Saskatchewan 2020
Clean energy. New opportunity.

Report on Bruce Power’s Feasibility Study
November 2008
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A message from Duncan Hawthorne
President & CEO

As Saskatchewan’s economy continues to grow and prosper so does the province’s need for clean, reliable and affordable electricity. That’s why in June of this year, Bruce Power launched a feasibility study to consider the role that nuclear power could play in Saskatchewan.

We have now completed our feasibility study and the purpose of this document is to share our findings with the people of Saskatchewan.

Nuclear power is safe, clean, reliable and affordable electricity and is an important part of any clean energy mix. As Saskatchewan makes historic investments in clean coal technology and other sources of electricity to secure a balanced supply mix for the long-term, we believe the nuclear option deserves consideration.

As a business, we have considered the nuclear option in Saskatchewan and believe it could play a positive role in the province’s energy future.

Not only could nuclear electricity generation produce clean electricity, but it has the potential to have a major impact on the province’s economy in the long-term. In our feasibility study we examined the following:

» The electricity supply requirements in Saskatchewan and Alberta over the long-term.

» How best to integrate nuclear energy, which produces no greenhouse gases when it generates electricity, with hydrogen, wind, solar and clean coal technologies to give Saskatchewan a diverse and secure supply of clean energy for 2020 and beyond.

» The economic impacts, public attitudes and level of support for adding nuclear energy to the province’s current electricity supply mix.

» Potential locations that would be suitable to host a new nuclear generating station.

Although we haven’t made a decision to proceed with the nuclear option in Saskatchewan, we are sharing with you our findings as we progress through the decision-making process.

Regards,

Duncan Hawthorne
About Bruce Power
Canada’s only private nuclear power generator

Bruce Power is Canada’s only private nuclear generator and was formed in May, 2001. The company is a partnership of TransCanada, Cameco, OMERS (Ontario Municipal Employees Retirement System), PWU (Power Workers’ Union) and Society of Energy Professionals.

The company operates one of the largest nuclear facilities in the world and has the capacity to produce up to 6,300 MW of electricity. Bruce Power is currently investing billions of dollars to refurbish units at its Bruce County Ontario site, which represents one of the largest electricity infrastructure projects in North America.

Our nearly 4,000 employees and 2,000 contractors make up our team that is focused on safety first, strong operational performance and investing the future. In fact, a majority of our employees are owners in the business and have invested their own hard-earned money to see the company grow and prosper.

<table>
<thead>
<tr>
<th>Power numbers</th>
<th>2007</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Safety Accident Rating</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Output (in terawatt hours)</td>
<td>35.47</td>
<td>36.47</td>
<td>32.90</td>
</tr>
<tr>
<td>Capacity factor</td>
<td>86%</td>
<td>88%</td>
<td>80%</td>
</tr>
<tr>
<td>Electricity revenue</td>
<td>1,920</td>
<td>1,861</td>
<td>1,907</td>
</tr>
<tr>
<td>All-in-cost ($/MWh)</td>
<td>42</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Profit before taxes and OCI (millions)</td>
<td>487</td>
<td>554</td>
<td>563*</td>
</tr>
<tr>
<td>Realized selling price ($/MWh)</td>
<td>55</td>
<td>51</td>
<td>58</td>
</tr>
</tbody>
</table>

* BEFORE LOSS ON DISPOSITION

Bruce Power is also a member of the Canadian Hydrogen Association and is active in research and development work with leading Canadian universities to study the potential of what a hydrogen economy could offer to society as we tackle climate change. Bruce Power’s partners are also the owners of Ontario’s first commercial wind farm, Huron Wind, which produces enough electricity for 3,000 homes on an annual basis.

The company is also considering new build growth options throughout Canada. In August, 2006, Bruce Power was the first Canadian company in a generation to file for the construction of new units in Bruce County. Last month, the company launched a similar planning process in Haldimand-Norfolk. The company is also continuing with work in Western Canada and has an active development project currently underway in the Peace Country.
Saskatchewan’s energy mix
We believe there is a role for nuclear energy by 2020

Saskatchewan’s electricity mix currently consists of coal, gas, hydro and wind. Over 55 per cent of the province’s electricity comes from coal that emits greenhouse gases, which is why the government is making an historic investment into clean coal technology. However, even with a successful initiative into deploying cleaner coal technology over the course of the next decade, Saskatchewan will need even more clean sources of electricity.

As Saskatchewan continues to grow and prosper so will the need for safe, clean, reliable and affordable electricity. That’s why we believe there is a role for nuclear in the province’s energy mix by 2020. As the table below illustrates, given the anticipated growth of the province, up to 2,200 MW of new electricity could be required by 2020. At a minimum, Bruce Power believes 1,000 MW of generation will be required. Our feasibility study provides the company a high degree of confidence that this could come from nuclear.

### Peak System Load

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Low (1.5%)</td>
<td>3,125 MW</td>
<td>3,792 MW</td>
<td>+660 MW</td>
<td></td>
<td>+1,266 MW</td>
<td></td>
<td>+812 MW</td>
</tr>
<tr>
<td>Moderate (2.5%)</td>
<td></td>
<td>4,308 MW</td>
<td>+1,183 MW</td>
<td></td>
<td>+2,449 MW</td>
<td>1,114 MW</td>
<td>+1,335 MW</td>
</tr>
<tr>
<td>Threshold (4% to 1.5%)</td>
<td></td>
<td>4,700 MW</td>
<td>+1,263 MW</td>
<td></td>
<td>+2,529 MW</td>
<td></td>
<td>+1,415 MW</td>
</tr>
<tr>
<td>High (4%)</td>
<td></td>
<td>5,203 MW</td>
<td>+2,078 MW</td>
<td></td>
<td>+3,344 MW</td>
<td></td>
<td>+2,230 MW</td>
</tr>
</tbody>
</table>

As the Alberta economy continues to also grow, it is estimated that the province may require up to 9,000 MW of new generation, providing a possible export market for electricity. Specifically, the growth in demand in northeastern Alberta, which is fueling the province’s growth, is also a significant opportunity for Saskatchewan.

“Saskatchewan’s economy will continue to roar…... Saskatchewan will lead the country in economic growth for the next few years.”

LEADER-POST
Nuclear units are large and generate baseload electricity. The introduction of such large units into Saskatchewan would need to be effectively managed as electricity infrastructure is upgraded over the next decade. However, it is not uncommon to have large baseload nuclear units in an electricity market the size of Saskatchewan.

For example, over the past two decades, in New Brunswick the Point Lepreau nuclear facility is capable of producing approximately 25 per cent of the province’s electricity. A 1,000 MW nuclear facility in Saskatchewan would produce a similar percentage of the supply mix by 2020, as is currently the case in New Brunswick.
Selecting a site for possible new reactors
How we identify the regions of the province that could host a nuclear power plant

As part of Bruce Power’s feasibility study, an evaluation was carried out of the entire province to identify what regions of the province could host a nuclear power plant. A detailed assessment was conducted of the province using advanced mapping technology. This data will be essential in moving forward as specific sites for a nuclear power plant are considered for a possible Environmental Assessment (EA).

To build, operate and manage a nuclear power plant is a considerable undertaking and one of the most important factors considered by Bruce Power is the availability of human resources. For this reason, a number of areas were excluded from the assessment process due to a lack of sufficient infrastructure regionally to host a nuclear power plant. It is estimated a nuclear facility would require 2,000 people during construction and 1,000 during operation.

The operation of a nuclear facility also requires water for cooling. An assessment was conducted of all viable water sources in the province near sufficient infrastructure to support a facility. The North and South Saskatchewan Rivers were identified as viable water sources for a new nuclear plant in the province.

Canada is the world’s largest producer of natural uranium providing 22 per cent of total world production from its Saskatchewan mines in 2007.

Source: Canadian Nuclear Association
Consideration was also given to Lake Diefenbaker and possible locations near Estevan, where coal facilities currently operate. Sites near Lake Diefenbaker were excluded because of the lack of infrastructure and population. Although Swift Current has considerable infrastructure that could support a facility, the most viable sites were located a significant distance from the city reducing the viability of this location.

Estevan was promising because existing facilities that use water and require infrastructure are already located in the region. However, Bruce Power excluded the Estevan option because the role that region will play in terms of future clean coal generation will be considerable in the future. To locate a nuclear facility, in addition to such a significant amount of coal, would have concentrated too much electricity in the province in a single location. The Estevan region currently has 1,000 MW of generating capacity and the...
Selecting a site for possible new reactors (continued)

Another important consideration is gaining access to growing electricity markets. In addition to supporting Saskatchewan’s electricity needs, a nuclear facility could also be used to export electricity to Alberta. This need must be balanced with the importance of proximity to infrastructure and water.

Bruce Power’s detailed assessment into siting for a possible nuclear plant in Saskatchewan concluded that a region spanning from Lloydminster, including the Battlefords and Prince Albert, was the most viable host for a nuclear facility. As shown on the map opposite, this region is generally referred to as “Prince Albert economic sub-region.” This region met all of the criteria identified and offers real potential for identifying specific sites which could be the focus of an EA.

A number of community representatives from this region have expressed an interest in being considered through letters, meetings and a tour to the Bruce Power site in Ontario. The economic impact of a nuclear facility has a number of community officials excited about a historic development opportunity a new nuclear facility presents.

### Detailed criteria used in assessing availability of sites

- Social considerations
- Heritage resources
- First Nations Reserves and Treaty Land Entitlements
- Populated places
- Crown vs. private land
- Environmentally sensitive areas
- National, provincial and regional parks
- Provincial reserves, refuges and other protected habitat areas
- Known occurrences of rare or endangered plants or animals
- Wetlands
- Physical constraints
- Slope
- Aquifer risk
- Extreme meteorological events
- Flood risk
- Seismic activity and ground conditions
- Other conflicting land use
- Water wells
- Oil and gas activity
- Access to infrastructure
- Distance to road and rail
- Distance to water supply
- Distance to existing transmission corridor
Public support in Saskatchewan
Second highest support in Canada

An early poll conducted on behalf of Bruce Power shows a majority of Saskatchewan residents support nuclear power and are second only to Ontario in their backing of the technology. Those results were posted in August on Bruce Power’s website. In July, Bruce Power retained POLLARA Research and Communications to survey more than 800 Saskatchewan residents on a number of energy-related issues. A survey of this size is considered accurate to within 3.4 per cent, 19 times out of 20.

Bruce Power compared the preliminary Saskatchewan findings from nationwide Canadian Nuclear Association polling done earlier this year and the results are positive at this early stage in the process.

The poll reveals that a majority Saskatchewan residents support nuclear power and that support remained strong and stable following the announcement of our feasibility study in June. In fact, as noted, Saskatchewan has the second highest support for nuclear power in Canada.

We view this finding as significant because the province currently does not have any nuclear generation and the industry has not yet had an opportunity to fully communicate the facts about the safe, reliable and affordable nature of next generation nuclear. Bruce Power also wanted to determine why people support or oppose nuclear power.
Public support in Saskatchewan (continued)
Also, the poll reflects concerns in a number of areas which are driving the need to consider a nuclear option in the province. These include:

» The reliability of Saskatchewan’s electricity supply.
» The environmental impacts of generating electricity.
» The environment, overall.

“Majority favours nuclear. Fifty-two per cent support nuclear development here”
August 7, 2008

The StarPhoenix
A nuclear option in Saskatchewan would be driven by the need for reliable baseload power in the province while reducing greenhouse gases and tackling climate change. It is also clear that people in Saskatchewan share the view that nuclear could play a role to address environmental challenges while the Saskatchewan economy continues to grow. The poll asked people if they agreed with the following statements:

- Nuclear energy is a reliable source of power.
- Nuclear power generation in Canada is safe.
- Nuclear power generation does not emit greenhouse gases.

In addition to considering nuclear options, Bruce Power will examine the possibility of establishing a clean energy hub to generate electricity and hydrogen through wind and solar. People in Saskatchewan overwhelmingly support the use of wind (94 per cent) and solar (95 per cent). If Canada is going to tackle climate change, all forms of clean energy need to be explored and this will be included in the feasibility study.
Economic impacts
New opportunity for the province

The construction and 60 year operation of a nuclear facility in Saskatchewan would have a significant and stabilizing impact on the province’s economy for decades to come.

Bruce Power has conducted an assessment to determine economic impacts on Saskatchewan of a two unit nuclear build in the province, assuming operation in 2018.

Construction impacts

» During site preparation and construction the project would contribute about $4 billion to the provincial economy, including $1.4 billion in labour income.
» The project would generate a total of 20,000 direct, indirect and induced jobs during construction.
» During the peak year of construction the project will directly and indirectly contribute approximately 2.2 per cent of provincial GDP and 48 per cent of the GDP in the host region.

During the construction of a nuclear facility this project alone could help drive economic growth in Saskatchewan.

A new nuclear facility would not only provide significant economic impacts during construction but would provide economic benefit for the full 60 years of operation. These economic impacts are estimated to be:

Annual operating impacts

» The project will generate approximately 1,000 full time jobs in addition to 900 indirect jobs – for 60 years.
» On an annual basis the project would contribute almost $240 million to the provincial economy.

Nuclear Energy is a $6.6 billion dollar a year industry in Canada which accounts for 21,000 direct jobs, 10,000 indirect jobs and 40,000 spin-off jobs.

Source: CERI, 2008
“Saskatchewan poised for strong economic growth”

RBC Economics

Government revenues

Throughout the construction phase of the project total tax revenues generated would be $1.8 billion (2007 dollars).

» Federal – $1 billion
» Provincial - $639 million
» Local – $205 million

During the 60-years of operation the project would contribute to over $10 billion (2018 dollars) in government revenues.

» Federal - $5.7 billion
» Provincial - $3.4 billion
» Local - $1 billion

By the numbers

the construction of a two-unit nuclear facility:

» $8-10 billion
» 1,000 jobs for 60 years
» 2,000 jobs during construction
» 400,000 cubic meters of concrete
» 20,000 tonnes of steel
» 700 kilometers of wiring
» 70 kilometers of piping
Reducing greenhouse gases
Protecting the environment

Bruce Power recognizes that one of the most significant benefits to developing a nuclear option in Saskatchewan is the impact it could have on reducing the growth of greenhouse gases.

When compared to other energy sources, nuclear produces less emissions than solar when entire life cycle is considered. When compared with wind and hydro, the life cycle emissions impact of nuclear is nearly identical. These conclusions were made by the University of Wisconsin-Madison, when the full life-cycle emissions of all sources of electricity generation were considered.

A new nuclear facility of just over 1,000 MW would have the same reduction on greenhouse gases as taking half of Saskatchewan’s vehicles off the road today.
Given the impact from coal generation on greenhouse gas emissions, success of clean coal initiatives in Western Canada is essential. This is why Bruce Power applauds the province’s efforts to invest in clean coal technology, which could complement nuclear baseload generation in a clean way. We believe the nuclear option is entirely complimentary with clean coal and we recognize the long term role the Estevan area will play in electricity generation.

A nuclear power plant producing approximately 1,000 MW of electricity in Saskatchewan would place significant downward pressure on the growth of greenhouse gases. On average, annual greenhouse gas (GHG) reduction would be 1.7 Mt from 2020 to 2035 as a result of the introduction of nuclear generation. Over a 15-year period a reduction of 25.8 Mt of GHG reduction will be realized.

*The base case does not include a wide array of other initiatives underway by government to reduce greenhouse gases.
**Reactor designs**
The next generation of safe nuclear power

When considering the viability of a Saskatchewan nuclear option, Bruce Power has considered a number of Generation III reactor designs including Atomic Energy Canada Limited's ACR-1000, Westinghouse's AP1000 and AREVA's EPR. Generation III reactors are safer, more efficient and easier to build than earlier reactors.

In addition to differences in their technology, the reactors also differ in the amount of electricity they produce, which can be anywhere from 1,085 MWe net per reactor (ACR-1000) to 1,600 MW net per reactor (AREVA's EPR).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ACR-1000</th>
<th>AP1000</th>
<th>EPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactor Type</td>
<td>PTR a</td>
<td>PWR b</td>
<td>PWR b</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Atomic Energy of Canada Ltd</td>
<td>Westinghouse</td>
<td>AREVA</td>
</tr>
<tr>
<td>Country of origin</td>
<td>Canada</td>
<td>US</td>
<td>France, Germany</td>
</tr>
<tr>
<td>Generation Capacity Per Reactor Unit (MWe net)</td>
<td>1,085</td>
<td>1,000</td>
<td>1,600</td>
</tr>
<tr>
<td>Design Status</td>
<td>New design</td>
<td>New Design</td>
<td>Being built</td>
</tr>
<tr>
<td>Fuel Enrichment</td>
<td>Enriched</td>
<td>Natural or enriched</td>
<td>Enriched</td>
</tr>
<tr>
<td>Design Life (years)</td>
<td>60 c</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

a. Pressurized tube reactor
b. Pressurized water reactor
c. Requires mid-life refurbishment
ACR-1000 ( Atomic Energy of Canada Limited)

The ACR-1000 is a Pressure Tube Reactor (PTR), and uses “heavy water” called deuterium oxide as the neutron moderator. Thus, the Canadian reactor is named CANDU, for CANada Deuterium Uranium.

The core of the reactor is contained in a large, horizontal, cylindrical tank called a “calandria” which contains the heavy water moderator and coolant. Several hundred fuel channels run from one end of the calandria to the other. Pressure tubes, located inside the fuel channels, hold the fuel and the pressurized heavy water. The fuel, in the form of bundles or rods containing uranium pellets, is inserted into the pressure tubes. In a closed circuit, the heavy water coolant is pumped through the tubes to pick up heat generated from the nuclear reaction and on to steam generators to produce steam from ordinary water.

The major innovation in the ACR-1000 is the use of low enriched uranium fuel, and light water as the coolant, which circulates in the fuel channels. The design also features higher pressures and temperatures in the reactor coolant and main steam circuit, thus providing an improved thermal efficiency than in existing CANDU plants.

AP1000 (Westinghouse)

The AP1000 is a two-loop, 1,000 MWe Pressurized Water Reactor (PWR). Pressurized Water Reactors use ordinary water under high pressure (superheated water) as a moderator and coolant. High pressure is created to keep the water in the reactor tank from boiling even though it reaches a temperature of about 300°C at full force. This water is conducted to a steam generator and passes through thousands of small pipes. The heat in the pipes causes the water in the steam generator to turn to steam—which then drives the turbine. The AP1000 has passive safety features and extensive plant simplifications that enhance its construction, operation, maintenance and safety when compared to earlier generations of PWR reactors. US Nuclear Regulatory Commission design certification for the AP1000 was completed in 2006. Four reactors have been ordered by China with the first Unit scheduled to be in service by 2013. Since it is a newly-developed design, there are currently no AP1000 reactors operating today; however, it has been selected for construction in the United States of America.

EPR (AREVA)

The Evolutionary Pressurized Water Reactor (EPR) is a very large 1,600 MW Pressurized Water Reactor (PWR) design developed by Framatome ANP, an AREVA and Siemens company, during the 1990s. By working in collaboration with various European nations, Framatome completed the basic design in 1997, which conforms to French and German laws and regulations. The main design objective of the EPR is to ensure increased safety while providing enhanced economic competitiveness through evolutionary improvements to previous PWR designs scaled up to an electrical power output of 1,600 MW. The reactor can use five per cent enriched uranium oxide or mixed uranium plutonium oxide fuel. The pilot EPR is currently being built in Finland at the Olkiluoto site and is expected to start production in 2009.
Environmental Assessment process
Exploring opportunities for growth

Before any decision is made to progress with building a nuclear facility, an Environmental Assessment (EA) must be conducted as a planning tool to predict the effects of a project on the environment. Bruce Power believes the EA process is an opportunity to consult with impacted communities and aboriginal peoples before a decision is made to progress a project.

- Proponent submits Site Licence Application and Project Description
- Participant funding allocated by CEAA for review of Guidelines
- Draft EIS Guidelines issued
- EIS Studies released
- Participant funding allocated for review of EIS
- Proponent submits EIS (most likely to a Joint Review Panel)
- Panel reviews EIS and may seek additional information
- Public Hearings held
- Panel prepares Report and submits it to Federal Government
- Government responds to Report recommendations
- CNSC makes decision on Site Licence Application
Why do we do EAs?

The Canadian Environmental Assessment Agency (CEAA) states that an EA has two purposes:

1) Minimize or avoid adverse environmental effects before they occur; and

2) Incorporate environmental factors into decision-making.

A federal EA is required to obtain a site licence for a new nuclear power plant. Before any work can begin, the assessment must show that the Project would not have significant adverse effects on the environment.

In most cases, project design and activities will change throughout the course of the EA to avoid adverse effects on the environment. In this way, an EA is a planning/decision-making tool that ensures the best possible project for the community.

What is involved in an Environmental Assessment?

The EA will evaluate the effects of construction, operation and decommissioning of the Project on components of the natural and human environments. EA studies will include environmental components such as air quality and noise; ground and surface water; fish, wildlife and vegetation; geology and seismicity; radioactivity; land use and resources; cultural and physical heritage; aboriginal interests; human health; and socio-economic conditions.

Mitigation measures are developed to minimize or eliminate adverse effect of the Project on the environment. The final product of this environmental assessment would be an Environmental Impact Statement (EIS). This report will summarize all of the findings of the EA studies.
Social and environmental responsibility
Our commitment to Canadians

Bruce Power is committed to providing safe, reliable, affordable, and environmentally sound electricity. We will achieve this through living our values, which will condition every decision and action we take.

The Bruce Power Values

Safety First.
Safety is at the heart of everything we do.

Commercial Responsibility.
We focus on the safe, reliable production of clean electricity, and continue to demonstrate that the safest nuclear stations also enjoy the lowest operating and maintenance costs.

Openness.
Ensuring that the community is aware of site activities is a top priority.

Respect and Recognition.
We respect the professional and personal commitment made by every employee and contractor.

Professional and Personal Integrity.
We believe in honouring ourselves, our business, and our personal commitments.