

The Ecology Action Centre (EAC) appreciates this opportunity to provide a written submission to the 2014 Electricity Review, allowing us to follow-up on fruitful conversations with Department of Energy staff.

This document will focus on three key recommendations for the Review:

- 1) Describe pathways to a carbon-free electricity system by 2035
- 2) Identify opportunities for incremental growth in and integration of solar photovoltaic energy in Nova Scotia
- 3) Establish an on-going consultation process for long-term energy planning and decision making

We believe these additions to the current areas of Review focus will substantially enhance the value of the Review process in a time where Nova Scotia's electricity system is undergoing dramatic change and Nova Scotians are consistently demanding opportunities to better understand and have their say in these changes.

Describe pathways to a carbon-free electricity system by 2035

Nova Scotia is a national leader in setting targets for and achieving greenhouse gas (GHG) emissions reductions from the electricity sector. We have set ambitious targets for renewable energy development and integration that we are on track to meet. Simultaneous to these efforts, we have made substantial investments in energy efficiency and demand side management that have reduced our electricity consumption by 5.5% since 2008 while creating jobs and saving Nova Scotians money. EAC applauds Nova Scotia's initiative and impressive progress to date.

However, Nova Scotia's electricity system still relies heavily on GHG-emitting fuels, making our province particularly vulnerable to likely future scenarios where Federal climate change policy will regulate the electricity sector for deep emissions reductions.

On a global per capita basis, a Canadian target consistent with the goal of preventing greater than 2°C would set national GHG emissions reductions by 2050 at 95% below 2010 levels. By 2040, national targets would limit GHGs to approximately 1/3 to 1/4 of present-day emissions.

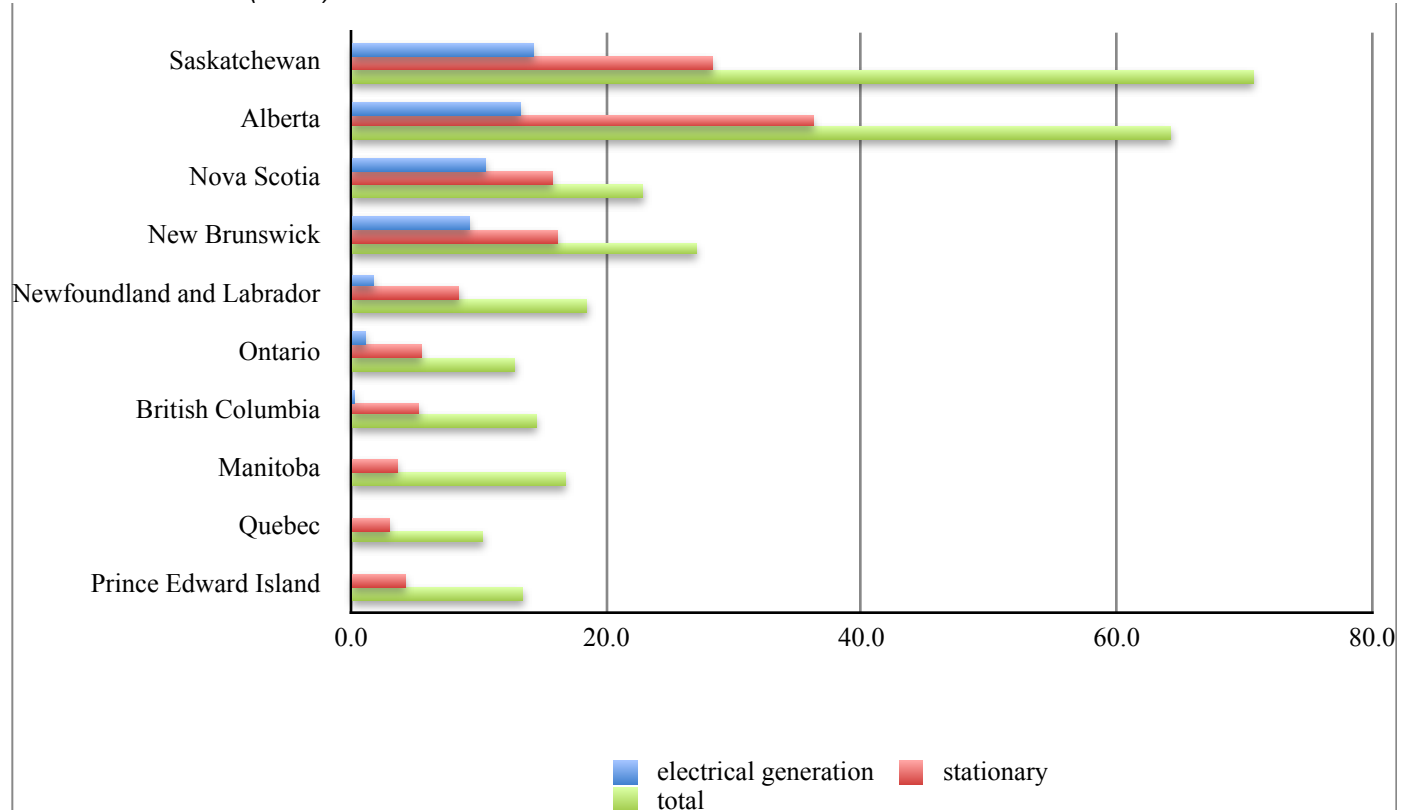
These reduction targets lie within the range of policies under consideration by Canadian federal parties. The Climate Change Accountability Act Bill C-311 (2010) proposed similar limits and passed third reading in the House of Commons in 2010. Originally sponsored by Member of Parliament Bruce Hyer (then an NDP MP and now a Green Party MP), Bill C-311 achieved broad support including, among others, current leaders of both opposition parties. Bill C-311 was only defeated on second reading in the Senate in 2010. The current official opposition has resubmitted this bill for consideration and policies similar to it are likely to remain under active consideration for the foreseeable future.

Stationary emissions, especially electrical power generation facilities, present the largest opportunity for easy reductions today, particularly when compared to the difficulty associated

with reducing emissions from transportation or oil and gas extraction. For this reason, under potential future federal emissions reductions regulations, electricity generation will be looked to virtually eliminate GHG emissions as soon as possible. Electricity systems are the 'low-hanging fruit' of GHG emission reductions.

2009 Per Capita CO2 equivalent Emissions ¹

Statistics Canada (2012)



Further, existing and potential future mercury emissions standards will make coal-fired electricity generation increasingly impractical. The United States Energy Information Administration increased its short-term coal retirement prediction by 50% in 2014, citing improving air quality standards and increasing availability of natural gas².

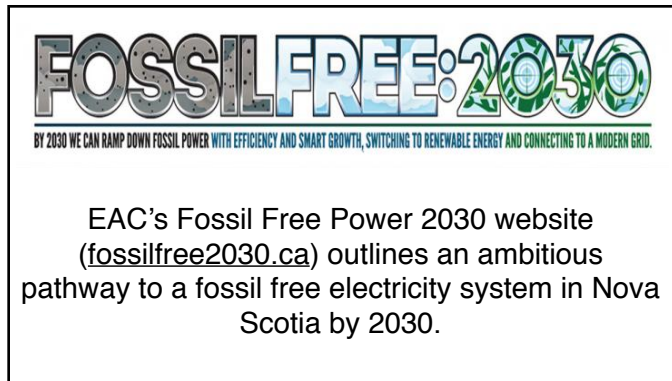
Confronting this realistic assessment of future regulatory scenarios and meaningfully addressing climate change means planning for a future where the carbon liability of Nova Scotia's electricity system is quickly eliminated.

The Electricity Review is ideally positioned to outline several possible pathways to a carbon-free electricity system in Nova Scotia.

¹ Statistics Canada. 2012. *Reality Check: The State of Climate Progress in Canada*. National Round Table on the Environment and the Economy

² US EIA. 2014. *2014 Annual Energy Outlook*. <http://www.eia.gov/forecasts/aeo/er/index.cfm>

EAC's suggested date of 2035 reflects the globally significant date of 2050 for GHG emissions reductions to prevent more than 2°C of warming. Reducing our electricity emissions by 100% by 2035 gives us room to aggressively target emissions reductions in transportation and industrial sectors between 2035 and 2050. The date also reflects the Review's finding that the year 2030 will present a significant turning point for Nova Scotia's electricity sector.



Elements of a carbon-free electricity system

As mentioned above, ongoing leadership on sustainable energy policy is a cause for celebration in Nova Scotia. Continuing this momentum and safeguarding against short-term concerns that might derail long-term goals is critical to preparing our province for the future by decarbonizing our electricity system.

EAC believes the following commitments are crucial to this goal:

- > ***Pursue all energy efficiency that is cost effective and achievable.*** We waste too much electricity, and it is too financially expensive, environmentally and socially destructive, to allow that waste to continue.
- > ***Make provincial energy security a top priority*** when considering development of domestic energy resources. Building up our own local, sustainable energy system and boosting local economies should be our priority before export.
- > ***Develop non-cost criteria for selecting energy sources*** such as carbon emissions, environmental progress and sustainable prosperity policy directions.
- > ***Do full-cost accounting for future fuel procurement*** to factor in environmental, social, and human costs and benefits in addition to economic costs. We know that the costs and benefits of electricity production are about more than just money, so we must balance the impacts our energy choices have on our communities and environment in addition to our finances.
- > ***Do not overcommit to natural gas.*** The Review currently reflects a growing reliance on natural gas for electricity production, a common trend in jurisdictions across North America. It is important that Nova Scotia safeguard against an overzealous embrace of this trajectory. A recent study from the University of California, Irvine, and Stanford University finds that over-reliance on natural gas as a 'bridge-fuel' in the United States threatens to worsen climate change by increasing electricity consumption and delaying the switch to renewable, non-emitting fuels³. While our commitment to energy conservation and renewable energy targets will

³ Shearer, C., J. Bistline, M. Inman, S.J. Davis. 2014. *The effect of natural gas supply on US renewable energy and CO2 emissions.* <http://iopscience.iop.org/1748-9326/9/9/094008/article>

help protect Nova Scotia from this potential outcome, we must be wary of overbuilding natural gas -dependent electricity infrastructure.

Identify opportunities for incremental growth in and integration of solar photovoltaic energy in Nova Scotia

Solar photovoltaic (PV) energy has until recently been marginalized by many North American jurisdictions as an expensive and impractical option for electricity generation. This situation has shifted dramatically in the past decade with a substantial improvement in the efficiency and affordability of solar PV technology. Ontario's rapid development of solar PV since 2009 through its feed-in tariff program has gone a long way to normalizing solar PV energy in Canada.

As outlined by Groszko (2013), the installed cost of solar PV in Nova Scotia has decreased by an average of \$1.06/W in recent years. Though yet to be confirmed, Groszko predicted a levelized cost of PV electricity for Nova Scotia of 25 cents/kWh by 2013. While not competitive on a utility scale, this price is certainly competitive when considering the small-scale, distribution-level electricity production solar PV is ideally suited for.

EAC submits that much of the information regarding solar PV energy so far captured by the Review is out-of-date (particularly cost calculations contained in the emerging technologies report) and/or too high-level and generalized to be of much use in decision-making for Nova Scotia's electricity system in 2014.

EAC emphasizes the importance of updating the Review's information and assumptions pertaining to solar PV by referencing anticipated submissions to the Review, particularly those from Dr. Wayne Groszko, Solar Nova Scotia, and Jacob Thompson. EAC defers to these submissions on the specifics of solar PV potential for Nova Scotia.

EAC wishes to touch on the important role that solar PV can play in improving Nova Scotians' energy literacy and 'inviting' them to participate directly in the transformation away from fossil fuel dependency currently underway in the larger electricity system surrounding them. This may be particularly true for urban residents in Nova Scotia who are less likely to come into contact with community feed-in tariff (COMFIT) projects that residents of other parts of the province may have the opportunity to participate in and interact with.

EAC has collected nearly 400 signatures from Nova Scotians on a petition asking the province to design a COMFIT for solar PV.

Designing a COMFIT is just one way in which Nova Scotia might create opportunities for the expansion of solar PV in the province. EAC makes several suggestions below.

Beyond providing accurate, up-to-date, and useful information on solar PV, EAC suggests that an important role of the Review is to enumerate opportunities for incremental growth in and integration of solar photovoltaic energy in Nova Scotia.

Opening Nova Scotia to incremental growth of solar PV

Taking advantage of the province's existing programs by designing a COMFIT (or FIT) for solar PV would be a straightforward means of giving Nova Scotians the opportunity to participate in this promising technology.

However, given current grid constraints and the nature of Nova Scotia's solar resource, it may be preferable to begin with programs that target geographic and demographic areas of the province most immediately primed for efficient uptake of solar PV.

> Urban solar

Densely populated urban areas have high daytime electricity loads, making them ideally suited for uptake of daytime-peaking solar PV installed at the distribution level. Programs designed to target solar PV installations in urban communities could make strategic use of Nova Scotia's solar resource and reduce the amount of electricity transmitted long distances from larger generators to urban areas. It would also give urban residents the opportunity to participate in renewable energy generation as most urban areas can not accommodate the requirements for other types of renewable generation underway in other parts of the province (e.g. setback distances for wind turbines).

> Industrial solar

The advantage of coupling low rise industrial buildings and solar power is that daily electricity use, especially in the summer, peaks midday when solar energy is the strongest and wind energy is often low. Local distribution level PV generation can counter peak demands from refrigeration and air conditioning that strain summertime grids. While winter output is lower, well insulated buildings and greater wintertime wind output can help balance these effects.

The 3400 acre Burnside industrial Park has enough area to collect over 400GWh of electricity each year. Even allowing for restricted use on rooftops alone, the park could provide 2-3% of Nova Scotia's annual electricity use.

> Solar + electric thermal storage

As explored through PowerShift Atlantic, electric thermal storage (ETS) is already available to many households throughout Nova Scotia. The majority of these households are located outside of urban areas. Designing a program that couples solar PV with households equipped with ETS units might avoid some of the difficulties associated with solar PV outside of urban areas (different load dynamics and distribution grid capacity). Solar generators might charge ETS units for deferred use.

> Virtual Net Metering

Massachusetts' virtual net metering (VNM) law permits people to buy solar panels in a community -owned and -sited array. The law requires utilities to reduce the panel owners' bill by an amount commensurate with the power sent to the grid by the array. While grid constraints may prohibit this arrangement in the near-term in some areas of the province, such a program might make solar available to a larger number of individuals who may not have roofs

appropriate for solar PV. It is also a means of extending the ‘community’ value of the COMFIT to solar PV without designing a specific solar PV COMFIT.

Establish an on-going consultation process for long-term energy planning and decision making

Nova Scotians clearly want a say in the complex decision-making surrounding our province’s energy future. We’ve seen passionate involvement from Nova Scotians in the hydraulic fracturing review and discussions about new energy infrastructure like wind turbines and the Maritime Link. Recent legislation regarding Efficiency Nova Scotia and creating a ‘renewable to retail’ competitive energy market were direct responses to vocal public debate. Now it’s time for Nova Scotians to be given the tools and avenues we need to talk about the big picture.

Historically, electricity in Nova Scotia has been generated from a small number of large-scale thermal generation units allowing for more simplistic planning. Planning for Nova Scotia’s energy system is becoming more complex, requiring balancing a variety of factors such as global and local environmental impacts, economic considerations, and social implications. Such decisions require engaging multiple stakeholders from a variety of disciplines. As we strive to reach our goals, we more often discuss plans and projects that have far-reaching implications for Nova Scotia’s energy future and the regional energy picture.

While criticism is often attached to the financial benefits perceived as accruing to NS Power at the expense of ratepayers, EAC observes that much of the resentment levelled at NS Power actually results from Nova Scotians wanting and failing to identify how they might benefit from the shifts currently taking place in our electricity system.

As long as the range of benefit seems limited to a large, monopoly utility, Nova Scotia’s energy transition will remain a source of instability and controversy. Nova Scotians want the opportunity to take part in their new electricity system, whether through understanding it better or installing a solar panel. Nova Scotians also want to be sure their best interests are being pursued by those responsible for their electricity system.

Making Nova Scotia’s electricity system more available and accountable to Nova Scotians is essential to mitigating pushback that has the potential to stall and reverse progress. It is also the best way of moving responsibility for the kinds of infrastructural changes our province needs to all levels and scales of Nova Scotia society so that transition is owned by many and easy to spot everywhere.

It’s time to stop tackling issues one-by-one and start giving citizens the ability to feed into large-scale, long-term energy planning on an ongoing basis. While this review, like others that have come before it, will result in valuable findings and discussion, it is essential that next steps focus on how to consistently engage Nova Scotians in energy decision-making for decades to come.

In 2013, EAC released *Electricity and Nova Scotia’s Future: Hurdles and Opportunities*, which makes 29 comprehensive recommendations for Nova Scotia’s electricity system and energy policy. Among these recommendations is an exploration of the concept of an Energy Planning Authority (EPA) for Nova Scotia (see Appendix A). Energy planning processes for three jurisdictions (Germany, United Kingdom, and Ontario) are briefly compared and cursory suggestions are made for a Nova Scotia EPA.

EAC understands the concept may seem vague without a thorough jurisdictional analysis and the application of this analysis to the Nova Scotia context. EAC submits that a helpful outcome of this Review would be a commitment to undertake such an analysis in the near future.

As discussed with Department staff, stakeholders such as EAC that are regularly involved in dialogues and regulatory processes surrounding Nova Scotia's electricity system are ready and willing to mobilize Nova Scotians to participate in this dense and fruitful exchange. Yet we can not mobilize Nova Scotians in the absence of some body or avenue to direct them toward. Undertakings such as the Electricity Review and the Review of Hydraulic Fracturing provide us with such avenues. Bodies such as Efficiency Nova Scotia and Solar Nova Scotia provide targeted sources of information and conversation. Outside of such specific bodies and occasional (from the perspective of the average Nova Scotian) avenues, there is nowhere to point those interested in feeding into big-picture energy and electricity system thinking.

The Broten Tax and Regulatory Review made a similar suggestion for Nova Scotia's taxation system. It suggests a model similar to New Zealand's Tax Working Group (TWG) be adopted for the province. New Zealand's TWG "includes government, academic experts, and tax professionals in an ongoing collaborative review of tax policy"⁴. This is perhaps a useful way to imagine an EPA for Nova Scotia - a collaborative body that regularly reviews electricity and energy policy and is open to ongoing public input.

EAC appreciates the ambitious undertaking of the 2014 Electricity Review and numerous opportunities for input provided to stakeholders.

Sincerely,

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⁴ Broten, L. 2014. *Charting a path for growth: Nova Scotia Tax and Regulatory Review*. p55.

Appendix A: From *Electricity and Nova Scotia's Future: Hurdles and Opportunities*

ENERGY PLANNING AUTHORITIES

The suggestion that Nova Scotia's energy planning process is in need of restructuring dates back to 2001 when then NDP energy critic Howard Epstein proposed legislation to establish an arms-length Energy Council. The proposed council would develop energy policy through public consultation. Over a decade later, our province is more in need of a modern, publicly accountable planning framework than ever. Establishing an EPA in Nova Scotia may fulfill this need.

Many jurisdictions around the world are creating EPAs to plan for increasingly complex energy systems. An EPA creates integrated, long-term energy plans for developing a sustainable energy system. The plans assess how future energy demands can be met through conservation, generation and transmission and offer recommendations for government policy priorities. An effective EPA should evaluate energy decisions using environmental and social metrics in addition to economic and technical considerations. The implementation and structure of these authorities varies across jurisdictions.

In the United Kingdom, the EPA is a government department known as the Department of Energy and Climate Change (DECC). The DECC was created in 2008 to merge energy policy and climate change policy into one department. The department is responsible for ensuring secure, clean and affordable energy supplies. Their current priorities are supporting energy infrastructure investment, promoting action on climate change and minimizing costs to the consumer (United Kingdom 2013).

In Germany, energy planning occurs within the Federal Network Agency (known as Bundesnetzagentur, Bnetza). Like Nova Scotia's UARB, the Bnetza is the regulatory authority responsible for electricity and gas markets, providing efficient and non-discriminatory access to the grid and regulating fees. In contrast to the UARB, the mandate of the German agency has a broader scope; the agency is responsible for ensuring safe, cost-efficient, consumer-friendly, efficient and environmentally friendly electricity and gas for the public (Bundesnetzagentur 2013).

In Ontario, the Ontario Power Authority (OPA) develops integrated electricity plans that examine long-term energy demands and the options available to meet these demands. The purpose of the OPA is to create an electricity system that meets technical standards, public policy goals and community support (Ontario Power Authority 2013). The OPA also initiated a regional planning process that is integrated, forward-looking, and engages stakeholders. Design criteria for choosing options are decided by the specific study team and may include input received through stakeholder consultation. Regional plans developed through OPA's process consider cost responsibility, affordability, feasibility, environmental impacts and feedback from community stakeholders (Ontario Power Authority 2013).

These are three examples of EPAs are housed respectively within government, regulatory, and third-party models. Despite their structural diversity, all are responsible for creating an electricity system that is not only affordable, but meets environmental goals and includes long-term considerations. In each case, the governments involved established the overall direction and the EPAs led an integrated planning process based on goals set at the political level. While not

always successful or popular, these EPAs have to some degree separated energy planning in their jurisdictions from election cycles and created space for public engagement and all-party buy-in.

SUGGESTIONS FOR A NOVA SCOTIA PLANNING AUTHORITY

Sustainable energy planning is associated with high levels of uncertainty, conflicting objectives, multiple interests and perspectives, and a variety of data and information. Consequently, the decision-making method should reflect these intricacies. Traditional single criteria approaches focused on determining the most efficient option at the lowest cost is no longer sufficient. A multi-criteria approach to decision-making has become increasingly popular for sustainable energy planning, and typically include the following criteria:

- Economic – investment, operation and maintenance, fuel costs;
- Technical – efficiency, reliability, safety;
- Environmental – greenhouse gas emissions, local environmental degradation;
- Social – social acceptability, job creation;
- Geopolitical – security of supply.

Broader Criteria

In 2009, Adams and Wheeler of the Faculty of management at Dalhousie University conducted a stakeholder consultation process on the future of renewable energy in Nova Scotia on behalf of the province. Following their report, the EAC submitted a supplementary report, highlighting key recommendations (Ecology Action Centre 2009).

Wheeler and Adams (2009) found that “*the current mandate of the UARB does not provide clear or adequate direction in relation to the integration of renewable energy in the supply mix for the province*” and recommended a review process of the UARB’s mandate. The EAC recommended that the mandate of regulators (UARB) be modified to include the best interests of future generations and non-cost criteria such as carbon emissions, environmental progress and sustainable prosperity policy directions.

As neither Wheeler and Adams’ or the EAC’s recommendations for the mandate of the UARB have been implemented, we reiterate the importance that the energy regulator’s decision criteria include environmental and other non-cost variables, and consider long-term implications.

Recommended long-term planning priorities for a Nova Scotia EPA

- Establish a 2050 target date for a 100% carbon-free energy system in Nova Scotia where electricity is produced from renewable sources and vehicles and heat are predominantly fueled by clean electricity
- make provincial energy security the first consideration before opportunities for export when considering development of domestic energy resources
- plan for how to deal with a price on carbon
- define the benefits and parameters of enhanced regionalization
- develop a full-cost accounting methodology for considering cost-effectiveness of domestic energy resource development and non-domestic fuel procurement
- commit to pursuing all energy efficiency that is cost effective and achievable for electric and non-electric fuels

- implement a consultation process that ensures energy-related resource and policy developments are consistent with overall vision established by the EPA

Public Engagement

The EAC also recommends a planning process that includes improved and meaningful public consultation. Public involvement in energy decisions is beneficial for a number of reasons: it allows decisions to reflect public values; educates the public; creates a process that the public views as fair and transparent; and may illuminate issues otherwise ignored. Involving public in the planning and development of energy projects typically leads to greater public acceptance (Hobbs and Horn 1997).

Nova Scotia has a history of mistrust and politicization with energy supply and distribution issues (Wheeler 2013). Much of the public outrage can be attributed to a lack of mechanisms available for the public to influence the actions of the utility and the resulting implications for Nova Scotia's energy landscape.

As Nova Scotia shifts to an increasingly complex energy system, the public needs improved tools in order to discuss changes to our energy system. A crucial component to this is creating a two-way flow of information. Public acceptance of energy projects depends on providing the public with adequate and trustworthy information about the potential implications of the project on their area. Improved information flow will enable Nova Scotians to make informed and nuanced judgments (Parks and Theobald 2011). An improved system for educating and engaging the public will enable the public to play a role in changes affecting their futures and create a more mature dialogue around energy issues in the province.

Structure

Several options exist for the structure of an energy planning authority in Nova Scotia as highlighted above. A regulatory approach to the energy planning authority could be housed in the Nova Scotia UARB (similar to the German Federal Network Agency). Alternatively, the EPA could be a government body (similar to the DECC in the UK, building on the NS Department of Energy) or a third party (similar to the OPA in Ontario).

The benefit of housing the energy planning authority within government is that the government is already responsible for setting policy goals and criteria. On the other hand, government is vulnerable to political changes.

A third party EPA would be independent of government and industry groups. It might have access to greater expertise in planning for energy projects than a government department. The downside of a third party model is higher implementation difficulty due to distance from decision makers. There is also significant potential for bureaucratic overload.

There are some advantages of creating an EPA within the UARB: it would be arms-length of government and therefore less influenced by political turnover; implementation might be relatively simple, requiring modifications to the existing mandate; and decisions would be fairly transparent as they would result from clearly defined decision criteria. It is fair to question the flexibility of an entrenched bureaucratic body like the UARB. Whether such an institution would be able to transition into a dynamic forward-thinking EPA needs some discussion.

If the UARB were to take on the role of an EPA, the provincial government would be required to significantly modify its mandate. A new mandate could require the board to assess projects through a multitude of policy criteria, including economic considerations, environmental effects (greenhouse gas emissions, local environmental degradation), and social implications. It would be of the utmost importance to explicitly require public consultation and to ensure proposed projects are in the best interest of current and future generations.

Regardless of the structure used to create an energy planning authority, the EAC recommends that the authority: 1) evaluate energy decisions using multiple criteria that includes environmental, social, and other non-cost criteria; 2) consider long-term implications; and 3) involve the public in meaningful engagement.