

The Difficult Problem of 'Too Much Electricity'



One of the enduring themes of those opposed to the Site C hydro development project on the Peace River in British Columbia is “we don't need the electricity.” Such claims have been repeated countless times, and they still dominate the positions taken by groups like DeSmog.ca and SierraClub.bc.ca

Whatever you've read on this subject, if it was written before September of this year, it is almost certainly out of date. That's because in the weeks since then, the whole energy budget situation involving land transportation has been turned on its head. European nations are lining up to ban gasoline and diesel-powered automobiles, and replace them with electric vehicles, all within the next 10 to 25 years. The situation is changing rapidly, [but here's what it looks like at the moment](#). Automobile manufacturers are responding with [big plans to produce electric vehicles](#). [Shell has announced](#) it will have charging stations at all of its retail outlets worldwide.

Another important factor is that as battery prices continue to fall, we can expect price parity between electric and gas-powered vehicles to occur about the time that Site C power generation comes online. If one compares all life cycle costs for both types of vehicles, price parity will almost certainly occur well before 2025. For an electric vehicle, the energy cost per kilometer travelled is typically about one-third that of a gas-powered car; maintenance costs are also much lower since there are many few parts, and no need for oil changes, transmission service, etc.

It is estimated that [by 2020 there will be more than 80 EV and hybrid EV models on the market in North America](#).

All of which makes it a fairly sure bet that we'll be transitioning from gas to electric vehicles sometime in the next decade or two. So how much electric energy will be required if the current number of

vehicles in British Columbia are replaced by electric ones? This is a fairly easy number to estimate, a 'back of an envelope' calculation, that can be done several ways.

Noted sustainability advocate [Guy Dauncey's calculation \(see his Table 1\)](#) is that full electrification of road transportation will consume an additional ~27,000 GWh (GigaWatt-hours) per year. My calculation ([which you can easily follow here](#)) is that between 23,000 and 29,000 GWh of electrical energy will be required. So these two calculations come up in reasonably close agreement. According to BC Hydro, [total 2016 domestic sales of electricity were 57,300 GWh](#), so we're talking about ~50% increase in electrical demand to accommodate electric vehicles.

For comparison, the annual production of the [W.A.C. Bennett Dam \(Gordon Shrum Generating Station\)](#) is 13,100 GWh. We'd need two more of these to meet the electric vehicle energy demand. The projected [annual production of the Site C generating station](#) will be 5100 GWh. We'd need 5 more of these to meet the electric vehicle energy demand. These figures just show the magnitude of the demand. Of course what will really happen is that much of this additional power will eventually come from solar photovoltaic and wind generation. A reasonable expectation would be that with Site C contributing an additional 5100 GWh, another additional 22,000 GWh could come from sun and wind.

Here's the problem. There are no major sun and wind generation developments underway in British Columbia at present; there may not be before 2025, when Site C nears completion. **If the federal government removes the punitive import duties** on solar panels (which currently double or triple the cost of solarPV installation in Canada), and **if regulatory changes are made in BC** to lessen the current overhead costs imposed by BC Hydro, individuals with rooftop or store-top solar panels could become major producers of electricity in BC within a very few years. **We must express urgently to both levels of government the need to mandate those necessary changes.**

Look online, then look around you. In California, in other states and in other countries, all flat-roof stores, warehouses & schools, parking areas, etc are already covered with solar panels, but in British Columbia they are not. That's because BC Hydro tolerates, but does not encourage solarPV. **They actively discourage it** at present by offering shopping malls and warehouses ultra-low electricity rates so they will lack any incentive to produce their own power. Sad, but yes, that is the case at present.

So within the current regulatory environment, Site C power is the sole means by which we can transition to electric vehicles within the same time frame as is planned in Europe. It is also the case that this is the only credible path to fulfilling our Paris Agreement commitments.

Let's imagine the best, or almost-best, outcome that is really possible: that both governments remove the shackles that are holding back solarPV installation, and that individual families, businesses and communities leap into solarPV generation in the next few years (by 2025 or 2030). That's certainly possible, though not assured. Germany has over a million electricity producers. British Columbia currently has about 200 (BC Hydro and their independent power producers). An electrical market is actually prohibited by our present laws. At present, BC Hydro and some other utilities like FortisBC are the only electrical retailers permitted by law.

Now let's get really enthusiastic. Suppose wind generation is encouraged, solar is encouraged, and Site C is completed as planned, so that by (say) 2030 we have all that 27,000 GWh additional energy needed to electrify vehicle transportation. Then suppose that on a good day of sun and wind, all three new sources are generating electricity at their full capacity. All of those assumptions lie at the limit of optimism, but are nonetheless possible. Then we might find that **on that day we suddenly have too**

much electricity! How can we handle it?

We can handle it very simply. We simply ramp down generation at the Bennet Dam/Shrum Generating Station, even down to zero production in the extreme case. The water just stays behind the dam, until nightfall, or whenever. The dwell time of water in the Williston reservoir is over two years in any case. An extra half-day or several days there makes no significant difference. Meanwhile, at Site C, it's business as usual. The 22-day water supply behind its dam allows routine downstream flow without interruption, without flooding. Nothing below the Site C dam will feel any change in water flow.

Of course, the above scenario is just one simple example of how the vast flexibility of the BC Hydro reservoir system might be orchestrated. The symphony of flowing water can be played any number of ways.

Alice Munro wrote inventively about the problem of 'Too Much Happiness'. I believe we could get very inventive with the challenge of 'Too Much Electricity'. We're an inventive species. Business will boom.

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