Welcome to the Active Grid
Where analysis, decisions and action take place quickly at the edge of the network

It’s late afternoon on a hot day in mid-August. In a suburban neighborhood, rooftop solar panels are producing lots of electricity—in fact, more power than the homes they serve require. At the same time, two electric vehicles are charging simultaneously on level-two chargers under a single transformer. People arriving home from work are turning up their air conditioning and cooking dinner. As a result, electricity demand and transformer loading in the neighborhood is headed for the red line from power flowing in both directions.

But something else is happening. Smart meters in the neighborhood—each equipped with a computing platform, robust processing power and peer-to-peer communications capability—are analyzing detailed 1-second data in real time to sense what’s going on with the grid. Guided by a continuously updated connectivity model and running a transformer load management app downloaded over the network, the meters communicate with each other directly to calculate total load on the nearby transformers.

Based on that load calculation and the rated capacity of the transformers—which the smart meters are well aware of—they quickly determine if any transformers are approaching overload conditions, and whether that overload is coming from the line side or customer side of the meter. If overloading is occurring, the app on the meters runs a distributed analytic to determine the most appropriate course of action: whether to curtail controllable loads behind the transformer, or to increase/decrease distributed generation on the customer side.
All this happens quickly, locally and automatically, with summary data provided to utility grid operators over the network. As a result, safe loads are maintained on each transformer by the smart meters working collaboratively and in real time with other devices and assets—load control switches, smart thermostats, DER, EV chargers, energy storage, smart inverters—at the edge of the network.

REDEFINING WHAT’S POSSIBLE

Welcome to a day in the life of the Active Grid. The Active Grid leverages significant recent advancements in Internet of Things (IoT) technology, including distributed intelligence; machine-to-machine communications; multi-application network architecture; cloud computing; and data analytics to deliver an entirely new level of awareness and control in the distribution network. With these capabilities, the Active Grid enables operational and customer service outcomes that were simply not possible just a few years ago.

Itron delivers these and many other Active Grid outcomes through OpenWay® Riva, our next generation IoT solution for smart utilities and cities that builds on our widely-deployed OpenWay technology, which connects utilities to more than 20 million smart meters, grid devices and customers in the U.S. and Canada.

“The utility manages this local power pool and transactions as a service to its customers, creating a new source of revenue in the process.”

But the story doesn’t end there. By running another app in parallel, the smart meters also create and administer a “local power pool” in the neighborhood so that surplus distributed generation can be used locally instead of being wasted in an effort to protect utility equipment.

Using a consumer-facing version of the app running on their smart phone that automates the entire transaction, a customer purchases excess generation from their neighbor at a discounted price to dry their clothes, charge their electric vehicle or cool their home. The utility manages this local power pool and transactions as a service to its customers, creating a new source of revenue in the process.

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The scenario described above represents one or two Active Grid use cases made possible by deploying an IoT-enabled platform and network where smart metering is viewed as an initial application rather than the fundamental purpose of the network.

The ability of intelligent devices to communicate, collaborate and take coordinated action in real time at the edge of the network to solve problems, create opportunities and manage rapidly changing grid conditions, is the essence of any smart grid vision. The Active Grid, through Itron’s OpenWay Riva technology, makes this vision a reality.

ACTIVE GRID REQUIRED INGREDIENTS:

ACTIVE

Every smart meter and grid device equipped with OpenWay Riva technology has the data processing power of a smart phone, enabling analysis of highly-detailed data in real time at the edge of the network. It also provides an application platform to run apps on meters and devices.

CONNECTED

OpenWay Riva technology incorporates a flexible portfolio of communication technologies—RF wireless, advanced PLC, cellular and Wi-Fi—providing communication options for high-performance and assured connectivity in all service environments.

OPEN

Itron has partnered with Cisco to architect the OpenWay Riva solution based entirely on open standards through the Wi-Sun alliance, making it easy to add new devices, applications and services to the network.

UNIFIED

The OpenWay Riva solution supports utility applications across electricity, gas and water, but also smart city applications to make our communities safer, more convenient, more energy efficient and sustainable.
Itron’s OpenWay Riva solution was designed specifically to meet the key challenges utilities face today: running a more efficient, reliable and safer grid; accommodating more distributed generation into the resource mix; transforming and personalizing the customer experience; and creating new business and revenue opportunities for the utility.

In fact, we’re confident that the Active Grid capabilities of our OpenWay Riva technology can increase your smart metering business case benefits by up to 50 percent, based on implementation of the first few Active Grid apps, with additional upside from there based on expansion of grid- and customer-facing applications from both Itron and a growing ecosystem of developers.

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YOU CAN DO THIS

The Active Grid redefines what’s possible for smart metering, grid operations and customer service. Imagine if you could:

» Accelerate outage detection and analysis, and eliminate reliance on customer calls for understanding outage conditions

» Always know exactly which distribution assets your smart meters are connected to through a continually updated and accurate connectivity model

» Detect high-impedance connections or “hot spots” on your lower voltage network before they become a safety or fire hazard

» Disaggregate customer loads in real time with pinpoint accuracy without any specialized equipment or back-office statistical modeling

» Quickly detect and locate grid problems such as broken neutrals or loss of primary phase

» Improve the accuracy of energy theft detection by 300 percent to increase recoverable revenue

» Provide each of your customers a customized set of services by downloading and running apps that reside on each meter

» Create new service and revenue opportunities by partnering with other utilities and municipalities for meter reading and smart city services

THE ACTIVE GRID = BETTER BUSINESS OUTCOMES

The OpenWay Riva solution provides the Active Grid technology platform to accelerate digital transformation in an increasingly challenging business environment. By leveraging advances in technology, such as distributed intelligence and machine-to-machine learning, the Active Grid goes far beyond current smart metering offerings to unlock entirely new sources of value.

The Active Grid is where smart grid, smart cities and IoT come together. We look forward to continuing the conversation.

* per customer per year

Our analysis shows the Active Grid capabilities can increase your annual smart metering business case benefits by up to 50 percent just by utilizing 3-5 initial distributed intelligent apps for grid efficiency, reliability and safety.