

# Green (renewable) Energy Versus Nuclear Energy

The following is part five of an eight part written debate regarding nuclear power generation

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Note: The debate was intended as the fifth, but published last.

## The Debaters

**Gordon Howell** is an electrical engineer specialising in the design and development of grid-connected solar-electric (photovoltaic, PV) generating systems. His passion is empowering people to prepare for the energy and environmental issues. Since 1995 he has been encountering, uncovering, and identifying the barriers in connecting PV systems to the grid, and working with the Alberta's government, regulators and electric utilities to resolve and remove them in order for Alberta to be ready for PV-grid parity. His work since 1990 on national and international solar PV standards committees has helped him see how other places have resolved the same barriers.

**Walter Keyes**, no photo available, Age 68, Trained as an accountant with B.Comm and MBA degrees. Professional experience includes 5 years as project accountant for International Power and Engineering Ltd at 2700 MW Peace River Hydro Electric, 4 years as consultant/advisor to the President of SaskPower on energy options. Deputy Minister in Saskatchewan Government (5 years), Senior Official in federal government in energy, resources and FN projects – 11 years), twenty years as consultant and advisor on energy projects in Canada including BC Hydro, Manitoba Hydro, and Hydro Quebec. International work on energy projects including nuclear, hydro and coal projects in Asia (China, Thailand, Laos, Indonesia).

## Gordon Howell opening statement

Green electricity sources consists of a number of renewable energy technologies ranging from tiny-scale residential systems, to commercial, municipal, industrial and utility scale. As such it is nearly impossible to discuss them all en masse with these very brief comments. Renewable electricity technologies that are technically practical in Alberta include solar photovoltaics, solar thermal electricity, wind, small hydro, geothermal electricity, biomass, biogas and waste heat (cogen). The Pembina Institutes Greening the Grid report, at <http://re.pembina.org/pub/1763>, very clearly discusses these technologies and the opportunities with them.

To properly compare any electricity generating technologies, a number of factors need to be evaluated — technical capacity, equipment availability, reliability and durability, energy resource availability, life-cycle costs (real, open and validated, without any hidden subsidies), and environmental effects. The challenge and opportunity is to utilise the strengths of these technologies and accommodate their weaknesses in order to move towards being sustainable.

Renewable electricity technologies have a number of characteristics, depending on which technology is being discussed:

- operating emissions and other environmental damage ranging from zero to sustainable;
- operating costs ranging from zero to low;
- electrical energy costs ranging from cheaper than the true cost of grid electricity to slightly more expensive;
- energy storage;
- scale ranging from house-sized to utility-sized;

The biggest challenge to renewable electricity is the large public subsidies given to fossil fuels and nuclear, which makes renewables appear to be expensive.

Alberta has already begun the transition to renewable electricity. The present wind electric developments are poised to increase the generation of wind electricity from 3% to 39% annually, with much more to come. Several utility-scale solar electric projects are being planned too. I expect that solar electricity will be the least-cost electricity option for homeowners in Alberta within 2 to 4 years.

## **Walter Keyes opening statement**

If climate change really is the serious global issue that most scientists believe it is, there is a very limited amount of time to fix the problem and we should not be wasting valuable time debating which non GHG generation source is the best – we need them all, desperately!

Naturally proponents of nuclear power favour the nuclear option and proponents of renewables favour that option. Each presents information and facts to support their point of view. But how can an ordinary person make an informed decision on such a complicated technical subject.

Another way might be to consider the views of people who have impeccable reputations for scientific and engineering excellence, unquestionable dedication to the public interest and are so rich that they are beyond being swayed by the financial benefits of any one type of energy production. Bill Gates, the founder of Microsoft is one such person.

Gates became the richest man in the world in only fifteen years. In the process he changed the way the world stores information and communicates. He created a product that we all use on a daily basis.

Gates next turned his attention to helping the world's poor and sick. His Gates Foundation provides more health benefits to the world than the World Health Organization of the United Nations.

In Gates view, to solve this problem, we are going to need to invest massive amounts of resources into non GHG energy producing sources. He considers nuclear the most immediate large scale GHG free solution which, together with emerging technologies of wind and solar are our best hope to address the problem.

Gates has the resources and organizational integrity to get the facts. [Listen](#) to him at and decide for yourself.

## **Gordon Howell first rebuttal**

The easiest, fastest, and cheapest option for reducing our GHG emissions is by becoming energy efficient – this means getting the same amount of energy services and using less energy. Each one of us can become significantly more energy efficient in all the choices we make today, at home, at work or in our industries. The next easiest, fastest and cheapest option is renewable energy — wind and solar in our homes and businesses, wind and biomass in our industries, and the whole range of renewable energy in our utility companies. People, communities and industries can all take choices in becoming energy efficient and using solar energy. In contrast, nuclear energy can only be done by large companies, and they need massive government subsidies. Nuclear energy is not fast enough, not flexible enough, not reliable enough and not cheap enough to provide our energy and our environmental needs. Nuclear generating plants only operate for some 30 years, yet leave a waste legacy for thousands of years, as well as the well-known risks and consequences of contamination of the whole of the environment.

People can easily become informed about becoming energy efficient — all this information has already been available for years. Solar energy information also abounds. What we “merely” need is the government to make the policies, which are technically really easy to do, to eliminate the subsidies for fossil fuels and thus give the proper price signals to all of us so that we can make the right choices.

## **Walter Keyes first rebuttal**

Gordon Howell sells solar electric systems so it's not surprising he is a promoter of their use so don't forget the statement 'buyer beware' when it comes to some of his 'facts'. For example, Howell quotes the Pembina Institute as an authority on energy systems, its not, the Pembina Institute is an advocacy group for renewable energy and has very limited technical credibility.

In 12 recent 'independent' studies on life cycle ghg emissions of various electricity sources, the United Nations (IEA, IAEA), World Energy Council, German Physical Society, OECD, Institute for Applied Ecology, Australian Government, Canadian Government, European Commission, and the California Government all conclude that nuclear produces less ghg emissions than either solar or biomass-only wind produces less ghg emissions – on a life cycle basis.

As for costs of electricity, Howell has it backwards. Its renewable energy sources that are the most highly subsidized, not nuclear or coal. He claims “solar electricity will be the least cost electricity option in Alberta within 2 to 4 years”. This is a preposterous claim, today, in Ontario, the Ontario Power Authority pays 82.5 cents per kwh for solar electricity, 13.5 cents for wind power and 7.5 cents for nuclear. Check it out for [yourself](#).

Mr. Howell, solar energy has an important role to play in the future, give it a chance to develop and don't create false claims and impossible expectations! In the meantime, let's get on with reducing ghg today, and that includes nuclear.

### **Gordon Howell second rebuttal**

Energy choices need to be evaluated using full life-cycle costs, not publically subsidised costs. Wind-energy is already the cheapest electricity option for acreage-owners near Grande Prairie because of the coming rapid rise in our grid-prices due to costs of transmission lines, carbon capture, and GHG emissions. Solar will be next, unsubsidised.

The astute, multi-billionaire, Warren Buffet, owns many energy companies and recently cancelled his nuclear plans citing costs and liabilities that did not make business sense. Using the price of AECL's most recent nuclear proposal in Ontario, Alberta's 4000 MW nuclear plant would cost \$43 billion – more than solar, almost twice wind-energy. Nuclear just received \$300-million in subsidies from Canada, plus \$650-million in 2009. Nuclear essentially bankrupted New Brunswick Power.

Coal, nuclear and natural-gas generators are not flexible enough to rapidly ramp up and down as Alberta develops its massive wind and solar resources. This inflexibility will eliminate the business case for baseload boiler-based coal, nuclear and natural-gas.

Progressive electric utilities are now developing wind combined with natural-gas turbines. These provide the best combination of economic profitability, low risk, low legacy, low emissions, power security, flexibility, high reliability, and geographically-diverse jobs. Nuclear is the exact opposite.

In 2009, more money was invested in renewable electricity than nuclear, coal and natural-gas generation combined. Alberta can easily have a stable secure sustainable affordable flexible electricity grid using gas, renewable energy and energy-efficiency. The status quo is having a tough time letting go of its past joy ride.

### **Walter Keyes second rebuttal**

Solar energy salesman Gordon Howell has a real knack for getting it wrong! He claims solar is (will be) the cheapest form of energy in Alberta; in fact it's the most expensive. He speaks of wind power currently being the cheapest electricity source in the Peace River region, why does he say such things? Phone your power company and ask them.

Howell claims American investor Warren Buffet does not believe nuclear energy is a good investment. If you Goggle 'Warren Buffet Nuclear', the first story that comes up is headlined "Billionaire financier extends nuclear energy portfolio in move which is expected to give him control over almost four per cent of US electricity supply".

Howell talks about subsidies (\$300 million) to AECL and mistakenly attributes them to nuclear power. In fact the subsidy is for research with the largest part going to medical isotopes.

Howell claims the cost of 4,000 MW of nuclear power for Alberta is twice the cost of the same amount produced by wind, but doesn't mention that wind electricity is only available 30% of the time.

A much sounder case can be made for renewable energy than Howell has done, by using real facts and realistic assessments. With continued research and technology, wind, solar and other renewables will play increasingly larger roles. But to pretend they are the current solution is to deny reality! Nuclear is the most immediate, large-scale, proven non GHG technology that is available, and it should be considered.