

ENERGY EVOLUTION

SUMMER 2017 PATHWAY WORKSHOPS
AS WE HEARD IT



City of Ottawa
Planning, Infrastructure and
Economic Development
[DRAFT]

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INTRODUCTION

In the summer of 2017, the City of Ottawa (the City), in collaboration with Leidos Canada (Leidos), held a total of five workshops to gather feedback on specific energy technologies as part of Phase 1 of the City's Energy Evolution Strategy initiative.

Purpose of the Workshops

Leidos was contracted to develop a baseline energy consumption analysis (Baseline Study), as well as a series of technically focused pathway documents (Pathways). The Pathways summarized how a specific energy technology may be developed in Ottawa and included (a) considerations of the overall technology potential and constraints that are likely to reduce uptake, and (b) influences and opportunities that may be able to increase uptake in Ottawa. The Pathways focused on the following technologies:

- Solar – large scale
- Solar – commercial rooftop
- Solar – residential
- Wind
- Waterpower
- Biogas
- Heat Pumps
- District Energy

An additional Pathway for the Electrification of Transport (Cars and Light Trucks) was developed by the City's Building Engineering and Energy Management (BEEM) group. This Pathway followed the same template as those developed by Leidos.

The purpose of the workshops was to walk through the draft Pathways with a targeted group of technical stakeholders in order to (a) receive feedback on the draft documents and (b) to identify specific projects and initiatives stakeholders perceived as "actionable," i.e. projects seen as having few barriers to implementation and that could be implemented within the next one to three years. The actions could be corporately or community led, and could be project based or policy based.

Format of the Workshops

Attendees were provided with the draft Pathways in advance of the workshops to allow time for consideration of the analysis and opportunities identified.

A team of City and Leidos staff facilitated four workshops over three separate dates. These workshops included:

- **Solar / Wind / Waterpower Pathways**
9:00 am to 12:00 pm on June 23, 2017
- **Biogas Pathway**
1:00 pm to 4:00 pm on July 18, 2017
- **Heat Pumps Pathway**
9:00 am to 12:00 pm on July 26, 2017
- **District Energy Pathway**
1:00 pm to 4:00 pm on July 26, 2017

Additionally, a fifth workshop facilitated by the City was held on August 28, 2017 from 10:00 am to 12:00 pm for the Electrification of Transport (Cars and Light Trucks) Pathway.

Each workshop followed the same general format:

- Welcome and introductions
- Overview of the findings from the Baseline Study and the relevant Pathway(s), with a question and answer period
- Facilitated review and ranking exercise where stakeholders discussed short term action ideas they felt were most "actionable"
- Small, facilitated breakout group sessions to workshop and refine top ideas
- Facilitated roundtable report back discussion.

With the exception of the Solar / Wind / Waterpower Pathways workshop, presentations were made by key external stakeholders ahead of the breakout group sessions to further the discussions.

Over 40 external stakeholders participated in the workshops, representing 31 stakeholder groups. Stakeholder groups included, but were not limited to: utility companies; developers; affordable housing; federal, provincial, and local governments; and subject matter technical experts. A list of stakeholder groups can be found in Appendix A.

METHODOLOGY TO DETERMINE SHORT TERM ACTIONS

The catalyst project ideas from each Pathway were presented at each of the workshops. Through a facilitated exercise, participants were given the opportunity to review and add more ideas, as well as discuss them with other stakeholders, and were asked to rank those ideas that they felt were most actionable. The ideas that emerged as front runners formed the theme for the breakout groups, and participants were asked to further flesh out the ideas in the groups and come up with concrete actions that could potentially be turned into business cases. A list of project parameters was distributed to each breakout group to assist with the discussion, as well as a project template to expand on the ideas. The list of project parameters and the project template can be found in Appendices B and C respectively.

KEY MESSAGES HEARD

The following is a summary of key messages heard during the question and answer periods, as well as the breakout group and roundtable discussions. The key messages are categorized by workshop.

Solar / Wind / Waterpower

- Opportunities for solar electricity generation was the focal point of discussion as (a) the wind resource in Ottawa does not favour substantial development; (b) the major sources for waterpower have already been harnessed; and (c) opportunities for solar electricity generation are significant, particularly with respect to commercial rooftops.
- New mechanisms to sell electricity produced by plants should be enabled. Virtual net metering is considered to have great potential in supporting renewable electricity generation, but is still a relatively new concept in Ontario. While the Province does not have a framework in place for virtual net metering, Hydro Ottawa feels that there is an opportunity to develop a framework at the local level in the interim.
- There are a number of local organizations (e.g. Ottawa Renewable Energy Co-op, Ottawa Community Housing) that also have an interest in further exploring virtual net metering at the local level.

- Grid connection costs and processes continue to be an impediment for the realization of many medium and large projects.
- There are a number of potential solar projects that are in limbo due to their inability to find a buyer for the electricity generated (e.g. Energy Ottawa's proposed Trail Road solar project and Burritts Rapids proposed waterpower project).

Biogas Pathway

- The City's Robert O. Pickard Environmental Centre (ROPEC) and Trail Road Waste Facility currently make productive use of biogas to generate electricity and capture waste heat, i.e. ROPEC has three co-gens and Trail Road has a gas-to-energy generating facility.
- As a renewable electricity generator, biogas is more expensive than today's low cost wind and solar projects, so unlikely to experience much further growth. Using biogas for renewable natural gas (RNG) generation over electricity generation is considered to have greater potential because of the much higher conversion efficiency and ability to offer low carbon heating. However, RNG is presently more expensive than regular natural gas in the Canadian market.
- Per the draft findings of the Pathway, 11% of natural gas consumption (5,300 TJ/year) could be displaced through biogas under an aggressive uptake scenario (relative to a 2015 energy consumption baseline).

- 100 TJ/year is considered to be the minimum acceptable size for a RNG facility.
- RNG pipes require close proximity to natural gas pipe lines to be viable (within 5 km), and connection point must be reviewed for appropriateness (of input and system pressures).
- Biogas can be economically trucked up to 120 km. For this reason, a centralized facility could receive biogas from other places.
- For projects to be economically viable, there needs to be a buyer for the energy produced. An example would be businesses purchasing RNG to be used in their fleets, and virtual sales to jurisdictions with well-priced renewable energy credits.
- The City's portfolio presents a significant opportunity to take further advantage of biogas (e.g. ROPEC, Trail Road Waste Facility, Fleet Services); however, it still needs to be determined what would be most feasible.
- Enbridge currently offers resources to entities interested in pursuing RNG projects.
- A 2 MW power to gas (spare electricity to hydrogen gas) facility is coming on stream in the Greater Toronto Area.

Heat Pumps Pathway

- Per the draft findings of the Pathway, 57% of natural gas consumption could be displaced through heat pump technology under an aggressive uptake scenario (relative to a 2015 energy consumption baseline).
- Switching over from oil and propane furnaces to heat pumps is considered to be low-hanging fruit with a 5 to 15-year payback.
- Switching from natural gas to heat pumps in Ontario is marginal due to high electricity prices and low natural gas prices.
- Buildings with Class A electrical accounts present an opportunity for heat pump technology as they can take advantage of competitive spot market electricity rates which can be lower than natural gas costs.
- There is a large variability in terms of knowledge and expertise when it comes to heat pumps.

- Existing City policies can be barriers to utilizing ground source heat pump technology due access restrictions placed on non-utility users (e.g. Right-of-Way Policy, Parks By-law).
- Natural gas heat pumps are not well supported in North America.

District Energy Pathway

- Per the draft findings of the Pathway, 14% of natural gas use could be displaced through district energy under an aggressive uptake scenario (relative to a 2015 energy consumption baseline).
- In Canada, the majority of district energy systems have been initiated by public sector entities (e.g. hospitals, universities, municipalities).
- There is significant opportunity to work with Public Services and Procurement Canada to tie into their existing district energy systems, which are scheduled to be upgraded and converted to lower temperature hot water.
- The Ontario Building Code does not require new buildings to be "district energy ready," limiting future opportunities to have those buildings connect into a district energy system.
- Existing City policies can be barriers to utilizing district energy systems due to access restrictions placed on non-utility users (e.g. Right-of-Way Policy, Parks By-law).
- Large new developments such as LeBreton Flats Redevelopment and Gladstone Village present significant opportunity to incorporate district energy technology.
- It would be helpful to have a better understanding of where there are areas of waste heat in Ottawa and how to utilize them.
- Enwave is interested in pursuing large scale, low-carbon system projects outside of Toronto.



Electrification of Transport (Cars and Light Trucks)

- A current challenge to electric vehicle (EV) adoption is the difficulty in car manufacturers to produce enough EVs to meet current market demand.
- Car dealerships do not do a good job in promoting or selling EVs — still largely focused on selling combustion engine vehicles. A local EV enthusiast is directing buyers to sales reps who are interested in selling EV's
- It will be difficult to achieve the Pathway's aggressive uptake scenario unless autonomous vehicles adopt EV technology.
- EVs should not be considered a new consumer technology for most consumers as there is already a space for cars and light trucks, which may make EV market penetration more challenging.
- User fees must be considered acceptable to the user to incent EV adoption, i.e. if the cost to charge an EV is more than it would cost to fill-up with gasoline, EV owners will typically forego charging.
- The Province is currently ahead of schedule in meeting its province-wide target that EVs make up five percent of passenger vehicle sales by 2020.
- Level 1 charging stations may have a role at Park and Ride parking lots and other long-term parking as Level 2 charging stations are often used by the same people every day and the level of charge is not required. Payment for Level 1 charging stations could be based on a sticker system.
- While many countries are setting targets that will ban the sale of internal combustion engines in the future, it was felt that the focus should be on how to encourage EV adoption at the local level in the short-term.
- Stakeholders felt the biggest opportunity was to advocate to the Province to finance an Electric Vehicle Discovery Centre in Ottawa through cap and trade funding in collaboration with Plug 'N Drive (similar to the one recently opened in Toronto). This was the best liked of the ideas on how to encourage EVs and Plug 'N Drive indicated this initiative has been very successful in Toronto.
- Plug 'N Drive is participating on a working group that is looking into whether condo boards have the authority to refuse requests for EV charging infrastructure.

FEEDBACK AND NEXT STEPS

Feedback forms were handed out at the end of each session. Overall, participants found the workshops to be very useful and informative, particularly the breakout group sessions and the opportunity to collaborate with other stakeholders. Many stakeholders expressed an interest in attending further meetings of similar nature.

The next steps for the project are:

- Leidos and the City will revise the Pathways based on feedback received and the final documents will be circulated to the Energy Evolution Sounding Board, as well as be included in the report to the City's Environment and Climate Protection Committee in Q4 2017.
- City staff will develop a list of all short term action ideas and, using a set of weighted evaluation criteria, assess and rank them to determine which are best suited to be further developed into business cases. The short term action list and business cases will be brought forward in the Q4 2017 report.



APPENDIX A – LIST OF STAKEHOLDER GROUPS

- Bullfrog Power
- Burritts Rapids Renewable Energy Association
- Canadian Geoexchange Coalition
- CanmetENERGY
- CH Four Biogas
- City of Ottawa (various departments)
- City of Hamilton (Office of Energy Departments)
- EcoGen Energy Inc
- Econogics Inc.
- EDF Renewable Energies
- Enbridge
- Energy Ottawa
- Enwave
- FVB Energy
- Greater Ottawa Home Builders' Association
- Healthy Transportation Coalition
- Hydraulic Energy and Renewable Energy Technologies
- Hydro Ottawa
- Innovative Hydro Controls
- Isolara Solar Power
- JAZZ Solar Solutions
- Master Group
- Minto Group
- National Research Council
- Natural Resources Canada
- Norsun Energy
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ottawa Community Housing
- Ottawa Renewable Energy Co-op
- Plug 'N Drive
- Public Services and Procurement Canada
- Windmill Developments

APPENDIX B – LIST OF PROJECT PARAMETERS

Parameter	Yes/No
1. Who – Can your organization lead the project?	
2. When – Can the project be initiated within 1-3 years?	
3. Is the scope of the project within the scope of the energy pathway?	
4. Will the project increase local renewable energy generation or encourage its advancement?	
5. Does the project advance renewable energy generation goals?	
6. Does the project use technology that currently exists?	
7. Is there a funding source in place?	
8. Does your organization have existing funding to support the proposed project?	
9. Can the project self-finance?	
10. Can the project generate a return on investment to help offset project costs – capital or otherwise	

APPENDIX C – PROJECT TEMPLATE

Action (name):				
Description	Lead Organization & Partners		When: Timeline(s)	Cost Estimate (\$)
	Lead:			
	Partners:			
Resources & Other Considerations				
Financial Resources Available (e.g. existing resources, potential funding opportunities, etc.)	Other Resources Available/Required	Potential Obstacles	Supporting Policies/ Bylaws	Performance Measures