

Burke Mountain Naturalists

PO Box 52540, RPO Coquitlam Centre
Coquitlam BC V3B 7J4

“To Know Nature and To Keep It Worth Knowing”

*Adapted from the January 2007 Burke Mountain Naturalists Newsletter:
Updated April 7, 2007*

BC Electricity Overview

From all the Alcan and BC Hydro ads on TV and in newspapers last fall, you might be misled into thinking that our province is in dire straits and quickly running out of sources to generate electricity. Widespread power failures in December probably convinced you how critical a supply of electricity is to our way of life. Well, electricity is wonderful and a modern necessity, but, no, we are not about to run out of it.

A report, “Maximizing Energy Efficiency and Renewable Energy in British Columbia” published by the Pembina Institute in October, 2006 documents that, with the exception of low water years (1995, 2001, 2004), BC was a net exporter of electricity over a 10 year period. However, BC Hydro imports electricity every year simply to achieve greater efficiencies. Over 90% of our electricity in BC comes from hydro facilities that are easy to turn on and off – unlike coal, gas or nuclear plants whose outputs are difficult (and energy-inefficient) to adjust. Thus, for many years, BC Hydro has been importing energy from places like coal-burning Alberta during off-peak hours when the full output from their plants is not needed. While we import electricity every year, BC has not usually been a net-importer of electricity. Please note that, at present, BC Hydro has sufficient facilities to meet all the electricity needs of its customers.

Our province continues to grow and, eventually, we will need new sources of electricity to supply new residents and new industry. It's industry that is the main consumer of so-called stationary energy in BC (supplied approximately equally by electricity and natural gas) – residents use just over 20%, industry takes the greatest share at almost 60% while commercial and institutional uses consume the remainder. A few years ago, meeting new electricity demands was a fairly straightforward process for BC Hydro and involved public consultation on choices between, e.g., new dam construction or conservation initiatives. Conservation, of course, should always be the first choice.

In 2002 the Campbell government's Energy Plan forced massive changes on BC Hydro and, essentially, crippled their operations. That's when one third of BC Hydro's workforce was privatized and the billing business sent offshore, when a new crown corporation, BCTC, was created to handle electricity transmission and when, astoundingly, BC Hydro was prohibited from developing new sources of electricity. All this was done to create opportunities for private entrepreneurs. This has stimulated a gold-rush mentality with regard to

electricity production. It certainly has made it difficult for BC Hydro, BC residents and other stakeholders to work together to develop an integrated, wise and sustainable electricity energy plan to best meet our future needs.

BC Hydro is now forced to develop all new sources of electricity by putting out calls for energy purchase agreements from private producers. Last summer, BC Hydro awarded contracts to private operators for a total of 7000 Gigawatt hours/year (GWh). These included coal (2033 GWh), wind (979 GWh), small hydro, i.e., run-of-river (3077 GWh), biomass, i.e., wood-burning (1186 GWh) and other sources for electrical generation. Recent statements by the Premier that carbon dioxide emissions from any new coal plants must be sequestered (i.e., buried in the ground) probably mean the proposed coal plants will burn wood waste from beetle-killed timber instead of coal...at least, initially.

Our current electricity demand in BC is about 58,000 GWh per year; this could increase to as much as 77,900 GWh by 2025. In addition to energy purchases, BC Hydro has outlined a number of ways greater efficiencies can be achieved in electrical generation through their sensible Power Smart Program (which could save 9,6000 GWh by 2025) and more efficient use of their "heritage hydro" resources. These include a new generating unit (Revelstoke 5) by 2012 plus Revelstoke 6, Mica 5 and 6 in future years. In addition, the government could decide to take an additional 4279 GWh from the Columbia River Treaty benefits that they now take in cash rather than electricity.

Despite growing electricity demands, BC Hydro announced plans to close their Burrard Thermal natural-gas fired 950 MW generating plant in 2015. This plant, located in Port Moody, has a capacity to produce almost 10% of the BC Hydro's total electricity output. It has not been used much recently due to increasing costs for natural gas. Over the past decade, improvements in the plant's operation have significantly reduced its impact on air quality as well as on water quality in Burrard Inlet. (Ideally, excess heat from this plant should be used to heat buildings rather than the waters of Burrard Inlet.) Burrard Thermal provides a reliable source of electricity close to the biggest population centre in BC. Should there ever be a problem with transmission lines due to, e.g., ice storms, there is an inherent safety factor in having a large power source close to BC's major population centre. Why close Burrard Thermal prematurely? It produces far fewer emissions than either of the two coal-burning cement plants in the lower mainland and, unlike so-called "green" energy sources such as run-of-river, Burrard Thermal can supply electricity to residents during the critical winter months. BC Hydro presently purchases out-of-province electricity from coal-burning plants instead of using Burrard Thermal because it is cheaper. If their decision were to be based on minimizing greenhouse gases, Burrard would be the preferred option as gas-fired plants produce only half the emissions of coal-fired plants. The main challenge for BC Hydro right now is to meet electricity demands during the cold winter months – Burrard Thermal can easily meet this demand (unlike run-of-river plants).

The Pembina report concludes there is potential for additional electricity production in BC from wind turbines (5000 MW, i.e., megawatts), wave energy

(37,000 MW), tidal energy (4000 MW), solar (6000 MW), biomass (9500 MW), small hydro, i.e., run-of-river (2450 MW) and geothermal (1070 MW). While not all of these sources are ready to come on-stream immediately, the future appears to bode well. BC Hydro could get up to 2000 MW from installing additional turbines at Revelstoke and Mica. Compared to the 950 MW capacity of Burrard Thermal (mostly unused) and BC Hydro's current total capacity of 11,000 MW, there are a number of opportunities and abundant potential to enable BC residents to choose a mix of options and new conservation measures to meet future electricity demands. If the government makes wise choices and ensures proper planning, siting, monitoring and regulation, there should be minimal negative impacts from new power generation.

Given these abundant opportunities, there are no compelling reasons why we must make some Faustian bargain in BC and choose methods of electricity production that will harm the environment or increase emissions of greenhouse gases and toxic pollutants. It made no sense for BC Hydro to award contracts to two proposed coal plants in 2006. Rather than being forced to make decisions that maximize profits to private power producers, we should have an energy plan that will provide BC residents with a sufficient supply of electricity and ensure minimal impacts to the environment.

Note: GWh is a measure of rate while MW is a measure of capacity. While they are not directly comparable, a capacity ranging from 1000-1800 MW could allow for the delivery of 7400-11,600 GWh of electricity per year.

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Are "Small" Run-of-River Hydro Projects Really Green?

Most of us are now aware that big hydroelectric dam projects have come at a cost to the environment wherever they have been built around the world. While we are now reaping the benefits of these "heritage resources" in BC, construction of big dams, especially during the Bennett era, destroyed fertile valleys, blocked salmon passage and displaced people and wildlife. But are the smaller run-of-the river hydro projects really "environmentally-friendly"? Hundreds of these projects have been proposed around the province. Some have been highly controversial.

These projects, called 'small' or "micro" hydro depending on their size, divert most of a river's flow into a long pipe. Downstream (usually a steep drop), this pipe feeds into a turbine to generate electricity and then returns the water

to the river. They are called run-of-river because, after several kilometers, the water is eventually returned to the river from which it came. Micro-hydro projects are usually defined as having a capacity of 5 MW or less while larger projects are called "small" hydro.

The Burke Mountain Naturalists are especially concerned about projects recently proposed in the Upper Pitt River Valley north of Pitt Lake. This area is considered by many to be the last and best stronghold of wild salmon in the lower Fraser River Valley. "Small" hydro facilities with capacities varying from 16 to 35 MW, proposed on Boise, Homer, Pinecone, Steve, Bucklin, Shale, Corbold and East Corbold Creeks, would total over 160 MW in capacity. Already, these projects have twice expanded in size since they were first proposed in mid 2006. In addition, a transmission has been proposed through a remote wilderness area of Pinecone-Burke Provincial Park to tie in with transmission lines in the Squamish area. More recently, an alternative transmission route down Pitt Lake in an underwater cable was proposed - but is clearly not preferred - by the proponents.

A run-of-river hydro project consists of a dam/weir built at the top end of the river to collect and divert water into a pipe, i.e., penstock. The penstock diverts water downhill through forested areas that would have to be cleared or blasted (if rock is present) into a powerhouse at the bottom. The penstocks are typically several kilometres in length and deliver water down steep mountain slopes to create the "head" which drives the turbine at the bottom. The powerhouse must be in a building. All this infrastructure would be serviced by roads. Roads in steep and remote mountainous areas require vigilant maintenance. During heavy rainfall or snowmelt events, washouts can occur and silt can be discharged into streams. Furthermore, water returned to the creek through the tailrace coming out of the powerhouse will carry oil, grease and other lubricants from the machinery plus dissolved gases that could be harmful to fish. Clearly, there could be considerable impacts from these projects.

Water diverted into the penstock means less water in the river to recharge groundwater and provide habitat for the aquatic insects that salmon eat. Reduced water flow also means less recruitment of the large organic woody debris that creates salmon habitat downstream as well as less gravel recruitment needed for spawning sites. Some run-of-river projects are built upstream of areas that ocean-going salmon can reach but that doesn't mean these projects won't impact their habitat downstream. There will be considerable habitat loss all along the portion of the river from which the water is removed. Several species-at-risk including tailed frogs and the Pacific water shrew could suffer damage to their habitat. Indications are that run-of-river projects are allowed to remove a significant portion of a river's flow (up to 95% of the Mean Annual Discharge). Removing this much water will obviously have serious environmental impacts on the creek. Who measures the stream flow and determines its seasonal and annual variations? More importantly, who verifies these numbers before decisions are made about the size of penstocks and turbines? Water licenses are issued for 30 to 40 years and are then renewable. Will it be possible to adjust these licenses to accommodate the reduced summer

flows predicted from global warming? Private projects, once approved, will be in place forever. Rivers, once open to the public, will become private property with limited access.

The small Upper Pitt River Valley is famous for its abundant and diverse wild salmonid populations. It supports the largest population of wild coho left in the entire Fraser River system. What will be the cumulative effect of placing hydro projects on every major tributary of this River and diverting most of the water flow from over 30 km of creeks? Surely, the cumulative impacts from these not so very “small” hydro projects will be equal to that of one large one. The manner in which small hydro projects are regulated, planned, sited, managed and monitored will critically affect the degree of their impact on the environment. Will there be ongoing and adequate government oversight of these projects? Will stream stewards have opportunities to be involved? Currently, only projects larger than 50 MW are required to go through a BC Environmental Assessment. Although the proposed 161 MW project in the Upper Pitt will require an Environmental Assessment, this review process has been considerably weakened in recent years with limited opportunity for public input. Many people now regard the BC assessment process to be ineffective in protecting the environment.

Given all the impacts small hydro projects can have, it is not clear why some of them have been able to acquire an “Ecologo” certification for “green” energy. An overview of their environmental impacts as well as the certification process will be the subject of a report to be soon released from the BC Salmon Watershed Watch Society (www.watershed-watch.org). Can run-of-river energy be really “green” if provincial parks and wild salmon habitat are damaged as a consequence?

The southwest corner of BC with its steep mountain valleys and high rainfall plus many electricity consumers in nearby Greater Vancouver is considered to be a prime location for run-of-river projects. Presently, there are reported to be over 500 of them under consideration across BC with the bulk of them in the Squamish-Lillooet Regional District. This Regional District attempted to do its best to review these proposals to ensure minimal environmental damage. They consulted the public and developed policies to assess the merits of small hydro projects. The Regional District approved several projects, but turned down one on the Ashlu River which they – and members of the public - feared would damage fish and wildlife habitat as well as recreational values. This so enraged the provincial government that, last spring, they passed Bill 30 to eliminate local government review of all electricity generation projects. Now, there is no way for a local government to stop an electricity generation project from going ahead regardless of its potential impacts on the local environment.

What recourse will there be if consultants over-estimate how much water can be taken from a river? When river flows are reduced by global warming, what will take precedence – fish and wildlife habitat or electricity consumers in California? These projects mainly produce electricity in the spring when BC

Hydro needs it the least for BC residents. For decades, private corporations have profited by cutting down trees in BC. Now that the value of our remaining forests is diminishing, industry is turning its attention to our rivers. We urgently need safeguards and adequate government regulation to ensure that run-of-river projects will not destroy wild salmon rivers and critical wildlife habitat.