Canadian Smart Grid Development and Demonstration

Clean Energy Fund
ecoENERGY Innovation Initiative
International Smart Grid Action Network

Presented by: Jen Hiscock
jennifer.hiscock@nrcan.gc.ca
Publicly Funded Smart Grid Demonstrations & Pilots in Canada

$386M in demo projects
37 projects
24 companies
6 utilities
2 institutions
1 First Nations

$114M invested

Smart grid project value by technology area 2005 - 2013

- Storage
- Microgrid
- Grid Monitoring & Automation
- EV Integration
- Demand Management
- Data management, communication & security*
- Customer Enabling

* Investments in this category include cross-cutting data analytics technology and capacity such as the IBM Canada R&D Centre

Natural Resources Canada: Clean Energy Fund
ecoENERGY Innovation Initiative

Clean Energy Fund (CEF)
- Demonstration projects
- 5 year funding 2010 – 2015
- $ 759 M in clean energy funding → $ 146 M for renewable energy projects
- 16 small-scale renewable energy demonstration projects → 8 are demonstrating smart grid applications, $ 61 M in smart grid funding
- 5 years of post-completion monitoring to 2020

http://www.nrcan.gc.ca/energy/funding/current-funding-programs/cef/4953

60 % of publicly funded smart grid projects in Canada

ecoENERGY Innovation Initiative (ecoEII)
- R&D and demonstration projects
- Funding announced in 2011
- 55 projects, over $ 82 M in funding → 5 demonstrations, 6 R&D projects and studies, over $ 21 M in smart grid project funding
- 5 years of post-completion monitoring

http://www.nrcan.gc.ca/energy/funding/current-funding-programs/eii/4985

Figures reflect all publicly announced projects as of 2013
Renewable Integration and Storage

**BC Hydro**
Energy Storage and Demand Response for improved reliability in an outage-prone community
$13.5M project, $6.5M fund

**University of British Columbia**
Advanced Biomass Gasification for Heat and Power Demonstration
$28M project, $10M fund

**Cowessess First Nation**
Wind and Storage Demonstration in a First Nations Community
$5.5M project, $2.7M fund

**Electrovaya**
Utility Scale Electricity Storage Demonstration Using New and Re-purposed Lithium Ion Automotive Batteries
$7.6M project, $3.4M fund

**Wind Energy Institute of Canada**
Wind Energy R&D Park and Storage System for Innovation in Grid Integration
$24.8M project, $12M fund

**Opus One Solutions**
Integrated Urban Community Energy Project
$12.7M project, $5.3M fund
Grid Automation and Virtual Power Plant

**Hydro Québec**
Development of an interactive smart grid zone in Boucherville, with addition of integrated centralized Distribution Management System
$25.5M project, $7.5M fund

**New Brunswick Power Corp.**
Installation of monitoring and control systems in over 1200 properties in New Brunswick, Prince Edward Island, and Nova Scotia. Control is driven by availability of regional wind power.
$32M project, $15.9M fund

**Qulliq Energy Corporation**
Iqaluit Arctic Smart Grid
$3.4M project, $1.7M fund

**Prolucid / Local Grid Technologies Inc.**
Distributed Generation Monitoring and Control
$3.9M project, $1.5M fund
Electric Vehicle Integration and Smart Building Integration

**BC Hydro**
British Columbia Electric Vehicle Smart Infrastructure Project
$8.8M project, $4.1M fund

**Power Measurement Ltd.**
Load curtailment and peak shaving in large commercial buildings
$10M project, $3M fund

**Addénergie**
Commercial Demonstration of a Management System for Electrical Vehicle Charging Station Networks
$14.2M project, $3.4M fund
**ecoEII Research and Development: Storage, Microgrid, Demand Response**

**University of Toronto**
Direct-Current Arc-Free Circuit Breaker for Utility-Grid Battery Storage System
$1.1M project, $0.6M fund

**Hatch Ltd.**
Development of a Utility Grade Controller for Remote Microgrids with High Penetration Renewable Generation
$3.1M project, $1.9M fund

**L’école Polytechnique de Montréal**
Managing Energy Storage Capacities Dispersed in an Electrical Grid to Reduce the Effects of Renewable Energy Source Variability
$1.4M project, $1.0M fund

**CanmetENERGY Varennes**
- Performance Assessment and Optimization Tools for Remote Smart Microgrids with Renewable Energy Resources
- Real Node Environment for balancing renewable generation with flexible resources
The Clean Energy Ministerial was an outgrowth of the agreement at the Major Economies Forum on Energy and Climate (MEF) in L’Aquila, Italy in July 2009, where countries agreed to collaborate on advancing clean energy technologies.

As a result, ISGAN was launched at the first meeting of the Clean Energy Ministerial (CEM), which brought together government energy ministers (or their equivalents) and stakeholders from 23 countries and the European Union in Washington, D.C in July 2010. The CEM focused high level attention and commitment to concrete steps - both policies and programs - that can accelerate the global transition to clean energy.

In April 2011, ISGAN was formally established as the IEA Implementing Agreement for a Co-operative Programme on Smart Grids (ISGAN), operating under the IEA Framework for International Energy Technology Co-operation.
Contracting Parties (25) Invited to Join the IA
Brazil, Denmark, Israel, Turkey, Mongolia

ISGAN PARTICIPANTS (25)

Forschungszentrum Jülich GmbH
Government of Belgium
Government of United Kingdom
Sustainable Energy Authority of Ireland
European Commission
Government of France
Union Fenosa Distribucion
Ricerca sul Sistema Energetico (RSE S.p.A.)
Government of Austria
Norwegian Ministry of Petroleum and Energy
Swedish Energy Agency
Tekes (Finnish Funding Agency for Technology and Innovation)
Russian Energy Agency
Government of the Netherlands, Ministry of Economic Affairs, Agriculture and Innovation
Sustainable Energy Authority of Ireland
United States Department of Energy
Government of Canada
Government of Mexico

U.S. Department of Energy
Government of Mexico

New Energy and Industrial Technology Development Organization (NEDO)
Ministry of Science and Technology Department of High and New Technology Development and Industrialization
Energy Market Authority
Government of India
Government of Korea
Government of the Netherlands, Ministry of Economic Affairs, Agriculture and Innovation
Swiss Federal Office of Energy
Government of India
Government of Korea
Government of Korea

South African National Energy Development Institute (SANEDI)
Government of Australia
Organization

Clean Energy Ministerial (CEM)

International Energy Agency (IEA)

ISGAN Executive Committee

Annex 1: Global Smart Grid Inventory

Annex 2: Smart Grid Case Studies

Annex 3: Benefit & Cost Analyses And Toolkits

Annex 4: Synthesis of Insights for Decision Makers

Annex 5: Smart Grid International Research Facility Network (SIRFN)

Annex 6: Power T&D Systems

Annex 7: Smart Grid Transitions
How do we move international collaboration on smarter grids from here... to here?.....Specific Applications & Policies
Feature Project: PowerShift Atlantic

- Flagship Canadian Project

- ISGAN Case Book: Spotlight on Demand Management

- ISGAN Smart Grid Project Catalogue