



Enabling Grid Optimization with Behind-the- Meter Appliances

THE CLEAN ENERGY REVOLUTION

There is no doubt that the clean energy revolution is taking place and is expected to continue to grow rapidly. The shift in the energy system can be seen everywhere from corporations and local governments to utilities and even the end consumer. This revolution is causing a significant impact on distribution grids. With just a fraction of the expected supply of distributed solar photovoltaics (PVs), upgrades are needed as supply becomes more variable. Issues such as reverse power flow and voltage regulation management are required. This translates into needed investments in software, systems and infrastructure along with management of billing and rates in order to recoup costs and ensure equity.

In addition to the renewable energy supply influx, there is dramatic growth of electric vehicles (EV) and electric vehicle service equipment (EVSE). In the U.S. alone, it is estimated by 2030 there will be 9.5M Level 2 EVSEs and 100,000 Level 3 Fast DC EVSEs (Navigant, 2018). Where these devices are installed and when they are used poses yet another technical challenge.

To enable grid optimization with the influx of solar PV (distributed, community and power plant generated), as well as the burst of electric vehicle charging, utilities are being faced with new challenges of changing demand peaks, multiple daily peaks, excess supply during the sunny summer days and providing decarbonized energy when the sun sets.

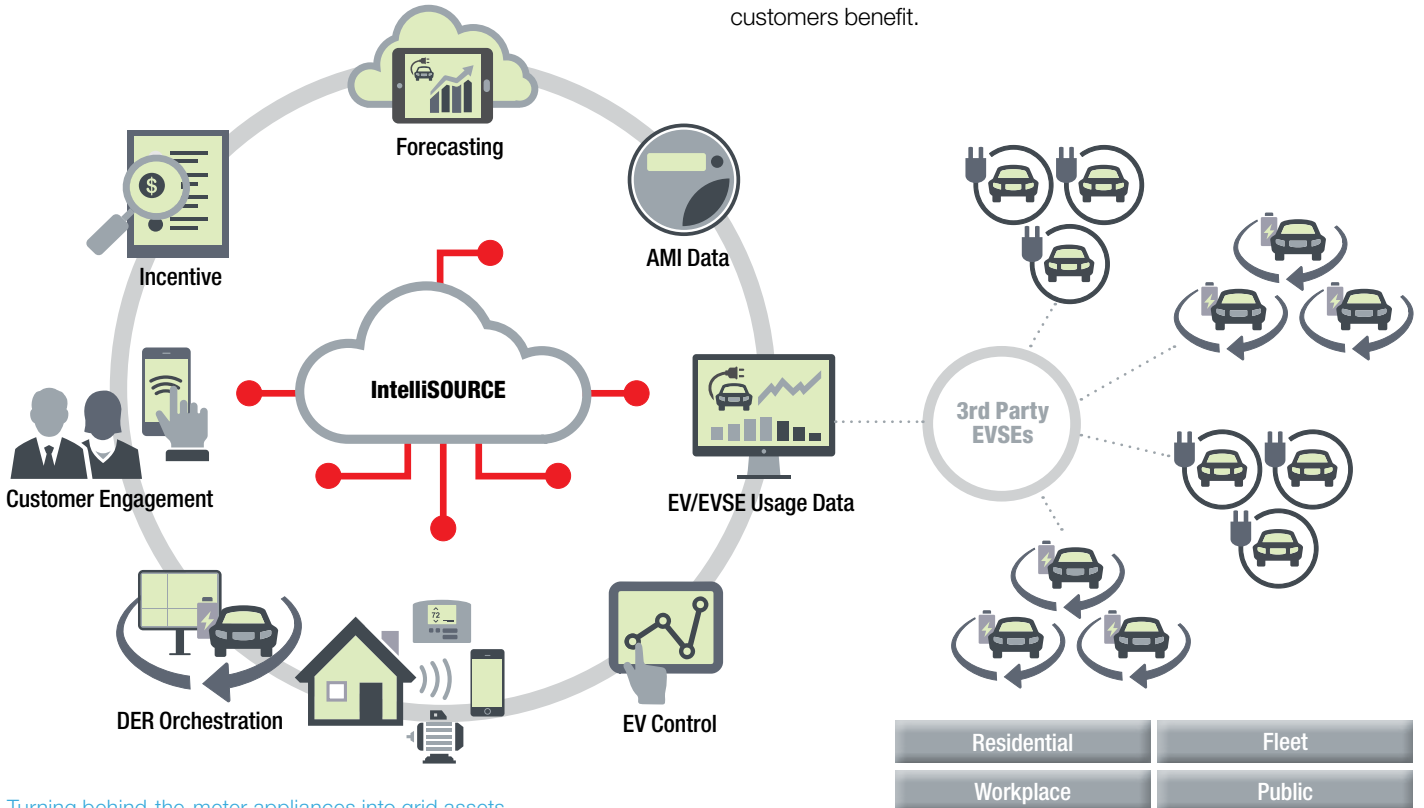
These conditions present opportunities for utilities to deliver a true “win, win, win” outcome.

- » Customers win by paying much lower costs for electric “fuel”.
- » Utilities win with significant base load growth and by offering new services to customers.
- » Society wins by achieving cleaner air and decarbonization objectives.



The Customer to the Rescue

An electric utility’s most valuable asset—their customers—possess the keys to the solution. With a combination of software, attractive rates and smart connectivity to home and business appliances (HVAC, hot water, battery storage, motors and EVSE equipment), utilities will be able to analyze and forecast expected load from the substation to the transformer, and then from the transformer down to the meter, and ultimately down all the way to the individual appliances. In using this information, customer consumption can be orchestrated through offering technology and financial incentives. This promotes the use of energy at specified times by the utility, which ensures that both the customer and utility’s needs are being met. In the past, asking customers to reduce energy usage during peak demand periods and when they needed it was not exactly an alluring value proposition from the customer standpoint. Today, there are many ways utilities can entice customers to invest in behind-the-meter (BTM) technology and services and help them save money on their energy and transportation costs. The customer is the key to enabling the clean energy revolution and Itron can help with the entire lifecycle to ensure that utility client objectives are achieved, and their customers benefit.



Turning behind-the-meter appliances into grid assets



TURNING BEHIND-THE-METER APPLIANCES INTO GRID ASSETS

Itron has the complete program solution for the forecasting of load, analyzing aggregate consumption, identifying vulnerable transformers as well as measuring and monitoring EVSE consumption from all EVSE equipment using open standards. Itron understands the process of how to orchestrate and balance consumption with supply. With our industry leading distributed energy resource management system (DERMS) platform, IntelliSOURCE, Itron supports a myriad of behind-the-meter appliances and leverages them to ensure grid optimization.

SUCCESSFUL OPTIMIZATION OF CUSTOMER APPLIANCES CAN SOLVE MANY CHALLENGES

- » **Protecting Vulnerable Transformers:** As EVs proliferate, they will significantly increase the load for many residential homes, putting new capacity challenges in pockets throughout a distribution grid. With analytics, forecasting, DERMS, customer outreach services and advanced metering infrastructure (AMI) grid intelligence, Itron can more cost effectively manage the load of these transformers.
- » **Maximizing Consumption of Solar Generation and Mitigating Impacts of the Duck Curve:** As solar PV generation grows, getting customers to consume at the right time will require technology as well as services to help customers become part of the solution. Itron has proven we can support customer consumption at the right time, while turning appliances into grid assets, automatically supporting consume and shed strategies that benefit customers and maximize PV generation.
- » **Supply Intermittency Challenges:** Achieving forecasting awareness to support supply variability and then being able to execute mitigation will be key for utilities. Itron is a leader in forecasting as well as demand response to be able to quickly identify ideal loads to curtail and respond quickly.
- » **Economic and Environmental Dispatch:** Aligning variable rates and emergency incentives with automatic dispatch is one of Itron's strengths. When the price is too high for additional capacity, being able to offer variable pricing and have appliances automatically respond is essential to customer satisfaction, participation and grid stability. Itron has operated multiple economic demand response programs over the last 20 years.
- » **Scaling EVSE and Maximizing Value:** Utilities do not want to be in the business of choosing technology winners or losers but want to enable a competitive market for EVSE build out, including Level 3 EVSEs. Itron's expertise in controlling multiple technologies is critical for scale, allowing utilities to be able to measure, monitor and orchestrate the rapid growth of EVSEs in their distribution grid.
- » **Solving Reliability and Metrology Challenges:** Itron offers a ubiquitous path for technology communication and orchestration, including leveraging our private networks provided to our utility and municipal customers. In addition, Itron is the leader in metrology solutions, and supports revenue grade metrology inside L2 and L3 EVSEs, solving communication, reliability and accuracy challenges. In addition, Itron will support the maintenance and overall health of EVSEs to enable utilities to ensure that their investment in EVSEs remains valuable.



SUMMARY

Utilities have a tremendous opportunity to deliver the ambitious objectives of decarbonization in generation with new, distributed clean energy, while maximizing opportunity for electric vehicle adoption in their service territories. The technology exists and future improvements will add to the foundation. A critically important asset in this energy transformation is the utility customer, who already wants to be part of the clean energy revolution, and will benefit with lower energy costs, more energy

efficient and smart appliances, and a better quality of life. Enabling grid optimization with behind-the-meter assets will reduce utility capital and maintenance costs, and will deliver more value to society and their customers.

Itron provides turnkey solutions from analytics and technology to software and customer services to enable utilities to advance distributed energy and decarbonization objectives, while optimizing and enhancing their distribution grids.

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