Unlocking the potential of DER management on the distribution grid

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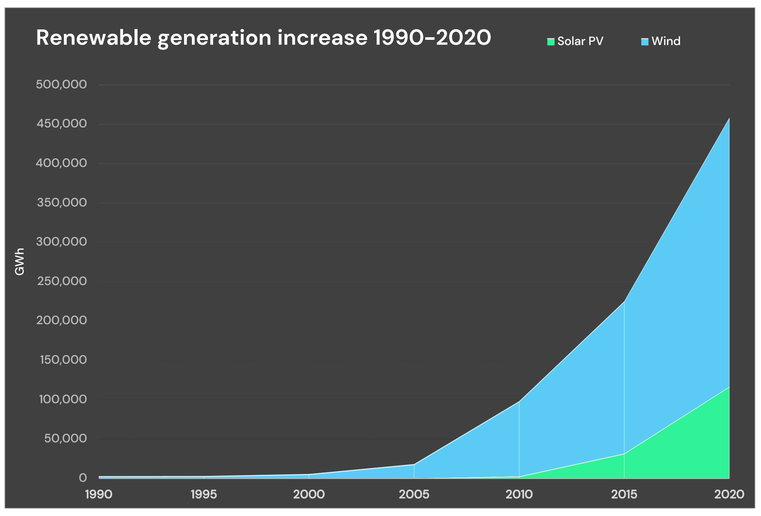
Renewable resources on the distribution grid have long been viewed as having a negative impact, but that assumption is being challenged by today's innovative utilities. With grid modeling powered by data and active control, renewable generation—especially utility-scale renewable generation—can play a positive role in supporting the distribution grid with benefits to both the utility and the customer.

Challenges presented by distributed generation (DER):



Source: IEA Renewables Information https://www.iea.org/data-and-statistics/data-product/renewables-information

Utility

- Voltage fluctuation
- Masked load
- Protection
- Safety
- Power quality
- Equipment life
- Hosting capacity

Customers/Developers

- Return on investment
- Curtailment
- Grid access and available capacity
- Reinforcement costs
- Site viability

Inverter Voltage Management: Potential solution

The new generation of inverters can provide a wealth of information at the DER location, and, in some cases, can be operated remotely to support the grid. There are three modes of operation that are available on most modern inverters:

Monitored inverters report measured data via SCADA and provide valuable insight.

- **Can reveal masked/hidden load**
- **Provides voltage monitoring**
- **Operates in a set configuration**
- **No voltage regulation benefit**
- **Often easy to install requiring only communications set up**

Self managed inverters can be set with a pre-determined power factor or an operational curve, instructing the inverter to generate or absorb VARs under specific conditions.

- **Volt/VAR or Watt/VAR curves can be programmed in**
- **Able to be programmed remotely**
- **Adaptive operation can reduce or sometimes mitigate voltage issues**

Real-time management allows for adaptive response based on current grid conditions.

- **Requires a distribution management system with live voltage management**
- **Requires robust communications**
- **Allows for real-time inverter control**
- **Can result in reduced truck-rolls and wear and tear of voltage management system devices**

Some potential benefits of managed DER

Utility

- Voltage management
- Voltage violation detection
- Customer satisfaction
- Safety
- Reveal hidden load
- Improve load forecasting accuracy

Customers/Developers

- Avoid costs due to upgrades to support interconnections
- Improved hosting capacity = more opportunity
- SCADA verification for protection and billing accuracy