

Recommendations for a Renewable and Alternative Electrical Energy Framework for Alberta

Prepared by the
Renewable and Alternative Energy Project Team
for the
Clean Air Strategic Alliance
Board of Directors

Final Report

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About CASA

The Clean Air Strategic Alliance (CASA) is a non-profit association composed of stakeholders from three sectors – government, industry and non-government organizations such as health and environmental groups. All CASA groups and teams, including the board of directors, make decisions and recommendations by consensus. These recommendations are likely to be more innovative and longer lasting than those reached through traditional negotiation processes. CASA's vision is that the air will be odourless, tasteless, look clear and have no measurable short- or long-term adverse effects on people, animals or the environment.

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Contents

| | |
|--|-----------|
| Acronyms and Abbreviations..... | ii |
| Executive Summary and Recommendations..... | 1 |
| 1 Background on the Renewable and Alternative Energy Project Team..... | 2 |
| 1.1 Goal and Objectives of the Project Team..... | 3 |
| 1.2 Status of the EPT's 2003 Recommendations on Renewable and Alternative Energy..... | 3 |
| 1.3 Status of the 2005 Consensus Recommendations on Renewable and Alternative Energy..... | 4 |
| 1.4 Status of the 2005 Non-Consensus Recommendations on Renewable and Alternative Energy..... | 6 |
| 1.5 Progress in Meeting the 2008 Target..... | 6 |
| 2 A Renewable and Alternative Energy Policy Framework | 7 |
| 2.1 Key Framework Components..... | 7 |
| 2.1.1 Framework Objectives | 7 |
| 2.1.2 Framework Guiding Principles | 8 |
| 2.1.3 Framework Management..... | 8 |
| 3 Potential Options for the Policy Framework..... | 8 |
| 3.1 Research, Development, Demonstration and Commercialization..... | 10 |
| 3.2 Education, Awareness and Training..... | 10 |
| 3.3 Electrical Transmission and Interconnection | 11 |
| 3.4 Distributed Generation | 12 |
| 3.5 Financial Instruments | 15 |
| 3.6 Regulatory Approaches | 16 |
| 3.6.1 Renewable Portfolio Standard..... | 16 |
| 3.6.2 Feed-in Tariffs and Standard Offer Contracts (Small Installations) | 17 |
| 3.6.3 Systems Benefit Charge | 18 |
| 3.6.4 Emissions Trading..... | 18 |
| 4 Recommendations | 19 |
| Appendix A: Project Team Members..... | 20 |
| Appendix B: Terms of Reference..... | 21 |

Acronyms and Abbreviations

| | |
|-----------------|--|
| AESO | Alberta Electric System Operator |
| CASA | Clean Air Strategic Alliance |
| ENGO | Environmental Non-Government Organization |
| EPT | Electricity Project Team |
| EUB | (Alberta) Energy and Utilities Board |
| GHG(s) | Greenhouse gas(es) |
| GWh | Gigawatt-hour |
| kWh | Kilowatt-hour |
| MW | Megawatt |
| MWh | Megawatt-hour |
| NOx | Nitrogen oxides |
| PPA | Power Purchase Agreement |
| RDD&C | Research, Development, Demonstration and Commercialization |
| REC | Renewable Energy Certificate |
| RPS | Renewable Portfolio Standard |
| SO ₂ | Sulphur dioxide |
| SOC | Standard Offer Contract |
| WPPI | Wind Power Production Incentive |
| WREGIS | Western Renewable Energy Generation Information System |
| WSPs | Wire Service Providers |

Executive Summary and Recommendations

Following the recommendations made in the Electricity Project Team's 2003 report, CASA's Renewable and Alternative Energy Project Team worked to identify mechanisms to increase Alberta's supply of renewable and alternative electrical energy. The team has most recently focused on exploring and developing potential options for a renewable and alternative electrical energy policy framework. In the end, members decided it would be more appropriate for the Government of Alberta to develop such a framework, and the team agreed to forward the results of its thinking and discussions to the Government for consideration, via this report.

This report presents status reports on the recommendations made by the Electricity Project Team in 2003 as well as the 2005 recommendations from this team on renewable and alternative electrical energy. It also describes the components the team thinks should be part of a policy framework that has the goal of increasing Alberta's supply of and demand for renewable and alternative electrical energy, specifically:

- Objectives;
- Guiding principles; and
- Framework management structure.

Central to the team's work and this report are the options developed in six policy areas. The team feels these could be included in the Renewable and Alternative Electrical Energy Policy Framework to be developed by the Government of Alberta. The policy areas in which options are proposed to the Government for consideration are:

- Research, Development, Demonstration and Commercialization
- Education, Awareness and Training
- Electrical Transmission and Interconnection
- Distributed Generation
- Financial Instruments
- Regulatory Approaches

Recommendations

1 **Developing a Policy Framework**

The Renewable and Alternative Energy Project Team recommends that the Government of Alberta develop and implement a policy framework to increase the supply of and demand for renewable and alternative electrical energy in Alberta. This policy framework should be developed and implemented in a timely manner, and the Government should consider including in the policy framework the elements and policy options described in this report.

2 **Stakeholder Process**

The Renewable and Alternative Energy Project Team recommends that the Government of Alberta consult with stakeholders and consider their concerns in developing a Renewable and Alternative Electrical Energy Policy Framework for Alberta.

1 Background on the Renewable and Alternative Energy Project Team

Early in 2002, then Minister of Environment, Hon. Lorne Taylor, asked CASA to develop an approach for managing air emissions from the electricity sector. CASA established a multi-stakeholder Electricity Project Team (EPT) to undertake this task.

Because of the potential for renewable and alternative energy¹ to contribute to improved air quality in Alberta, the EPT established the Renewable and Alternative Energy subgroup. This subgroup made ten recommendations, all of which were included in the 2003 final report of the EPT. One of these was that a project team be formed to look at specific key issues in more detail.

The CASA board established the Renewable and Alternative Energy Project Team in January 2004, with the overall aim of identifying mechanisms to increase Alberta's supply of renewable and alternative electrical energy. The team reported back to the CASA board in December 2005 with 17 recommendations, but was unable to reach consensus in six areas. The board did not discuss the non-consensus recommendations, but instead accepted the offer of the Government of Alberta to work with the team on a policy framework to encourage the development of renewable and alternative electrical energy in Alberta. The full wording of the 17 consensus recommendations is provided in the team's terms of reference found in Appendix B of this report (page 30).

In April 2006, the team co-chairs met with senior representatives of Alberta Environment and Alberta Energy. At that meeting, a serious commitment on the part of the Government to renewable and alternative electrical energy in Alberta was evident. Other factors also encouraged the team to continue its work through the CASA process, including:

- the fact that all potential strategies were agreed to be “on the table” for discussion;
- the provincial government's renewed commitment to renewable and alternative energy generally, as evidenced by the biofuels strategy; and
- new stakeholders joining the team.

In September 2006, the team brought to the board “fresh start” terms of reference, which reflected the team's sense of purpose and its renewed focus on a policy framework for renewable and alternative electrical energy. These were approved and the team worked very hard to explore and develop potential options for a renewable and alternative electrical energy policy framework.

This report includes the status of implementation of the EPT's 2003 recommendations, as well as progress on the 17 consensus recommendations from 2005. It also presents the team's thinking and rationale on potential components and options for a policy framework. The members of the team are noted in Appendix A and the team's terms of reference appear in Appendix B of this report.

¹ The definition of renewable and alternative energy agreed to by the Electricity Project Team appears in recommendation 57; this recommendation is included on page 3 of this report and in Appendix B, page 24).

1.1 Goal and Objectives of the Project Team

The goal of the CASA Renewable and Alternative Energy Project Team, under its new terms of reference, was to work within the CASA process to increase the supply of and demand for renewable and alternative electrical energy in Alberta.

The project team identified six objectives in support of achieving this goal:

1. Develop a policy framework that supports the team's goal.
2. Develop approaches and programs that enable the development of renewable and alternative electrical energy in Alberta.
3. Develop a plan for reporting on changes to the supply of renewable and alternative electrical energy in Alberta.
4. Address the six non-consensus recommendations from the December 2005 Renewable and Alternative electrical energy report to the CASA board, if not already addressed in the policy framework.
5. Report on the implementation of the 17 consensus recommendations from the December 2005 Renewable and Alternative electrical energy report to the CASA board, and if necessary, make recommendations to address outstanding issues.
6. Report on the implementation of the renewable and alternative electrical energy recommendations as described in the EPT report and, if necessary, make recommendations to address outstanding issues.

1.2 Status of the EPT's 2003 Recommendations on Renewable and Alternative Energy

Item 6 in the Renewable and Alternative Energy Team's terms of reference was to report on the implementation progress of the renewable and alternative electrical energy recommendations in the EPT's 2003 report and, if necessary, make recommendations to address outstanding issues. Implementation status as of December 2006 is summarized below for each of the ten recommendations. The full wording of each recommendation is included in the team's terms of reference in Appendix B (page 24). All recommendations are being addressed.

| # | Recommendation | Status |
|----|---|---|
| 55 | Provincial target | The current data and projected generation indicate that Albertans will have exceeded, by a significant margin, the 2008 target of a 3.5% increase in renewable and alternative electricity developed after 2001 (see also recommendation 57). |
| 56 | Basis for the target | This recommendation has been superseded by recommendation 8 of the December 2005 report, <i>Renewable and Alternative Energy as a Source of Electricity in Alberta</i> . |
| 57 | Defining renewable and alternative energy | Recommendation 57 defined Renewable and Alternative Energy, for the purposes of calculating the 3.5% target for new renewable and alternative energy, as that which is: <i>a) Power generated within the province of Alberta; and</i> <i>b) EcoLogo™ compatible in that it meets the EcoLogo™ criteria for Renewable Low-Impact Electricity, but from facilities that are not necessarily EcoLogo™ certified;</i> <p style="text-align: center;">OR</p> <i>Alternative electricity supplies whose source meets the following criteria:</i> <i>a) 5 MW or less; and</i> <i>b) greenhouse gas intensity less than or equal to combined cycle gas turbine 418 kg per MWh.</i> |

| # | Recommendation | Status |
|----|--|--|
| | | <p><i>Projects eligible for the target would be those that begin producing electric energy after December 31, 2001.</i></p> <p>This definition will be used as required.</p> |
| 58 | Calculating the amount of generation | This recommendation has been superseded by recommendation 8 of the December 2005 report, <i>Renewable and Alternative Energy as a Source of Electricity in Alberta</i> . |
| 59 | Mechanisms for achieving the target | Implementation of initiatives by government (e.g., the federal Wind Power Production Incentive), industry (e.g., retail programs), and customers for renewable and alternative electrical energy (e.g., the provincial government's commitment to meet 90% of its electricity needs from renewable and alternative energy sources) have contributed to the expected achievement of the 3.5% target. A significant factor in reaching the target was the federal government's tax and production incentives. The lessons learned from these experiences will inform the development of further mechanisms and approaches to increasing renewable and alternative electricity. |
| 60 | Retailer-based method | While this option is still a possibility, it is not in place at this time. |
| 61 | Sectoral agreements and green power | Implementation of this recommendation is in abeyance pending re-engagement with the federal government on greenhouse gases. It will be included in the Alberta government position as talks proceed. |
| 62 | Net metering and net billing | Alberta Energy plans further consultations with stakeholders on the development of a policy to facilitate the development of micro-generation. This work includes net metering and net billing. |
| 63 | Infrastructure needs | The Transmission Development Policy and the enactment of the Transmission Regulation requires that the Alberta Electric System Operator (AESO) plan the transmission system in such a way that any generation that is in merit has unconstrained access to markets. Work is currently underway at the AESO to address concerns relating to transmission and system stability requirements of renewable and alternative electricity. |
| 64 | Renewable and Alternative Energy Implementation Team | This recommendation was considered in preparing the terms of reference for the current team. |

1.3 Status of the 2005 Consensus Recommendations on Renewable and Alternative Energy

The team's terms of reference (item 5) instructed it to report on the implementation of the 17 consensus recommendations from the December 2005 report to the CASA board, entitled *Renewable and Alternative Energy as a Source of Electricity in Alberta* and, if necessary, make recommendations to address outstanding issues. Implementation status as of December 2006 is summarized below for each of the 17 recommendations. The full wording of each recommendation is included in the team's terms of reference in Appendix B, page 30). All recommendations are being addressed or will be captured in the recommended framework.

| # | Recommendation | Status |
|---|--|---|
| 1 | Reviewing progress towards target of 3.5% | This report has been updated to 2005 and reported to the Renewable and Alternative Energy team (see section 1.5). A 2006 report will be distributed through the team and the CASA board when ready. |
| 5 | Role of renewable and alternative electrical energy in greenhouse gas management | Implementation of this recommendation is in abeyance pending re-engagement with the federal government on greenhouse gases. It will be included in Alberta's position as talks proceed. |
| 6 | Supportive policies | This is among the primary focal points for the current team. The Alberta government has committed to implementing recommendations that achieve |

| # | Recommendation | Status |
|----|---|---|
| | | consensus at the CASA board. The Alberta government is working with the AESO, Climate Change Central, the Alberta Energy Research Institute and others to support renewable energy. |
| 7 | Transmission infrastructure constraints | <p>The Transmission Development Policy and the enactment of the Transmission Regulation requires that the AESO plan the transmission system in such a way that any generation that is in merit has unconstrained access to markets. Renewable and alternative electrical energy generation faces two potential hurdles: the system's ability to handle variations in wind power generation, and the need for more transmission capacity in the south west of the province. These issues are being addressed as follows:</p> <ul style="list-style-type: none"> • The AESO and wind power industry representatives are looking at developing wind forecasting techniques, increasing reserves, increasing transmission reliability margins on the BC tie and placing constraints on the operation of wind power facilities as a possible suite of mitigation measures. • Transmission system upgrades in the area are planned to be phased in over the period from 2008 to 2012. The first phase is scheduled for completion in the 2008-2009 timeframe and may allow for up to 1200 to 1400 MW of wind power generation, pending resolution of the reliability issue. |
| 8 | Calculating progress towards target | Alberta Environment has been reporting and will continue to report on progress towards the 3.5% target. The method set out in the recommendation will be used for this reporting. As independent sources such as WREGIS become available they will be used to track the numbers that are available from the EUB and Alberta Energy. |
| 9 | Eligibility of incremental power | As incremental power from projects that meet the renewable and alternative energy definition come on line this power will be included in the calculations above. |
| 10 | Effective implementation date | In reviewing and reporting on the achievement of the 3.5% target the 2008 calendar year will be used. |
| 12 | Reporting progress | Alberta Environment has been reporting and will continue to report on the progress towards the 3.5% target in its business planning process. |
| 13 | Definition of retailer | <p>The definition is: "Notwithstanding the definition of a retailer in the <i>Electric Utilities Act</i>, a Retailer for the purposes of this report means persons that provide electricity services directly to a customer, to themselves, and/or to eligible customers under a regulated rate tariff."</p> <p>This definition will be used as required.</p> |
| 14 | Single corporate entity | <p>The definition is: "The 3.5% target apply to the Retailer as a singular corporate entity; that is, in the case where Retailers have both regulated and competitive customers, the 3.5% target applies to their entire customer base."</p> <p>This definition will be used as required.</p> |
| 15 | Definition of REC | <p>The definition is: "A REC be defined as the instrument that embodies all non-energy environmental and social attributes of electricity generated using renewable and alternative energy sources. A REC is measured in MWh and is created at the time electricity is generated at any facility that meets CASA's recommended definition of renewable and alternative energy,² and is measured by a revenue-quality meter, or the power output of which can be derived through mathematical calculations from the readings of other revenue-quality or comparable meters on-site at a rate of one REC per MWh of electrical output.</p> <p>"The environmental and social attributes of a particular REC are a function of the characteristics of the generating facility at the time the associated electricity was generated. For the purposes of accounting for Alberta's target for 3.5% new renewable and alternative electricity, all RECs created at any facility that meets the Renewable and Alternative Energy Project Team's definition are deemed equivalent.</p> <p>"The property rights to a particular REC belong to the owner of the generation facility and may be transferred by contract or sale or retired permanently together with or separately from the underlying electricity."</p> |

² This definition is contained in the CASA Electricity Project Team's recommendation 57, which was approved by the CASA board in 2003 and adopted by the Government of Alberta in 2004.

| # | Recommendation | Status |
|----|----------------------------------|---|
| | | This definition will be used as required. |
| 16 | Tracking system | At this point in time the work on WREGIS that the Alberta government has been involved with has wrapped up and we are awaiting the completion and operationalizing of the WREGIS system. Once it is ready, Alberta generators should have access to it. |
| 17 | Consistent terminology | The recommendation was: "To avoid confusion and potential misunderstanding, CASA documents use the phrase "Renewable Energy Certificates" or "RECs" instead of its conventional synonyms, "Green Tags" and "Green Certificates," which may have other meanings in other documents." This terminology will be used. |
| 20 | Waste heat's contribution | Waste heat units will be considered in calculating future targets. |
| 21 | Interconnected micro-generation | Alberta Energy plans further consultations with stakeholders on the development of a policy to facilitate the development of micro-generation. |
| 22 | Areas requiring further work | This was considered in the current project team's work. |
| 23 | Consumer awareness and education | This was considered in the current project team's work. |

1.4 Status of the 2005 Non-Consensus Recommendations on Renewable and Alternative Energy

The team's terms of reference (item 4) instructed it to report on the six non-consensus recommendations from the December 2005 report to the CASA board, entitled *Renewable and Alternative Energy as a Source of Electricity in Alberta*, if these were not already addressed in the policy framework. The previous team was unable to agree on recommendations in the areas identified below and the current team continued to seek ways to address these concerns. The status of each recommendation is summarized below. All recommendations are being addressed or will be captured in the recommended framework.

| Recommendation(s) | Status |
|--|---|
| 2, 18 and 19 concerned waste heat | If a waste heat development is less than 5 MW, it falls into the alternative energy definition of renewable and alternatives. The team agreed that discussions of waste heat should be included in the process for developing future targets. |
| 3 concerned meeting the 2008 target | Alberta Environment's assessment on progress towards the 2008 target indicates that the target will be met. |
| 4 concerned renewable and alternative energy and emissions trading | The team is recommending that the renewable and alternative electrical energy policy framework consider including renewable and alternative energy in the provincial emissions trading system. |
| 11 concerned the need for a process to define future targets | The Government of Alberta has indicated that it will consult with stakeholders on determining future renewable and alternative electrical energy targets as it develops a comprehensive energy strategy for the development of Alberta's renewable and non-renewable energy sources and for conservation of energy use. |

1.5 Progress in Meeting the 2008 Target

Recommendation 55 in the EPT's 2003 report was that the Alberta Government implement at the very least the 3.5% target for new renewable and alternative energy referenced in its *Albertans & Climate Change - Taking Action* plan. As can be seen from the chart below, the uptake of renewable and alternative generation is exceeding expectations.

| Year | Total electricity sales (GWh) | Renewable and alternative electrical energy | | % of new renewable and alternative electrical energy since 2001 |
|------------|-------------------------------|---|-----------------------|---|
| | | Generation (GWh) | % of total generation | |
| 2001 | 48,289.9 | 2,314.7 | 4.8 | 0.0 |
| 2002 | 48,728.9 | 2,738.4 | 5.6 | 0.8 |
| 2003 | 48,218.5 | 2,889.7 | 6.0 | 1.2 |
| 2004 | 49,406.3 | 3,430.5 | 6.9 | 2.2 |
| 2005 | 50,609.3 | 4,018.5 | 7.9 | 3.4 |
| | | | | |
| 2008 (est) | 55,302.0 | 4,985.0 | 9.0 | 4.2 |

Source: Compiled by Alberta Environment using data from the Alberta Energy and Utilities Board, December 2006

The forecast is based on known projects under construction or planned, and assumes that the 900 MW wind threshold and transmission constraints are resolved. It assumes a 35% capacity factor for wind projects in Alberta. Forecast total electricity sales are based on 3% annual growth compounded from 2005 to 2008.

2 A Renewable and Alternative Energy Policy Framework

As the team pursued its objectives, members decided against developing a framework. They concluded that it would be more appropriate for the Government of Alberta, with stakeholder input, to develop a policy framework to increase Alberta's supply of and demand for renewable and alternative electrical energy, as a stand-alone outcome, or part of a broader, integrated sustainable energy development outcome. The team documented its thinking about a policy framework and has done a great deal of the work needed to produce such a framework. Section 2.1 of this report describes the components the team believes should be considered as the framework is developed; section 3 describes specific policy options the team proposes to the government for consideration.

2.1 Key Framework Components

The team is of the view that a policy framework with the goal of increasing Alberta's supply of and demand for renewable and alternative electrical energy should include objectives, guiding principles and a management structure. Its ideas and suggestions for what these components should address are presented below.

2.1.1 Framework Objectives

The team believes that the Renewable and Alternative Electrical Energy Policy Framework should contain objectives that could include the following:

- Foster market demand.
- Recognize and incorporate environmental costs and benefits into the marketplace, thus providing a more comprehensive price signal by valuing environmental attributes.

- Establish or adapt an emissions trading system to include renewable and alternative electrical energy that meets the current definition for renewable and alternative energy.
- Create an investment environment that is stable and attractive for the generation and sale of renewable and alternative electrical energy in Alberta.
- Complement other policies.
- Identify and resolve regulatory barriers.
- Help achieve clean air objectives.
- Increase public awareness of and accessibility to renewable and alternative electrical energy choices.

2.1.2 Framework Guiding Principles

The team believes that the Renewable and Alternative Electrical Energy Policy Framework should be guided by principles that could include the following:

- Include all forms of renewable and alternative electrical energy.
- Provide environmental benefits in the form of reduced emissions and better air quality.
- Encourage diversity in renewable and alternative electrical energy supply.
- Encourage a diversity of approaches.
- Be fair and equitable so that no form of renewable and alternative electrical energy is disadvantaged relative to others.
- Ensure public accountability and transparency.
- Be sustainable.

2.1.3 Framework Management

The work to develop a Renewable and Alternative Electrical Energy Policy Framework should include developing a structure for managing the framework. This could include:

- Periods for framework review following adoption and implementation;
- Responsibilities for framework oversight and stewardship; and
- Implementation.

3 Potential Options for the Policy Framework

The project team spent considerable time and effort developing options that could be considered in the renewable and alternative electrical energy policy framework. Members first identified a range of potential options, then assessed each one using the decision criteria noted in Box 1. Options in six policy areas were refined to the point where all members were comfortable in recommending that the government consider including them in a policy framework. The team did not have time to undertake detailed analysis on each option, which is why it is recommending that the government consult with a range of stakeholders in developing the framework.

Box 1: Policy Option Decision Criteria

(Note: No order of priority is implied by the way criteria are listed in this box.)

Administrative simplicity

Assess the complexity or level of administration required. A higher level of administration may be acceptable if there is great benefit from the option. Also, administration requirements may vary over time; for instance, there may be a lot of start up, but very little operational administration.

Cost (dollars per increased MWh of renewable and alternative electrical energy)

Assess the cost to implement; cost to consumer, government and industry; and cost to become self-sustaining.

Fit with the definition of renewable and alternative electrical energy

This is a 'yes' or 'no' assessment, noting that the definition is a minimum, not a maximum.

Environmental benefits and impacts

Does the option provide a net benefit to the environment, including land, water and air?

Ease of implementation

How easy is it to implement the option? For example, off the shelf is easier than establishing a new manufacturing process, as is leveraging existing policy frameworks, policy and technology.

Ease of measuring performance against the renewable and alternative electrical energy goal

How easy is it to measure implementation of any specific initiative against the renewable and alternative electrical energy goal? Some may be more difficult than others to measure.

Equity of supply and demand sectors, technology, renewable and alternative electrical energy fuel types, renewable and alternative electrical energy sizes

No one sector should be given an advantage or put at a disadvantage.

Potential to be self-sustaining

Does the option have the potential to be self-sustaining over the long term?

Appropriate distribution of risks (financial, technology, other)

No one sector will be burdened with all the risks; one of the roles of government is to back new programs or ventures. Consideration should be given to how risks are shared, and otherwise managed. Implied risks include, but are not limited to, economic and technical risks.

Extent of coordination and integration with other relevant initiatives

If a policy option builds on an existing framework it should receive a higher ranking.

Degree of impact on the electricity market

Are the options transparent and predictable in how they impact the electricity market? Consideration must also be given to Alberta's deregulated electricity market structure.

Impact on the goal of increasing renewable and alternative electrical energy

Will the option increase renewable and alternative electrical energy in Alberta?

Level of incentive to homeowner and small business renewable and alternative electrical energy producers

Will the option assist or encourage homeowners and small business to produce renewable and alternative electrical energy themselves?

3.1 Research, Development, Demonstration and Commercialization

Investment in research, development, demonstration and commercialization (RDD&C) will be an important element of a policy strategy for promoting growth in the renewable and alternative electrical energy sector in Alberta. RDD&C will help make the industry competitive and will help resolve some of the technological barriers facing the sector. One of the key barriers is the intermittency of the energy supply from wind and solar generators. To overcome this barrier, research into energy storage options is a high priority. Other priorities for RDD&C should be ranked in order of importance for funding.

Funding for developing and commercializing new technologies could be important in retaining investment dollars in Alberta. Funding options for RDD&C may include tax measures, direct incentives, provision of venture capital for emerging technologies, a Systems Benefit Charge³ and a technology innovation fund. Potential funding sources for researching, inventing, or improving renewable and alternative electrical energy technologies could involve organizations and initiatives such as the Alberta Energy Research Institute, Climate Change Central, and Alberta Energy's Innovative Energy Technologies Program. The latter program is currently limited to funding research into improving the efficiency of oil and gas extraction, but consideration should be given to expanding the program to include renewable and alternative electrical energy supplies.

Support for demonstration projects will also be important for commercializing new technologies and promoting growth in the renewable and alternative electrical energy sector. Multi-sector demonstration projects can effectively increase public and business awareness of the potential for and applicability of existing and new renewable and alternative electrical energy technologies. Demonstration projects provide a means of monitoring and improving performance of renewable and alternative electrical energy systems while developing installation expertise and overcoming marketplace barriers.

3.2 Education, Awareness and Training

Raising awareness of the environmental benefits of using renewable and alternative electrical energy has been underway and should continue. Many residential consumers, as well as a number of retail and government customers, have purchased green power, but ongoing work is needed to continue to increase the demand for renewable and alternative electrical energy. In particular, mechanisms are needed to: a) raise awareness of the benefits of renewable and alternative electrical energy to industrial and commercial customers, and b) encourage these consumers to consider renewable and alternative electrical energy.

Micro-generation systems such as solar and home-scale wind generation have not yet achieved significant market penetration. Nevertheless, sales of these home systems point to the need for accurate and timely information on their benefits and challenges. Government, industry and ENGOs could consider partnering to host workshops and develop education materials aimed at potential home users.

³ A Systems Benefit Charge is a charge added to a tariff or other charge, with the funds raised being set aside for a specific purpose, such as energy efficiency education programs or funding renewable and alternative energy programs. See also section 3.6.3.

The increasing demand for both commercial- and residential-scale renewable and alternative generation means that developers and trades-people who install and manage these systems (electricians, plumbers, etc.) must fully understand them. Financial and insurance professionals as well as municipal planners also need to be aware of the requirements of these systems.

An education and outreach program in renewable and alternative energy could help to:

- Provide new jobs and stimulate market activity in emerging technologies;
- Create the market circumstance and opportunities needed for small business development;
- Stimulate long-term economic growth while reducing environmental impacts in all sectors throughout the province;
- Promote Alberta innovation while developing marketable programs, skill sets and technologies;
- Help all sectors and individuals play a role in reducing greenhouse gas emissions;
- Present a “made in Alberta approach” that could generate long-term verifiable greenhouse gas emission reductions; and
- Place the government in the position of supporting and developing renewable and alternative electrical energy.

The educational institutions that train trades-people may be open to adding a renewable and alternative electrical energy component to their programs. It may be possible to partner with government or industry in financing or running these programs. As appropriate, certification of professionals as “renewable and alternative electrical energy ready” may also be possible. Banks, insurance brokers and real estate professionals may also be interested. Workshops could be an appropriate mechanism for education and outreach to these groups.

3.3 Electrical Transmission and Interconnection

As the province’s independent system operator, the Alberta Electric System Operator (AESO) is responsible for the safe, reliable and economic operation and planning of Alberta’s interconnected electricity system. The AESO also facilitates Alberta’s competitive wholesale electricity market, which has 200 participants and approximately \$7-billion in annual energy transactions. The AESO recognizes that investment in new generation, including renewable and alternative electrical energy generation, depends on an open and efficient transmission system.

Two transmission system issues presently face renewable and alternative electrical energy generation developers (although others could arise), and these concern mainly wind development.⁴ The first relates to the reliability of the Alberta Interconnected Electric System where the requirement to instantaneously balance supply and demand for electricity is affected by how well the variability of wind powered generation correlates with the variability of load. This can be managed by controlling the output of wind power facilities, controlling the output of other generation sources, or changing flows on the intertie with British Columbia.

A threshold of 900 MW of wind power development has been established, beyond which additional mitigation measures will need to be developed and implemented to ensure reliability standards continue to be met. The AESO and wind power industry representatives are looking at a possible suite of mitigation measures, which includes developing wind forecasting techniques,

⁴ Wind is only one source of renewable and alternative electrical energy in Alberta, but it has been the most extensively developed to date and is the single largest renewable and alternative component in the grid.

increasing reserves, increasing transmission reliability margins on the BC tie, and placing constraints on the operation of wind power facilities.

The second issue relates to the transmission infrastructure required to allow interconnection of additional wind power projects in southern Alberta. Transmission system upgrades in the area are planned to be phased in between 2008 and 2012. The first phase is scheduled for completion in the 2008-09 timeframe and may allow for up to 1200 to 1400 MW of wind power generation, pending resolution of the reliability issue.

3.4 Distributed Generation

Distributed generation (DG) refers to decentralized, grid-connected electricity generating systems located at or near the place where energy is used. The term generally refers to generating systems that are small enough to be connected to the electricity distribution system rather than the transmission system. The technologies typically used in DG systems include:

- solar photovoltaic arrays,
- wind turbines,
- biomass-fired generators,
- engine generators (such as those fuelled by fossil fuels or biofuels),
- fuel cells (such as those fuelled by fossil fuels, biofuels, or direct hydrogen),
- hydro,
- Stirling engines (such as those fuelled by fossil fuels or biofuels), and
- other suitable scale systems, although these technologies can easily be ramped up in size and used for large scale generators too.

Distributed resources (DRs) includes DG systems plus energy storage devices such as banks of batteries, flywheels, ultra-capacitors, and others that will connect to the grid in ways similar to DG systems. DRs can help meet peak demands and reduce the load on the system; however, due to the intermittent and non-dispatchable nature of some of these resources, dispatchable generation (such as central generating plants) must continue to provide grid support to ensure standard grid stability and operating requirements and be built to satisfy peak load requirements.

Distributed generation can be divided into two intent-based categories: load-offset DG, designed to provide electricity to on-site loads and reduce purchased electricity costs; and merchant power DG, designed to provide electricity to the grid and generate revenue. Note that the renewables-based non-dispatchable load-offset technologies (microsolar photovoltaic microwind and microhydro in particular) must, for technical reasons, export excess electricity to the grid during times of high energy resource availability (solar radiation, air flow, and water flow).

In some cases, both intent and size are factored into categorizations of DG, whereby micro-generation is considered to be load-offset DG with a maximum generation size. The Alberta discussion of the appropriate definition of micro-generation is ongoing. The Alberta Government ~~has not finalized~~ is finalizing its policy with respect to micro-generation, ~~but has previously released a position paper on micro-generation.~~

These different types of distributed generation should be considered separately from a policy perspective. While the development of micro load-offset DG could be encouraged and facilitated, merchant power DG, even small scale (<5MW), should be required to conform to the same

interconnection and metering rules as large centralised merchant power generators. This includes application of user-pay policies to merchant power DG. Such treatment of merchant power DG would be consistent with the level playing field policies currently in effect in Alberta's electricity market.

While there is the potential for a portion of the electrical power supply to come from DG systems regardless of their ownership and the intended purpose of the system, a number of issues remain to be resolved as they are included in Alberta's electricity supply system. Some of the more significant issues are:

- **Grid interconnection** – Wire Service Providers (WSPs) have the discretion to deal with their own distribution systems. In the absence of DG-specific standards, distributed generators are required by Alberta's laws and by the WSPs' current generator processes and practices to meet standards for larger industrial systems, making the interconnection process time-consuming and expensive, which is not appropriate for distributed generation that qualifies as micro-generation. Some WSPs are in the process of creating distributed generations connection requirements to facilitate micro-generation interconnection. Although the grid interconnection situation varies across the province, the lack of uniform and simple interconnection procedures for micro-generation makes it difficult for WSPs and the regulators to accommodate them. The technical, quality and safety aspects of interconnection have been thoroughly developed and are contained in the Alberta Distributed Generation Interconnection Guide.
- **Safety** – WSPs need the ability to isolate parts of their electrical distribution system; specifically, during a power outage, crews must be certain that no operating generators are connected to the lines before they work on them. Discussions on safety are ongoing and are related to past experience that WSPs have had with inappropriately interconnected customer-owned generators.
- **System stability** – WSPs spend considerable effort maintaining the quality of power in the grid. Distributed power installations can make control of issues such as intermittent supply, more difficult, though experience in some other countries shows that these are not insurmountable.
- **Financial costs** – Currently, there is generally a high difference in capital costs per kW of generating capacity for DG technologies compared to large central generating plants. However, going forward, capital costs of DG technologies are expected to drop.
- **“Right to light”** – Operators of solar photovoltaic generating systems face challenges maintaining their access to solar radiation. For example, if taller buildings are constructed to the solar resource side of a solar photovoltaic energy system, the ability to generate electricity will be compromised.

Various actions can be taken to address these issues, examples of which are shown in Box 2.

Distributed generation can effectively support the expansion of renewable and alternative electrical energy in Alberta, and various approaches could be part of a policy framework to accomplish this goal. These include:

- Removing administrative barriers by streamlining and simplifying the approval process for connecting micro-generation to the grid.
- Developing clear standards and procedures for micro-generators that also address billing, meter data management and energy credit issues.

- Addressing and resolving technical issues to ensure that the distribution system facilitates the physical interconnection of distributed generation. The policy framework should make

Box 2: Examples of Actions to Encourage and Support Distributed Generation

Land use planning – New subdivisions could be developed using “solar ready” standards with architectural covenants. Zoning regulations could be changed so they do not prohibit the sale of electricity from home-based load-offset generator systems.

“Right to light” – Explore mechanisms to protect access to sunlight for operators of solar-based systems.

Building codes – Require all new houses and buildings to be constructed to “solar ready” standards. A house or building that is “solar ready” means that its design and construction has considered a number of factors that facilitate the subsequent installation of solar heating and solar power systems onto it. To be solar ready means to have considered house, street and subdivision orientation, the amount of solar collection area (in south-facing windows, roof area, and roof tilt angle), landscaping (primarily trees), and inclusion of a raceway from the basement to the attic sufficient to contain electrical cables and hot water pipes.

Incentives – Green loans (lower interest rates, longer terms), direct incentives (feed-in tariffs, buy-down subsidies), or indirect incentives (such as tax deductions for the purchase and operation of micro-DG systems) could be offered. Residential and industrial property taxes on load-offset DG systems could be eliminated. Any incentives considered for merchant power DG should be market neutral to maintain a level playing field between generators of different energy sources.

Grid-interconnection process - Significant developments in power electronics may enable reductions in registration and permitting requirements. These advancements may result in micro-generation systems being treated similar to standard household appliances with respect to meter and interconnection regulations, with the only regulatory processes in the manufacturing, sale and installed inspection of the systems, allowing meter and interconnection regulations similar to standard household appliances. While it may be possible to reduce the current notifications and authorization required by municipalities, WSPs, the Petroleum Registry, the AESO and the AEUB, it will be important to ensure that the appropriate notifications of the installation of the micro-generation system occur. For example, for safety, reliability and meter data management reasons it is necessary that WSPs be notified of the existence of micro-generation systems. Any such changes must be determined through stakeholder consultation. These changes could facilitate the existing electrical supply chain of hardware and other stores selling the products, and installation services of electricians installing them according to **existing** permits and processes.

Metering – Consider metering options to facilitate distributed generation. There are currently no meters approved for net metering in Canada. Net metering may stimulate the market, improve the economics (pay back) and provide a simple and inexpensive mechanism for encouraging the use of micro-generation DG. Net metering may, however, create problems as it may adversely affect the accuracy of load settlement, through degradation of metering accuracy and process consistency, and result in loss of data that would otherwise be useful to analyze the impact of micro-generation on the distribution system. An alternative option, employed in Ontario, BC, Manitoba, Quebec, New Brunswick, PEI, Nova Scotia and 30 US states is net billing using bi-directional meters, whereby the customer receives full retail value for excess electricity produced on-site and exported to the grid. Net billing allows the customer to receive the same benefits as net metering using meters approved by Measurements Canada and easily permits discounted rates, equal-rates and premium rates (such as renewable feed-in tariffs) for exported electricity, while maintaining the integrity of the load settlement process.

it easy for micro-generators to connect to the distribution system no matter where they live in Alberta.

3.5 Financial Instruments

Alberta's robust economy and the forecast increase in population in the province will cause the electricity market to increase substantially in the coming years. The goal is to increase the amount of renewable and alternative electrical energy in Alberta. However, several things may affect the achievement of this goal, including:

- Energy prices are typically insufficient to support the development of many renewable and alternative electrical energy projects.
- Renewable and alternative electrical energy projects typically are smaller (5 MW or less) and, due to the high cost per MW of capacity, are thus unable to attain the economy of scale necessary to be competitive in the long term.
- Transmission capacity and the current rate structure have not been designed to readily accommodate the impact of renewable and alternative electrical energy projects.

The team discussed a range of financial instruments that could help overcome some of these barriers and foster development of new renewable and alternative electrical energy projects in Alberta; these are described briefly below. (Also see the description of metering in Box 2.)

1. Financial Incentives

Financial incentives could encourage the development of renewable and alternative electrical energy projects and help offset the risk associated with these projects. They could also motivate consumers to purchase energy produced by these projects and encourage negotiation of long term Power Purchase Agreements (PPAs), further supporting the development of these projects. Specific incentives considered by the team include:

- **Accelerated Capital Cost Allowance:**⁵ Providing renewable and alternative electrical energy developers with an accelerated capital cost allowance will allow them to reduce the cost of energy produced by these projects, thus making them more competitive and desirable to power purchasers.
- **Research, Development, Demonstration and Commercialization (RDD&C):** Incentives for RDD&C activity are required to encourage industry and resource entities to develop new sources of renewable and alternative electrical energy projects and improve currently available renewable and alternative electrical energy technology. RDD&C activity could be increased through the establishment of provincial RDD&C programs or by offering RDD&C incentives for corporate spending.
- **Financing:** In other jurisdictions, regulated power providers have initiated programs for environmentally friendly power production that are supported by long-term PPAs that pay a premium power price, which is recovered through the ratepayers. In the absence of such programs in Alberta, some form of financing incentive could encourage the development of additional renewable and alternative electrical energy projects. This incentive could take several forms, such as a direct incentive, incentives for long-term contracts, a willingness to backstop the project, or some form of price rebate to consumers who purchase electricity from renewable and alternative electrical energy projects.

⁵ An accelerated capital cost allowance is a tax reduction for business-related capital property that provides for a more rapid depreciation of these assets than would otherwise be the case.

In developing financial incentives, consideration must also be given to Alberta's deregulated electricity market structure to ensure:

- a level playing field for generation;
- that any potential impacts on existing generation are taken into account; and
- that any incentives are outside of the market and market neutral.

2. Taxation

A number of taxation incentives could be considered at the provincial level. For example, users of power generated from renewable and alternative electrical energy facilities and contracted to a pool of users willing to contract directly for renewable and alternative electrical energy, might qualify for favourable provincial tax treatment. Also, developers of renewable and alternative electrical energy projects might qualify for favourable considerations so that investors would be encouraged to invest in these projects.

3.6 Regulatory Approaches

All of the proposals in this section would require changes to existing legislation and regulations and it may be appropriate to assemble them into a Renewable and Alternative Electrical Energy Act or Regulation. The legislative and regulatory measures that have been identified for potential inclusion in the renewable and alternative energy regulation are:

- A Renewable Portfolio Standard
- Feed-in Tariff or Standard Offer Contract legislation
- Micro-generation and interconnection standards
- Emissions trading

Regardless of the regulatory measure, consideration must also be given to Alberta's deregulated electricity market structure to ensure:

- A level playing field for generation,
- That any potential impacts on existing generation are taken into account, and
- That any incentives are outside of the market and market neutral.

3.6.1 Renewable Portfolio Standard

A Renewable Portfolio Standard (RPS) policy could be designed to set a regulated target for a minimum amount of renewable energy for the province. The key component of the RPS is a target for renewable and alternative electrical energy capacity or energy in a given timeframe, typically a percentage of overall electricity production or capacity. In most cases this target is set to increase over time. An expanding target with long lead times allows for the capital and infrastructure decisions that need to be made well in advance. The use of a trading system allows greater flexibility in the siting and marketing of power that meets the requirements of the RPS.

There are different ways of implementing an RPS. One option is a retailer-based method, which works by requiring all retailers to include a minimum percent of renewable electricity in their electric power supply portfolio. Retailers have some flexibility in meeting this requirement. They can generate the necessary amount of renewable electricity themselves; they can purchase it from

someone else; or they can buy a Renewable Energy Certificates (RECs)⁶. An RPS could be also administered through a Government of Alberta coordinating body and the additional cost for renewable and alternative electrical energy could be spread across the entire customer base in Alberta.

Challenges to implementing a provincial RPS include:

- Recognizing the differences between different types of retailers in the province – regulated, non-regulated, competitive, and self-retailers.
- Uncertainty regarding if or how the additional cost of renewable and alternative energy would be passed on to regulated customers.
- Determining whether EUB-approved methods of procuring energy for regulated customers would have to be revised.
- Avoiding a discrepancy between competitive and regulated customers by creating a disincentive for signing competitive contracts that would have to include some percentage of higher priced renewable and alternative electrical energy in order to meet the RPS.
- Determining how to treat customer contracts signed prior to the implementation of the RPS and how they should be grandfathered.
- Determining what to do when prudent measures were taken by entities to meet the target but supply did not materialize in the timeframe expected.
- Monitoring, reporting and compliance for the entities required to participate.
- Designing an RPS to be aligned with the design of the emissions trading system or compliance REC market to ensure that the systems are compatible and issues such as double counting are avoided.
- Ensuring the development of a market for RECs is far enough advanced to allow entities sufficient opportunity to acquire RECs in a market environment that does not hold them hostage to RPS requirements.
- Design the target in such a manner that if there is a rush to build out to that target level, there continues to be a cost effective expansion of renewable and alternative electrical energy.

The RPS option is currently implemented in numerous jurisdictions, primarily those with a central authority responsible for resource planning and development.

3.6.2 Feed-in Tariffs and Standard Offer Contracts (Small Installations)

Feed-in tariffs and standard offer contracts provide small electricity producers a guaranteed price for the electricity production. The main difference between a feed-in tariff and a standard offer contract (SOC) is that the SOC is a formal contract typically signed for multiple years at a standard price, whereas the feed-in tariff does not typically include a commitment to purchase the electricity into the future, although in order to be effective feed-in tariffs are typically applied in a stable, predictable manner. These mechanisms are particularly useful for very small producers where administrative costs to establishing an electricity contract would be prohibitive.

⁶ The Renewable and Alternative Energy project team defined a REC as the instrument that embodies all non-energy environmental and social attributes of electricity generated using renewable and alternative energy sources. A REC is measured in MWh and is created at the time electricity is generated at any facility that meets CASA's recommended definition of renewable and alternative energy. For more information, see consensus recommendation 15 in the 2005 report.

3.6.3 Systems Benefit Charge

A systems benefit charge could be used as a source of funding for renewable and alternative electrical energy-related programs. A small additional amount could be added to current users of electricity and the funding dedicated to the development of renewable and alternative electrical energy. Implementing a systems benefit charge would require a change to the tariff (see section 3.6.2). Premiums paid for feed-in tariffs of standard contracts could be funded through a systems benefit charge. A small surcharge could be collected on all energy exchanged through the Power Pool to fund the premiums.

3.6.4 Emissions Trading

In its December 2005 report, the project team noted that an emission trading system is one tool that could contribute to the increase of renewable and alternative electrical energy in Alberta. The team discussed at length including renewable and alternative electrical energy in the 2006 NO_x/SO₂ emission trading system as a mechanism to encourage new renewable and alternative energy development. However, agreement could not be reached on how much credit renewable and alternative electrical energy should be given for NO_x and SO₂. Thus the team did not reach consensus in 2005 on whether renewable and alternative energy should be included in the 2006 emission trading system, but described in the report the baseline options and background rationale proposed by each stakeholder group.

Emissions trading is a mechanism that can be used to more effectively achieve environmental objectives as part of a regulatory or non-regulatory system. Alberta now has a regulated NO_x and SO₂ emissions trading system for the electricity sector, which allows for the creation and use of emissions credits by coal and gas-fired thermal generation in some circumstances.⁷ Consideration is being given to expanding the system in a variety of ways, including the addition of renewable and alternative generation. The issues identified by the CASA Renewable and Alternative Energy project team in 2005 on this matter remain relevant and should be considered in the policy framework.

For renewable and alternative generation the use of emissions trading would allow some “externalities”, specifically emissions offsets or reductions related to the production of renewable and alternative power, to be monetized, and thus some of the benefits associated with this power recovered through a compliance market. It does this by allowing renewable and alternative electrical energy producers to create emission credits on a kg/MWh basis. The rate at which these credits would be created as well as other important design elements have yet to be determined and would be handled through a multi-stakeholder process.

In addition to the financial benefit that emissions trading could provide, including renewable and alternative electrical energy in the trading system would encourage thermal generators to utilize the renewable and alternative electrical energy sector in planning their emissions compliance strategies for greenhouse gases and Criteria Air Contaminants. Consideration should be given as to whether adding renewable and alternative electrical energy to the existing emissions trading system would result in an absolute⁸ reduction of emissions.

Non-regulatory approaches using emissions trading could also be considered.

⁷ For details please read the “A to Z” document found at <http://www3.gov.ab.ca/env/air/pubs/AtoZTrading.pdf>.

⁸ The term “absolute” requires further definition in the development of specific government policies.

4 Recommendations

Building on the descriptions of the components and policy options presented in sections 2 and 3 of this report, the team makes the following recommendations.

Recommendation 1: Developing a Policy Framework

The Renewable and Alternative Energy Project Team recommends that the Government of Alberta develop and implement a policy framework to increase the supply of and demand for renewable and alternative electrical energy in Alberta. This policy framework should be developed and implemented in a timely manner, and the Government should consider including in the policy framework the elements and policy options described in this report.

Recommendation 2: Stakeholder Process

The Renewable and Alternative Energy Project Team recommends that the Government of Alberta consult with stakeholders and consider their concerns in developing a Renewable and Alternative Electrical Energy Policy Framework for Alberta.

Appendix A: Project Team Members

| | |
|---------------------|--|
| Darren Aldous | Alberta Urban Municipalities Association |
| David Axford | Nexen |
| Carol-Ann Brown | Climate Change Central |
| Denise Chang-Yen | EPCOR |
| Julia Ciccaglione | Pristine Power |
| Matthew Dance | CASA |
| Peter Darbyshire | Graymont |
| Keith Denman | Alberta Environment |
| Rob Falconer | Enmax |
| Brian Gilliland | Weyerhaeuser |
| Karen Haugen-Kozyra | Alberta Agriculture, Food and Rural Development |
| Gordon Howell | Howell-Mayhew Engineering |
| Theresa Howland | Vision Quest Windelectric |
| Carolyn Kolebaba | Alberta Association of Municipal Districts & Counties |
| Martha Kostuch | Prairie Acid Rain Coalition |
| Michael Langfeldt | ORTEC |
| Bevan Laing | Alberta Energy |
| Frank Letchford | Environment Canada |
| Sat Lota | Energy and Utilities Board |
| Brian Mitchell | Mewassin Community Action Council |
| Al Morin | Dow Canada |
| Keith Murray | Alberta Forest Products Association |
| Jeff Nish | Alberta Electric System Operator |
| Courtney Oishi | Climate Change Central |
| Ian Peace | Residents for Accountability in Power Industry Development |
| Kelsey Prevost | Southern Alberta Group for the Environment |
| Jason Proche | Alberta Sustainable Resource Development |
| Andy Ridge | Alberta Environment |
| Mark Roedel | Suncor |
| Jesse Row | Pembina Institute |
| Rich Smith | Alberta Beef Producers |
| Andre Tremblay | Alberta Association of Municipal Districts & Counties |
| Eugene Wauters | Alberta Association of Municipal Districts & Counties |
| Leslie Welsh | Environment Canada |
| Shannon Wever | TransCanada |

Appendix B: Terms of Reference

Renewable and Alternative Energy (R&A) Project Team

Start Fresh Terms of Reference

Date: 06 September 2006

Background:

The CASA Electricity Project Team (EPT), which reported to the CASA Board in November 2003, included a number of recommendations on renewable and alternative energy in its report (#s 55 – 64, Appendix A). Due to tight time frames and a number of policy issues that needed to be resolved, the electricity project team's recommendations included a recommendation that a team be struck and further work done on a number of issues related to renewable and alternative electrical energy. The CASA board agreed to form the Renewable and Alternative Energy Project Team, and their terms of reference were approved by the CASA board in March 2004 (Appendix B).

The CASA R&A team worked over 2004 and 2005, and produced a report to the CASA board in December 2005, with 17 consensus recommendations and six non-consensus recommendations (Appendix C). The board did not discuss the six non-consensus recommendations (Recommendation 2, 3, 4, 11, 18, 19), but instead agreed that the CASA Renewable and Alternative Energy Project Team would work with the Government of Alberta on a policy framework to encourage the development of renewable and alternative electrical energy in Alberta.

The original members of the R&A team, plus new, interested stakeholders, came together in April 2006 and agreed to work within the CASA process on R&A. They met several times thereafter to develop this terms of reference to enable the CASA R&A team to renew its mandate.

Goal:

The goal of the CASA Renewable and Alternative Energy Project Team is to work within the CASA process to:

Increase the supply and demand of Renewable and Alternative electrical energy in Alberta.

Objectives:

In order to achieve its goal, the Renewable and Alternative Energy project team will aim to accomplish the following objectives:

1. Develop a policy framework that supports the Team's goal.
2. Develop approaches and programs that enable the development of renewable and alternative electrical energy in Alberta.
3. Develop a plan for reporting on changes to the supply of Renewable and Alternative electrical energy in Alberta.
4. Address the six non-consensus recommendations from the December 2005 Renewable and Alternative electrical energy report to the CASA board if not already addressed in the policy framework.
5. Report on the implementation of the 17 consensus recommendations from the December 2005 Renewable and Alternative electrical energy report to the CASA board, and if necessary, make recommendations to address outstanding issues.
6. Report on the implementation of the Renewable and Alternative electrical energy recommendations as described in the EPT report, and if necessary, make recommendations to address outstanding issues.

Key Task Areas:

1. Develop a team workplan and budget, and secure the resources to carry out the workplan.
2. Gather information as necessary to achieve the Team's objectives.
3. Identify information gaps and aim to fill those gaps, by using internal and external resources or by making recommendations for future work.
4. Consider the need for, and possible approaches to communication and/or consultation with the public.
5. Evaluate and report on the project team's achievement of its goal and objectives, and if necessary, make recommendations to address the evaluation.
6. Review the implications of draft recommendations on other forms of Renewable and Alternative electrical energy
7. Develop a final report to the CASA board. The report will include:
 - a. Recommendations to achieve the Team's goal and objectives
 - b. A plan for tracking the implementation of any recommendations and reporting to CASA board on the implementation of the recommendations.

Timelines:

The Team will aim to report to the CASA board in March 2007. The team will test any proposed changes to this timing with the board, as appropriate.

Budget:

The team currently has approximately \$20,000, which was carried over from the 2005 R&A team. New resources, if required, will be requested from stakeholders around the table.

Membership:

The following groups have been identified as having a stake in the outcome of this team's work:

- Electricity industry, including:
 - "Wires" companies – Alta Link, ATCO Electric, Fortis, EPCOR
 - Independent Power Producers Society of Alberta

- Retailers – EPCOR, ENMAX
- Self-retailers – Dow, Trans Canada
- Generators, including Canadian Solar Industries Association, VisionQuest Windelectric, Pristine Power, EPCOR
- Government
 - Environment Canada
 - Alberta Agriculture Food and Rural Development
 - Alberta Electric System Operator
 - Alberta Environment
 - Alberta Energy
 - Alberta Energy and Utilities Board
 - Alberta Sustainable Resource Development
 - Alberta Urban Municipalities Association
 - Alberta Association of Municipal Districts and Counties
- Alberta Beef Producers, Intensive Livestock Working Group
- Climate Change Central
- Canadian Association of Petroleum Producers
- Canadian Petroleum Products Institute
- Canadian Chemical Producers Association
- ENGOs:
 - Mewassin Community Action Council
 - Pembina Institute
 - Prairie Acid Rain Coalition
 - Toxics Watch Society
- Alberta Forest Products Association
- NewEra
- Mining sector:
 - Graymont

APPENDIX A - CASA EPT Renewable and Alternative Energy Recommendations

| | |
|----|--|
| 55 | <p>The Provincial Target for Renewable and Alternative Energy</p> <p>The Alberta government implement at the very least the 3.5% target for new renewable and alternative energy referenced in its <i>Albertans & Climate Change - Taking Action</i> plan.</p> |
| 56 | <p>The Basis for the Target for New Renewable and Alternative Energy</p> <p>Irrespective of the mechanism adopted for its implementation, the Alberta government calculate the 3.5% target for new renewable and alternative energy based on 100% of electric energy sold through the Alberta Power Pool, from Alberta sources.</p> |
| 57 | <p>Defining Renewable and Alternative Energy</p> <p>The following definition of Renewable and Alternative Energy be adopted by the Alberta government for the purposes of calculating the 3.5% target for new renewable and alternative energy:</p> <p>Renewable and Alternative Electricity is defined as that which is:</p> <ul style="list-style-type: none"> a) Power generated within the province of Alberta; and b) EcoLogo™ compatible in that it meets the EcoLogo™ criteria for Renewable Low-Impact Electricity, but from facilities that are not necessarily EcoLogo™ certified; <p align="center">OR</p> <p>Alternative electricity supplies whose source meets the following criteria:</p> <ul style="list-style-type: none"> a) 5 MW or less; and b) greenhouse gas intensity less than or equal to combined cycle gas turbine 418 kg per MWh <p>Projects eligible for the target would be those that begin producing electric energy after December 31, 2001.</p> |
| 58 | <p>Calculating the Amount of New Renewable and Alternative Energy Generation</p> <p>The Alberta government use the following energy-based method to calculate new renewable and alternative power:</p> <p align="center">(Total new renewable and alternative electricity in MWh, as defined in recommendation 57)</p> <p align="center">Divided by (Total power sold through the Alberta Power Pool in MWh)</p> |
| 59 | <p>Mechanisms for Achieving the Renewable and Alternative Energy Target</p> <p>The Alberta government consider developing a program to implement the mechanisms required to achieve a target of at least 3.5% new renewable and alternative energy by January 1, 2008. These mechanisms may include a “green certificate” program, emissions trading, offset credits, or any other mechanism to incent the use of green power.</p> |
| 60 | <p>The Retailer-Based Method for Achieving the Renewable and Alternative Energy Target</p> <p>The retailer-based method, described in this report, be the preferred option for achieving the target for additional renewable and alternative energy. The implementation team (see recommendation 64) will be tasked with recommending options to resolve the issues listed below and identifying any additional issues for resolution related to implementing the retailer-based method. The implementation of the retailer-based method is contingent upon the resolution of these issues to the satisfaction of affected stakeholders represented on the implementation team:</p> |

| | |
|----|---|
| | <ul style="list-style-type: none"> • scope of audit process; • timely development of a market for green certificates; • provisions to allow providers of the Regulated Default Supply Option to flow through the costs associated with meeting the 3.5% target; • provisions to ensure retailers that have taken prudent measures to achieve the 3.5% target are not penalized if supply does not materialize in a timely manner; and • transitional provisions that take into account previously signed long term contracts. |
| 61 | <p>Sectoral Agreements and Green Power</p> <p>The Alberta government, in any sectoral agreement negotiations, consider encouraging all purchasers of power to buy at least 3.5% new renewable and alternative electricity, as defined in recommendation 57, as a means of reducing their greenhouse gas emissions.</p> |
| 62 | <p>Net Metering and Net Billing</p> <p>Alberta Energy undertake a study to identify the technical, legal and financial issues associated with net metering and net billing, including a policy direction for the industry.</p> |
| 63 | <p>Infrastructure Needs</p> <p>Alberta Energy and the Alberta Electric System Operator examine the decision-making process for the renewable and alternative energy sector's infrastructure needs, with a view to:</p> <ol style="list-style-type: none"> a) ensuring that the process is accessible to the renewable and alternative sector, and b) improving the infrastructure for renewable and alternative energy. |
| 64 | <p>Renewable and Alternative Energy Implementation Team</p> <p>A CASA multi-stakeholder implementation team be formed to address the following issues, as well as issues that may be referred to it by other stakeholders or other sub-groups of the EPT. In forming this group, it is essential that all interested stakeholders who will be affected by the matters discussed be actively involved.</p> <ol style="list-style-type: none"> a) Setting a further target for renewable and alternative energy beyond 2008. b) Clarifying the eligibility of upgraded facilities that result in incremental power for the target. c) Determining ways in which larger co-generation and waste heat facilities can be encouraged and incented. d) Clarifying whether the definition of retailer found in the <i>Electric Utilities Act</i> is sufficient for the purposes of implementing a retailer-based target for new renewable and alternative electricity. e) Seeking means by which the federal government's Wind Power Production Incentive program, the Renewable Energy Deployment Initiative and other production incentives described in this report, might be augmented and integrated into Alberta's renewable and alternative energy sector. f) Seeking means by which consumer engagement mechanisms as described in this report could be funded and implemented. g) Seeking means by which a Solar Infrastructure Initiative, described in this report, could be funded and implemented. h) Examining options that would allow Climate Change Central, with the assistance of other groups such as the Office of Energy Efficiency, ENGOS, and retailers, to take the lead in the educating consumers about the sources of their electrical power. i) Examining ways in which the Alberta emissions trading system might be used to assist in developing renewable and alternative energy. |

APPENDIX B - CASA R&A 2004-2005 Project Team Terms of Reference

Revised as per the March CASA Board meeting March 12, 2004

Background:

The Alberta government's Climate Action Plan, released in the fall of 2002, includes an increase in the use of renewable and alternative electrical energy as one means of reducing Alberta's green house gas emissions. The CASA Electricity Project Team (EPT), which reported to the CASA Board in November 2003, included a number of recommendations on renewable and alternative energy in its report (#s 55 – 64, appended to these terms of reference). Due to tight time frames and a number of policy issues that needed to be resolved, the electricity project team's recommendations include a recommendation that a team be struck and further work done on a number of issues related to renewable and alternative electrical energy. This group is being formed in response to these recommendations.

Renewable and alternative electrical energy, whose definition for the purposes of this team can be found in recommendation #57 in the November 2003 EPT report, includes low or zero emissions sources such as wind power, solar power, run-of-river hydro, biomass, and other small GHG-efficient sources. It does not include larger co-generation projects, although these are efficient means of generating electricity. These sources are not only low or zero emissions, they also reduce the province's exposure to the price and supply variations of carbon-based fuels. While the cost of some of these technologies is becoming competitive, approaching that of gas generation, it is necessary to ensure that any barriers in the marketplace that are impeding the development of renewable and alternative energy are removed. These barriers include but are not limited to regulatory barriers, transmission and metering issues, the lack of a liquid market for green credits, and the belief that renewable energy is not able to provide reliable capacity to the grid.

Goal:

The goal of the Renewable and Alternative Energy Project Team is to implement the renewable and alternative energy recommendations found within the EPT report, with the aim of increasing the supply of renewable and alternative electrical energy in the province to meet the target of 3.5% new renewable and alternative electrical energy power, as defined in recommendation 58 of the EPT report, by January 1, 2008.

Objectives:

In order to achieve its goal, the Renewable and Alternative Energy project team will accomplish the following objectives:

1. Develop tools and mechanisms to facilitate meeting the target and to implement the renewable and alternative electrical energy recommendations as described in the EPT report. Develop tools and mechanisms to implement the renewable and alternative energy target and recommendations as described in the EPT report.
2. Develop a renewable and alternative electrical energy target beyond 2008, with corresponding tools and mechanisms.
3. Develop cost effective approaches and programs that enable the to development of renewable and alternative electrical energy.
4. Develop interim benchmarks and reporting for the period between the present and January 1, 2008 to determine if the target is achievable and allow for adjustments to ensure the target is reached.

Key Task Areas:

1. Administration

a. Underpinnings

- i. Setting a further target for renewable and alternative electrical energy beyond 2008.
- ii. Clarifying the eligibility of upgraded facilities that result in incremental electrical energy power for the target.
- iii. Clarifying whether the definition of retailer found in the Electric Utilities Act is sufficient for the purposes of implementing a retailer-based target for new renewable and alternative electrical energy.
- iv. Recommending options to resolve the issues listed below and identifying any additional issues for resolution related to implementing the retailer-based method described in the November 2003 report of the renewable and alternative energy sub-group of the EPT. The implementation of the retailer-based method is contingent upon the resolution of these issues to the satisfaction of affected stakeholders represented on the implementation team:
 1. Scope of audit process
 2. Timely development of a market for green certificates
 3. Provisions to allow providers of the Regulated Default Supply and Regulated Rate Tariff Options to flow through the costs associated with meeting the 3.5% target while continuing to support a competitive marketplace.
 4. Provisions to ensure retailers that have taken prudent measures to achieve the 3.5% target are not penalized if supply does not materialize in a timely manner.
 5. Transitional provisions that take into account previously signed long term contracts.
 6. Examine the need for compliance mechanisms and regulatory backstop

b. Implementation, Operation, and Management

- i. Examining ways in which the Alberta emissions trading system might be used to assist in developing renewable and alternative electrical energy
- ii. Examining ways in which Alberta' sectoral agreements might be used to assist in developing renewable and alternative electrical energy
- iii. Clarify the definition of green tags and green certificates to ensure they are compatible with both the provincial and federal government positions on emissions trading.

2. Enabling mechanisms

- a. Determining ways in which larger co-generation and low-impact electric energy sources and waste heat facilities can be encouraged and incented.

- b. Seeking means by which programs such as the federal government's Wind Power Production Incentive program, the Renewable Energy Deployment Initiative and other production incentives described in the November 2003 report of the Renewable and Alternative Energy Sub-group of the EPT might be augmented by the Alberta government to promote Alberta's renewable and alternative energy sector.
- c. Seeking means by which consumer engagement mechanisms as described in the November 2003 report of the Renewable and Alternative Energy sub-group of the EPT could be funded and implemented.
- d. Examining options that would allow Climate Change Central, with the assistance of other groups such as the Office of Energy Efficiency, ENGOS, and retailers, to take the lead in the educating consumers about the sources of their electrical energy power.
- e. Seeking means by which a Solar Infrastructure Initiative as described in the November 2003 report of the renewable and alternative energy sub-group of the EPT could be funded and implemented.

3. Reporting

- a. Preparing a final report and recommendations to the CASA board covering the goals and objectives set out above.
- b. Preparing and implementing a plan to communicate to CASA stakeholders and other potentially interested people the results of the team's work.

Timelines:

It is expected that the Renewable and Alternative Energy Project Team will report to the CASA board in March 2005. An interim report, on the implementation mechanisms referred to in objective #1 should be made to the CASA Board in September 2004.

Budget:

The financial needs of this team committee are unknown at this time. There will be some funding available from Alberta Environment to be shared between this project team and the Energy Efficiency and Energy Conservation Project Team, and also the remaining funding from the EPT will be made available to these two groups. It is not anticipated that this group will require a great deal of financial resources beyond the costs relating to the preparation of its final report. Fundraising for this work beyond the available monies, if required, will be one of the tasks for this group.

Membership:

The following groups have been identified as having a stake in the outcome of this team's work:

- Electricity industry, including:
 - "Wires" companies
 - Independent Power Producers Association
 - Renewable and alternative electricity generators
 - Retailers
 - Self-retailers
 - Generators, both Renewable, Alternative, and others
- Alberta Environment
- Alberta Energy

- ENGOs
- Canadian Association of Petroleum Producers
- Alberta Electrical System Operator
- Canadian Chemical Producers Association
- Alberta Forest Products Association
- Canadian Petroleum Products Institute
- NewEra
- Climate Change Central
- Municipalities
- Federal Government
 - Environment Canada
 - Natural Resources Canada

APPENDIX C - CASA R&A December 2005 Recommendations to the CASA Board

Recommendations

| Rec. # | Recommendation |
|--------|--|
| 1 | <p>Reviewing Progress Towards Meeting the 2008 Target of 3.5%</p> <p>In the first quarter of 2007, the CASA Renewable and Alternative Energy project team be reconvened to assess progress towards meeting the 2008 3.5% target.</p> |
| 2 | <p>Review of Barriers, Targets and Contribution of Waste Heat</p> <p><i>No consensus</i></p> |
| 3 | <p>Meeting the 2008 Target</p> <p><i>No consensus</i></p> |
| 4 | <p>i. Including Renewable and Alternative Energy in the 2006 Provincial Emissions Trading System</p> <p><i>No consensus</i></p> |
| | <p>ii. NO_x and SO₂ Baselines for Renewable and Alternative Energy</p> <p><i>No consensus</i></p> |
| 5 | <p>Role of Renewable and Alternative Energy in Managing Greenhouse Gas Emissions</p> <p>The federal and Alberta governments continue to explore and influence the role that renewable and alternative energy plays in a system intended to manage greenhouse gases.</p> |
| 6 | <p>Supportive Policies</p> <p>The Government of Alberta implement supportive policies to enable the 3.5% target to be achieved.</p> |
| 7 | <p>Transmission Infrastructure Constraints</p> <p>The AESO, EUB and other stakeholders use best efforts for the timely resolution of any transmission constraints that may exist in areas where renewable and alternative energy generation occurs or is expected to occur in the future.</p> |
| 8 | <p>Calculating Progress Towards Meeting the Target</p> <p>Alberta Environment use the following formula to calculate progress towards meeting the target:</p> $\frac{\text{Total electricity produced from new}^9 \text{ renewable and alternative sources}}{\text{Electric energy distribution sales}}$ <p>Where: <i>Total electricity produced from new renewable and alternative sources</i> means the electrical output in megawatt-hours of facilities that meet the definition of renewable and alternative energy in EPT Recommendation 57, including behind the fence generation.</p> <p><i>Electric energy distribution sales</i> means the sum of “distribution sales” of electricity to regional distribution companies, as reported to the EUB and which will be adjusted by the EUB and/or AESO to account for new renewable and alternative electricity generated behind the fence.</p> <p>Alberta Environment will make best efforts to ensure this metric is accurate by using additional sources such as industry disclosure on their contributions to the target and/or</p> |

⁹ “New” as defined in recommendation 57 of the Electricity Project Team; see Appendix B.

| Rec. # | Recommendation |
|--------|--|
| | sources of information that offer higher resolution or better quality and reliability if they are readily available to it. Such sources may include WREGIS (if and when operational) or the AESO or other. |
| 9 | <p>Eligibility of Upgraded Facilities that Produce Incremental Electricity to Meet the 3.5% Target</p> <p>The calculation of the 3.5% target for new renewable and alternative energy include the <u>net</u> incremental electrical energy output of facilities that have undergone retrofits after December 31, 2001 in order to upgrade the facility to meet the CASA definition of renewable and alternative energy (in Recommendation 57 of the EPT final report).</p> |
| 10 | <p>Effective Implementation Date for 3.5% Target</p> <p>The 3.5% target for new renewable and alternative energy be achieved for the 2008 calendar year.</p> |
| 11 | <p>Establishing Future Targets</p> <p><i>No consensus</i></p> |
| 12 | <p>Reporting Progress Toward Meeting the Target</p> <ul style="list-style-type: none"> (a) Starting in 2006, Alberta Environment report the total incremental production from renewable and alternative energy sources that is produced on an annual basis and where it is in relation to achieving the target. (b) Starting in 2006, on a voluntary basis, Retailers and large consumers disclose directly to the public on an annual basis, the share of their retail portfolio that is based on renewable and alternative energy. |
| 13 | <p>Definition of a Retailer</p> <p>Notwithstanding the definition of a retailer in the <i>Electric Utilities Act</i>, a Retailer for the purposes of this report means persons that provide electricity services directly to a customer, to themselves, and/or to eligible customers under a regulated rate tariff.</p> |
| 14 | <p>Retailer as a Singular Corporate Entity</p> <p>The 3.5% target apply to the Retailer as a singular corporate entity; that is, in the case where Retailers have both regulated and competitive customers, the 3.5% target applies to their entire customer base.</p> |
| 15 | <p>Definition of a Renewable Energy Certificate (REC)</p> <p>A REC be defined as the instrument that embodies all non-energy environmental and social attributes of electricity generated using renewable and alternative energy sources. A REC is measured in MWh and is created at the time electricity is generated at any facility that meets CASA's recommended definition of renewable and alternative energy,¹⁰ and is measured by a revenue-quality meter, or the power output of which can be derived through mathematical calculations from the readings of other revenue-quality or comparable meters on-site at a rate of one REC per MWh of electrical output.</p> <p>The environmental and social attributes of a particular REC are a function of the characteristics of the generating facility at the time the associated electricity was generated. For the purposes of accounting for Alberta's target for 3.5% new renewable and alternative electricity, all RECs created at any facility that meets the Renewable and Alternative Energy Project Team's definition are deemed equivalent.</p> <p>The property rights to a particular REC belong to the owner of the generation facility and may be transferred by contract or sale or retired permanently together with or separately from the underlying electricity.</p> |
| 16 | <p>Use and Implementation of a Tracking System in Alberta</p> <p>a) As soon as available, the Government of Alberta adopt WREGIS, or a similar system, as</p> |

¹⁰ This definition is contained in the CASA Electricity Project Team's recommendation 57, which was approved by the CASA board in 2003 and adopted by the Government of Alberta in 2004.

| Rec. # | Recommendation |
|--------|--|
| | <p>an information and tracking system for purposes of improving the tracking and exchange of RECs.</p> <p>b) As soon as possible, and on an ongoing basis when the system is available to accept the data, AESO submit generation data for facilities registered with WREGIS (or a similar system).</p> |
| 17 | <p>Consistent Terminology</p> <p>To avoid confusion and potential misunderstanding, CASA documents use the phrase “Renewable Energy Certificates” or “RECs” instead of its conventional synonyms, “Green Tags” and “Green Certificates,” which may have other meanings in other documents.</p> |
| 18 | <p>Definition of Waste Heat</p> <p><i>No consensus</i></p> |
| 19 | <p>Recognizing Waste Heat</p> <p><i>No consensus</i></p> |
| 20 | <p>Waste Heat’s Contribution</p> <p>When the reconvened team comes together again in 2007 they determine waste heat’s contribution to:</p> <ul style="list-style-type: none"> • future targets, • any Alberta emission trading system, • definition of a REC, • upgraded facilities, • any Alberta tracking system or • other future aspect of renewable and alternative energy management. <p>The 2007 team will appropriately adjust the future targets to recognize the contribution of waste heat and other alternative energy sources to Alberta’s targets. The 2007 team will not discuss the definition of waste heat or the inclusion of waste heat, as it relates in the 2008 3.5% target, unless Alberta Environment adopts a new definition between now and 2007 for projects over 5 MW.</p> |
| 21 | <p>Interconnected Micro-generation</p> <p>Alberta Energy complete as soon as possible the review of the technical, legal and financial issues associated with distributed micro-generation, including net metering and net billing, and provide policy direction for the industry.</p> |
| 22 | <p>Areas Requiring Further Work</p> <p>Key task areas 2b, 2c and 2e from the Renewable and Alternative Energy project team’s terms of reference continue to be pursued. In particular, the team recommends that the Government of Alberta and any future CASA Renewable and Alternative Energy project teams explore the need for additional incentives for renewable and alternative energy, including supplementing federal incentives such as the Wind Power Production Incentive and the Renewable Energy Deployment Initiative, developing a solar infrastructure initiative, and other consumer engagement initiatives.</p> |
| 23 | <p>Consumer Awareness and Education</p> <p>In 2007 at the latest, the provincial government initiate (possibly through Climate Change Central) a consumer awareness and education campaign to be collaboratively undertaken by government and interested electricity market and industry participants with the following objectives:</p> <ul style="list-style-type: none"> • Raise public awareness about the environmental attributes of renewable and alternative energy and the role renewable and alternative energy plays in Alberta • Educate the public about the options that are available to them with regard to the electricity that they consume |