

# THE FUTURE SMART GRID IN BRITISH COLUMBIA

UCA OPEN SMART GRID  
JULY 19, 2011



# BC HYDRO – A CROWN CORPORATION

Established under  
the Hydro and  
Power Authority  
Act

Wholly owned by  
the Province of  
BC

Regulated by the  
British Columbia  
Utilities  
Commission

Currently serves  
1.8 million  
customers

# BC HYDRO'S CHALLENGE

- A growing population, economic development, new technologies, and advanced environmental green initiatives are driving the increasing demand for energy
- Forecasting that the province's electricity needs will grow by as much as 40 per cent over the next 20 years
- Three part strategy to fulfilling the demand:  
Conserve, Buy, Build



# BC HYDRO'S LEGISLATIVE CONTEXT

2007

## **B.C. Energy Plan**

- A Vision for Clean Energy

2008

## **Climate Action Plan**

2008

## **Utilities Commission Amendment Act**

- Legislated to install smart meters by 2012

2010

## **Clean Energy Act**

- Reconfirmed requirement for smart meters, including in-home feedback and conservation rates, by December 2012
- Added an initial Smart Grid program, focused on system metering to reduce energy theft, and advanced telecom infrastructure

# THE BC HYDRO SYSTEM

## Generation

- 41 Dam sites, 30 Hydro facilities and 9 Thermal units

## Transmission

- 18,000 km of Transmission lines  
260 substations, 22,000 steel towers
- One Control Center
- Consolidation of 4 regional systems (including back-up)
- Interconnect to Alberta and US

## Distribution

- 56,000 km of Distribution lines
- Approx. 900K poles, over 300K of transformers
- Serve 17 Non-integrated areas



# BC HYDRO'S SMART GRID PROJECTS



RENEWABLE  
POWER



ACADEMIC  
COMMUNITY



SYSTEM ENERGY  
STORAGE



ELECTRIC  
VEHICLES

## RENEWABLE POWER

### Bella Coola

- Coastal community of 1800 people, north of Vancouver
- 3.8 MW load, not grid connected
- 4.6 MW of diesel generation plus
- 2.0 MW run-of-river plant

### Goal

- Increased use of renewables
- Viability of energy storage
- Improved reliability



## PARTNERING WITH THE ACADEMIC COMMUNITY

### British Columbia Institute of Technology (BCIT)

- Canada's first campus based Smart Microgrid
- Includes all aspects of microgrid research from generation to load management
- Over \$20M committed to date





# SYSTEM ENERGY STORAGE

Golden & Field, to pilot new batteries and smart grid applications:

- Two 1 MW battery storage systems
- To support substation and transmission constraints
- Peaking support and islanding support for remote community



# ELECTRIC VEHICLES

- BC Hydro has partnered with City of Vancouver and Easy Park to launch first multi-vendor public electric vehicle charging pilot in B.C.





# MANY MORE SMART GRID PROJECTS



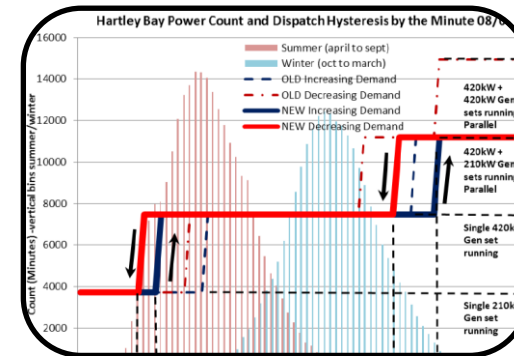
HYDRO KINETIC  
TURBINE  
TESTING



GREEN  
NEIGHBORHOOD  
PROJECT



DG DEMONSTRATION  
PROJECT



COMMUNITY  
ENERGY  
MANAGEMENT

# BC HYDRO'S SMART METERING PROGRAM

## METERING SYSTEM

- Upgrade old meters to smart meters
- Implement metering telecommunication network
- Deploy automated data collection system



## THEFT DETECTION SOLUTION

- Install distribution system meters
- Develop theft analytics software



## IN-HOME FEEDBACK TOOLS

- Introduce in-home display devices
- Launch new conservation website



## GRID MODERNIZATION

- Adopt standards for clean energy transportation
- Support micro-grids & distributed generation
- Enable an intelligent, self-healing grid that can accommodate two-way flow of electricity



# PROGRAM BENEFITS

## MODERNIZE BC'S ELECTRICITY SYSTEM

- Accommodate clean energy transportation
- Support micro-grids & distributed generation
- Enable an intelligent, self-healing grid that can accommodate two-way flow of electricity



## IMPROVE WORKER & PUBLIC SAFETY

- Pinpoint outages and restore power faster
- Discourage illegal tampering with electricity wires which cause fires and live wire dangers



## ENHANCE CUSTOMER SERVICE

- Better informed customer service
- Eliminate estimated billing
- Streamline moving procedures
- Faster outage restoration



## IMPROVED OPERATIONAL EFFICIENCY

- Optimize voltage regulation to reduce electricity waste and improve power quality
- Enable long-term distribution system planning
- Automate meter reading



## GREATER CUSTOMER CHOICE & CONTROL

- Enable timely access to usage information
  - Web & mobile applications
  - Energy management devices
- Introduce new conservation programs
- Enable customer generation

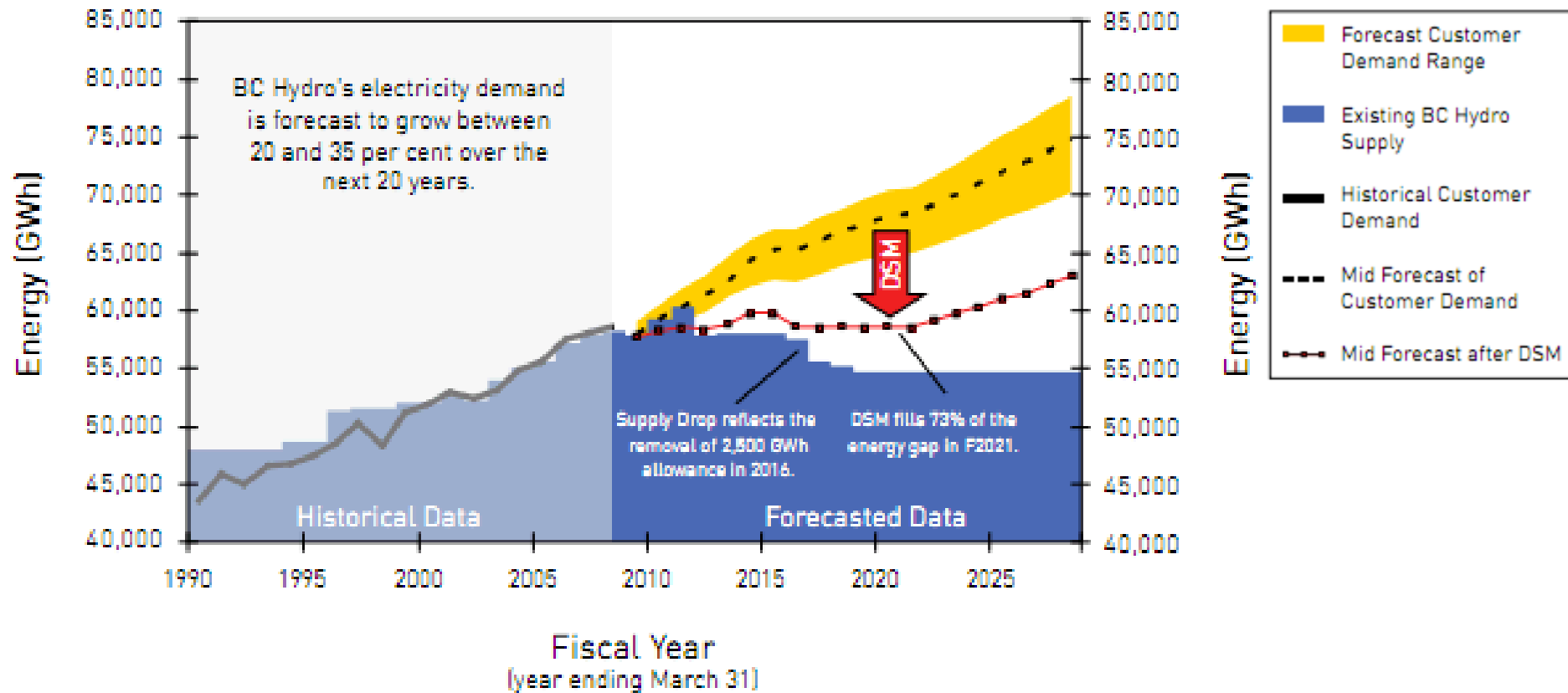


## REDUCE ELECTRICITY THEFT

- Locate and reduce power diversions that cost ratepayers over \$100 Million per year

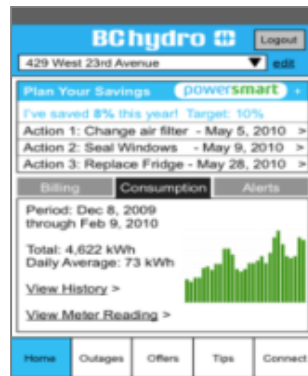


# BC HYDRO'S SUPPLY & DEMAND OUTLOOK



# IN HOME FEEDBACK AND SUPPLY GAP

Supply customers with a choice of conservation tools that will help them make informed decisions about their electricity consumption.



# THANK YOU

Thank you for your help and support:

- UCA OpenSG
- Partner utilities
- Vendors
- Academia

We look forward to a bright future together.