Solar Power Where the Sun Doesn’t Set

by Brian Castner

AT THE ARCTIC CIRCLE, NWT—If I had to prioritize [the most important gear I brought with me on this trip](http://motherboard.vice.com/read/everything-i-brought-on-a-1200-mile-river-kayaking-trip), the portable solar panels would rank pretty high.

The canoe and paddles probably have to come first. Then my DeLorme inReach, a fantastic device that acts as both GPS and text-via-satellite link to the outside world. But then, next on the list, my method of charging that device: a system from Goal Zero, a three-panel array and heavy rechargeable battery pack. The sun never set, and so I could put the system outside the tent at night and find a charged battery in the morning.

The longest stretch of the Mackenzie River without human settlement is the section between Fort Good Hope and Tsiigehtchic, over 200 miles of gorge, wind, mud, rain, and grizzly bear that crosses the Arctic Circle. It took me a week of paddling to traverse it, and I never saw another person, boat, or plane. If the canoe capsized and I got stranded in that rocky socket of wilderness, I could drink the water from the river and survive without food for days, but unless I had a fully charged inReach, I couldn’t call for help. My communications, my navigating, my hope of rescue, all relied on electricity provided by my solar panel.

Communities in the north can’t possibly hang [from such a tenuous thread](http://motherboard.vice.com/read/how-first-nations-kids-built-their-own-internet-infrastructure). In a land of such extreme weather, reliable electricity is a matter of urgent public safety. Which is why, in my experience, the song of the North is not a loon’s call or wolf’s howl, as many famous outdoor writers contend, but rather the hum of the diesel generator.

It should go without saying that the towns of the Northwest Territory [are off the grid](http://motherboard.vice.com/read/the-arctics-internet-is-so-expensive-that-people-mail-the-web-on-usb-drives). Most power plants in each village consist of a bank of three massive diesel generators: one to run, one in maintenance, one emergency backup. Harmonizing with this perpetual rumble is a symphony of engines, from the trucks, four-wheelers, dirt bikes, powerboats, personal home generators, and heavy construction equipment that clog each outpost. Fuel is extremely difficult to transport to a place like Fort Good Hope or Tulita, and yet motors run all day and night.

I’m far from the only one who has taken notice of this incongruence. Teresa Chilkowich, the Dehcho community coordinator with the [Arctic Energy Alliance](http://aea.nt.ca/), is working with local First Nations to find a practical energy balance, between full reliance on dirty and expensive fossil fuels and my precarious clean alternative. Sometimes her work is deceptively obvious and practical; [Jean Marie River](http://motherboard.vice.com/read/why-i-canoed-1200-miles-to-the-arctic-circle-to-report-on-climate-change), a town of 70 people near the start of the Mackenzie, saved $9000 a year by unplugging a single soda machine, a [story that went semi-viral](http://www.cbc.ca/news/canada/north/jean-marie-river-electricity-pop-machine-1.3602098).

More often, though, the work is more complicated. There is a regulatory limit to the number of pellet stoves, LED lighting systems, and other clean projects Chilkowich can undertake.

“There is a cap on solar in each community,” she told me, because she can’t put Northwest Territories Power Corporation out of business. The company has to stay just profitable enough so it’s worth it to run the diesel generators all winter. When oil prices are low, the territorial government reinvests the savings in clean energy projects—but not too many.

“Everything’s connected,” Chilkowich said, as she explained the economics to me.

Consider the case study of Jean Marie River, home not only to an unplugged soda machine but also to a new 6000-watt solar array that its citizens [can monitor in real time](https://www.solarweb.com/Home/PvSystem/ca84f040-3e06-45b6-bc08-a6630038865f). That project proved economically attractive because of the wide range of energy costs up north. In the United States, a kilowatt-hour of energy costs about 13 cents. In big cities, like [New York](http://www.bls.gov/regions/new-york-new-jersey/news-release/averageenergyprices_newyorkarea.htm), the cost can be higher (18 cents), and in Idaho it only costs [about 8 cents](http://www.npr.org/sections/money/2011/10/27/141766341/the-price-of-electricity-in-your-state). Still, the price is relatively consistent.

Not so in the Canadian north. While power in [Edmonton](https://www.edmonton.ca/city_government/facts_figures/population-history.aspx), a comparatively southern city (population: 900,000), [is 5 cents](http://www.epcor.com/power-natural-gas/regulated-rate-option/Pages/residential-rates.aspx) Canadian (about 4 cents USD), a kilowatt-hour of power in the indigenous community of [Coleville Lake](http://www.statsnwt.ca/community-data/Profile-PDF/Colville%20Lake.pdf) (population: 166) costs [up to $2.96](http://aea.nt.ca/research/research-2) CDN. The first 600 kilowatt-hours of electricity are [subsidized](http://ntpc.com/customer-service/territorial-power-support-program---tpsp) for residential customers, costing “only” 28 cents CDN, but businesses and governments make up the difference. The First Nations band in Jean Marie River was paying $1.91 CDN, making a solar array an easier sell.

During my travels down the river, I came to realize that one of Chilowich’s greatest challenges, ironically, is instilling a mentality of conservation. A thousand caribou for every hunter, more oil under the ground than Alaska; so many resources on so much land inhabited by so few people, one could easily feel like they will never run out. When I spent time in people’s homes in the north, I discovered they were very conscious of their water use, because it was delivered only twice a week to a holding tank at their home.

Electricity and gasoline, however, were more conspicuously wasted. Fans and lights left on, the television blaring while no one watches, and, despite the $8/gallon CDN cost of gas, cruising around town in a crew-cab pickup seemed to be typical recreation. [Northern Canadian communities don’t use any more electricity, per capita, than southern ones](https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/archive/2011nrgsncndnrthfct/nrgsncndnrthfct-eng.html), but with costs so high, this surprised me. I asked Chilkowich to explain, since she is also working a project to place advanced electricity meters in individual homes.

“I think it’s out of sight, out of mind,” she said. “You can see the level of the water tank in your home, you know to conserve. But the electricity, you don’t see. If they had to add quarters to get power, like at the car wash, they’d turn off the lights.”

The scenery changes, but human nature stubbornly pervades.