



A Renewable Energy Plan for Canada

How Do Renewable Energy Sources Compare with Current Fossil Fuels Use?

According to the National Energy Board, fossil fuels (oil, gas and coal) accounted for 74.3% of primary energy demand in Canada in 2012. This is projected to rise to 76.8% by 2035. Renewable energy sources, principally hydro, constituted 16.6% of primary demand in 2012 and are projected to fall to 16.1% by 2035. Nuclear power accounts for the remaining 9.1% of demand in 2012 and 7.1% in 2035.¹

Can a Northern Country Substitute Renewables for Fossil Fuels?

Denmark is on track to produce 33% of its total energy needs from renewable sources by 2020. The Nordic country aims to achieve complete independence from oil, gas and coal by 2050.² Wind power, chiefly from offshore turbines, will provide nearly half of Denmark's electricity by 2020 with another fifth coming from biomass. The government is promoting this remarkable transition in part by allowing households or community wind-turbine cooperatives to sell excess power back into the grid.

What Portion of Fossil Fuels Must Remain in the Ground to Avoid Disastrous Climate Change?

There is a range of estimates concerning what proportion of fossil fuel reserves must be kept in the ground to keep the rise in global temperatures below two degrees Celsius due to different assumptions about the extent of existing reserves, but they all point in the same direction. The International Energy Agency estimates that two-thirds of known fossil fuel reserves must stay underground to meet the international goal of keeping warming under 2°C.³ The Intergovernmental Panel on Climate Change says there is more than four to seven times as much carbon contained in existing fossil fuel reserves than what can be burned.⁴

A recent study published in the journal *Nature* builds on these findings by examining which fossil fuels are most costly to develop and are located farthest from markets. The study finds that oil from the Alberta tar sands and from the Arctic are among the most costly and least economical. The study concludes that 75% of Canada's known oil reserves, 24% of gas reserves and almost all coal reserves are unburnable.⁵ The implication is that the remaining amounts must be carefully allocated for use within Canada as part of a transition to renewable sources, while fossil fuel exports are curtailed.

Are Renewable Energy Sources Economical?

According to the International Renewable Energy Agency the costs of generating electricity from renewable sources including hydro, geothermal and onshore wind have become competitive with fossil fuels in many parts of the world.⁶ The most dramatic cost declines have been for solar photovoltaic installations where costs have fallen by 75% since 2009. However, these costs vary widely from region to region. In the United States solar power is on track to be as cheap or cheaper than average electricity costs in 47 states by 2016, provided that a 30% tax credit for system costs is maintained.⁷

The Canadian Wind Energy Association acknowledges that wind power currently costs more than electricity from generating plants that were built and paid for decades ago. However, it states that "Wind is extremely competitive with new installations of coal, hydro and nuclear power when the cost of health and environmental impacts are considered."⁸ Electricity produced from natural gas may be cheaper than power from wind turbines while gas prices remain low. In the past electricity from natural gas plants was

more expensive than from wind.

Similarly the Canadian Solar Industries Association, while acknowledging that solar photovoltaic electricity is not yet cost competitive, states that it can be competitive by 2020 provided that certain conditions are met including the establishment of a supportive policy and regulatory environment.⁹ Solar space and water heating systems are cost competitive when investments are amortized over several years.

What Federal Government Programs Support the Transition to Renewable Energy?

While the ecoENERGY for Renewable Power program launched in April 2007 provided incentives for the generation of electricity from renewable sources, funding for this successful program elapsed in January 2011 and no new funding was provided in the 2010 federal budget.¹⁰

How Will the Transition to Renewable Energy Affect Jobs?

Investing one million dollars in oil and gas creates only two jobs while 15 jobs would be created if the same amount were invested in wind, solar, hydro and biomass energy.¹¹

Are All Renewable Energy Alternatives Equal?

Not all renewable alternatives are the same. For example, producing ethanol from corn in North America has a very low energy return on energy invested. That is, it takes almost as much energy to produce one unit of ethanol than is contained in the final product.¹²

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¹ National Energy Board. *Canada's Energy Future 2013: Energy Supply and Demand Projections to 2035*. Ottawa: National Energy Board. November 2013. Figure 4.7. Page 33.

² Independent from Fossil Fuels by 2050. DENMARK.dk The Official website of Denmark. Accessed February 13, 2015 at <http://denmark.dk/en/green-living/strategies-and-policies/independent-from-fossil-fuels-by-2050/>

³ International Energy Agency. *World Energy Outlook 2012*. Executive Summary. Paris: International Energy Agency. November 2012. Page 3.

⁴ Intergovernmental Panel on Climate Change. *Climate Change 2014: Synthesis Report*. November 1, 2014. Page 24 of Longer Report. At http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_LONGERREPORT.pdf

⁵ Christophe McGlade1 & Paul Ekins "The geographical distribution of fossil fuels unused when limiting global warming to 2°C" *Nature*. Vol. 517 8 January 2015.

⁶ International Renewable Energy Agency. *Renewable Power Generation Costs in 2014*. Bonn: International Renewable Energy Agency. January 2015. Page 12.

⁷ Data from a Deutsche Bank report cited in Tom Randall. *While You Were Getting Worked Up Over Oil Prices, This Just happened to Solar*. Bloomberg. October 29, 2014.

⁸ Canadian Wind Energy Association. *Wind Facts: Affordable Power*. Accessed February 13, 2015 at <http://canwea.ca/wp-content/uploads/2014/05/canwea-factsheet-pricing-e-web-May2014.pdf>

⁹ Canadian Solar Industries Association. Roadmap 2020: Powering Canada's Future with Solar Electricity. Accessed February 13, 2015 at http://cansia.ca/sites/default/files/cansia_roadmap_2020_final.pdf

¹⁰ *Federal Budget Fails the World's Poor and Urgent Need to Address Climate Change*. KAIROS. April 6, 2010 at <http://www.kairoscanada.org/sustainability/federal-budget-fails-the-world%E2%80%99s-poor-and-urgent-need-to-address-climate-change/>

¹¹ Blue Green Canada. *More Bang for Our Buck: How Canada can create more jobs and less pollution*. Blue Green Canada. November 22, 2012 at <http://bluegreencanada.ca/jobs-per-million>

¹² John Dillon. "Are Agrofuels Alternatives to Oil?" *KAIROS Briefing Paper No. 9*, March 2007. Page 2. at <http://www.kairoscanada.org/research-analysis/briefing-papers/kairos-briefing-paper-9-are-agrofuels-alternatives-to-oil/>