interconnection Study module within ISM/DEW provides the capability to study any type of generation and storage technology that is being connected to the distribution system. ISM/DEW is uniquely suited to model complex electrical networks of any voltage and complexity. The DER Interconnection module enables the planner to perform semi-automated studies of interconnection requests that are aligned with the IEEE 1547 standards. In addition, the planner can analyze a group of feeders up to and including an entire system to understand the combined effects of multiple DER interconnections. Mitigation strategies and plans are easily developed in the application, including the ability to study multiple options before selecting a final solution design. Several of our customers are particularly interested in the impact on the transmission system from high concentrations of distributed energy resources.

The DER Interconnection Study module interfaces directly with two external providers who predict the amount of solar generation that can be expected based on the location, type and orientation of the proposed solar generator. One of these providers uses satellite weather data to forecast twenty-four hour ahead solar radiance that can be used in operational resource planning.

The DER Interconnection Study performs the following analyses:

- **Generation Time Series Analysis** that runs power flows over annual load patterns utilizing



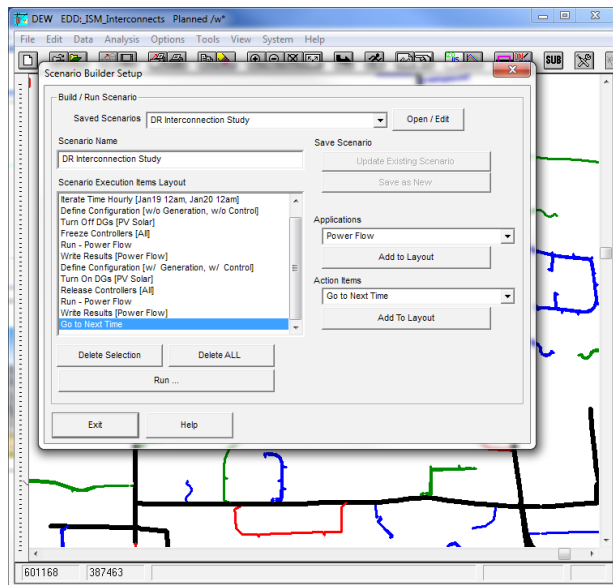
generation sample increments as small as measurement data will support. For instance, Dew comes with normalized PV generation data for every minute for a year from actual field data, and this normalized data may be used to evaluate time varying effects for new installations. Using the one minute sample generation data 1,051,200 power flow runs may be automatically run on a feeder. In the analysis the base case is performed without the new generation and results from the base case are compared against analysis on the feeder with the generation to identify:

- Voltage profiles and differences in voltage profiles between cases
- Counts of the number of operations of control devices and differences in operations between cases along with estimated annual increase in automated line equipment operations
- Islanding of generation including smallest amount of load isolated with generation
- Back feeds
- System constraint violations.

- **Generation Impact Analysis** performs a series of power flow analysis runs associated with loss and restoration of user selected generation types (operating at rated conditions) and load conditions evaluated at both minimum and maximum for a selected feeder. The output is a report addressing maximum voltage variations for both daytime peak and low load conditions for both loss and restoration of rated generation. There are six cases associated with the Generation Impact Analysis, which are referred to as:

- Impact Study Rated Generation Max Load
- Impact Study Loss of Generation Max Load
- Impact Study Restoration of Generation Max Load
- Impact Study Rated Generation Min Load
- Impact Study Loss of Generation Min Load
- Impact Study Restoration of Generation Min Load.

- **Generation Fault Analysis** evaluates the effects on fault current that will result from the addition of new generation. For the fault analysis all generation on the feeder, including new



generation, is operated at rated generation. The output is a report addressing maximum and minimum fault currents, fault types, and fault voltages at points of common coupling and at all points selected by user for display of results. There are two cases associated with the Generation Fault Analysis referred to as:

- Generation Fault Analysis Base Case
- Generation Fault Analysis New Generation.

The DER Interconnection Study module is one of the applications that is making ISM/DEW the “Heart of the Smart Grid”.

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With more than 15 years of experience, EDD partners with companies at the forefront of the electric and power industries to improve operational performance, plan for future requirements and implement next generation designs. Contact us today to get help designing your smart grid solution.

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