

Distribution Roadmap Initiative in Manitoba Hydro

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- 24 utilities (including MH) in CEATI DALCM Interest Group sponsored a study by Capgemini to look at the utility environment in the future and how utilities can prepare for it
- Study looks at the near future, the medium future and long term future (2010, 2015, & 2025)
- 4 reports are produced
- Many utilities are already doing something
- Manitoba Hydro has initiated several projects that have long term significance

A number of utilities are:

- Developing road map plans
- Developing & Implementing DA
- Developing & Implementing AMI
- Developing & Upgrading IT solutions
 - Customer databases
 - Outage Management Systems
 - Work Management Systems
 - others

What Manitoba Hydro needs is

- Determine our issues
- Develop a Coordinated Approach

- Government owned
- Monopoly of energy supply
- Mostly hydro generation – relatively cheap
- Population growth not too fast
- Population spreadout – large service area

- 1. Technology**
- 2. Customers**
- 3. Workforce**
- 4. Regulatory**
- 5. Assets**

New Technology

- Information Technology
- Communication Technology
- Distribution Automation
- Automated Metering Infrastructure
- Alternative Energy - Wind Turbines, Solar Panels
- Electric/Hybrid Vehicles
- Modular Substations
- ...

Customer Issues



- Service Reliability
- Power Quality (sags, harmonics)
- In-service Dates (unexpected demands)
- Energy Management Programs
- Customer Information - bills, outages, energy usage profile, etc)
- Distributed Generation
- Health Concerns
- Aesthetics
- Rates – TOD, residential demand billing

Workforce

- Loss of experience and expertise
- Attraction and retention
- Motivation/ priorities of the younger generation
- Different skill sets, generally more hi-tech
- Workforce Management
- Contracting in/Contracting out
- Industrial Relations
- Succession Planning
- Training

- Compliance with many agencies – Federal, Provincial, American
- More stringent environmental regulations
- Land use - right of way, station siting
- Reliability requirements from NERC and FERC
- DER connection and tariffs
- EMF and other health issues

Asset Issues

- Aging infrastructure, e.g. equipment over 40 years old, some facilities not properly maintained
- Demand on capacity & equipment to handle fast load growth
- Reaching maximum capacity (urban renewal) – feeder ties, fault level
- Loss of gas supply, loss of key electric stations
- Safety
- Shorter lifecycle for new technology

- **Changing regulatory environment**
- **Difficulty in obtaining land**
- **Sharp increases in energy costs**
- **Drastic change in energy market**
- **Shift towards electric (hybrid) vehicles**
- **Different load profile due to DER, energy management, life style**
- **Increased power quality expectations**
- **Changing knowledge & skill set requirements**
- **Proliferation of Distributed Energy Resources and Co-Generation**



1. The development of a Distribution Roadmap is established as a goal in the Business Unit Strategic Plan
2. Held 2 symposiums with Capgemini & staff from stakeholders
3. Created a Distribution Roadmap Task Force comprised of Distribution Planning & Design, Stations, AMD, Customer Operations, Consumer Marketing & Sales, Major Accounts, Communications and Construction
4. Held workshop for Task Force members and their associates in March, 2007

- 5. Conduct research projects on**
 - Distribution Automation**
 - Automated Metering Infrastructure**
 - Distributed Generation**
 - New equipment /material**

- 6. Develop IT projects on**
 - Data management**
 - GIS**
 - Customer service**
 - Workforce management**
 - Outage Management**

Terms of Reference



- **Manitoba Hydro Distribution Roadmap**
- **Champion/Sponsor:** E.H. Wiebe
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- **Overall Purpose:** Identify and prioritize technical and organizational initiatives required to effectively prepare for the changes expected in customer needs, as well as technical, business, and regulatory environment of the Distribution system in Manitoba.
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- **Objectives:** Develop a Distribution Roadmap for Manitoba Hydro that describes the vision of the Distribution utility for 2020, the changes required and the implementation strategy for technologies and practices that support it.

Terms of Reference



- **Scope:** The distribution system of Manitoba Hydro and its impact on others.
- **Deliverables:**
 - 1. Report describing the distribution utility of the future in Manitoba, recommendations for implementing the vision, and next steps to achieve this vision.
 - 2. Communications to all staff impacted to bring them to a common understanding.

Action Plan

- Ensure IT developments are coordinated and compatible with Distribution Roadmap vision
- Continue with existing pilot projects on DA, AMI, DG and other areas. If trial is successful, develop large scale implementation
- New initiatives on
 - telecommunication, e.g. optical network
 - human resources, e.g. partnership with schools
 - energy delivery, e.g. substation technology...
- Convey message to Upper Management and staff

Some New Initiatives



- **Communication**
 - optical network
- **Human resources**
 - partnership with schools
 - recruitment & retention strategy
 - workforce management
 - training
- **Asset Management**
 - asset management system
- **Energy Delivery**
 - substation technology
 - HV PMT
- **Energy Management**
 - Utility controlled DSM programs (commercial, industrial, residential)
 - residential demand billing
 - wholesale conversion to alternate lighting, e.g. CFL, LED

...

- Draft Distribution Roadmap Report issued for comments
- Final Report issued
 - Identify and prioritize initiatives
 - Develop costs and benefits
 - Establish processes and schedules
- Submit to Executives for approval
- Future corporate projects (e.g. outage management system) reviewed and signed on by Distribution Roadmap Task Force

EXAMPLE

ASSETS



-2010	2011-2015	2016-2025	Vision Attainment
eGIS enhancements Development of dist. common data model	Linkage of eGIS to CIS, SAP, RMS, CDM, OMS	Maintenance staff in the field have access to database	Integrated OMS and dist. mgmt
Trial of PMT Substation (DSC)	Regular Use of DSC as Supply Option		Flexibility in meeting load
Integrate functions of CS Operations, SIR, Call Centre	Deployment of OMS		
Pilot on AMI	Limited deployment of AMI	Remote monitoring & control of dist. system	Smart Grid
Pilot project on dist automation	Feeder automation	Distribution SCADA	
Pilot on sensors	Condition monitoring of major equipment	Real time data on equipment	
Dist. Mtce Planning linked to reliability data	Condition-based mtce		Optimal use and replacement of asset
Establish asset management program	Asset Management policy in place		21

Distribution Automation

- Report from KEMA consultants
- Staged Implementation
- Incorporate DA into Design Philosophy

Goal – Increase Reliability & Efficiency



Automated Metering Infrastructure



- \$1.5 M Pilot Project
 - Radio Frequency (Urban)
 - Power Line Carrier (Rural)
- \$170 M full project cost

Benefits

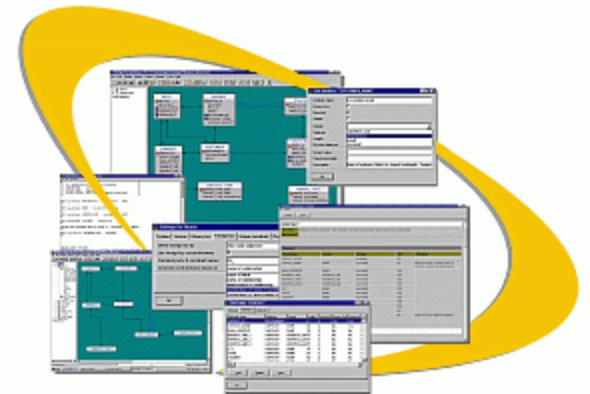
- Improved Service Interruption Reporting
- Improved Service Restoration Time (CAIDI)
- Better Customer Load Profiling
- Better Load Estimates
- Improved Billing & Collections
- Improved Planning & Design
- More accurate Customer Information

Conceptual Data Model

- Central data repository
- Standardize data format
- Linkage between databases

Benefits

- Easy access to data
- Avoid duplication, confusion
- Improves data integrity
- Facilitates data exchange



Distributed Generation/Resources Research

- How to connect safely
- Anti-Islanding Technology
(Transfer Tripping – zero crossing technology)
- Dispatchable Power Programs
- Prevent System Problems

Benefits

- Accommodate Alternative Energy Sources
- Export DG resources
- Delay new construction



Distribution Supply Centers

- Match supply with load
- Minimal Maintenance
- Short Lead Time (6-8 months)
- Small foot print
- Increased reliability
- Reduced stranded assets



Conventional station



5 -10 MVA units

66 Kv

Developing 115 kv

DSC



Barriers

- Lack of Long Term Vision
- Corporate Culture
- Perception
- Political Climate
- Communication to decision makers
- Costs
- Lead Time for Equipment & Material

What Works ?

- Visionary Leader
- Commitment
- Buy-in by T&D Management
- Stakeholders Involvement
- Spirit of Cooperation
- Available Resources – CEA, other utilities, consultants

Questions?