Application of an ADMS (Advanced Distribution Management System) for Hydro One

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1,5 million customers (meters)

Project Drivers:

- DG Management
- Safety and security of switching operations
- Volt/VAR optimization
- Fault management and service restoration
- Mobile DMS – Field Switching
- FAT completed
- SAT – Starts July 2012
- Go Live – Nov 2012

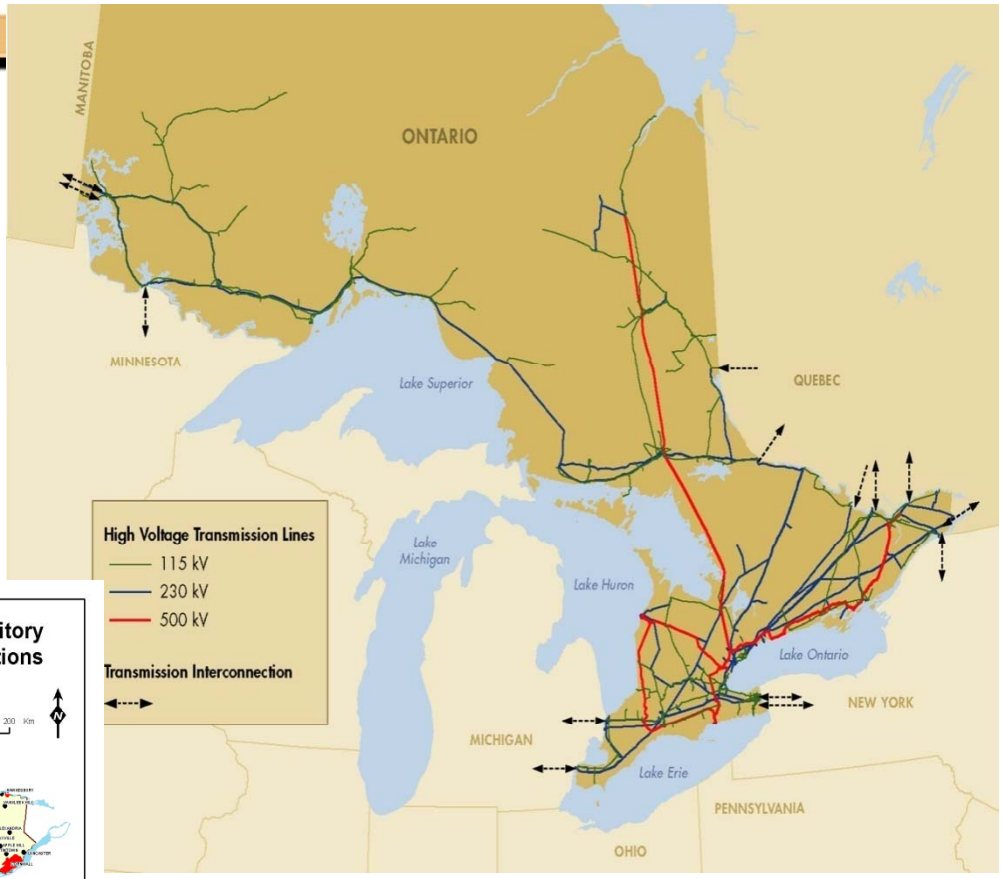
Transmission:

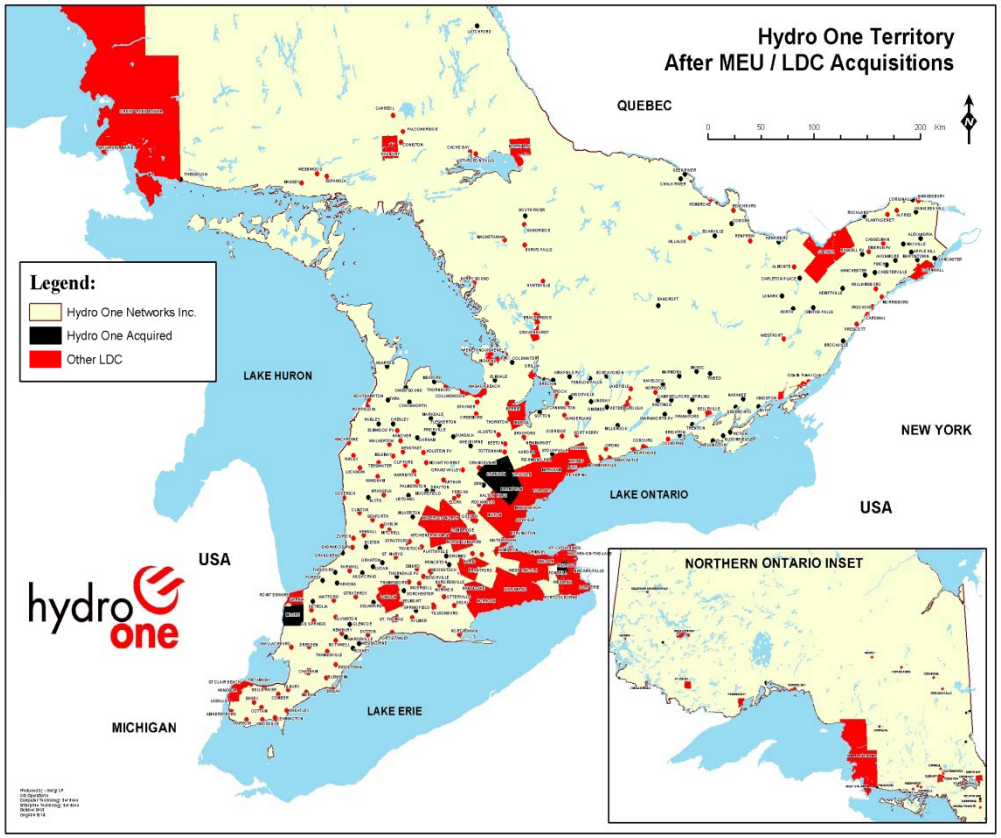
28,600 (circuit - km) interconnected

85,000 towers, 4000 km fibre

Peak demand: 27,005 MW

Energy transmitted: 157 TWh





Distribution:

123,000 km of distribution lines,

1.8M poles, 1.3M customers,

640,000 sq km service territory
(twice the size of Texas)

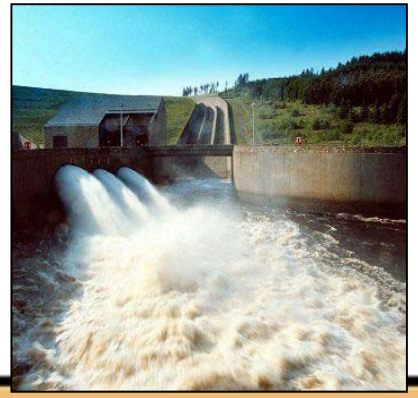
acquired 90 utilities since 2000

(still about 90 utilities left)

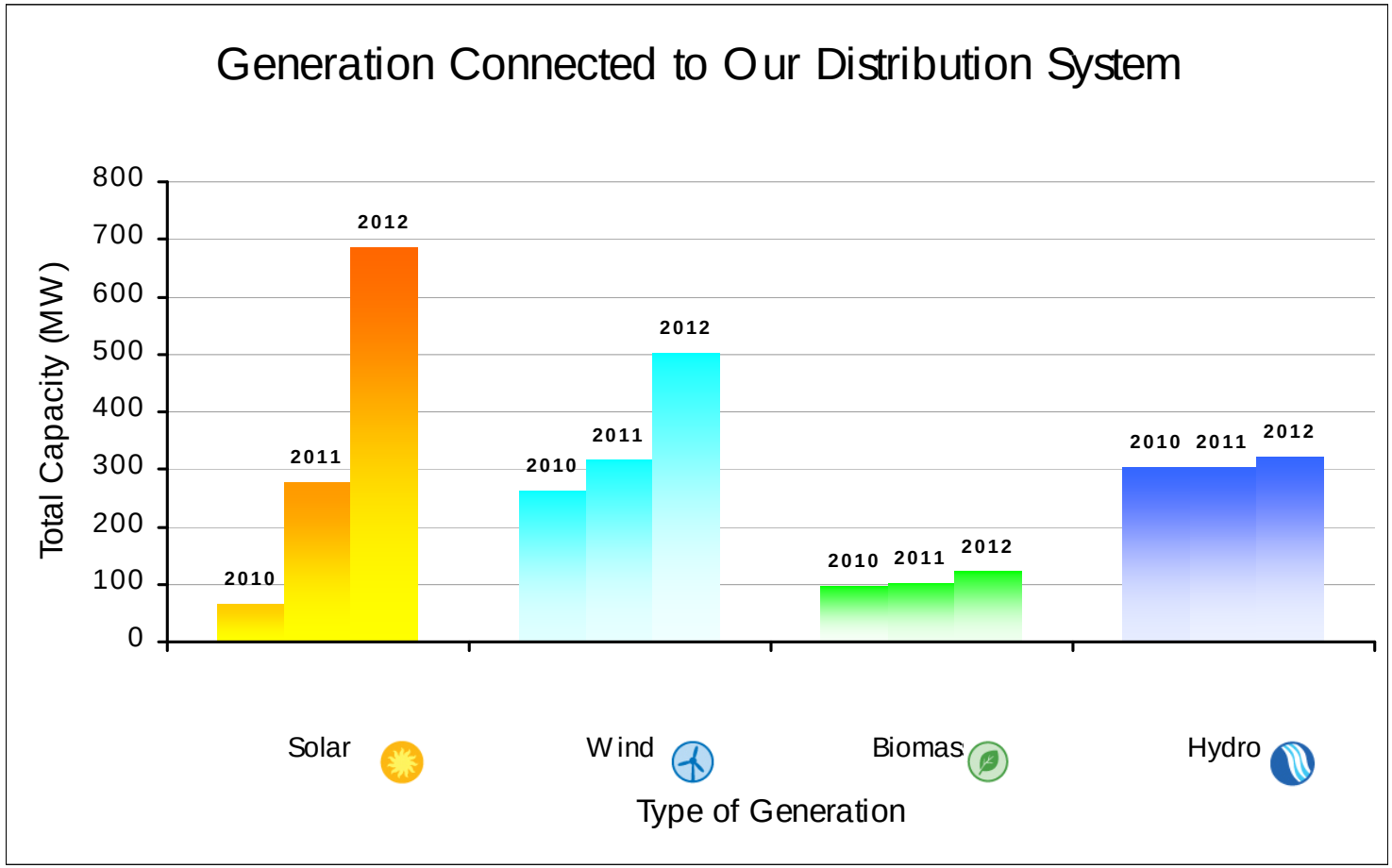
The Ontario Situation

- *Green Energy and Green Economy Act 2009*, laid the framework for the Feed-in Tariff (FIT) Program.
- Two program streams: **FIT** and **microFIT (<10kW)**
- North America's first comprehensive guaranteed pricing structure for renewable electricity production, open to ***anyone***
- Offers stable prices under long-term contracts for energy generated from **solar, wind, waterpower and bio energy**



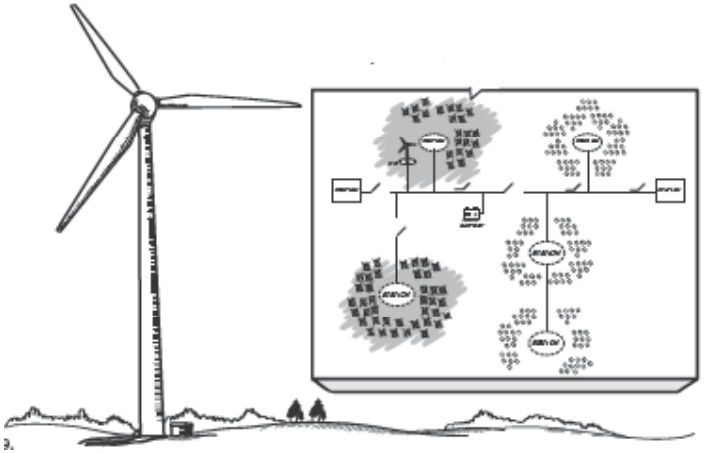



Connecting Renewable Energy



ADMS – Business Requirements

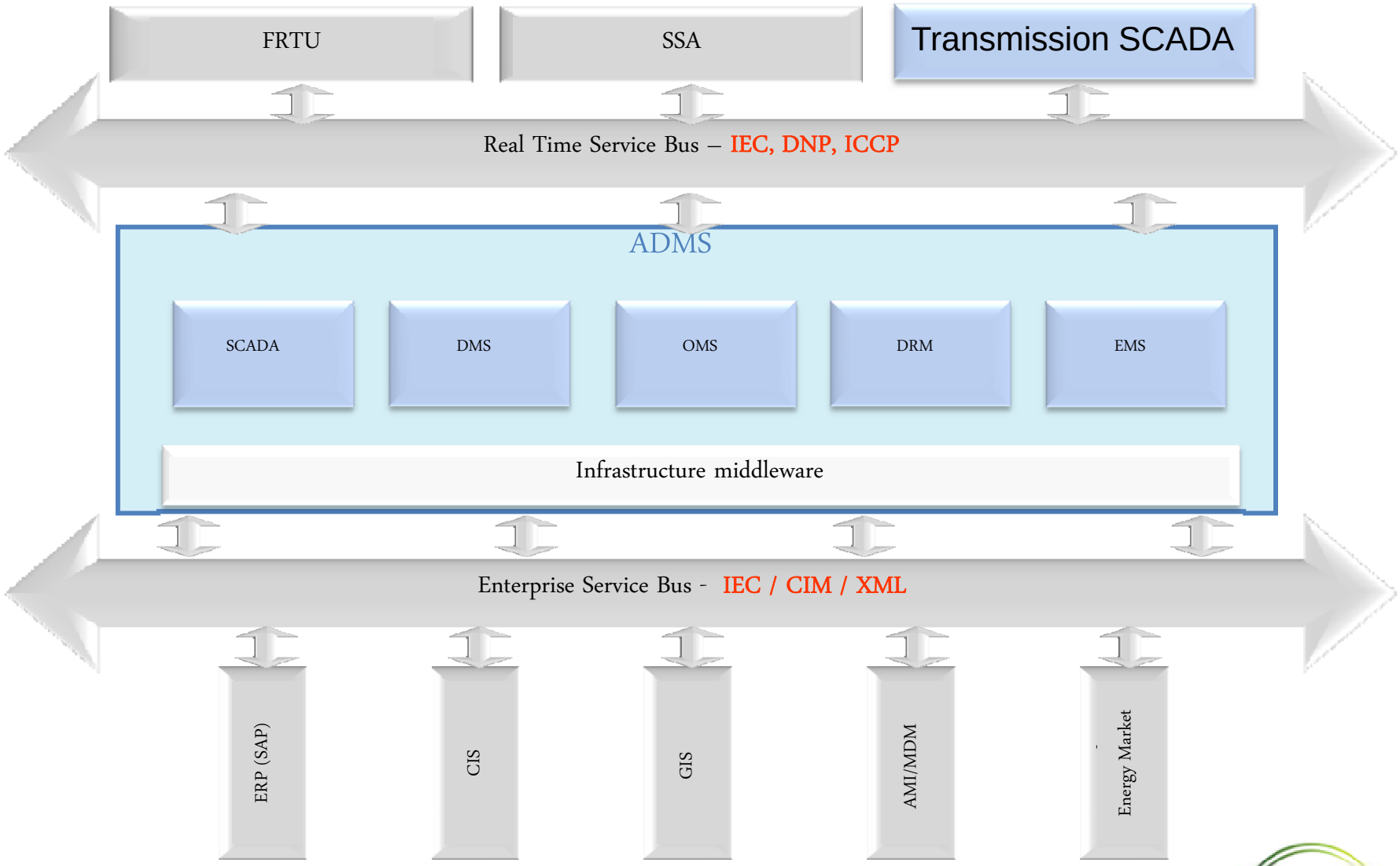
Distributed Generation (DG) Integration

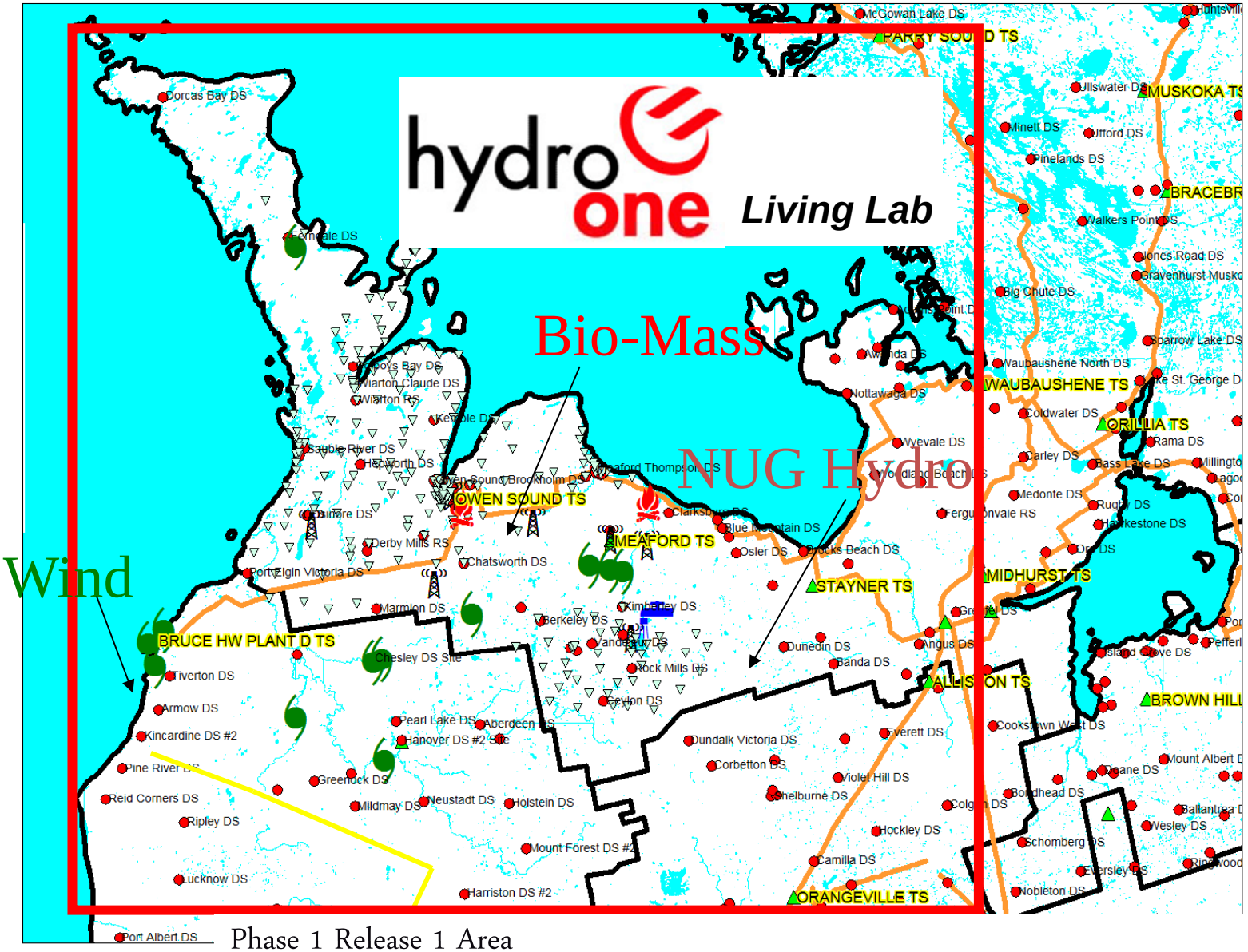


- Increased DG Connections to Hydro One distribution system as a result of the Ontario Green Energy Act

- DG Objectives include:
  - Automation
  - Dispatch
  - Monitoring

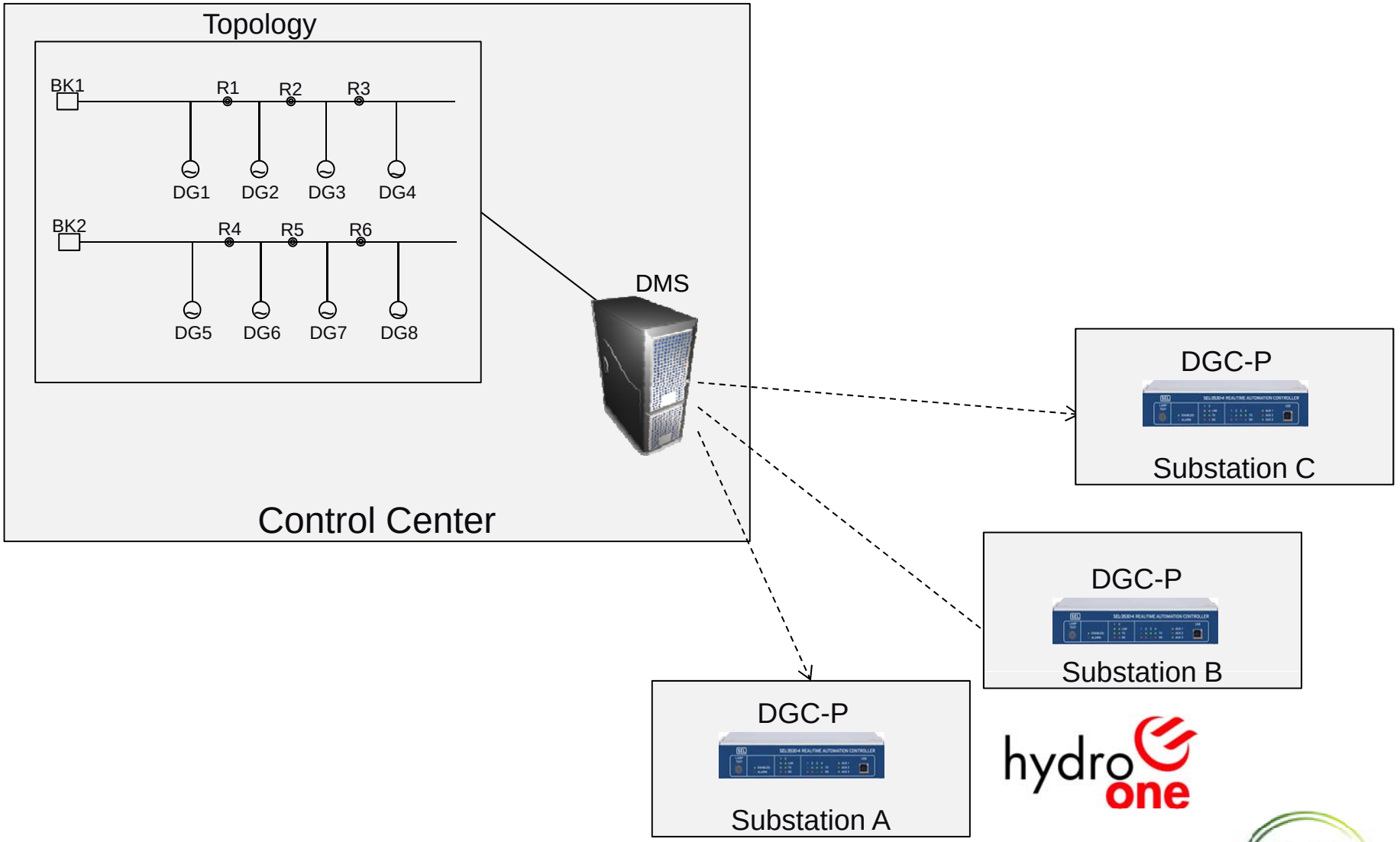
ADMS – general architecture





Phase 1 Release 1 Area

Solution Overview



Telvent Advanced DMS – Hydro One Platform

- Unification of DMS, OMS, and SCADA
- Comprehensive real-time network management solution

Control

- Fault Management (FLISR)
- Switch Order Management
- Under-load Switching
- Large Area Restoration
- Load Shedding

Optimization

- Volt/VAR Optimization
- Network Reconfiguration
- Short-term Load Forecasting
- Demand Management
- Distributed Energy

Analysis

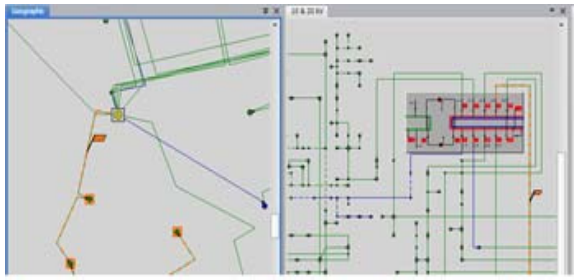
- Energy Losses
- Fault Calculation
- Reliability Analysis
- Relay Protection
- Breaker/Fuse Capability

Planning

- Med-term Load Forecasting
- Long-term Load Forecasting
- Network Automation
- Network Reinforcement
- Optimal Device Placement

Training

- Dispatcher Training Simulator

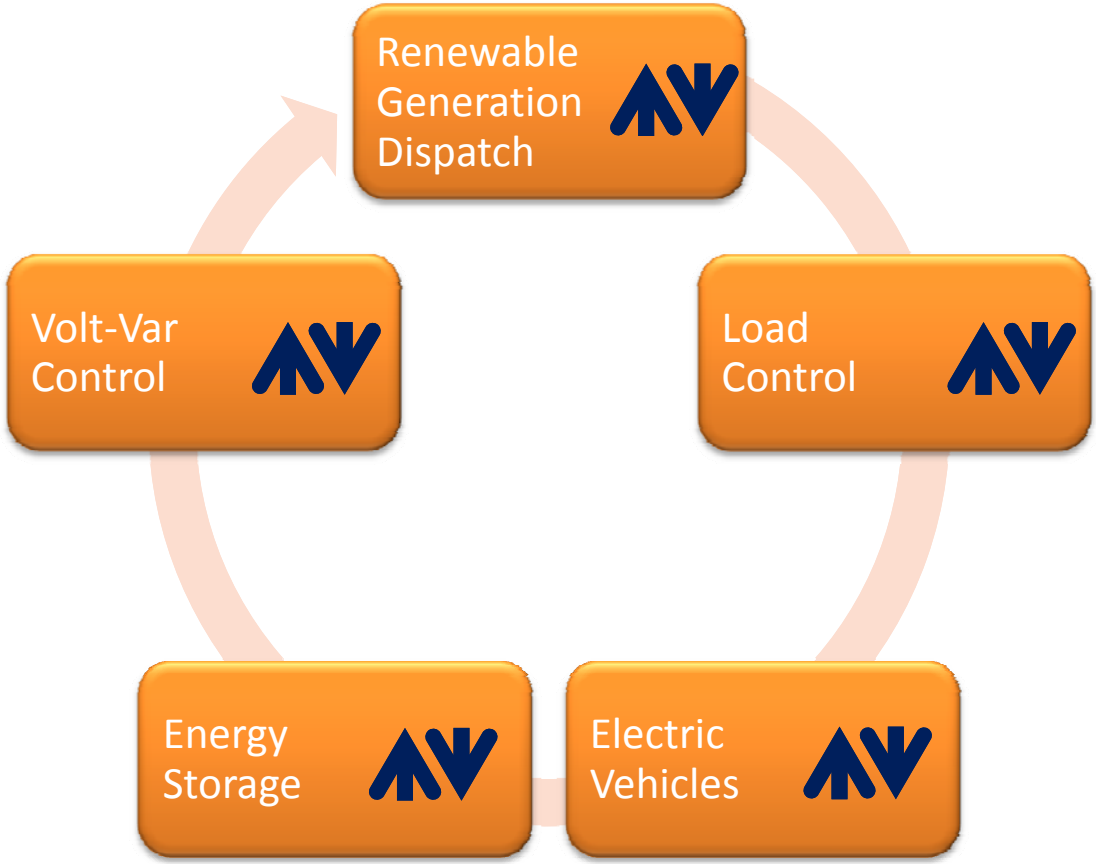


Outage Management

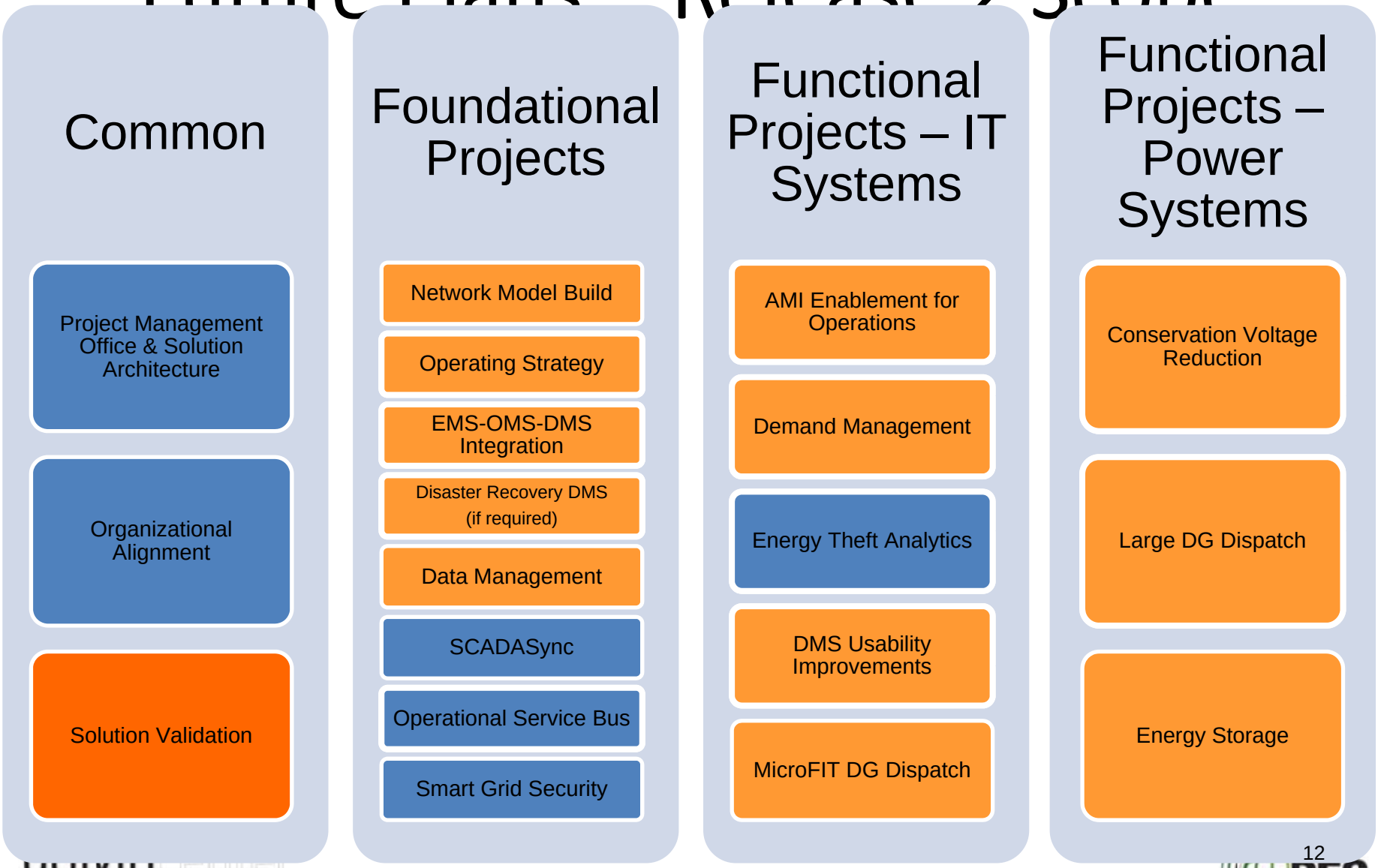
- Call Taking (CIS-IVR-AMI)
- Outage Prediction
- Crew Management
- Indices Reporting

Hydro One - Vision

Enable Set of Operational Levers to Manage Energy and Optimize the Distribution System



Future Plans - Release 2 Scope



Release 2 Benefits

Release 2 Investment

- AMI Enablement for Grid Operations
- Demand Management for Consumers
- Energy Theft Analytics
- Conservation Voltage Reduction Pilot
- Operational Service Bus
- Large DG Dispatch Pilot
- MicroFIT DG Dispatch Production
- Energy Storage Control Systems
- SCADASync
- DMS-based FLISR Pilot
- Standards – P&C & Lines
- OGCC /Field Operating Strategy
- WiMAX Infrastructure

Direct Benefits

- AMI Enablement for Grid Operations
- Energy Theft Analytics
- MicroFIT DG Dispatch
  Meet DG Enablement Mandate
- Productivity Improvement

Foundation for Future Benefits with Rollout

- Conservation Voltage Reduction
  Reduce customer energy consumption
- Reliability
  Improve SAIDI by 60 mins
- Large DG Dispatch
  Meet DG Enablement Mandate
- Demand Management for Consumers
  Contributes to CDM Targets
- Energy Storage
  Meets DG Enablement Mandate