Economic Impact of Community Energy Plans
National Webinar | July 15, 2020
# Multiple Ec Dev Impact of CEP’s

<table>
<thead>
<tr>
<th>Economic Benefits</th>
<th>Environmental Benefits</th>
<th>Human Benefits</th>
<th>Social Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce energy spending for households and businesses</td>
<td>Reduce greenhouse gas emissions</td>
<td>Improve mental health</td>
<td>Improve access to reliable sources of energy</td>
</tr>
<tr>
<td>Recirculate energy spending within the local economy</td>
<td>Foster healthy ecosystems</td>
<td>Reduce cardiovascular disease and respiratory</td>
<td>Reduce exposure to energy price volatility</td>
</tr>
<tr>
<td>Create high quality local jobs</td>
<td>Use land and natural resources more efficiently</td>
<td>Increase physical activity</td>
<td>Solutions for areas facing energy poverty</td>
</tr>
<tr>
<td>Attract and retain business</td>
<td>-</td>
<td>Improved air quality (indoor and outdoor)</td>
<td>Recognizes local priorities</td>
</tr>
<tr>
<td>Increased retail sales</td>
<td>-</td>
<td>Reduce healthcare costs</td>
<td>Improve social connectivity</td>
</tr>
<tr>
<td>Capitalize on a growing clean technology market</td>
<td>-</td>
<td>Reduce the heat island effect</td>
<td>-</td>
</tr>
</tbody>
</table>
Today

• A bit about QUEST and NB-based project
• "Transitioning Energy Economy"
  • Description/Definition
  • Scale
  • How jobs are created
  • Enabling the economy
• Estimating Job Creation

www.questcanada.org/resources
Introductions and QUEST Overview
A Smart Energy Community seamlessly integrates local, renewable, and conventional energy sources to efficiently, cleanly, and affordably meet its energy needs. It is a coveted, highly livable place to live, work, learn, and play.
## SMART ENERGY COMMUNITIES PRINCIPLES

<table>
<thead>
<tr>
<th>Technical Principles</th>
<th>Policy Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve efficiency</td>
<td>Match land use needs and mobility options</td>
</tr>
<tr>
<td>Optimize exergy</td>
<td>Match energy options to local context</td>
</tr>
<tr>
<td>Manage heat</td>
<td>Send clear and accurate price signals</td>
</tr>
<tr>
<td>Reduce waste</td>
<td>Manage risks and be flexible</td>
</tr>
<tr>
<td>Use renewable energy resources</td>
<td>Emphasize performance and outcomes in policy and regulations</td>
</tr>
<tr>
<td>Use energy delivery systems strategically</td>
<td>Pursue policy and program stability</td>
</tr>
</tbody>
</table>
ABOUT THE NB PROJECT

The NB research project was aimed at articulating the local economic benefits of implementing CEPs with the goal of improving understanding of the value of implementing CEPs among municipalities and their stakeholders. In an effort to increase “buy-in” from NB communities, the project will include the following objectives:

1. Development of a communication package for local governments that describes and demonstrates the positive local economic impact of implementing CEPs
2. Communicate content to local government
3. Clarify the economic development role of municipalities in supporting CEPs
ABOUT THIS PROJECT - PROCESS

1. Research
2. Focused Workshops - Feedback
3. Provincial Dissemination
The Transitioning Energy Economy
Local to Central to Local
Energy Transition - Local
Energy Transition – Centralizing Infrastructure

SAVE ELECTRICITY!

Acute Shortage Exists in New Brunswick

Lack of rain in southern New Brunswick required with increased demands for power throughout the Province has resulted in a serious power shortage. It is most necessary that everyone co-operate in saving electricity. The need is urgent! It affects the welfare of everyone. Do your part by saving electricity by every means at your command.

THE DAILY PERIOD DURING WHICH SAVINGS SHOULD BE EFFECTED IS BETWEEN 8 A.M. AND 8 P.M., AND CONDITIONS ARE PARTICULARLY ACUTE BETWEEN 4 P.M. AND 8 P.M.

HERE ARE SOME OF THE WAYS YOU CAN HELP

IN THE HOME

Turn off lights when not required.
Use the minimum number of lights in the living-room, consistent with good vision.
Use electrically heated water sparingly and check leaking hot water taps.
Do not use range electrically on "High" when a lower heat still serves, and turn off all appliances as soon as possible.
Turn off ventilating and other outside lights.
Turn off all small apparatus as soon as possible.
Do not use electric hair dryers and grills, 8 A.M. to 8 P.M.

IN STORES AND OFFICES

Eliminate the use of electricity for signs and store windows from 8 A.M. to 8 P.M.
Turn off electric lights when not required.
Use electrically heated water sparingly and check all leaking hot water taps.
Do not use electric air conditioners, 8 A.M. to 8 P.M.

IN INDUSTRIES

Switch from day to night operations wherever practicable.
Turn off factory and office lights when not needed.
Turn off motor-driven machines when not required and affect other savings wherever possible.
Avoid the use of all unnecessary, outdoor lighting.
Do not use electric space heaters, 8 A.M. to 8 P.M.
Energy Transition – Impact on Economy and Culture
Energy Transition – Highly Centralized
Energy Transition – Inefficiencies of Central
Energy Transition - $$ Flow

Understanding Electricity Charges

Breakdown Of Charges On A Monthly Residential Electricity Bill
Avg. Electricity Consumption = 800 Kw Hrs / Avg. Bill = $122

Monthly Electricity Bill* = $122

22% To Guelph Hydro

$29 Distribution Costs
Cost to distribute electricity in Guelph and Rockwood.

$69

SERVICES PROVIDED BY GUELPH HYDRO FOR APPROX. $20 PER MONTH*

Infrastructure
Engineering design, construction, operation and maintenance of the infrastructure required to safely and reliably deliver electricity to the communities of Guelph and Rockwood. Infrastructure consists of poles, overhead wires and underground cable, meters, transformers and transformer substations.

$10

Emergency Services
24/7/365 power outage emergency services provided in all kinds of weather by a highly trained workforce equipped with specialized service vehicles and equipment.

$6

Administrative Services
Administrative services including maintaining a Customer Service Call Centre in Guelph.

$15

($13)

$
Energy Transition – Local (Again!)
Energy Transition – Local (Again!)
Energy Transition – Definition

The Transitioning Energy Economy is largely defined as the change, over time, from centralized forms of generating and distributing energy in all its forms. This transition has 3 key attributes that link to a potential positive impact on local and regional economies.

• The increase in readily available technologies and services that can serve the local goals of Community Energy Plans

• The vast majority of those technologies are located or implemented locally

• Community Energy Plans create channels to local markets for product and service providers that have measurable positive economic impact by:
  • Creating more energy efficient economies
  • Attracting local investment for local energy infrastructure
Current Market Activity
For CEP-Related Technology
Scale of Economic Impact

- The size of markets for the products and services that serve the transitioning energy economy has significantly grown in the last 20 years.
- The channels to new energy markets are being driven, to a large degree, by local governments coordinating with stakeholders in their communities (i.e. CEPs)
- Local governments, who have an interest and purview over their local economies, are largely motivated by the positive economic impacts that come with the implementation of Community Energy Plans.
- Community Energy Plans are widely seen as having a large number of benefits beyond positive economic impact including environmental, health, and social benefits.
Scale of Economic Impact

- QUEST estimates the smart energy communities marketplace employs over 700,000 persons in a growing $70B industry.
- ECO Canada reports that, In 2018, close to 51,000 establishments across the six industries generated
- $82.6 billion in estimated operating revenues from the provision of energy efficiency goods and services.
Scale of Economic Impact

- **Distributed [Global] Energy Generation Market Size Worth $573.7 Billion by 2025**
  - Grand View Research, Inc.

- **Global investment in energy efficiency was USD 221 billion in 2015**

- The US market for green building materials could reach $69 B by 2019.
  - www.businessgreen.com

- **The energy efficient devices market is expected to reach a market size of $908.49 billion by 2022**

- **District Heating Market size will cross USD 280 billion by 2024**
  - Global Market Insights, Inc.
CEP’s and Economic Impact
How Are Jobs Created?
Three Ways Jobs Are Created by Implementing CEPs

- Local dollars kept in the community
- Direct, Indirect, and Induced job creation from these local dollars
- “New dollars” that can be attracted for investment activities that support CEPs.
Predicting Economic Activity

- **Multipliers**
- Adders - Adders are typically a percentage of quantified energy benefits that are added to said benefits to estimate a broader range of benefits.
- Input–Output models
- Econometric models
- Computable general equilibrium (CGE) and hybrid models
Multipliers and Jobs

- Direct Jobs
- Indirect Jobs
- Induced Jobs
Enabling the Transitioning Energy Economy
Role of the Municipality
Municipalities as Market Pathways

QUEST Policy Principles

• Match land use needs and mobility
• Match energy options to local context
• Send clear and accurate price signals
• Manage risks and be flexible
• Emphasize performance and outcomes in policy and regulations
• Pursue policy and program stability
Typical CEP Goals and Principles

Community GHG & Energy Action Plan - Excerpt

• Create new market opportunities for innovative energy solutions that are attractive for local and new businesses, and through high quality, affordable, clean energy services foster retention and growth of existing businesses and industries

• Create a competitive and economic advantage for the Community

GHG Target: XX% for 2025 and XX% for 2035
Sample Economic Development Plan

• Priority 2: Geothermal Energy Development

• Priority 4: Low-Cost Energy (from existing natural gas sources)

• Create new market opportunities for innovative energy solutions that are attractive for local and new businesses, and through high quality, affordable, clean energy services foster retention and growth of existing businesses and industries

• Build awareness about energy investment and create a culture of energy conversation amongst residents, business, institutions, and industries
Sample Economic Development Plan

4 Focus Areas

• WORKFORCE DEVELOPMENT
• ENTREPRENEUR DEVELOPMENT
• BUSINESS INVESTMENT & INNOVATION
• MARKETING GREATER SAINT JOHN

Integrated into Focus Areas:

• Securing significant investment in Energy
• Leverage Saint John Energy as an important regional asset for innovative energy solutions.
• Foundational strengths that include energy infrastructure and support capabilities.

Create new market opportunities for innovative energy solutions that are attractive for local and new businesses, and through high quality, affordable, clean energy services foster retention and growth of existing businesses and industries.

Build awareness about energy investment and create a culture of energy conversation amongst residents, business, institutions, and industries.
Estimating Job Creation Review
Sample Community GHG & Energy Action Plan

Estimated Energy Cost Totals (2015 Baseline)

Total Energy: 10,076,748 GJ

Sample - Primary and Secondary Energy Distribution
Percentage of Total GJ
## Typical Community GHG & Energy Action Plan

### Estimated Energy Cost Totals (2015 Baseline)

#### Total Energy: 10,076,748 GJ

<table>
<thead>
<tr>
<th>Fuel – Primary and Secondary</th>
<th>GJ</th>
<th>Cost/GJ</th>
<th>Total $$’s (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>3,439,771</td>
<td>$30.00</td>
<td>$103</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>1,146,013</td>
<td>$27.30</td>
<td>$31</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1,579,725</td>
<td>$20.48</td>
<td>$32.3</td>
</tr>
<tr>
<td>Heavy Fuel Oil</td>
<td>125,752</td>
<td>$25.00</td>
<td>$3.1</td>
</tr>
<tr>
<td>Propane - Buildings</td>
<td>111,870</td>
<td>$39.80</td>
<td>$4.5</td>
</tr>
<tr>
<td>Gasoline - Transportation</td>
<td>2,401,461</td>
<td>$35.00</td>
<td>$84</td>
</tr>
<tr>
<td>Diesel - Transportation</td>
<td>1,248,564</td>
<td>$33.50</td>
<td>$41.8</td>
</tr>
<tr>
<td>Ethanol - Transportation</td>
<td>23,229</td>
<td>$35.00</td>
<td>$0.8</td>
</tr>
<tr>
<td>Propane - Transportation</td>
<td>315</td>
<td>$39.80</td>
<td>$0.012</td>
</tr>
<tr>
<td>CNG</td>
<td>48</td>
<td>$20.00</td>
<td>$0.001</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>10,076,748</strong></td>
<td>-</td>
<td><strong>$300.5</strong></td>
</tr>
</tbody>
</table>
Sample Community GHG & Energy Action Plan

Value of Energy Cost Reduction

$300.5 \times 15\% = $45\ M

How Does This Convert to Local Jobs?
Estimating Job Creation

Typical Sector-based Job Creation Multipliers*

*American Council for and Energy Efficient Economy - Fact Sheet, How Does Energy Efficiency Create Jobs?
Estimating Job Creation

- Investment Phase
- Savings Phase

<table>
<thead>
<tr>
<th>Phase</th>
<th>Pre-CEP Implementation Multiplier (Jobs/$M)</th>
<th>Post-Implementation Multiplier (Jobs/$M)</th>
<th>Net Job Creation Benefit (Jobs/$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Phase</td>
<td>17 (Average)</td>
<td>20 (Construction)</td>
<td>3</td>
</tr>
<tr>
<td>Savings Phase</td>
<td>9 (Utility)</td>
<td>17 (Average)</td>
<td>8</td>
</tr>
</tbody>
</table>
## Est. Investment in Energy Efficiency and Job Creation

- $300.5M \times 15\% = $45M \text{ (targeted reductions in energy costs)}
- $45M \times 8 \text{ Yrs.} = $360 M \text{ (min. investor expectations for payback)}
- Investment Phase: $360M \times 3 = 1,080 \text{ jobs (during construction)}
- Savings Phase: $45M \times 8 = 360 \text{ jobs (person-yrs. for 20 years)}

<table>
<thead>
<tr>
<th>Phase</th>
<th>Pre-CEP Implementation Multiplier (Jobs/$M)</th>
<th>Post-Implementation Multiplier (Jobs/$M)</th>
<th>Net Job Creation Benefit (Jobs/$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Phase</td>
<td>17 (Average)</td>
<td>20 (Construction)</td>
<td>3</td>
</tr>
<tr>
<td>Savings Phase</td>
<td>9 (Utility)</td>
<td>17 (Average)</td>
<td>8</td>
</tr>
</tbody>
</table>
Infrastructure and Major Market Actors

• Local impact depends on location of manufacturing
• Local construction benefits are possible
• At scale, potential to attract manufacturing increases
THANK YOU

Rob Kerr
Senior Associate QUEST
rob@rkerrassociates.ca
519-400-2529