TRACING NUCLEAR ENERGY AND ONTARIO'S VOLATILE RELATIONSHIP

Ontario first met nuclear energy in 1962 when the CANadian Deuterium Uranium (CANDU) constructed the first nuclear reactor, the Nuclear Power Generation (NDP).[1] It was love at first sight! Post-WWII Ontario had been searching for a more secure and local source of energy and nuclear energy promised to meet those needs. Excited by the possibilities, the Ontario government confirmed the construction of numerous nuclear power plants. By the 1980s Ontario was host to 16 nuclear power plants nestled comfortably in three sites: Darlington, Pickering and Bruce.[2] Nuclear didn't disappoint; by the 1990s it became the dominant energy, replacing fossil fuels. Since the 1990s, nuclear energy has accounted for over 50 percent of Ontario's electricity production.[3]

Fast-forward to the 21st century and the once starry-eyed Ontario is having reservations about its beloved energy source. New renewable energy technologies, with their modern radioactive-free design, have caught Ontario's attention. Ontario has grown tired of nuclear power's never ending production of radioactive waste that takes over 100,000 years to decay and its aesthetically unappealing and expensive reactor sites. Over the past 48 years, nuclear energy's flaws have become more apparent to Ontario.

Renewable energy's sleek design and environmentally sustainable means of energy production have seduced the province. However, the Ontario government is reluctant to distance itself from its trusty old partner. The 21st century has been a volatile time for nuclear energy in Ontario.

Electricity from nuclear power is one of the cheapest means of energy generation in Ontario at $0.05/kWh

Believe it or not, nuclear energy does have many attractive qualities. When it comes to the economics of energy, the main focus is on the cost of energy production. Electricity – dollar per kilo Watt hour ($/kWh) – produced from steam in a nuclear power plant is one of the most inexpensive forms of energy available in the Ontario market. Nuclear energy in Ontario costs approximately $0.05/kWh, which is only second to coal at $0.045/kWh.[4] Nuclear is also significantly cheaper than renewable energy produced from wind ($0.06/kWh) or solar ($0.08/kWh).

Furthermore, renewable energy generation is intermittent and dependent on the climate; wind power generation lessens with decreased wind speeds while solar power generation fluctuates throughout the day and seasons.[6] In an economically conscious society, the low cost of energy production makes nuclear power a very handsome energy technology. Although renewable energy appears exciting and new, nuclear energy is a reliable partner that generates cheap energy at a constant rate that can easily increase production to meet energy needs.

Nuclear energy generation does not contribute to greenhouse gas emissions.

In addition to nuclear energy's economic feasibility, nuclear power has appealing environmental qualities. With respect to climate change, nuclear energy can be categorised as an environmentally sustainable means of energy production. Nuclear energy production emits no greenhouse gases. Furthermore, with respect to air quality, nuclear energy also does not contribute to air pollutants such as of carbon monoxide sulphur, nitrogen oxides, fine particulate matters or ground level ozone.

Especially with the dominant discourse on environmentally sustainability centred on climate change, nuclear energy has been categorised as a pro-environment technology.

Coal-fired power plants contribute to greenhouse gas emissions and decrease air quality. (By Antonio Di Maria)

In Ontario, Nuclear energy has proven to be a necessary technology for phasing-out coal. Since 2003 the Ontario Premier, Dalton McGuinty, has actively pursued policies to phase-out coal from the energy sector. In 2009, the Ontario government closed four coal-fired facilities and reduced coal energy production by 40 percent.[7] To date only 6.6 percent of Ontario's total electricity is produced by coal-fired power plants. This is a significant decrease from 19.7 percent in 2005. The Ontario government has proposed new policies designed to stop coal energy generation in the province by 2014.[8] The government's aggressive policies to phase-out coal have been well received by environmentally conscious Ontarians. However, the project has also served to further entrench nuclear power into the Ontario energy grid.

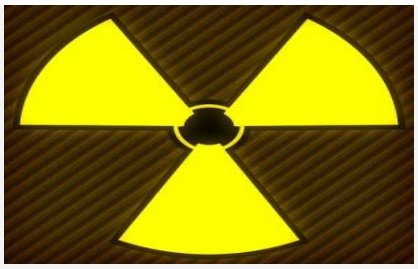
Eradicating the cheapest form of energy from the grid requires an equally economically feasible replacement. To date, nuclear power has been the only economically viable replacement.

Nuclear energy has also been identified as a necessary tool for the integration of renewable energy technology into Ontario's grid. The Ontario government has argued that nuclear power plants are necessary for generating a constant 'base-load' of energy that can easily be adjusted to consumer demands. The creation of a stable energy source, allows the market to incorporate more expensive and intermittent sources of energy like wind or solar power.

The 2009 Ontario Green Energy and Green Economy Act (GEGEA) reflects the governments evolving relationship with nuclear power. The Act is designed to promote renewable power generation through a series of economic incentives (i.e. feed-in-tariffs, renewable energy portfolios etc) and research and development funding. However, the Act also makes it clear that renewable energy technologies alone cannot address the energy concerns of Ontario. Renewable energy generation is identified as not economically competitive and unreliable. Furthermore, by announcing that the GEGEA's "main vision is to reduce the province's carbon footprint" the provincial government has categorised nuclear power as a necessary energy technology.

Cheap, reliable and not an emitter of an obnoxious gases and toxins; isn't that what everyone is looking of in a [energy] partner?

Over the years, nuclear power's advantages have been overshadowed by its numerous unattractive qualities. Its energy production costs may be low, but the industry has been criticised for its expensive plant manufacturing and refurbishing costs. The construction capital required for a new nuclear facility is estimated at $30 billion.[10] The cost of refurbishing a nuclear power plant is approximately $6 to $10 billion.[11] Furthermore, another $6.3 billion has to be budgeted for the decommissioning of a nuclear facility.[12] It has been argued that the 'true cost' of nuclear energy is $0.151/kWh (compared to the $0.05/kWh for just energy generation).[13] The 'true cost' of nuclear energy is more expensive than the 'true cost' of land-based wind power from Southern Ontario, which is estimated at $0.096/kWh.[14] Although, at first glance, nuclear energy appears to be a cheap resource for energy generation, the capital required for nuclear power construction and maintenance makes the technology an expensive venture



The process of electricity generation from a nuclear reactor results in a radioactive byproduct that has an average half-life of 10,000 years. (By Simon Strandgaard)

But probably the most unappealing quality of nuclear power is its generation of radioactive waste. To date, Ontario's 16 nuclear reactors have generated over 2 million high-level radioactive bundles, enough to completely fill three hockey arenas to the nosebleed section.[15] To date, the only proposed method for the disposal of nuclear radioactive waste is deep-geological burial. Potential host-sites have all been rejected due to fear of radioactive waste leakage into groundwater or exposure to air through seismic activity.[16] The presence of a never ending supply of radioactive waste without a scientific and socially acceptable method of disposal has made Ontario wary of nuclear energy's role in the energy grid.

The issues with the cost of nuclear facility construction and the growing anti-nuclear movement (largely over the issue of radioactive pollution) have stalled the expansion of nuclear energy in Ontario. In 2003, the McGuinty government planned to manufacture two new nuclear facilities. However, the increasing cost and time (10 to 15 years) needed to construct a nuclear facility have delayed policy implementation. To date, the Ontario government has no plans to construct or even refurbish any of its nuclear facilities.

The list of just some of nuclear energy's pros and cons demonstrates the difficulties Ontario faces when tackling nuclear policy. In 2006, McGuinty expressed Ontario's love/hate relationship with nuclear power when he stated, "I don't like nuclear power…

Natural gas is too expensive, wind power is unreliable, coal plants pollute the air and Ontario's hydroelectric potential has largely been maxed out, leaving nuclear power expansions 'on the table' for the province."[17]

Ontario's relationship with nuclear energy has been put to the test in the 21st century. Accusations of environmental negligence, radioactive pollution and diva-like economic demands have made Ontario rethink its commitment to nuclear energy. Coupled with the introduction of more handsome renewable energy technologies, nuclear and Ontario are no longer the perfect duo. Yet despite nuclear energy's imperfections, Ontario isn't prepared to let go. Ontario seems to be stringing along nuclear in an attempt to tackle coal reduction and its climate change goals while flirting with wind and solar power. Maybe its time, Ontario and nuclear become more open to a polygamous mix of energy technologies.

Source: http://www.sassweb.ca/3bb3/volume1-0/features-volume1-0/a-bad-romance-tracing-nuclear-energy-and-ontario%E2%80%99s-volatile-relationship