

ALBERTA RENEWABLE ENERGY ALLIANCE

September 30, 2015

Dr. Andrew Leach, Gordon Lambert, Linda Coady, Stephanie Cairns, Angela Adams

Re: Climate Leadership Discussion Document

Dear Advisory Panel Members

The Alberta Renewable Energy Alliance (AREA) is a Calgary-based organization initiated in July 2004 by students and citizens who were fascinated with an emerging energy sector – renewable energy. Our membership currently stands at 604 people, spanning from Victoria to Halifax. Our local members have met regularly every month since July 2004. The AREA Steering Committee was formally set in November, 2011.

Our members are extremely appreciative of the thought and effort which has been put into the Climate Leadership Discussion Document, the online questionnaire, and the time devoted by Panel members to consult with the public on an issue of extreme importance to Albertans.

We are basing our Submission on questions asked in the Document ([shown in blue font on the following pages](#)) in an effort to respond directly to the panel's enquiries. In essence, our answers address:

- Best market practices for Alberta to become a world leader in all forms of energy;
- Public Policy tools which should be utilized to leverage our leadership, as well as our environmental and economic stewardship;
- Economic development and job creation via low-carbon energy generation, energy conservation and efficiency, and energy storage; (environment + efficiency = economy);
- How Alberta can phase out coal-fired generation and reduce environmental emissions responsibly without disruption, and encourage investment in this province;
- Revitalizing rural and aboriginal communities.

AREA Recommendations are put forward throughout the following pages in response to specific questions asked in the Climate Leadership Discussion Document.

DOCUMENT QUESTIONS

EMISSION REDUCTION TARGETS

1. What should Alberta's emissions reduction goals be?

AREA recommends:

- **A carbon emission goal of 233 megatonnes (or better) should be set for the year 2020 (see figures 2 and 3);**
- **A carbon emission goal of 163 megatonnes should be set for the year 2030.**

Justification

In essence, we should be trying to get to the point where we leave our society, environment, and economy stronger and more resilient.

Alberta's carbon dioxide emissions are currently 267 MT and were 233 MT in 2005. The Canadian emission reduction goal for 2020 related to carbon dioxide is 17% below 2005 levels; the matching goal for Alberta would be $83\% \times 233 = 193$ Megatonnes.

The Canadian emission reduction goal for 2030 is 30% below 2005 levels; the matching goal for Alberta would be $70\% \times 233 = 163$ Megatonnes. Alberta is currently projected to emit 294 MT in 2020. It is one thing to set a target for the year 2030 that could potentially be achievable over a 15 year time frame. However, it is questionable whether the target of 193 MT in the five year time frame to 2020 is *achievable*.

An ambitious but achievable goal of 233 megatonnes by 2020 represents a return to the emissions measured in 2005 and a 13% reduction (or better) from current emissions of 267 MT.

2. What tools should Alberta consider to reduce emissions?

AREA recommends:

- **The current SGER (Specified Gas Emitters Regulation) should continue to be enforced and strengthened until 2020.**

Justification

Given the short five year time period between now and 2020, Alberta should use existing SGER regulations and policies that can be readily adjusted (increased and applied to more emitters).

How could those tools evolve over time?

Time is of the essence; jobs are being lost on a daily basis as a result of the dramatic drop in the oil price. Simple, clear, easily applied tools within SGER are available and should be applied immediately, (not in two or three years) which will kick-start job growth in a diverse energy sector – **one that integrates renewable energy with hydrocarbon energy**. Future policies and regulations such as a carbon tax

or cap and trade schemes which require integration on a North American scale may occur as a new energy paradigm evolves and as the world transitions from a hydrocarbon energy infrastructure to one that is sustainable. However, Alberta’s unique hydrocarbon economy cannot be transformed overnight; yet Alberta must start the process immediately.

Should the same tools be applied to the entire economy or differ by sector?

Emission reductions should be addressed equally across sectors.

The current carbon reduction tools that are outlined in the Specified Gas Emitters Regulation prescribe a (year 2017) fee of \$30 per tonne CO2e on carbon emissions from large industrial emitters *in excess of* 20% below Baseline emissions measured in 2003 to 2005. Only large final emitters (LFEs) exceeding 100,000 tonnes CO2e per year at present are required to reduce emissions below baseline – this should be extended to include 50,000 tonne emitters.

AREA recommends:

- **the following annual increases to the carbon price and percent reduction below baseline should be implemented until 2020;**
- **the SGER levy should be increased to \$50 / 50% in 2020 and yield an equivalent fee on all GHG emissions from large emitters of \$25.00 per tonne CO2e.**

Recommended continued annual increases in SGER levies until 2020			
	\$/tne	%reduction	\$/total tonne
2015	\$ 15.00	12%	\$ 1.80
2016	\$ 20.00	15%	\$ 3.00
2017	\$ 30.00	20%	\$ 6.00
2018	\$ 40.00	25%	\$ 10.00
2019	\$ 40.00	40%	\$ 16.00
2020	\$ 50.00	50%	\$ 25.00

Justification

On June 25, 2015 Minister Phillips increased the SGER levies in the short term (2016 and 2017) to an effective fee of \$3.00 and \$6.00 per total tonne of CO2 for large emitters. Although considered by some to be arbitrarily punitive, continued annual increases to \$10.00, \$16.00 and \$25.00 will signal price/cost certainty on carbon emissions generated by industrial emitters.

Should all emitters, producers and consumers be included?

Whereas Large Industrial Emitters are captured under SGER, a home heating (natural gas) tax, and a vehicle fuel (gasoline and diesel) tax should be legislated across Alberta.

How can Alberta minimize the impact of costs associated with emission reductions on low-income Albertans?

Costs should be applied to all users. Graduated charges could be applied for increased “tiers” of energy use which naturally charges excessive emitters more and conservative emitters less.

OIL AND GAS EMISSIONS

1. ***What are the greatest opportunities for reducing emissions in Alberta's oil and gas sector?***

AREA recommends:

- **Fugitive emissions of methane should be detected and controlled as a priority.**

Justification

Solution gas (gas withdrawn during Oil and Gas production) is currently directly vented to the atmosphere, incinerated or flared depending on an 'economic evaluation'. Solution gas/natural gas is comprised of methane, a potent GHG with a GWP (Global Warming Potential) of 25 times that of Carbon Dioxide on a 100-year time scale. However, scientific papers recently warn the GWP of methane on a 20-year time scale is 84 times more potent than CO₂ on the shorter time scale. Hence fugitive emissions of natural gas / methane during its drilling, collection, and transportation must be detected, monitored, and controlled with the objective of virtual elimination.

2. ***What actions are needed to ensure Alberta's oil and gas sector can compete in an increasingly carbon-sensitive global market?
For example, Alberta could consider pricing, performance standards, or a combination of approaches.***

The volatile price of oil which has plunged to a third of its peak price can override all analyses of risks associated with competition in the global market.

Companies need to be competitive in any landscape, and need to adapt to whatever new economic reality the world presents. Government should not interfere with the competitive market, except to ensure a fair playing field for all participants.

Alberta cannot control decisions arising from the OPEC cartel. But Alberta can control the *investment climate* for those investors seeking to divest from hydrocarbons and to encourage investments in sustainable energy.

3. ***How can Alberta encourage the development and adoption of carbon-reducing technologies and new innovations?***

AREA recommends:

- **the CCEMF (Climate Change and Emissions Management Fund) should be scrutinized, made transparent, and utilized effectively.**

Justification

Execution of projects is dramatically lagging collection of SGER revenues. While the CCEMF has collected fees exceeding \$600 Million since its inception, less than half the fund monies have been *committed* to projects and only a small fraction has been *expended* on completed projects. Many projects that have been funded can be considered to be in the innovation/research phase where full commercialization at large scale is still to come.

The Fund should be reviewed to determine the proportioning of monies that should flow immediately to fund reliable renewable energy, energy efficiency and energy storage projects still coupled with research. These projects require only a small amount of incentives to lessen the risk to investors who are eager to finance debt capital for zero emission generation. Once Alberta creates signals to the world's investment community that we are open to renewable investment opportunity, we will attract those funds.

The emissions from O&G industry are the largest single majority of emissions in the province at 46% of Alberta's total emissions. These industries, which have been typically extremely profitable, must account for their externalities. This is where the majority of gains can be made to reach our future emission reductions targets.

As outlined in the graphics in the Appendix A 1 and 2, AREA is of the opinion that international investor groups will see the opportunity to invest in low carbon electricity generation in Alberta and will provide the majority of funding to finance the estimated capital cost of \$7.5 Billion cost of installing an additional 3,200 MW of renewable energy to reduce the emission intensity of the electricity grid by 2020.

Appendix A 2 graphic "Envisioned Money flow for Growth of Renewable Energy" prescribes that two distinct Funds –an Environmental Fund and a Carbon Fund should be established.

The Environmental Fund should be financed via fees from emitters of CACs (criteria air contaminants). Revenues in the Environmental Fund should be used to monitor and protect environmental interests.

The Carbon Fund should be financed via fees from medium and large emitters of GHGs (enlarged SGER). Revenues in the Carbon Fund should be used to:

- assist large carbon emitters to install efficiency projects; and
- incent investment into Alberta in order to foster Renewable Energy growth.

Society will benefit from more efficient oil and gas use and renewable deployment. Oil and gas investors will benefit from better efficiencies. Investors will benefit from new opportunities in renewable industries while the economy benefits from fulfilling an underserved growth industry in Alberta.

ELECTRICITY

1. *Should government encourage more renewables in Alberta’s electricity system?*

AREA recommends:

Renewable Energy Generation should comprise:

- **20% of total Alberta generation by 2020;**
- **30% of total Alberta generation by 2025;**
- **50% of total Alberta generation by 2030.**

Justification

These goals are required to meet future energy generation and emissions targets. Currently the province generates less than ten percent of its electricity with renewable energy. Renewable energy emits neither carbon dioxide nor criteria air contaminants such as mercury, NO_x, SO₂ and particulate matter.

Renewable energy should be advanced for ecological reasons, for present and future health, economic resiliency, prosperity and wellbeing.

How aggressively should Alberta move toward a more renewable electricity mix? How quickly?

AREA recommends:

the Alberta grid should be decarbonized to:

- **450 kg CO₂e/MWh by 2020;**
- **285 kg CO₂d/MWh by 2025;**
- **170 kg CO₂e/MWh by 2030.**

Justification

The emission intensity of the Alberta electricity grid is 675 kg CO₂e per MWh which is four times the emission intensity of the Canadian electricity grid of 170 kg CO₂e/MWh. The high percentage of coal-fired generation in Alberta (53% in 2014) causes this problem. If coal-fired generation is curtailed and zero emission renewable energy is deployed across Alberta, the carbon emission intensity of the electricity grid can be reduced by 75% in 15 years.

2. *What is the right mix of sources to generate electricity for Alberta? How much electricity should Alberta generate through coal, natural gas, renewables, etc.?*

AREA recommends:

- **coal-fired generation should be eliminated by 2025.**

Justification

Coal-fired generation (as planned) has a long forecast into the future. As depicted in Figure 1, if coal runs 80% of the time until 2061 with an extended ‘useful life’ for each unit as negotiated in 2012 with the Federal government, 883 megatonnes of CO₂ will be discharged into the Earth’s atmosphere – more than three years’ worth of the **total** emissions that Alberta currently emits from all sources.

Figure 1

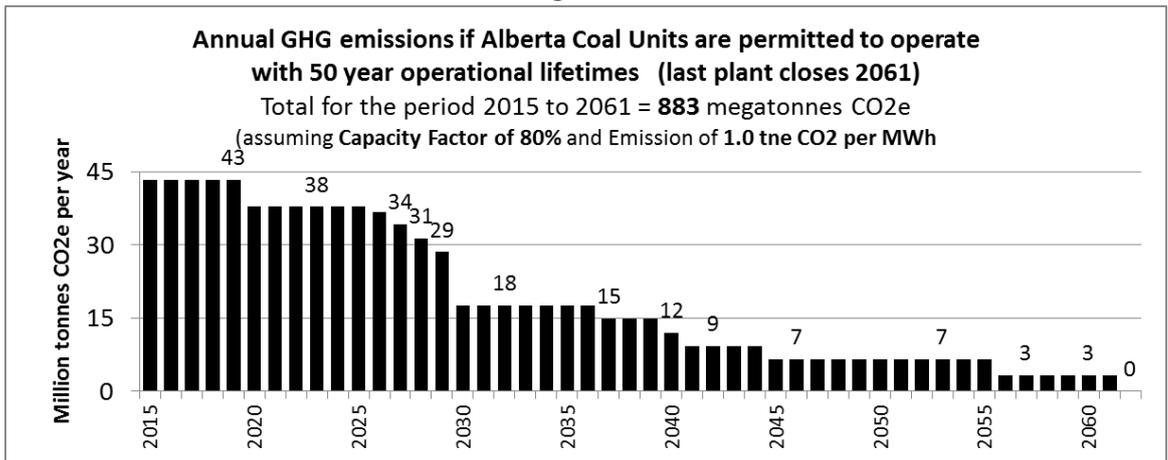


Figure 2 depicts the amount of carbon dioxide that is estimated to be emitted under various closure scenarios for coal units.

Nine coal units commissioned between 1969 and 1980 and operated for their design life of 40 years should be shuttered by 2020. This action will allow for the progressive but achievable deployment of low carbon renewable energy. The remaining nine units should be closed by 2025. This closure of coal generation would prevent the discharge of 594 megatonnes of carbon dioxide from coal-fired power in Alberta from 2015 to 2061.

Currently, four coal units are legislated to close by 2020 under the 2012 Federal Regulation; under that closure scenario 210 cumulative megatonnes of CO₂ will be emitted from coal generation from 2016 to 2020. If a '40 year closure rule' were followed, half the coal fleet will come off line by 2020 and will emit only 167 megatonnes of carbon dioxide from 2016 to 2020, representing a cumulative reduction of 43 million tonnes CO₂e from coal-fired generation.

Figure 2

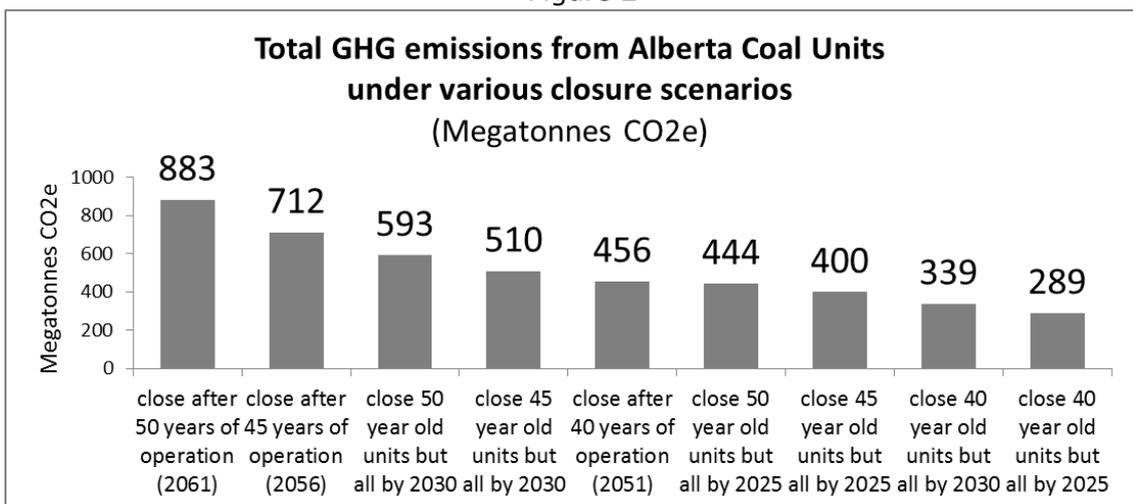


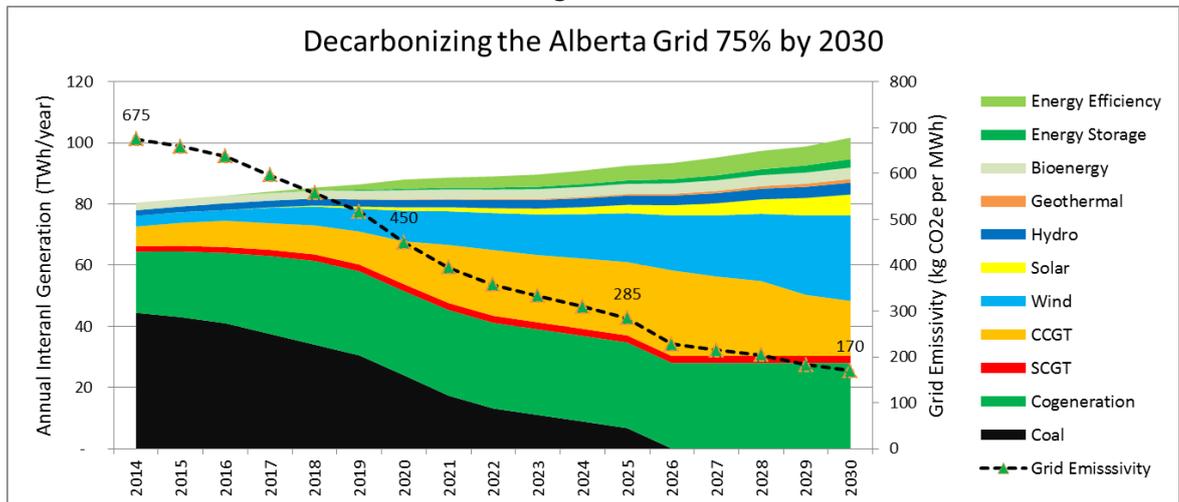
Figure 3 depicts AREAs recommended generation mix from coal, natural gas, and renewables for the period 2015 to 2030. Electricity demand growth is assumed to be 1.5% per annum.

By 2020 renewables should comprise 20% of Alberta internal generation.

By 2025 renewables should comprise 30% of Alberta internal generation.

By 2030 renewables should comprise 50% of Alberta internal generation.

Figure 3



How should Alberta weigh factors such as reliability, price, pollution and sustainability in that mix?

AREA recommends:

- **200 MW of energy storage be installed in Alberta by 2020.**

Reliability of the electricity grid is a necessity. Meeting peak loads with dispatchable power is the most important factor in supplying electricity to Albertans. Therefore, energy storage of renewable energy must be researched and innovatively deployed to guarantee dispatchability of renewable energy.

As a concrete example, California, with its goal of 33% renewable generation by 2020, has mandated that 1,330 Megawatts of energy storage be part of the capacity mix by 2020.

Renewable energy has an intrinsically high value because it is non-polluting and sustainable. Health and environmental concerns from the production and consumption of hydrocarbons are difficult to measure, but are certainly high cost. Accordingly, generators of renewable energy should receive a price that recognizes these benefits they provide.

Locating renewable energy projects should be optimized as follows:

Large industrial power production and supply should be sited near existing transmission lines, which will take advantage of current infrastructure and significantly reduce additional and marginal cost of development.

Small and residential power production and supply should be encouraged for micro-grid applications to minimize transmission and distribution costs, and maximize household self-sufficiency.

What policy approaches should Alberta consider to achieve this mix? Pricing, performance, or a combination of approaches?

AREA recommends:

- **A distinction must be made between industrial and residential scale generation.**

Industrial scale renewable generation (e.g. > 1 megawatt) **should participate** in the power pool and receive a higher price based on:

- *quality* of the electricity (low emissions of GHGs and CACs = higher value)
- *proximity* to load (reduced transmission costs and losses = higher value)
- *time* of generation (peak day availability = higher value)

Commercial and residential scale renewable generation **should not participate** in the power pool but should receive a credit on the owner utility bill, which acknowledges and provides an environmental credit for the high value of clean power provided to the grid.

Potential methods to set targets for decarbonizing the grid are:

- Applying an RPS (Renewable Portfolio Standard) which is simply a goal that requires a certain percentage of total electricity to be produced with renewables by a certain date;
- Applying a grid emission intensity factor **on generators** focused only on carbon dioxide emissions and measured as kg CO₂e per MWh. As discussed previously, AREA recommends that an overall target for the year 2030 should be 170 kg CO₂e / MWh which would equal the current Canadian average emission intensity (largely a result of hydro generation in several provinces) and which would represent a 75 percent reduction from the current grid emission intensity of 675 kg CO₂e / MWh;
- Applying differential offset factors within the SGER renewable energy offset protocol for different technologies which would reward renewable energy technologies for:
 - Proximity to load (reduced transmission requirement)
 - Time of performance (peak demand by midday : solar energy)
 - Baseload power (high capacity factor : geothermal energy)
 - Energy storage (immediate dispatchability for several hours)
- Applying variable FITs (Feed In Tariffs)

3. Is some level of price increase acceptable in order to achieve Alberta’s emission reduction and public health goals? What are the costs? How much?

Table 1 outlines the recommended additional renewable technologies that should be installed in Alberta to produce clean electricity and to **offer more than 43,000 new jobs** in a burgeoning energy sector.

The **cost/investment opportunity** of installing 3,200 megawatts by 2020 is estimated to be \$7.5 billion.

Considering there are no fuel costs for renewables, the price of electricity should remain competitive.

TABLE 1						
RENEWABLE TECHNOLOGY ADDED BY 2020	Capacity (MW)	Capacity Factor	Annual Generation (TWh/year)	Unit Cost (\$ / kW)	Investment Opportunity (\$Millions)	Forecast New Jobs (source NREL)
Wind	2,000	33%	5.8	\$2,000	\$4,000	19,600
Solar	800	16%	1.1	\$2,500	\$2,000	14,400
Geothermal	30	85%	0.2	\$5,000	\$150	390
Bioenergy	150	60%	0.8	\$4,000	\$600	5,100
Hydro	50	35%	0.2	\$5,000	\$250	575
Energy Storage	200	20%	0.4	\$2,500	\$500	3,050
TOTAL	3,230		8.4		\$7,500	43,115

TRANSPORTATION

1. *How can government, communities, industry, business and Albertans reduce emissions from transportation?*

Transportation is not AREA's core focus. Some suggestions we'd like to put forward are:

- Research should be conducted on alternative fuels to provide options for vehicle fuelling stations for ethanol, methanol, electricity, hydrogen and battery swap.
- Efficient, convenient and more reliable public transit should be promoted.
- Better access to public transit should be provided.
- Incentives should be provided for companies to encourage telecommuting.
- Car2Go incentives should be provided
- Promote car-shares, high occupancy lanes,
- Build far more high density living space around LRT stations
- Increase parking and better feeder bus to LRT
- Provide incentives to low carbon drivers
- Reduce bus fare
- Bike-shares

2. *How should sustainable transportation be integrated into community and regional planning?*

- Make large parking lots at zero or nominal cost to users at LRT stations.
- Create mini-communities with all amenities (reduce need to leave community)
- Create better community designs for mix of all housing types (high/low density)
- Provide more closed and open public spaces for multi-use (EG farmers markets, small business, corporate, and leisure)

What policies could best support reduced vehicle use and sustainable transportation?

Consider yearly/lifetime transit plans for individuals/families.

Provide tax rebates or incentives for low-or-no-emission vehicles

Note: vehicle **use** may not be the issue

- the need for use of a vehicle is the first issue to be deeply understood
- a majority of vehicles all trying to move vast distances may be the larger issue.
- Vehicle **efficiency** is a parallel issue.

The same expense deduction should be allowed per km for personal vehicle use when the vehicle is hybrid/electric as in a business use. Direct deduction from taxable income is a viable incentive.

How could government support public transit and active transportation in Alberta?

Make all public transit fees and charges fully deductible on tax forms.

3. ***What role should alternative fuels and new vehicle technologies in Alberta, such as electric or natural gas vehicles, play in Alberta's emission reduction goals?***

With the exception of fuel efficiency or electric vehicles, there is no infrastructure to support other choices. It seems probable that electric vehicles will be prolific in the future, and have an impact on our energy grid.

It would be seen as a competitive advantage if Alberta were to immediately research how to accommodate electric vehicles, as they will play a much bigger role in the future of our transportation.

BUILDINGS AND HOUSES ENERGY EFFICIENCY AND CONSERVATION

AEEA (Alberta Energy Efficiency Alliance) has the expertise on energy efficiency for constructing and retrofitting new and current building stock, and they should be consulted on this matter.

Building and Energy codes must be upgraded to mandate, at the minimum the LEED gold standard or better, immediately.

1. What action can be taken by governments, industry, businesses and Albertans to use energy more efficiently in houses and buildings?

AREA recommends:

- **Energy Awareness should be integrated into the educational system to increase energy literacy by 2020 or earlier.**

Justification

Energy plays an integral role in everyone's day-to-day life (that is, the ones who are fortunate to have it): lighting, heating, fuelling etc., with these services being taken for granted.

As the impact of uses of energy becomes understood, the public, in particular school children, and the future of our economy, will be better equipped to make well-informed and intelligent energy and career choices with enhanced awareness in energy.

Students should be taught early on about the benefits of energy conservation and energy efficiency just as the 3Rs of Reduce Reuse and Recycle were progressively introduced into the school systems several decades ago. Energy literacy should be treated similarly.

What information do Albertans need to make better informed decisions about cost-effective energy efficiency opportunities?

AREA recommends:

- **Home owners should be informed on their utility invoices as to how their total consumption compares to a residence involving similar occupancy and floor space in their local community.**
- **Communities should benchmark their energy consumption to permit anonymous comparison and competition between communities.**

Justification

The majority of homeowners are not informed of whether their consumption of electricity, natural gas, and water is higher or lower than that of a household of similar occupancy and floor space, or why their consumption is different. Studies have proven that when homeowners are informed that they exceed the average consumption pattern, they moderate their behaviour and install energy saving features.

What are the barriers, including costs and availability, to making energy efficiency investments? For families? For businesses?

Barriers involve awareness, upfront costs and general knowledge of what money will be saved, and perhaps the certainty that policy will not change dramatically.

Are new government programs and support required to assist with upfront financing?

Rebates for commercial and home and renovations for energy efficiency are essential to defray the capital cost of those improvements. Revenues to provide such rebates could be acquired from graduated charges for energy use. Incentives can be a win/win for homeowners and those in the construction industry. Renters and condo owners should be able to have choices as well.

- ***How can Alberta help develop a skilled workforce to advance energy efficiency in Alberta houses and buildings?***

Energy awareness should be made a vital, explicit and a standard part of the educational curriculum at all levels.

A public series of town hall presentations could be given in communities or online.

OTHER INDUSTRIAL EMITTERS

1. *This sector has several unique characteristics. Should emissions reduction policies be different for this sector than other types of emitters?*

Carbon emissions in excess of rigorous minimums should be standardized, monitored and published.

Should policies and standards be customized for different types of emitters in this sector?

Standards should not be customized; they should be equitable and open. Emission consequences should be applicable to all sectors.

2. *How can carbon-reducing innovation and technology be advanced in this sector?*

Carbon reduction should be made fair across all industries - no exceptions.

AGRICULTURE, FORESTRY AND WASTE

1. *What role can this sector play in helping Alberta to achieve its emission reduction goals?*

Enteric fermentation and the associated releases of methane from livestock have a high impact on GHG emissions due to the high GWP of methane, but such releases are difficult to control.

AREA recommends:

- **There should be emphasis on documenting areas in Alberta which have concentrated livestock operations with an objective to consolidate collection of agricultural waste into 'waste to energy' generation facilities.**

2. *What policy approaches could be applied to reduce emissions from agriculture, forestry and waste sectors?*

Generally, there should be little to no waste in an ideal system. Ecologically and technically speaking, the garbage of one system should be the feedstock for the next - the cycles should be self-contained within the broadest system.

Are added measures required to better protect Alberta's forests, wetlands and watersheds?

Yes. They offer filtering and aesthetic roles, and leave our ecology stronger and more resilient.

3. *How can this sector's emission reduction potential - through emission sequestration and emission reduction - be leveraged to reduce Alberta's emissions?*

More trees should be planted. Locking carbon into wood products can be a long range solution.

How can Alberta strengthen current policies to drive emission reductions?

There should be clear transparency, accounting for all benefits and costs, and simple public awareness. Concrete incentives should be available to consumers and industry to produce less waste and become better at energy husbandry. Examples of incentives are reduced vehicle licensing fees; provincially subsidized insurance rates; lifetime warranted renewable energy installations.

In Appreciation:

We thank you for the foresight shown by the Government of Alberta in encouraging this important dialogue and the opportunity to contribute. We hope that this consultation process and public input will bring balanced and insightful perspectives to the energy challenges which Alberta faces in the years to come.

We fully support the NDP's position of environmental stewardship, protecting the health of citizens, and a vibrant, growing, and fair economy, in order to regain the Albertan identity of smart energy leadership. We believe that encouraging the integration of renewable energy systems into our current energy mix will help to achieve that vision.

We look forward to a continued positive dialogue with you on these issues.

Respectfully,

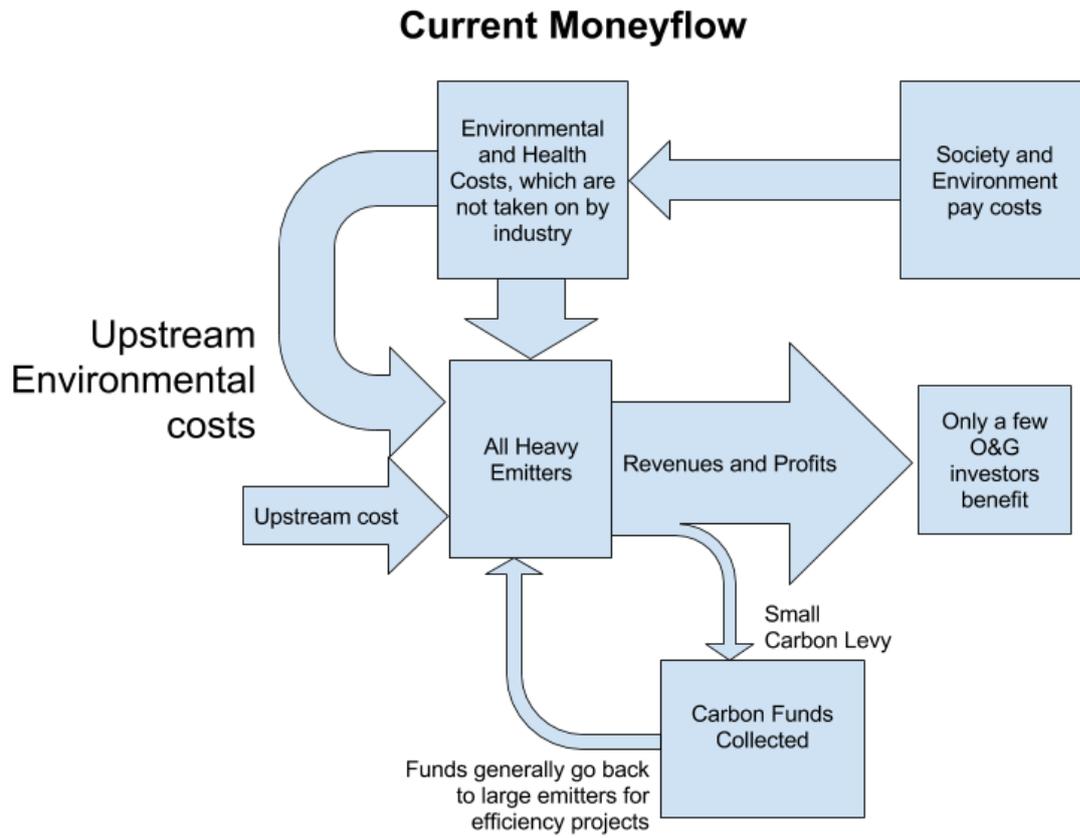
AREA Steering Committee

Name	email address
Ken Hogg M.Eng.,P.Eng.	kshogg@shaw.ca
Joad Clement M.A.Sc.	joad.clement@gmail.com
Richard Hall P.Eng.	richkhall@gmail.com
Helen Hu P.Eng.	helenh_hu@hotmail.com
Gordon Petersen TET, ITIL	gpete@shaw.ca
Luc Savoie P.Geo.	Nanook@telus.net
Paul Swift	pswift@shaw.ca

Website <http://www.abrenewableenergy.ca>

Contact Ken Hogg Office: 403 238 9389
Mobile: 403 463 9390

APPENDIX A 1



APPENDIX A 2

Envisioned Moneyflow for Growth of Renewable Energy

