

# Nuclear Energy and the Environment

**T**he renewed interest in nuclear power is being driven by a number of factors – most notable, given growing concerns regarding climate change, is its very low carbon profile.

According to Environment Canada, climate change is a long-term shift in average weather conditions over time, including temperature, precipitation, winds, and other indicators. Scientists from around the world believe that climate change has been caused by the significant increase of human generated greenhouse gas (GHG) emissions, primarily carbon dioxide.

On a per capita basis, Saskatchewan is one of the largest emitters of GHG in Canada. The primary sources of GHG are transportation and electricity generation. About 2/3 of Saskatchewan's electricity comes from burning coal, a significant source of GHG.

Nuclear power plants emit no CO<sub>2</sub> or other noxious gases. In nuclear power plants the energy to generate the electricity comes from a nuclear reaction

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## What about Renewable Energy Sources?

While a strong case can be made for nuclear power because of its low carbon emissions, the same can be said for wind and solar power.

'Renewable' sources of electricity such as wind and solar power are intermittent, producing electricity only when the sun is shining or the wind blowing. These systems require that a full-time backup method for power generation be available to ensure the province can have continuous access to electricity.

Additionally, vast land requirements are necessary for solar and wind electricity generation. For wind generators to produce all the electricity needed to supply a city of 3 million people, such as Toronto, the land required would be about 40 times the area of Metropolitan Toronto. This is more than four times the area of Prince Edward Island.<sup>1</sup>

Apart from the vast land requirement, and the visual and noise effects of the wind generator towers themselves, there would be considerable environmental impact [erosion, bird and bat deaths, fragmented animal habitats]. If that same city's electricity were to be supplied by solar collectors, a land area twice the size of Metropolitan Toronto would be needed.<sup>2</sup>



Wind power generation poses an additional problem to Saskatchewan that needs to be addressed. With the amount of wind power currently in service in the province (approximately 172 megawatts) SaskPower is experiencing grid operating challenges due to the natural variability of wind power. SaskPower is studying and assessing the effects of wind power on the provincial system through the Wind Power Integration and Development Unit (WPIDU) and will determine the benefit of building future wind facilities based on the results of this effort.

Unlike solar and wind, hydro electricity is not intermittent as it converts the natural flow of water into electricity. Hydro works by capturing water as it flows and falls from a height. The energy is produced by the falling water turning the blades of a water turbine, which in turn drives a generator to produce electricity.

**Nuclear energy is the largest source of emissions-free energy, which means it emits no pollutants into the air. This keeps the air clean, prevents acid rain, preserves the earth's climate and prevents ground level ozone formation.**

Hydro electricity generation is GHG emissions free but it also has its challenges. Hydro plant production may affect the water's ecosystem and fish habitat significantly. Further, construction of a Hydro facility may require flooding which can cause serious environmental consequences such as the loss of large areas of forest and destruction of fertile land.

New hydro-electric generating stations will also have to be located far from the consumer core and will therefore require very long transmission lines. These transmission lines mean that even more power will be needed, as some is lost in transmission and additional costs will have to be incurred to establish these lines.

The future of hydro-electricity is also uncertain. The changes in glacial melts will impact river flows, making it difficult to predict the quantity and timing of flows.



*Daggett, California.*

## Conclusion

The world's growing population wants and needs electricity. Through the use of nuclear power we can have the ability to minimize the amount of greenhouse gas we put into the atmosphere. That way we can enable a good standard of life for all people while avoiding the dangers of climate change and global warming.


### Sources:

- 1) Canadian Nuclear Association.  
*Nuclear Facts: Is Nuclear Energy a Good Choice for the Environment?*  
< <http://www.cna.ca/english/pdf/NuclearFacts/02-NuclearFacts-environment.pdf> >
- 2) Ibid.

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