Electricity Grids Under Siege. Novel DATA to the Rescue.

There is nothing novel about the importance of data. Nearly everywhere we turn, there is another article about data, data breaches, data security improvements, data value, etc.

What **IS** novel is the type of data that is now available…specifically, for our electric utility operators.

But why is "*novel data*" so important for grid operators?

*Because today, our **aging grids** are increasingly under siege from accelerating unplanned grid-edge impacts, and never-imagined Reverse Energy from Distributed Energy Resources, and Cybersecurity risk, and Clean Energy mandates, and Fire Risk. Operators are required to ensure exceptional grid Reliability while never-envisioned grid-edge pressures are escalating at unprecedented levels. Without Novel DATA, operators will struggle to keep pace. **Serious problems, costs, and potential disasters are now looming.***

Since the first electricity distribution grids were constructed (i.e., 65 - 100 years ago), utility operators have largely been relegated to reactionary grid management practices. Very simply, cost-effective technology has never existed to provide necessary intra-grid awareness and insights to operators. While extensive investments in substation upgrades and smart meter deployments have helped to provide data, operators have continued to be hamstrung by the lack of intra-grid understandings. This is not a utility-specific problem; it is a global electric utility industry problem, historically endured by all operators. And now that our grid assets are undeniably aging, our grid-edge challenges are real.

All distribution grids suffer from similar unknown, ongoing intra-grid conditions and problems. The more progressive the grid-edge activities and Clean Energy demands being placed on any specific grid, the more dynamic the unknown intra-grid conditions that exist, and are negatively manifesting.

The grid architecture which connects our substations to endpoint meters is the most expansive, most vulnerable, most volatile, and therefore the most dynamic segment of the grid. Yet, this same area is by far the least monitored, and therefore is the least understood.   The US distribution intra-grid consists of over 6 million line-miles of cable, millions of power poles, and over 40 million transformers under utility supervision.   Similarly, Ontario's LDCs manage approximately 490 thousand distribution transformers. In both jurisdictions, the transformer fleets now age 30-40 years old. Intra-grid conditions are continuously fluctuating within this intra-grid segment; traversing in and out of desired or safe tolerance ranges. Not until a trouble call or an outage is reported do utility operators typically have awareness of most intra-grid problems.
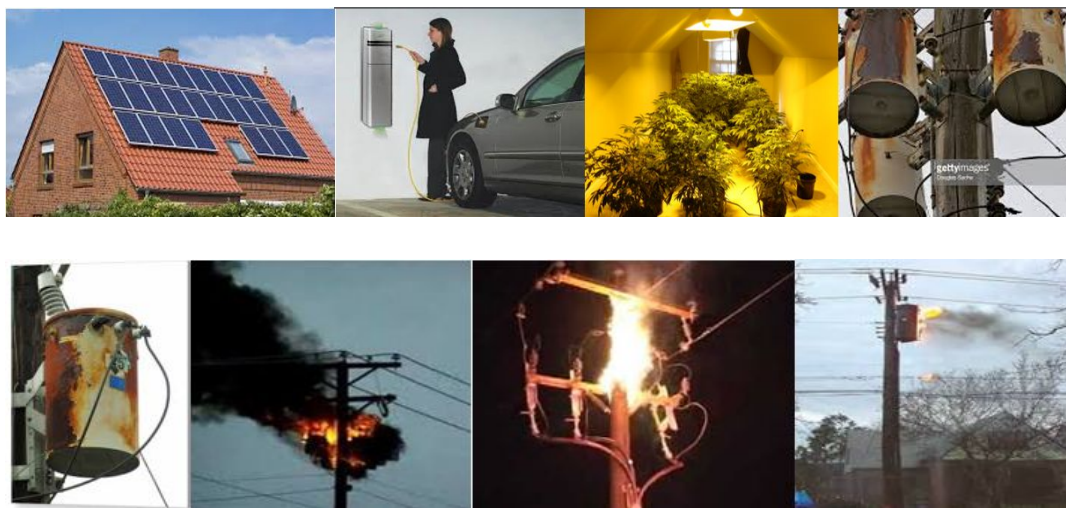
Advanced Transformer Infrastructure (ATI) presents a game-changing solution for safe and reliable grid management. After decades of being relegated to reactionary practices (i.e., trouble calls, outage reports), operators now have access to accurate, timely, granular, unique intra-grid data. In just minutes, dumb-asset transformers are converted into valuable intelligent nodes via time-proven, field-proven, revolutionary ATI technology. ATI drives actionable data; creating proactive grid awareness.

Novel intra-grid data will be required by grid operators to ensure necessary grid Reliability, facilitate the safe adoption of DER and Electric Vehicle charging stations, improve Energy Efficiency, enhance Cybersecurity protections, facilitate Artificial Intelligence, and lessen our risk of Asset Fires/Wildfires .

To safely and reliably establish Grid Modernization, Regulators and ratepayers will need to support the necessary investment in **Advanced Transformer Infrastructure (ATI)**. Knowing that DATA is fundamental to progress, we need to support our operators by ensuring they have exceptional data access. Without novel intra-grid data, we risk increased power outages, problematic clean energy adoption, increased fire/wildfire risk, decreasing energy efficiency, and increased operator liability risk as PG&E's bankruptcy example has unveiled. Cost-effective technology has commercially evolved via Advanced Transformer Infrastructure, thereby providing operators with a clear path for achieving genuine Grid Modernization.

Simply "keeping the lights on" is no longer the sole or primary charge of our operators. Today, operators are somehow expected to *simultaneously* keep the lights on, achieve decarbonization, welcome countless grid-edge developments, manage these grid-edge developments without awareness of where/when/how much unplanned demand burden is occurring throughout the expansive residential level, plus protect against cybersecurity threats, deter asset fires/wildfires, improve Reliability, and improve grid Resilience. ***Think about that!***

This 'new era' list of expectations tossed upon our operators is substantial; and is impractical without intra-grid DATA. The best way to help operators achieve grid Reliability while helping to ensure successful Fire Mitigation needs is to afford them critical intra-grid visibility. The novel data presented by ATI will enable operators to leverage actionable information, receive Automated Alert messages, and facilitate an evolving grid management process. Advanced Transformer Infrastructure simultaneously delivers on all of these key points, thereby enabling operators to meet the perpetually changing demands and expectations associated with our present and future grid challenges.

Unplanned Grid-edge impacts are real…Aging Grid Infrastructure is real…Asset Fires/Wildfires are real.
Advanced Transformer Infrastructure (ATI) is the next *necessary* step in Grid Modernization.