DER Management Systems Overview

Prepared for:

September 2014
1) About GTM

2) Understanding DER Management
   - The Distribution Grid
   - The DERMS Concept
   - Vendor Ecosystem

3) An Overview of North American DERMS
   - North American Deployments
   - DERMS Market Size and Forecast
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  - 29,000 Grid
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- Stands at the forefront of the clean energy industry with specific expertise in solar power, the Smart Grid, advanced transportation, and energy efficiency

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Omar Saadeh is a Senior Grid Analyst at GTM Research. He has completed the requirements for a Master of Engineering in power engineering at McGill University, where he was awarded a Graduate Excellence Fellowship and contributed as a staff writer to The McGill Daily. As a bilingual English and French speaker, Omar was a building efficiency sales associate at Johnson Controls in Montreal prior to grad school.

Omar holds a bachelor’s degree in electrical engineering from McGill University with a concentration in power engineering and minor in economics. He has published research for the Institute of Electrical and Electronics Engineers (IEEE) and the Conseil International des Grands Réseaux Électriques (CIGRÉ), focusing on the advantages of plug-in electric vehicles and economic dispatch of distributed resources in microgrids respectively.
Client Snapshot

CLIENTS

PRESS

The Economist
Chicago Tribune
San Francisco Chronicle
USA Today
Newsweek
Bloomberg
CNN
The Wall Street Journal
Wired
Fox News
The Huffington Post
Financial Times
Understanding DER Management
Evolution of DER Management

- Centralized Management
  - T&D integrated DERMS
  - Full System Visibility
  - Addresses local and global requirements
  - Virtual Power Plants (VPPs)
  - DR Management Systems
  - DERMS
  - Concentrated DG, Silo’ed DR
  - Microgrids
  - Addresses local requirements

- Local DER Management
  - Traditional
  - Bulk Generation
  - Predictable Loads

- Regional DER Management
  - Time

NY, HI, CA, and MA Lead Regulatory Overhaul

Popular “New” Regulatory Tools

Laying the Ground Work for Revolution

- Regulators are considering the effects of distributed energy resources on rates, reliability, revenue, and regulation.
- New rate structures, deployment of technology by fiat, and the further extension of the energy and power market into the distribution grid are likely to follow.
Implementing DER Management Systems

Level 3
- Demand and Supply
- Locally Optimized DERs

Level 2
- Generation Assets
- Locally Optimized DERs

Level 1
- Integrate Bulk Renewables
- DSM to “smooth out” intermittencies

Opportunities

Cost & Risk Reduction

1. Deferral of New Infrastructure
   - Enable DG Market Participation (VPP, DER Marketplace)
   - Simple Interconnection Process

2. Technical Losses
   - Market DSM Up/Down Flexibility
   - Economic Incentive Signals

3. Peak Demand Charges
   - Dynamic Balancing
   - Load/Gen. Following Resources

4. Fuel & Electricity Costs
   - Rapid Data Management
   - Volt-VAR Support

5. Outage Risk
   - Leverage Existing Distributed Assets
   - Reduced Spinning Reserve Requirement Due to DERs (i.e., Storage)

DR Revenues

- Market DSM Up/Down Flexibility
- Economic Incentive Signals

DG Electricity Sales

- Simple Interconnection Process

Renewable Smoothing

- Dynamic Balancing
- Load/Gen. Following Resources

Ancillary Services

- Rapid Data Management
- Volt-VAR Support

DERMS Vendor Ecosystem

Dr-Driven DERMS
- DMS Derived
  - ALSTOM
  - SIEMENS
  - VENTYX
  - COATI
- DR Aggregation
  - vitality energy
  - ENERGOC
  - enbala
  - LA (Integrity Analytics)
  - converge

Mixed Asset DERMS
- DMS Derived
  - ALSTOM
  - SIEMENS
  - COTII
  - bpt

Microgrid DERMS
- MGCC
  - ENCORP
  - Eaton
  - ABB
  - TOSHIBA
  - GE
  - HITACHI
  - IPER
  - Lockeed Martin

Substation, Pole Mounted
- TOSHIBA
- HITACHI

Distributed Intelligence
- LOCALGRID
- Spirae
- enbala
- smarter grid solutions
- COTII

DERMS Integrator
- IBM
- accenture
- leidos

Data Mgmt. Middleware
- LOCALGRID
- smarter grid solutions
- CISCO

Applications and Analytics
- smarter grid solutions
- bitstew

An Overview of North American DERMS
The current NA DERMS Market Expenditure (2009 – Q3 2014) is approx. $250M.

- A majority of the projects have received stimulus funding, most notably from ARRA funding.
- The $57.4M DERMS project with Spirae is the 1st NA deployment to be launched out of necessity and without stimulus support.

Current DERMS Market Size

Thank You

Questions?

Upcoming GTM Research (Sept. 30) –
Distributed Energy Resource Management Systems 2014: Technologies, Deployments and Opportunities

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