Self-healing grids & the future of Smart grids in Nigeria

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3D+E equation redefining the energy world

**More ELECTRIC**
48% incremental electricity demand in 2040 compared to 2020

**More DIGITIZED**
20X more incremental connected devices than connected people by 2020

**More DECARBONIZED**
82% of the economic potential of energy efficiency in buildings (and more than 50% in industry) remains untapped

**More DECENTRALIZED**
70% of new capacity additions will be in Renewables by 2040

Sources: IEA WEO 2014
Sources: Cisco, Internet World Statistics
Sources: World Energy Outlook 2012, Internal Analysis
Sources: BNEF
Major implications & Possibilities

DER integration.
What if you could integrate endless DER and supply green energy at superior consumer value, while minimizing investments and strengthening grid safety, reliability, and efficiency?

Changing Revenue Model.
What if you could put off capital investments and slash O&M costs, while smoothly adopting a model that solidifies your utility’s future?

Network losses.
What if you could cut network losses and supply energy at a fairer cost?

A self-healing grid.
What if you could shrink the impact of severe weather events with real-time information, fast automation, and integrated outage response?

Digital grid management.
What if you could leverage artificial intelligence to optimize operations and planning?

Cyber risk.
What if you took a holistic, multi-faceted, risk-based approach to fight cyber attacks that can damage or destroy key network assets?

Data as the new energy.
What if you could create data-driven relationships with your customers and fend off commoditization by new players, such as digital B2C giants who could offer free energy in exchange for personal data?

The new energy consumer.
What if you could turn prosumer into partners with comprehensive behind-the-meter services?

What if you could organize and operate local energy communities?

THINK ABOUT IT
Power industry is facing unprecedented changes

Increasing Complexity Ahead

From simple value chain ....

.... to a complex system with new rules
What are Utilities looking for?
Flexible and stepwise Digital Transformation to power the world's economy

Grid efficiency
- Network reliability
- Network management optimization
- Asset life-cycle management
- DER integration

Demand management
- Demand response, flexibility services
- Energy communities and microgrids
- Customer Engagement

Digital transformation
- Digitized infrastructure and workforce
- Internet of Things
- Cybersecurity
Connected devices, real-time control & open software, analytics & services

Open Data Management for seamless IT/OT convergence
The average annual economic cost of power outages caused by severe weather in the U.S. is $18-33B—and even higher as the weather gets worse.

FLISR operations can reduce by half the number of affected customers and total customer minutes of interruption.

What if you could shrink the impact of major storms and outage events with real-time information and fast automation?
FLISR operations with Self Healing Grid solution

Your challenge
“I want to reduce outage time in selected areas”

Our solution
• Peer to Peer communication between T300 installed in each MV substations
• Fault location, isolation and service restoration within 1 minute (to reduce SAIDI)
• Cost-effective modernization using off-the-shelf products
• Flexibility and ease-of-configuration through decentralization

Your benefits
• Ease of scalability and replicability
• Reduction of customer minutes interruption by half during a outages
Customer case: Self-Healing Grid

Oshawa Power Utilities Corporate (Canada)
Operating a distribution network that stretches across Oshawa in Canada with 521 Overhead line, 450 km Underground line with 220 MW peak demand, owner and operator of co-generation and solar generation

Challenges:
• Although faults in underground networks are rare, when they do occur they can be difficult to locate and typically have long restoration times (Average SAIDI = 75mn / year, SAIFI = 1,26/year)
• Re-energize your underground grid faster with self-healing capabilities

Power is restored to the majority of customers on a feeder in < 1 min
• Easergy T300 units communicate automatically to find the fault, isolate it, and re-energised the unaffected areas of the grid.
• Control center is notified of a fault, but no operator answer required

“Underground network reliability out of sight but very much top of mind, need for Self Healing for underground, the faulty part of the grid will be automatically isolated and the healthy part stays energized or will be re-energized automatically”
Customer Challenge
• Reduce unscheduled maintenance
• Move from reactive to proactive maintenance
• Monitor health of critical assets in real time
• Gain advanced warning of equipment issues

The Solution
• EcoStruxure™ Asset Advisor*

Customer Benefits
• Early warning identification of equipment problems
• Improved equipment reliability and performance
• Better maintenance planning and cost control
• Dynamic insights and deep-dive diagnostics

The Results: Life is On with...

Estimated cost savings of $270,000

“We found EcoStruxure Asset Advisor to be an effective tool in the predictive diagnostics space for detecting functional deviations and impending failures at an early stage for initiating suitable prioritized maintenance actions for enhanced reliability of critical power plant equipment”.

Praveen Chorghade, Chief - Core Technology and Diagnostics, Tata Power

Download Center link
*Formerly known as Avantis PRISM

TATA Power, India
Monitoring health and performance of critical assets

One of the largest integrated power companies in India with 8,750 MW of installed capacity & 9,100 MW under development

EcoStruxure Asset Advisor

Connected products

Edge control

Innovation At Every Level

Apps, analytics, and services

for Infrastructure

Download Center link

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Customer Challenge
- Reduce risks of severe weather
- Use data for better operational decisions
- Reduced carbon emissions

The Solution
- EcoStruxure™ ADMS
- EcoStruxure™ Substation Operation
- Easergy T200 Remote Terminal Unit

Customer Benefits
- Better response to severe weather conditions
- Enhanced customer communications about outages
- Reduced peak demand and minimize system loss

The Results: Life is On with...

Target Customer Satisfaction of 82%

“Creating a resilient grid is critical to reducing the nation’s vulnerability to severe weather”.

Austin Energy
Customer Challenge

- Adoption of innovative technologies to improve the city operations
- Provide real-time data on operations and maintenance of city infrastructure and services

The Solution

- Integrated Command & Control Center (Wonderware System Platform)
- End to end SMART grid solution (FRTUs, RTUs, SCADA, DMS & OMS)
- End to end Water Management system (Field Instruments, sensors, PLCs, Water SCADA, WNO and WMS)
- Integrated Building Management System with associated H/W

The Results: Life is On with...

More than 100,000 connected products

“It is a happy moment for us today as the Naya Raipur Smart City project takes off with the consortium and our partners. This is a unique project, one whose organic growth we shall pursue aggressively. The project shall be spread across verticals and integrate these diversified segments and I look to our dynamic team to make this real in a short span of time”.

Rajat Kumar, CEO
Naya Raipur Development Authority

India’s 1st greenfield smart city supported by connected products of more than 100,000 IO points, edge control, applications, advance analytics, and services

Apps, analytics, and services

Command & Control Center
Asset Management
Advance Distribution Management System

Edge control

Electrical SCADA,
Water SCADA
Building Management System

Connected products

FRTUs, RTUs,
PLCs, Instruments & sensors
Building sensors
Cameras

Naya Raipur, India
First integrated smart city in India
Powering the Digital Economy