Welcome

The Senate Standing Committee on Energy, the Environment and Natural Resources
meet
How We Do Electricity in Summerside

Electric Utility Functions
- Purchase of Electricity
- Sale of Electricity
- Production of Electricity
- Transmission of Electricity
- Distribution of Electricity

Innovative Programs
- MyPowerNet
- Heat For Less Now
- LED Street Lighting
- Smart Metering
- Smarter Homes & EV’s

Research
- Canmet Energy & UPEI
- Renewables Integration
- Living Lab
- Energy Storage (Distr. Vs. Cent.)
- Customer Engagement - info

Renewable Projects
- LNG to RNG Facilities Transition
- CUP Energy Storage
- Commercial Scale Solar
- Utility Scale Solar Farm
- New Generation
Summerside Electric Facts

- Peak Load: 27 MW
- Total Wind Energy available to City: 21 MW
- % of surplus wind sold outside City: 3% (was 15%)

<table>
<thead>
<tr>
<th>Source</th>
<th>MWh (2016)</th>
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<tr>
<td>Diesel Plant</td>
<td>339</td>
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<tr>
<td>Import Power</td>
<td>80,916</td>
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<tr>
<td>Wind</td>
<td>60,221</td>
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<tr>
<td>Totals</td>
<td>141,476</td>
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In last few years the City has averaged 20% of the time being powered by 100% renewable energy.

Summerside has the highest percent of wind integration for a utility in North America at 43%.
Summerside Electric, Hydro One

Plan
Import
Produce
Export
Purchase
Transmit
Distribute

Plan
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Autonomy of Community

Flexibility
• Rate Setting
• Program Offerings
• Innovations
• Energy Transformations (Provision vs. Service)

Community Ownership
• Value directed back to Community
• Holistic view on Business
• Economic Development a consideration
• Grass roots representation to Customers
• Long term planning (longer than 10 years into the 40 year investments)
Energy Programs

Change is in the wind.
Introducing MyPowerNet, empowering the people of Summerside to save money and help the environment.

Cost savings, increased reduced electrical rates

Decreased dependence on polluting oil prices

City of Summerside Smarter Homes Incentive Program

Summerside: The Living Lab
Current Projects

HEAT FOR LESS NOW!
CONVENIENT • AFFORDABLE • SUSTAINABLE
Electricity Industry Transformation

Provisional to Services Orientated Company
My PowerNet Components

- My PowerNet
- Dynamic Systems Control
- Data Management
- Distribution Operations
- Internet
- Advanced Metering
- Plug-In Hybrids
- Distributed Generation & Storage
- Efficient Building Systems
- Renewable PV
- Control Interface
- Smart End-Use Devices

My PowerNet

GROWTH

GROWTH
Communications Zones

- 11 Sections (4 Completed)
- 337 Appliances, (136 Real time control, 201 time clock control)
My PowerNet Vision

• Directing the wind farm benefits to the residents
  Reduce Heating and Hot Water Costs against oil energy sources
  Reducing Greenhouse Gas Emissions

• Creating an Additional Revenue Source for the Utility
  Reduce wind exports to Zero (Use locally)
  Increase OFF – PEAK sales (better margins)
  Stem the increase in Peak Growth on System

• Create Economic Development Opportunities
  Create an electric infrastructure network
  Living Lab for Research and Development
  Flexibility of Infrastructure – Less Barriers
  Increase disposable income to all Residents
  One Degree of Separation from the World
“Heat For Less Now”
Sustainability to the Power of Three

- Saving the Planet, -42% GHG
- Increased kWh Sales
- Infrastructure Efficiency
- Increased Disposable Income to Residents & Businesses
- Future Economic Growth Opportunities
- Energy Conservation
- Cheaper Heating Costs
- Increased Renewable Energy
My *PowerNet* - Reducing Exports

Less Wind Energy Exported = More Local Use

2010 (8,500 MWh's)

2016 (2,615 MWh's)
Utility Software Distributed Control

Active Wind & Power Generation: Previous 24hrs

- Generated Power (kWh): 1,261.13
- Average Wind Speed (mph): 26.31

Current Grid Storage: 138.5 kWh

Current Grid Capacity: 42.83 kW

Energy Profile: Furnace

03/15/2017 - 03/23/2017

Available Storage (kWh) and Current Storage (kWh)

City of Summerside
Prince Edward Island, Canada
Utility Control – Actuals (Before and After)

Average Temperature -10C

Average Temperature -13C

Excess Wind

Filling In the Valleys

Peak of Day

Minimal increase

Wednesday February 9th, 2011

Wednesday January 8th, 2014

Sources of Energy Satisfying Load
Heat For Less Now Consumer Results

- Amalgamated Dairies Ltd. (ADL)
  - Industrial Milk Processor
  - Installed 160kW of ETS
  - Cost Installed ~ $75,000
  - Savings ~ $59,000 / year
  - Simple Payback of ~ 1.3 years

- Lefurgey Cultural Centre – Heritage Office Building
  - Heritage Office Building
  - Has 56kW Total Installed
  - Cost Installed ~ $15,000
  - Savings ~ $2,200 / year
  - Simple Payback of ~ 6.8 years

- Independence Place – Row Housing
  - 11 unit attached living units
  - 6 kW room heater in each unit
  - Cost Installed ~ $17,650
  - Savings ~ $3,051 / year
  - Simple Payback of ~ 5.8 years

- Summerside Motel & Restaurant
  - Full Service Motel
  - Has 38kW Total Installed
  - Cost Installed ~ $8,528
  - Savings ~ $2,853 / year
  - Simple Payback of ~ 2.9 years

- Single Family Dwelling
  - ~ 1600 square foot home
  - Has 28kW total Installed
  - Cost Installed ~ $8,206
  - Savings ~ $1,450 / year
  - Simple Payback of ~ 5.6 years
Heat For Less Now Program

Incentives for electric thermal storage and controllable hot water tank customers.

Purchase or Lease (Rent) Appliances

Rate Discount Incentives (Locked for 5 years)
- Hot Water – 8.0 cents / kWh Year Round
- Space Heating – 8.0 cents / kWh

Bucket rate blocks

Consumers Participate through our **Heat For Less Now** Program
My PowerNet Financial Structure

Customer (Savings)
- Profit from appliance sales back to program
- Program sells appliances to customer

Heat For Less Now Consumer Program

KWh’s/$ for Heating & hot water

Utility
- Export Wind kWh’s Redirected to ETS Appliances
- Profit from split increment pricing from kwh sales
- Back to fund program (Customer $ - Export $)

Key Point: Profit from appliance sales and profit from split increment pricing pays for Operating and Capital Investments in program and communications construction. Those customers participating in program do not cause rate increase pressures on those not participating. (As more kWh’s sell more to invest)
LED Street Lighting

The Facts: 668 completed out of 2066 (33%)

40-80% energy savings and programmable for dimming

Always on during peaks in Winter Months

50-75% maintenance savings

Cheaper for the Customer

Summerside Electric only purchases LED street lighting in 2 years

Capital Costs on par with old technology
Electric Vehicles (Save $1,165 / year)

Travelling 60,000 km with an electric vehicle pays for added investment with electricity at 13 cents/kwh and $1.00 / litre for fuel within 3 years!
Electric Chargers

We have our fair share!!!!!
Smarter Homes Initiative Program

LED Street Lighting
The City’s Corporate & Community Climate Action Plan has identified street lights as a priority corporate reduction measure, due to the high energy consumption costs and corresponding greenhouse gas emissions. As a result, the City of Summerville will install LED street lighting systems. Some benefits of these lights include:

- Reduced utility costs
- Longer lifespan
- Improved safety and visibility
- Enhanced aesthetics

Fiber Connected to Summerville EIN
The city of Summerville will install optical fiber to every eligible new home as part of the electrical infrastructure network through MyPower. This infrastructure will be an energy analyzer for our community, it will provide an opportunity for new homeowners to adopt technology, save money, help the environment, and feel good doing it. Once the fiber infrastructure is in place, new homeowners will benefit from the connectivity and be encouraged to adopt additional new technologies that will drive even more energy efficiencies in their home.

Installation includes:
- Connected subsystem with fiber to every home
- 2 extra-conduit fiber trays to each home
- Plumbing for new technologies integration

Free Car Charger
The City of Summerville wants to encourage new homeowners to adopt technologies that save them money. Electric vehicles provide an opportunity to save money and the environment. In order for new homeowners to consider the potential of an electric vehicle, the City of Summerville will provide a level 2 charger to every eligible new home to facilitate car charging (consumer installation required).

Heat For Less
This program offers homeowners cost savings when heating their homes and water by using electricity rather than oil or gas. Summerville homes use the state-of-the-art FIS (Fiber-Optics Integrated Storage) use electricity at a reduced rate. This reduction is offered by the utility by using surplus energy generated by the Summerville wind farm. Smart Heat for Less appliances include:
- In-Home Heating
- In-Home Cooling
- Domestic hot water systems

In the case of new subdivisions, the first 30 building permits receive:
- 50% discount on packaged furnace and domestic hot water systems
- 30% discount on individual appliances
- The remainder of subdivision building permits receive:
- 25% discount on packaged furnace and domestic hot water systems
- 15% discount on individual appliances

Smart Home Consultation
The City of Summerville will provide a two-hour consultation with a designated smart home consultant to review home automation options for future proofing your new home.
AMI Metering - Tantulus

Better information, Identifies data patterns to sharpen conservation programs, Used to better inform the customer on usage, Real Time data (5-60 minute intervals), approximately 600 installed out of 7000.
Research
Future Projects
Summerside The Living Lab

The City of Summerside and private interest are working together to envision, develop, and deploy technologies in real-life contexts for the betterment of the community and environment.

What is a Living Lab?
It’s a platform for industry to collaborate with government to explore real-world issues and demonstrate how innovation can provide solutions.

A Living Lab is a new model; one that is defined differently around the world.

For Summerside, the model will help establish a culture of innovation and entrepreneurship that will benefit the community now and in the future.

and why that model?
- to gain access to knowledge in the community and better understand its needs
- to be inclusive and open about how technology can be introduced to encourage positive change
- to capture ideas and input from a larger population and evaluate how technology impacts their every day

Current Projects
Summerside and Partners are committed to advancing opportunities to assist in furthering the market potential for their initiatives.

Testing Assumptions
The culture we establish will open the door for many different opportunities. Summerside recognizes that there are numerous avenues to explore and many different applications that can be born out of this environment. As the development process by enabling participants with our unique infrastructure is just one way we envision turning concepts into reality. Potential applications are endless but a few that resonate in Summerside based on existing priorities and key investments are:

- Security and surveillance
- Appliance Control
- Water Quality
- Environmental Controls
- Centralized Smoke/Carbon Monoxide Detection
- Integrated Security Systems
- Enhanced Emergency Services
- Patient Connectivity
- Medical Services
- Virtual care from Doctors
- Solar Energy Integration
- Bio Fuel from Waste
- Advanced IT Development
- Interoperability for Health IT

The Science
The equation for success requires partners. Summerside has a unique ability to bring partners to the table. Together we can further extend our existing infrastructure and mutually benefit from shared investments that deliver value for the community.

Eco Business Park
There is a growing corporate responsibility to operate in a sustainable way. We are trying to create a sustainable business park targeted at these environmentally conscious businesses. The Eco-Park will offer wind-generated electricity, on-site storm-water retention and energy storage, access solar heat gain and natural day lighting, site recycling programs and more.

EV/Car Sharing
Summerside is developing an all-electric vehicle share program where the vehicle is the vessel that provides transportation but is also a repository for energy storage, an energy producer and innovative application device for future advancements.

Fibre to the Home
The City of Summerside is deploying full fiber to the premise solution to leverage the power of technology and provide, through our Electrical Infrastructure Network a pipeline to each premise in Summerside. This bi-directional communications network between the customer-end's smart device and the electricity provider will be an open network allowing for multiple solution providers to leverage this infrastructure.

Power Storage
Through our PowerNet program Summerside Electric has begun addressing the problem of energy storage solutions by encouraging residential use of electric thermal storage (ETS) units. ETS units use high-density ceramic bricks to store heat given off by elements inside the units. The elements come on during the off-peak nighttime to heat up the bricks, and then the stored heat is released throughout the peak day time periods as needed.

Pollution Control
Summerside’s tertiary Treatment Facility is one of the most advanced plants in Atlantic Canada. Through the advanced technology and research capabilities, Summerside is the only plant in Atlantic Canada that removes 95 per cent of solids from the water to produce grade A fertilizer.
What’s Next for the City of Summerside

- **CUP Facility**
  - Protection Relays
  - Switchgear
  - Transformer Panel
  - Wind Power

- **CUP Smart Storage**
  - AC Circuit Breakers
  - Power Conditioning System
  - DC Circuit Breakers
  - Battery

City of Summerside Electric
Thoughts to a Low Carbon Economy

• **Electrification is a must from other sources of energy**
  Heating Oil, Natural Gas to Controllable Devices with Thermal Storage
  Electric transportation with charger c/w battery storage intermediary
  Identify limits before major infrastructure investment needs (load factors most electric utilities are 60% or worse)

• **Synergies between Communications and Electric Utilities**
  Smart grid infrastructure a necessity for integration of renewables
  Facilitates distributed energy resources at customer level
  Creates flexibility for utilities to interact and manage loads from all ends
  Consumer education is key to lasting change

• **Create Flexible Regulatory Regimes for Utilities**
  Low carbon economy needs flexible rates and programs.
  As consumers/technology create their own sources, it erodes traditional business models of monopoly utilities which need to adapt
Thoughts to a Low Carbon Economy

• **Electrical Rates and Demographics**
  
  Electrical rates in a low carbon economy must be flexible to account for level of income by consumer.
  
  Electrical rates must be able to be flexible to accommodate the consumer to prosumer action of customers.

• **Energy Shifting (One industry Gains others hurt)**
  
  To subsidize energy shifting for function it must consider taxation systems both hidden and visible in the production of that energy and class of use. i.e. transportation (gas taxes, manufacturing taxes, corporation taxes of industry affected). i.e. electric rate at 13 cents/kwh but $1.12 per litre of gasoline

• **Timing to Target Levels (2030)**
  
  Short time frame necessitates subsidization of projects and include Utilities. Utilities and Municipalities need to work collaboratively across the nation. Monies must come from energy use by local economy. Must be aggressive on transportation and oil and gas sectors.
Low Hanging Fruit

- Electrification versus Load Factor versus Investments Required
  
  City of Summerside load factor 60% out of peak of 27 MW’s.
  Utilities plan for the peak and plan assets for peaks out ten years (growth).
  Deliverable MWH capability of Infrastructure = 27 x 8760 hr/yr = 236,520 mwh’s
  City of Summerside’s sales at 141,476 or 60%.
  Off peak electrification could be another 95,044 of MWH’s (needs to be renewable)

OFF PEAK ELECTRIFICATION will assist getting to a LOW CARBON ECONOMY
Continue to Try and You Will Succeed
Small City. Big Spirit

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Carbon Taxation and what it means for the City of Summerside

Presentation to Senate Standing Committee on Energy, the Environment and Natural Resources

May 2\textsuperscript{nd}, 2017
AGENDA

• Policy context (federal and provincial)
• How it’s been working elsewhere
• What does it mean for the City?
• Where to from here?
Policy context (Federal/Provincial)

• Federal government: carbon pricing to start at $10 per tonne in 2018, and rise to $50 per tonne by 2022
• All jurisdictions required to adopt a system by 2018
• Revenues from this system can be used as they see fit. **This is an area whereby the City of Summerside can provide input on provincial policy**
• Province of PEI’s position on carbon pricing is unknown
How it’s been working elsewhere

- BC has charged a tax since 2008
- Different opinions regarding its success:
  - Fuel consumption has dropped by 16%; in the rest of Canada, it’s risen by 3%
  - Canada’s Kyoto target was a 6% reduction in 20 years
  - However, BC’s per capita emissions were decreasing well before any real action on climate change
- In applying BC’s experience to Summerside, the estimated annual impact would be $191 for a single adult, $259 for a couple and $338 for a family of four
What does it mean for the City

• The electric utility would need to recoup $161,280 annually to be cost-neutral
• 3.85% per annum electric rate increase
• Assuming a 4% cost impact on other City departments and services: annual operating cost impact of $840,000
• However, there is also $410,420 per $10 tonne that we would otherwise have to pay if we did not have wind energy
Where to from here?

• Honeywell energy management project will help mitigate carbon tax impact
• Need to evaluate which system may be a better delivery system
• Partnerships to deal with the Province with one voice on the issue
• How will the Province deal with the revenue generated by the taxation?
• Will municipalities be empowered to reduce emissions?
SUMMERSIDE GREEN

GROWING THE GREEN ECONOMY AND CREATING BUSINESS OPPORTUNITIES THROUGH INNOVATION

LET'S BUILD THE FUTURE TOGETHER!
Barriers to Innovation

- New technologies competing with more mature and in most cases less expensive technologies.
- The price distortion from subsidies and other burdens between renewables and other energy sources.
- The public perception of renewables and deliveries of power adoption.
- Diverse economics of lack of standardization in renewables versus conventional.

Municipalities are Key Enablers of the Lower Carbon Future and typically are last to be engaged!
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Summerside Most Recent Case Study

Global Partner

Samsung Renewable — Samsung Renewable Energy Inc. has partnered with the City of Summerside on a renewable energy demonstration project, with ambitions for export market product development.

Regional Partner

HueGO Electric – China Gold Fortune International Group is a diversified, cross-industry international enterprise with its headquarters in Beijing and branches in Tianjin, Hong Kong and central Asian countries. Primarily engaged in infrastructure project contracting.

Start Up Partner

Stash Energy — Utilities around the globe understand the core problem with managing demand, specifically heat pumps. Summerside and Stash Energy Inc. have partnered on a unique system to pilot Heat Pump storage technology to look to address one aspect of peak demand drivers.
Energy competitiveness is the prevailing macro goal of the City of Summerside.

Summerside’s competitive advantages are ownership of its electric utility and a moderately developed smart grid that can absorb renewable sources.

Modernization will rapidly improving the quality, reliability, and efficiency of Summerside’s energy systems and other Utilities

Solely focusing on energy access will not achieve Summerside’s economic development objectives, while solely focusing on modernization will not achieve Summerside’s renewable energy objectives.
Summerside Message

• More Adaptive Policy to support Innovation in real world situation
• The need to link Innovation - Electricity to Economic Development
• Utilize those leading Municipalities (Summerside PEI) to assist in the transition to a lower carbon environment by making investment in smart infrastructure, renewables and testing in live situations.
• Assist Utilities/Municipalities in finding unique ways to turned something which is disruptive technology into a profit center while deliver cost effective services and create models to connect industry innovators and utilities
• Embrace Global Solutions to transition/adapt and test in Canadian Context
• Better Connection and Coordination of Policy and Investments between Federal, Provincial and Local – With an emphasis on getting monies to the local level for the transitioning to a lower carbon economy