

How to resolve the Trans-Mountain Pipeline standoff, and meet Canada's climate goals.

By Chris Aikman

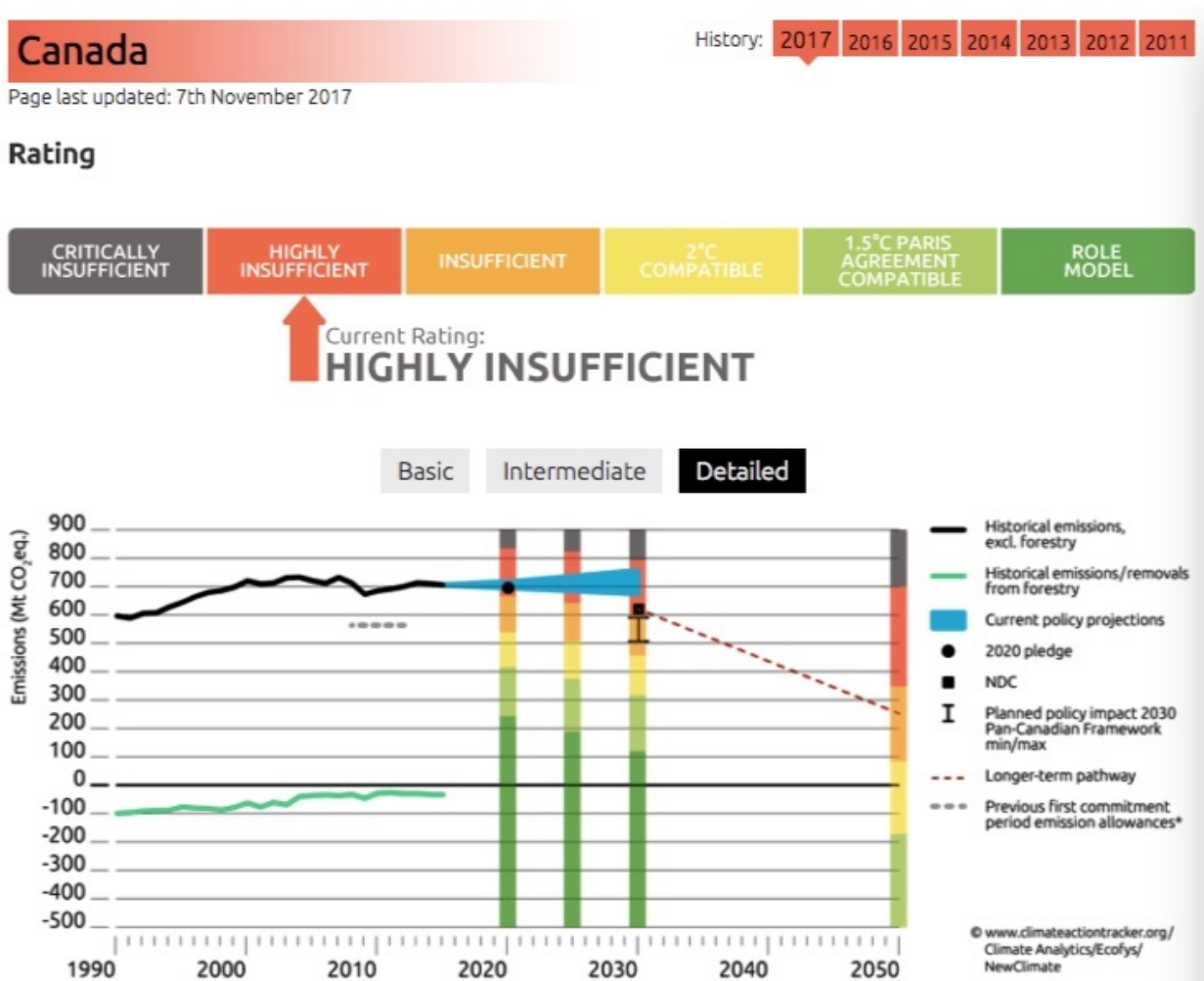
Summary

CFB Suffield is a 2700 square kilometer block of semi-desert Crown land, smaller than the oil sands development region, which it dedicated as a solar photovoltaic facility could double Canada's electrical power production. This could be developed rapidly or slowly, as appropriate. It would assure Alberta's continued prime position as an energy supplier and provide far more spinoff jobs than any pipeline construction project could foreseeably create. It would also provide a sure and timely way to transition our energy markets to sustainable energy, and to meet our stated emission reduction goals as set out under the Paris Accords.

There is no serious obstacle to a federal decision resolve our energy future right now.

As of mid-April 2018, British Columbia and Alberta are at a standoff over the proposed expansion of the Trans-Mountain Pipeline. The Federal government's attempts to force the issue has raised the ire of many in Canada and beyond, because the project highlights the obvious contradiction that we can continue to expand our rate of fossil fuel extraction while simultaneously addressing our stated climate goals. Indisputably, we can only stabilize our climate by reducing carbon dioxide emissions, which requires reducing the rate of extraction and combustion of fossil fuels.

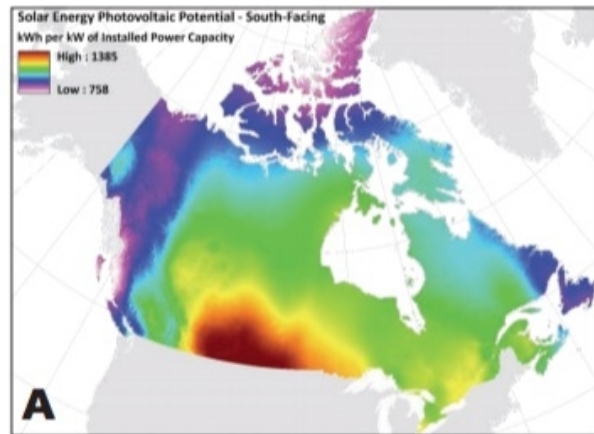
So how is Canada doing with its commitments under the Paris Treaty accords which we helped to fashion? Canada is facing failure in our emissions reduction targets.



Source: <http://climateactiontracker.org/countries/canada.html>

The easiest step towards CO2 emissions reduction is the shutting down of coal-fired electrical generation. This has been completed in Ontario, but remains to be done is Alberta and Saskatchewan and the maritime provinces. In 2016, Alberta generated 47.4% of its electricity from coal and 40.3% from natural gas, for a total of 87.7% from fossil sources, with only 12.3% coming from renewables. Saskatchewan is similarly dependent on fossil generation.

This is a clear anomaly: that Alberta and Saskatchewan remain heavily dependent on fossil generation, yet provide the very best locations in Canada for solar photovoltaic generation (solarPV). Although all parts of Canada (and the world) have solarPV potential, the southern prairies in Canada are especially favoured.



The most uniform month-by-month solar irradiation is located around Suffield & Medicine Hat, AB which experience only minor peaking during summer. Suffield averages 2427 hours of bright sunshine per year. It has long, cold, dry winters and short but very warm summers. Precipitation is low, with an annual average of 318 mm, falling mostly in the warmer months. This matches the 323 mm of precipitation at Osoyoos, BC, often called Canada's 'desert'. The narrow valley around Ashcroft, BC is the driest place in Canada outside of the high arctic, with only slightly less annual precipitation than this.

Adjoining the town of Suffield is CFB Suffield, 2700 square kilometers of Crown land administered by the Department of National Defence.



This is Canada's largest sub-Arctic desert (technically a semi-desert). The area is unfit for agriculture. Since 1941, it was used for chemical weapons testing, and was used repeatedly from 1961 to 1970 to

push the magnitude limits of military non-nuclear explosions. Since Canada renounced the use of chemical weapons and such explosives testing has ended, the area is now mainly used as a tank range for British Army training exercises.



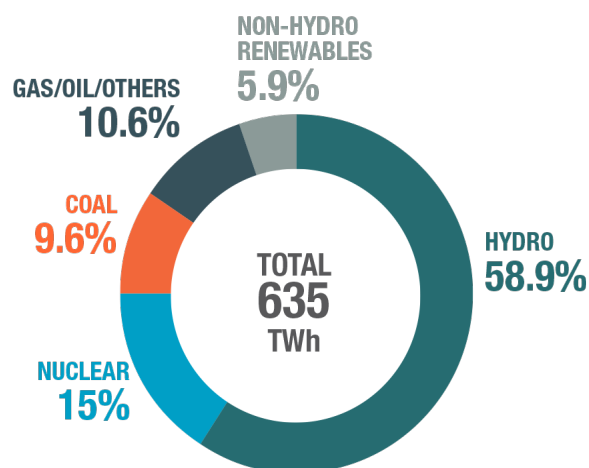
Source: https://en.wikipedia.org/wiki/British_Army_Training_Unit_Suffield

As the largest Canadian Forces Base, and also the largest military training base in the Commonwealth, CFB Suffield is underutilized as a national resource. Tank ranges for military training exist at other locations across the country, at CFB Petawawa for example. So it has become really a question of finding some use for this 'waste land'. There is a very timely use for it, which will solve national problems.

The purpose of this paper is to suggest CFB Suffield be dedicated to solarPV electrical generation.

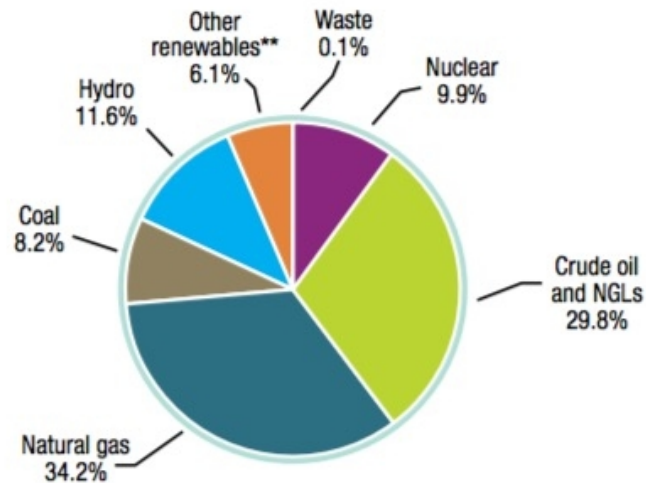
If covered with solarPV panels, the area it is capable of generating about 680 TWh (terawatt-hours) of electricity per year, This amount is almost double the 379 TWh of hydroelectricity produced in all of Canada in 2014. During 2015, Canada produced 635 TWh total electricity, of which net exports were 64 TWh, leaving 571 TWh for electrical consumption within Canada.

GENERATION BY SOURCE, 2015



By committing some or all of CFB Suffield to sustainable energy generation (wind could be a component along with solarPV), Canada can move beyond the energy impasse we find ourselves entangled in. Alberta would retain its position as an energy superpower. The rapid decarbonization of Canada's primary energy would follow. We have a long way to go, since most of our energy comes from non-renewable sources at present.

Total primary energy supply*, by source, 2014



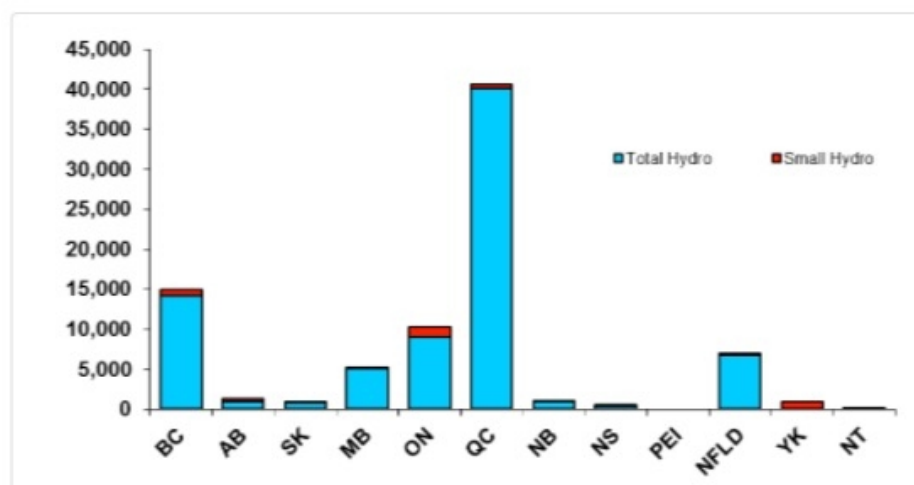
Renewable energy sources made up 17.7% of Canada's TPES in 2014.

Source:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/EnergyFactBook_2016_17_En.pdf

The beauty of having a huge solarPV facility in the southern prairies is that this naturally complements the general lack of hydroelectric capacity in that region:

Installed Hydroelectric Capacity by Provinces (2014, in megawatts)

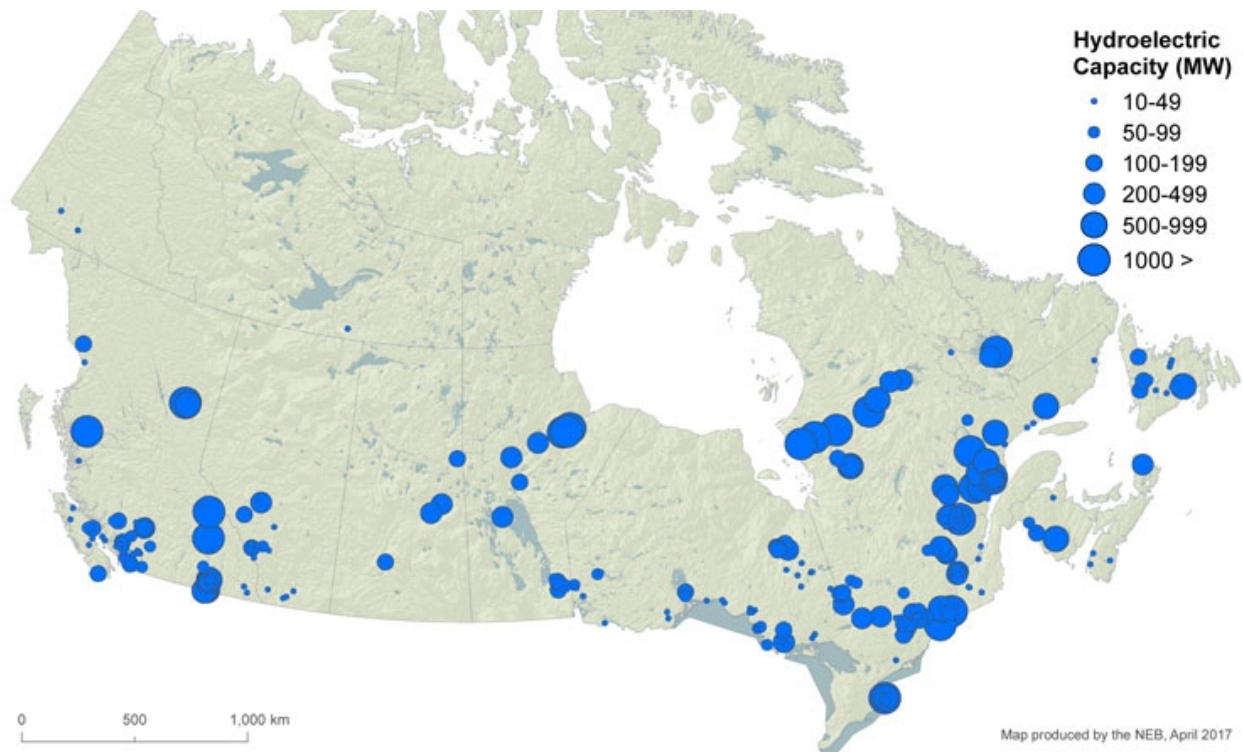


Source: <http://www.nrcan.gc.ca/energy/renewable-electricity/7295#key>

The regional complementarity for hydro and solar power generation should come as no surprise, since textured topography favours the former, while level topography favours the latter.

At this point, it is premature to specify how much energy we would still need from oil and gas, as compared to solar, wind and hydro. But it may be useful to consider a few key points:

1. Canada has a ready option to easily transition to a low-carbon economy. We need only the political and personal will to make this happen. Canada can offer Alberta a leadership position in this transition.
2. CFB Suffield has the potential to be a major facility for generating solarPV power, in the part of the country where hydro power is least concentrated
3. Of course, solarPV in Canada need not, & should not, be located on one single site. It should be widely distributed, and grid-linked to hydro generation stations across Canada for load balancing. But southeastern Alberta is the best place to start.



Source: https://www.neb-one.gc.ca/nrg/sttstc/lctrct/rprt/2017cnddptnrnwblpwr/hdr-eng.html?_undefined&wbdisable=true

4. Canada is especially favoured among all places on Earth by its immense and not-yet-fully-developed hydroelectric storage capacity. Nine percent of the Canadian landmass is covered with rivers and lakes, so the capacity for hydro energy storage is likewise immense. This is a huge advantage few nations have: we can integrate the intermittent sources of sun and wind power with the backup of stored hydro for clean, reliable electricity 24/7/365.
5. In the long run, we cannot reduce our CO2 emissions without decarbonizing energy for transportation and building heating. Doubling our electrical generation with solarPV makes it easy to make that transition.
6. No sacrifice of our prosperity is required; quite the reverse. Indeed, Canada as a low-carbon economy has a favoured potential to lead the world as a leader in manufacturing, transportation, high-tech knowledge-based services, while setting global standards for good

environmental practice. The assurance of reliable green energy will be a major attractor for investment, and lead to greater job security for all Canadians.

Conclusion:

The dedication of a large area of federal Crown land at CFB Suffield as a solar generation facility could resolve our dysfunctional energy and climate policies, and promote prosperity for Alberta and Canada.

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