



Encouraging Action & Leadership
on Sustainability in Municipal Government

Union of Nova Scotia Municipalities'
Municipal Sustainability Office



Proceedings of the
Annapolis Royal Environmental Conference on "Energy and
Climate Change: Living for Tomorrow"

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INTRODUCTION

The Climate Change Conference in Annapolis Royal, Living Today for Tomorrow, was hosted by the Town Council for the purpose of engaging and educating the public on climate change issues, empowering the public to make change in their own lives, and to gather feedback and input from the public on the renewable energy plans of the Town. It was the first of such sessions that the Town Council has held. The Dalhousie Graduate Student Group will provide suggestions based on public feedback on how the town can improve on similar sessions in the future.

PROGRAM SCHEDULE

DRAFT PROGRAM

November 19

- 4:00 p.m. Conference Registration, King's Theatre, St George Street
- 7:00 p.m. Nova Scotia Today at King's Theatre
- Andy Sharpe: How I Built an Energy Efficient Home
- Public Forum on Climate Change, King's Theatre: " *What's the Problem?*"

November 20

- 7:30 a.m. Registration continues, Port Royal Legion, Victoria Street
- 8:00 a.m. Breakfast with Celes Davar
- 10:00 a.m. Research to date in the Annapolis Valley
- Dr. Robert Maher, Applied Geomatics Research Group,
Centre for Geomatic Sciences
- 12:00 p.m. Lunch

1:30 p.m.- 4:00 p.m.

Stephen Hawboldt- Clean Annapolis River Project (CARP)

Dan Roscoe- Scotia Windfields

Will Marshall- geothermal energy

Terry Thibedeau- biomass

Glennie Langille - Tidal Power in the Minas Passage

4:30 p.m. Public Forum: *"What's the Solution?"*

6:00 p.m. Supper

7:00 p.m. Performance by DRUM! POWER King's Theatre

8:00 a.m. End of Day 2

November 21

Down Under Tours and tour of interpretive centre, NSPI Tidal Power Station, Annapolis Royal

November 20

Research to Date in the Annapolis Valley

Presenter: Celes Devar

Topic: "The Science Behind Climate Change"

Summary

Celes Davar, a biologist, independent eco-tourism business owner, and member of Al Gore's army, presented a series of slides based on *An Inconvenient Truth*. His talk provided current data on different aspects of the climate change crisis, including the arctic ice melt, rising CO₂ concentrations, increased land and sea temperatures, severe weather patterns, ocean rise, and species loss. He focused specifically on

tourism's share of the carbon emissions problem. Mr. Davar presented potential solutions to the climate crisis through personal actions and business leadership, including energy-saving options, political action, buying local, recycling, telecommuting, and seeking financial rewards for environmental business choices. He closed with a video from US President-elect Barack Obama, who gave a message of hope for the future of green business and technology. Obama's speech was given for a meeting of thirteen US state governors in California, the day before the Annapolis Royal conference.

Discussion: Q & A

Q. With the existing economic meltdown how do we still deal with climate change while reviving the economy?

A. We need to completely rethink economics. Investing in the energy sector in renewable energy is a way of doing both. The way to influence change begins in your backyard. Invest in your local economy; rethinking the small things that we can do – support the people in our backyards. We don't have all the answers. We have to engage in a level of leadership that we've never engaged in before.

Q. Why is the Fundy shore at less of rising sea levels than the Atlantic coast?

A. (Celes Davar) Tides themselves might subside due to rising sea levels. (Bob Maher) If you look at Fundy Shoreline, generally, they would see that coastline as a cliffed coastline – protected by the cliff. Therefore there will be less effect on communities along cliff portions of the coastline

Q. Is it misleading to blame population explosion as a leading cause of climate change? Does this lead to scapegoating blame to developing countries?

A. Not ranked. What do you want to do here in NS?

Q. Politicians and business leaders are getting on board with climate change but religious leaders do not seem to be as involved. Why?

A. There has been a shift where religious leaders are becoming more aware of their ability to affect attitudes toward climate change but it is an area that could have more leadership.

- The Archbishop of Canterbury has stopped flying
- Vatican City is 100% carbon neutral

Presenter: Dr. Robert Maher

Topic: Applied Geomatics Research Group, Centre for Geomatic Sciences

Summary:

Robert Maher identified the community mapping project COGS Cartigraphic mapping project; the Margo Project; the CLICK project, which is hosted by Middleton campus. The project is publicly run but its sustainable existence is maintained by NSCC. This project has mapped the lost villages of Margo, Roxbury, Douglasville/Port Lorne. CLICK offers services in teaching GPS, open source GIS community mapping, and providing technological assistance needed for the creation of maps from data collected from schools children, universities students, and professors to name a few.

Community mapping is important because it builds community self-esteem, it is the basis for place-based rural development through increasing jobs and the economy and value of locality, and it places value on the unique properties of the place. Flood risk maps will identify vulnerable areas and promote less development in these zones. They will serve to mitigate and reduce impacts of flood, better flood forecasting the implementation of flood warning systems and appropriate emergency plans for the municipalities and provinces. Community mapping allows for greater public participation and it will provide the means for the community to own their own indigenous knowledge. The essence is for the community to be subversive of "normal" or "official mapping". Such mapping was started in the Gulf Islands by artist and scientists. It will therefore provide opportunities for collaboration among different expertise in the community and will serve to breaks the silos, which often hinder environmental progress that promotes sustainability.

Community mapping can also help encourage sustainable tourism. Geocaching will make provisions for a new kind of tourism, one that will engage people using high tech equipment. These people will utilize GPS units for sightseeing, nature walks. This will promote tourism that is sustainable and eco-friendly.

Discussion: Q & A

Q. What can we do as a research group to bring new companies in to change the demographics and economic base of the Annapolis valley?

A. There are several things to bring about this action. People can be taught how to use technology to their benefit in order to capture the activities and events in their communities. These technologies can also be used to link the places with its history and the stories associated with. This can be realized with the use of maps. This will engage the community in the mapping of the community by the community. Community

mapping can have an effect on a number of sectors including the cultural and social environment, tourism and art. These maps may reflect infrastructure inequalities, living and maintaining a sustainable lifestyle and finally maps can reflect historically significant aspects of the community. Other aspects of the community's history are only available orally; therefore maps can be used to record and preserve this historical information. This will provide the mechanisms to record local knowledge so that it can be appreciated and prevent its disappearance. The technology to achieve or bring about the desired outcome can be transmitted through training workshops, and seminars in the community.

Q. Where are we going? (FOR ANNAPOLIS)

A. Robert Maher Contends that the way forward for Annapolis is four fold:

- Implementation of flood maps which
- Community Mapping
- Geocaching
- Community profiling.

Presenter: **Stephen Hawboldt**

Topic: **Clean Annapolis River Project (CARP)**

Summary:

Stephen Hawboldt gave a history of and prospectus for, the Clean Annapolis River Project, a community-based, charitable NGO whose mandate is to bring about sustainable use of the Annapolis River watershed. Since its foundation in 1990, CARP has been involved in environmental monitoring, habitat restoration, energy conservation, and climate change issues, among other programs. Its successes include restoring thousands of meters of stream banks, building hundreds of hectares of wetlands, eliminating thousands of tons of GHG, and providing 15 years of water quality data. For these successes, it has won national and international recognition.

In the years ahead, CARP faces many environmental challenges such as the prospect of storm surges, changes in temperature and precipitation, reduced dependence on fossil fuels, and declining biodiversity coupled with more invasive species. CARP is also

challenged to improve continuity between these areas of concern – in other words, to see how each part interacts with the others. Facing these challenges will require honest and hard debate, and demand that we avoid falling into black and white interpretations of issues.

Discussion: Q & A

Q. Do communities use your data to determine whether they can give building permits or not?

A. So far, no. You have to be very careful doing that. We need to develop a set of planning tools for developers to know the region and be mindful of the environmental threats (eg. if they are going to build a new shopping centre on a flood plain, they need to build it into their business plan.)

Q. What about having an invasive species eradication day sponsored by CARP?

A. That would be one thing to do. We did pull together some research, and a policy for buckthorn, working with the municipality. One of the problems with invasives is what to do with them. They are organic, so they can't go to the landfill. But their seeds will survive in the compost. There is a garlic industry study to determine how to get rid of the seeds.

Presenter: Dan Roscoe

Topic: Scotia Windfields

Summary

Dan Roscoe is the Chief Operating Officer for Scotian Windfields. Scotian Windfields is working with communities around the province to help them develop sustainable energy practices which are community owned and operated. The benefits to community ownership over renewable energy sources include: local economic benefits, community input, RRSP transferable investments in Windfields (CEDIF structure), and public acceptance of development. The three main challenges facing Nova Scotian communities in terms of energy supply are: i) GHG emission reduction target (10% of 1990 levels by 2020) of reduction by 500,000 ton/yr; ii) increasing and volatile cost of energy (fossil fuel based) due to supply as well as geopolitical and climate events; iii) Energy security—Nova Scotia imports 90% of its energy.

Dan Roscoe suggested three options for Annapolis Royal in solving these energy challenges:

Option 1: On site generation

- wind: will stabilize costs, provide green profile, decrease GHGs
- Technology: Aotec from France
- cost 40-50,000\$, revenue 2,500\$/yr
- wind atlas very useful tool, now on google
- in Germany is 4-6 m/s, here much higher, in Annapolis is 6.5m/s average
 - o North Mountain one of best resources in Province
- on-site turbines could provide 50% of electricity for the building on which it is installed
 - o 4 possible in Annapolis Royal: 2 water pumping stations, town hall, fire hall
 - o School, hospital, legion also an option
 - o 60-80 ft tall turbines

Option 2: Partner with larger project on North Mountain

- town could be involved in promoting to build acceptance
- revenues could be for energy efficiency projects
- risk is all eggs in one basket
- town prohibited from being a customer right now but legislation change has been recommended

Option 3: Solar Thermal

- 40% rebate available for solar thermal panels on businesses and institutions
- 14 B&Bs, hotels, cafes, restaurants all good candidates; town buildings not as much since they do not use much hot water
- Town can help facilitate and educate technicians
- Price \$5-30,000/system, payback 7-10 years but this depends on price of fossil fuels and price of carbon in future

Discussion: Q & A

Q. How can the community get involved in a community windfield now?

A. Share offerings, more info available at: Baywind.ca; Public meetings; the town could look at giving tax incentives to private residents and businesses.

Q. If curious about exploring some of these technologies for your own residence, how would we approach you?

A. There is certainly a possibility for Wind and solar as well for residential use in Annapolis Royal. For more Info visit the solarnovascotia website.

Q. Rough cost of installation of a turbine for private residential use and what is the savings generated?

A. \$40-50 thousand. Generates \$2500/year

Q. How loud is residential one?

A. Pretty quiet. Centripetal pitch system. Normally installed 150ft from home.

Presenter: Will Marshall, NSCC Course Director of Energy Sustainability and Technology Program

Topic: Geothermal Energy

Summary

Personal Background: Will was environmental manager at Michelin, just started at NSCC teaching course on residential heat pumps

Ground Source Heat pumps:

- heat pumps are like a refrigerator
- Coefficient of performance (COP) range between 1.4-4.5, compared to a furnace that has a max efficiency of 0.87

Types: 1) direct exchange, circulates refrigerant through pipes, cost \$18-25,000, #3500 rebate through EcoEnergy Program, COP up to 4.5, boreholes 5+ m apart, 450ft deep typically

2) Pond Loop, at least 6ft below, circulates antifreeze therefore liability for leaks

3) Open Loop – use water from aquifer to transfer heat from underground, there may be municipal regulations for this, can be merged with a solar thermal system

Air Source Heat Pumps:

- \$400 rebate through EcoEnergy Program
- Air fluctuates more than ground temperature, but rarely below -10C

Types: 1) Mini+multi split

- not very invasive for heritage homes
- COP 1.4-3 but high GHGs because requires coal-based electricity
- Does not require existing ductwork, just 1-4 ducts into the rooms heated with pump

2) unitary system

- needs ductwork

- RETScreen is free software from NRCan to size systems, +/-15% accuracy

- rule of thumb is 500ft²/ton of heat pump capacity

- need lower temperature heat distribution system

Discussion: Q&A

Q. If you have wells available will it reduce your installation cost for a ground source pump?

A. Yes. Typically the ground source pump will not provide the amount of heat that your typical radiator but it is a good supplement to traditional heating methods

Q. I heard of problems with geothermal heating in the Annapolis Valley. I am glad that I didn't go ahead and install one right away. Is there any difference between horizontal and vertical installment?

A. Soil stratification is a concern. Typically horizontal pipes should be at least 6ft under or they may freeze. Make sure you have a certified installer

Q. What are the costs involved in running one of these systems (specifically in regards to electricity costs)?

A. Your power bill will increase. However, this will be offset by lower costs of heating, so you will end up saving your oil bill for instance.

Presenter: Terry Thibedeau, Annapolis/ Digby Economic Agency

Topic: Biomass

Summary

Biomass is found all around the Annapolis Region and includes all organic materials found in the forest. Biomass can be collected and turned into bioenergy. In the Annapolis / Digby area there exists 508, 146 ton/yr of biomass that is presently being left in the forests to rot. At present there is a large market for biomass and biofuels in Europe however there are barriers to exporting and the theoretical local market will be key to building the industry. Investing in Biofuel production could help the struggling forestry industry. Theoretically there is 583,000 cord available for biofeul production. At this point

in Nova Scotia the demand for pellets and biofuel is low but growing. Last year there were over 1600 pellet stoves sold in the province. We would look to keep the market local supplying to customers within a 200km radius and having suppliers within a 150 km radius. Investing in biomass has the possibility of creating jobs and is a direct investment in the local economy. The primary steps that need to be taken are: 1) confirm supply; 2) Seek investors (local or foreign); 3) Set-up the market (look to smaller woodlot owners to supply the bulk of the biomass material and determine the demand locally). The benefits of investing in biomass and biofuel production include: reduced carbon footprint; investment in local economic development; job creation; help for a hurting forestry sector.

Presenter: Glennie Langille, NSPI Communications

Topic: "Tidal Power in the Minas Passage"

Summary: Tidal energy is a compelling renewable energy alternative for Nova Scotia. Currently, NS Power provides 11% of its energy using renewable sources; by 2013, it plans to raise this percentage to 20%.

The Electric Power Research Institute initiated work on tidal power in Nova Scotia. The Minas Passage was chosen as the test site, because of the way it channels water, and the Annapolis Pilot Project was established as a learning experiment.

The advantages of tidal energy are that it is more predictable and has a higher capacity factor when compared with wind. In-stream tidal appears to have less of an environmental footprint. The technology chosen for the pilot project is very simple and robust, with no gearbox, oils or other lubricants. The technology will be tested by the company Open Hydro, and the testing will go on for about two years, in order to determine what impact the environment will have on the machine.

Discussion: Q & A

Q. Will the credit crisis affect the installation?

A. It may affect the lines installed but not the turbine.

Q. You mentioned a cost of \$13-15 million for one turbine. How does that compare to the price of a 1 mgwt wind turbine?

A. It is not a comparison, because this is a test. Moving forward, we would not expect each machine to cost that much. Economies of scale come into play. This testing is about the technology, not about low-cost electricity. The worth is in the learning, not in the mega-watts at this point.

GROUP SESSION

Solutions

Panelists: Dan Roscoe, Glennie Langille, Will Marshall

Q. What are, in your opinion, the barriers to community involvement in renewable energy and what suggestions do you have to overcome these barriers?

A. Dan: one of the challenges is knowledge by the general public

- one of the only ways communities can get involved economically is through the Windfields but this took 8 years to develop and they are only now getting projects built
- as a province our definition of cost per kwh is only focused on lowest cost now; does not include issues like employing Nova Scotians, employing others, price of carbon, energy security in future
- the argument that renewable energy is too expensive is holding back inevitable development, ex. Wind farm proposed in 1978 was seen as too expensive at 2c/kwh.
- the ability to buy and sell power is restricted to 7 entities, NSPI and the 6 municipal utilities, who must provide 24hr load forecasting which is a barrier for others to be able to buy/sell power to ratepayers; others should be able to buy power if NSPI is not willing

Glennie: balancing all interests and concerns of all Nova Scotian

- o Biggest barrier – most people don't know now where their energy comes from
- o Most think 100% is coal-based which makes them apathetic; No clue that 10% of energy was coming from renewable sources
- o Starts to mean something to you when you start paying for it
- o Public education process – people know where energy coming from
- o Once we know that, some of the barriers will fall away

Utility

- o Change comes from customers because ratepayers and voters are the same bunch
- o Cost-driven: people will start to care
- o Net-metering will be expanded because we now know the impact of this interconnect to the grid

Will: include renewable energy in education, school system, community college; need technology providers

- need to understand hybrid systems, no silver bullet
- consumers stuck with local plumber, local electrician – they've been doing the same thing for many years, no renewable energy knowledge
- solarthermal courses – 60hr & 70hr certification process is soon to be offered by CanSIA
- NSCC waterfront campus is an example
- Free courses are not likely in NS as in Denmark but we can request cost-effective courses

- Evenings and weekends courses for professionals would help bring them up to speed

Glennie: jobs will build support for renewable energy projects

- if people know that the technology is from here, the money and skills will stay here
- top-up and spill regulations are needed for the security of the system with renewable energy developments
- NSPI is a regulated utility which is a barrier

Dan: essentially we have to train from within

- a barrier is that the government decides who is responsible for monitoring the grid

Q. Do you see as a barrier the legislation that dictates who is allowed to sell or buy power?

A. Dan: Yes. Net-metering program right now is great. Now we need to go next step. Public hearing next month on top-up and spill

- Process that is completely regulated. Security too.
- System operator's responsibility to make it work.

Q. Is there any intention to put carbon taxes on any of these sources?

A. Dan: Provincial government – no interest on putting a carbon tax at all at this point

- Preparing for it – most likely case now, we will have a price on tax imposed on us from outside NS. Obama administration impose cap-and-trade.
- Change NAFTA for environmental concerns. US will impose it on us.

Glennie: Whether it is a carbon tax or intensity levels, or cap and trade etc. There will be a price on carbon. No matter the result, there is one sensible path and that is to use less carbon. You would have to have been blind and deaf and not caring for the last 10 years to not see where we're going.

- Don't want people to be paying for a "stranded asset" as well as the new thing. Don't need to know exactly what the policy's going to be.

Dan: form is irrelevant – cost is going to be there.

- o We're already paying for it in health care; 1000-2000\$/person/year for fossil fuel use
- o Just accounting for it differently

Q. Why aren't we as a society initiating some of this? We're no where near ready – what do we need to do? My frustration: we're following.

A. (floor) There are companies. We could start our own voluntary process for carbon here in NS.

Amery: 200 municipal units in BC signed on – they're paying carbon tax.

Dan: Economy starting – from auditing point of view. Offer carbon services. Carbon regulation, accounting, standards that you are applying. It's a potential revenue stream for marginal industries. Ex. Minas Pulp and Power is trading all carbon credits on the voluntary market, using all recycled products. Jacques Whitford is going carbon neutral

- Scotian Windfields is planning to get into Carbon auditing, includes diverting organics, wind turbines, solar panels, etc. A market order is approx 5000 tons

Glennie: there will be a whole economy around carbon trading. Carbon credit price value should be known to Independent Power Producers

Q. When NS Power plants become obsolete, is there a plan in place to replace them?

A. Glennie: They can have a lifespan of 40-50 years, which makes them economical but no desire to close them before the end of their life.

- The plan is the "Integrated Resource Plan" – online

- It is held by the Utility and Review Board – stakeholder process to form it including the EAC

- Looks at the Immediate, middle and long-term goals

- Short term will use coal, since NS does not have a major renewable energy project, the change will be incremental. Our piece is tidal and we will benefit from the major projects around the Maritimes

- We will always have a tie to New Brunswick, next step is to integrate is transmission development (improve grid connect to NB)

- There will be changes regionally on how we use and run power plants
