

Energy Resources in BC's Central Interior

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Reliable, convenient, and reasonably priced energy services are a prerequisite for both quality of life and an energy-intensive resource sector in central British Columbia. Investments by governments, Crown corporations, and BC-based companies in energy infrastructure to facilitate regional economic development characterized most of the last 50 years. This is changing. While access to infrastructure remains important, the region's gas and electricity price advantages are disappearing as these commodities are traded across continental infrastructure networks. Future energy investments in the region will be more environmentally benign and perhaps environmentally beneficial, as efforts to continue to mitigate the environmental impacts of reservoirs, reservoir operations, and energy corridors.

Introduction

The Central Interior's abundance of low cost energy resources has strongly influenced the evolution of the region's economy and patterns of settlement. Aside from biomass supplies (e.g., firewood, pulping liquor, hog fuel), the region imports most of its energy needs using a highly developed and reliable network of oil and gas pipelines and power transmission lines. Access to these supplies has been a prerequisite to attracting the energy intensive, resource based industries upon which the region will continue to depend. However, these abundant, low cost supplies have come at an environmental cost, primarily in the form of flooded valley bottoms and land alienated by pipeline and transmission corridors.

Historical Context

Traditionally when we think of energy, its sources come to mind. The four main types of energy consumed on the Central Interior are refined petroleum products (the derivatives of crude oil, such as gasoline), natural gas, electricity, and biomass. However, energy is critical not in and of itself, but rather in the services it provides, such as lighting, heating, motive power, and industrial processes. Increasingly, choices can be made among the types of energy and energy technologies, with different implications for cost, efficiency, environmental impact, energy security, and economic benefit. These choices were severely limited in the past.

Prior to World War II, the Central Interior's energy resources were provided by local wood, local and imported coal, and refined petroleum products brought in by rail. Over the last half of the 20th century, the availability of electricity and natural gas shaped the region's economy and enabled the development of biomass energy (pulp and paper mill residue) to manufacture steam to generate electricity and heat ("cogeneration") in pulp and paper mills.

Electricity

In the west, Kitimat owes its existence to Alcan's diversion of the Nechako River to generate electricity at Kemano, limiting the long term potential for economic diversification in the Bulkley-Nechako region. Further east in the Fraser Basin, the Province's "Two Rivers" policy in the 1950s and early 1960s provided inexpensive, abundant electricity from the Peace and Columbia to power growing provincial demands, including forest industry projects in the Mackenzie-Prince George-Quesnel corridor. Each of these will be reviewed in turn.

Alcan and Kemano

In 1948, the Province invited Alcan to investigate the electricity potential of damming the Nechako River in order to divert the water westward via a 16 km tunnel through the Coast Mountains to tidewater at Kemano 790 metres below. Two years later, the Province enacted the *Industrial Development Act*, giving Alcan rights that it mostly (but not entirely) developed through the Kemano project. Aluminum production began in 1953. BC Hydro began buying Alcan's surplus electricity in the 1970s, prompting Alcan to attempt to exercise its complete water rights through the Kemano

Completion Project ("KCP"). An earlier, more ambitious expansion proposal, known as "Kemano II", would have diverted headwaters of the Dean River system.

"Jobs versus fish" concerns divided public opinion, with First Nations and residents of the eastern part of the reservoir region tending to oppose KCP, with North Coast residents more supportive. Three key decisions led to construction beginning in 1989: Alcan agreed to drop the Nanika diversion¹ component of KCP; BC Hydro agreed to buy the output of KCP until Alcan needed it for a smelter expansion; and the Department of Fisheries and Oceans ("DFO") agreed to a flow regime for fish protection. The 1987 Settlement Agreement among the Province, Canada, and Alcan was heavily criticized for not being open to public scrutiny and inadequately explaining the trade-offs involving water for fish and water for electricity generation.

In 1991, with KCP half completed, Alcan took the unusual step of suspending construction, citing uncertainty over legal challenges. Some observers speculated that the project was suffering from major cost overruns that would translate into heavy losses for Alcan in its sales contract with BC Hydro. The following year, the newly elected NDP government authorized a public review of KCP through the British Columbia Utilities Commission. What began as a process to recommend additional environmental and social mitigation measures became a two-year forum to revisit the Social Credit government's decision to allow KCP to proceed. In early 1995, the Premier announced cancellation of the project, and in 1997 an out-of-court settlement was reached, involving the provision by the Province of replacement power for a proposed smelter expansion.

B.C. Hydro and the Two Rivers Policy

Alcan's Kenney Dam, and its related spillway and reservoirs, are likely to remain the only large hydroelectric installations in the Central Interior. While Kitimat in the 1950s was served by Kemano, electricity in most other centres was provided by small diesel thermal plants. Service was costly, inefficient, and erratic. Loads tended to be too far apart to be tied to a transmission grid.

The arrival of natural gas from the Peace River area in the mid 1950s made possible the construction of larger, more efficient gas-fired generation plants, replacing diesel units in larger centres like Prince George and Quesnel. Transmission lines were built to con-

nect these plants to adjacent communities such as Vanderhoof and Fort St. James, replacing diesel units.

The British Columbia Hydro and Power Authority ("BC Hydro") was created in 1962 as a Crown Corporation to develop major dams on the Peace and Columbia systems, to bring a set of disparate private (e.g. BC Electric Co.) and public (e.g., BC Power Commission) systems under common public ownership, and to encourage economic diversification through the availability of abundant and inexpensive electricity. The Central Interior's first major supply of public hydro power actually came from the south, when BC Hydro completed a 230 kV transmission line to Prince George from the Bridge River plants in 1964. This replaced gas-fired generation in Quesnel and Prince George, and also represented the first step in integrating the Peace River projects with an emerging provincial transmission grid.

Acquisitions of smaller utilities (e.g., the Northern British Columbia Power Company serving Prince Rupert and Stewart, and the East Kootenay Power Co.) continued to the point where the only significant electric utility left in B.C., other than BC Hydro, is West Kootenay Power Ltd., now known as Aquila Networks Canada (B.C.) Ltd.

BC Hydro was building hundreds of kilometres of transmission lines annually, to places such as Morfee Lake (the Mackenzie townsite), from Kitimat to Terrace and Prince Rupert, Prince George to Upper Fraser, Vanderhoof to Endako, and Topley to Houston. Through the 1960s, power demand growth in the Central Interior was consistently the highest in the Province, exceeding 10% per year.

Pulp mills were under construction in Prince George, Prince Rupert, Mackenzie and Quesnel, and an oil refinery was being built in Prince George. The workforce at the "Peace River project" (subsequently named the G.M. Shrum Generating Station, Bennett Dam, and Williston Reservoir) peaked at 3,500 in 1965.

To the south, the Columbia River Treaty projects were being built with the \$273 million paid to British Columbia for Canada's entitlement to downstream power benefits created by the three treaty dams (Arrow, renamed Keenleyside, Duncan, and Mica). As with the Nechako Reservoir ten years earlier, communities were displaced along the Arrow Reservoir. Unlike the Nechako Reservoir, a Special Commissioner was appointed to deal with "complaints" (BC Hydro, Third Annual Report: 17) from the 2,000 people who had to move. "Close attention is being given to the

orderly relocation of schools, churches, community halls, and cemeteries." (BC Hydro, Fourth Annual Report: 17)

As articulated in BC Hydro's 1967 publication "The Power of British Columbia", provincial electricity policy focussed first on hydro-electric development of the Peace and Columbia Rivers, followed by projects on other major rivers, then urban-sited nuclear plants:

Hydro resources, while they do not become depleted, must be harnessed or they are wasted. In this regard, BC Hydro's present policy is to develop as much hydro-electric power in British Columbia as is economically feasible to meet our growing energy demands before rising construction and borrowing costs make other energy sources (the atom) economically more attractive.

And

There are enormous untapped hydro resources in B.C. This includes such rivers as the mighty Fraser...the Liard...the Homathko...the Skeena, Nass, and Stikine Rivers...

And

By the mid 1980s, however, it is entirely possible that nuclear power plants will be constructed at sites close to the demand centres. These nuclear-fired steam plants would then carry the base load, and hydro-power would be used to supplement them—a reversal of our present "hydro supplemented by thermal" program. (BC Hydro, *The Power of British Columbia*, 1967: 24)

In the Central Interior, the provision of low cost, abundant electricity supplies from BC Hydro's aggressive expansion had an immediate effect on the economy and settlement patterns. The large dam projects resulted in continuously declining costs of electricity and increases in reliability, which helped attract energy intensive industries and improve the quality of life for most of the region's residents. It made possible the consolidation of many smaller, scattered and erratically operated bush mills into fewer, more efficient central mills in larger established communities. A citation from the Northwest Public Power Association in 1965 noted that "the Annals of the electric utility industry have never recorded so much progress in so little time", noting BC Hydro's progress on the Peace and Columbia, rural electrification, rate reductions, and service improvements.

Reductions in the growth of power demand and the emergence of more cost efficient technologies in the 1980s and 1990s resulted

in BC Hydro not pursuing new hydroelectric or nuclear megaprojects. Based on experiences in Ontario and several U.S. jurisdictions, B.C.'s avoidance of nuclear generation has kept electricity rates at very competitive levels.

BC Hydro's 1975 proposal to dam the McGregor River and divert the flow north into the Peace system elicited public concerns associated with lost fish habitat and potential inter-basin transfer of fish diseases. As the region became increasingly aware that timber resources were finite, log salvage operations on the Williston and Nechako reservoirs highlighted the imprudent resource management decisions that allowed these reservoirs to be filled before being logged. Mackenzie and Vanderhoof residents, perceiving few benefits from "their end" of the Williston and Nechako reservoirs respectively, have sought greater local control of reservoir levels. As part of the 1997 Agreement between British Columbia and Alcan, the two parties agreed to contribute \$7.5 million each to a Northern Development Fund to assist communities affected by the Nechako Reservoir. The proposed Site C dam on the Peace River was once considered inevitable, but by the early 1980s it became less likely to be built, for both environmental and economic reasons—there are lower cost resource options closer to load centres. The 1997 *Fish Protection Act* prohibits dam construction on the Fraser mainstem and many northwest rivers. If applied for today, the Kemano and Peace projects would likely be rejected, and B.C. would be faced with difficult decisions on electricity generation from coal, nuclear, and gas. BC Hydro's most recent major project in the Central Interior—an additional 500 kV line between Prince George and Clinton in 1991—was, in retrospect, premature, as it was justified on the basis of bringing KCP power to the Lower Mainland.

New Directions

Electricity generation will likely follow oil, gas, airlines, and telephones in becoming deregulated and competitive. Industrial customers in the Central Interior and elsewhere are seeking the option to access market-priced power, especially when market prices for electricity are less than rates based on BC Hydro's costs to make, move, and sell electricity. BC Hydro is becoming more customer- and community-oriented, both to foster customer loyalty in anticipation of competition and to remind the public of its regional development roles and responsibilities. Should future policies lead to the dismantling of BC Hydro and the selling of its

distribution assets, the more isolated, higher cost areas of the Central Interior may face rising electricity prices, as they may no longer be protected by current “postage-stamp” rate structures under which similar customers pay the same rate regardless of location or cost of service.

Future generation projects in the Central Interior will likely be gas or wood fuelled cogeneration projects sited beside a steam host (e.g., a pulp mill using steam that would otherwise be wasted). As KCP has taught us, in British Columbia, new large, remote hydro projects or expansions serving distant metropolitan markets via transmission corridors are generally no longer acceptable because their social, economic and environmental costs may be too high.

Oil

Over half of Central Interior residents’ direct energy expenditures are made on fuel for vehicle transportation. Refined petroleum products continue to dominate the transportation sector because they are abundant, inexpensive, and easily stored and transported. While their market share is declining slowly at the expense of natural gas, about a third of the region’s energy needs are fulfilled by fuel oil, gasoline, and diesel.

Refined petroleum products were trucked and railed to the Central Interior prior to the construction of the Westcoast Petroleum pipeline in the late 1950s. That pipeline was built from Taylor to Kamloops, providing crude oil for Pacific Petroleum’s (later PetroCanada) refinery at Taylor, the Husky Oil refinery at Prince George, and Gulf’s refinery at Kamloops. At Kamloops, the Westcoast Petroleum pipeline joined the much larger Trans Mountain pipeline from Edmonton to Vancouver, which was built in 1951 to provide crude oil for the Shell, Esso, Chevron, and PetroCanada refineries around Burrard Inlet.

All but two of British Columbia’s refineries (Prince George’s Husky refinery and Chevron’s refinery in Burnaby) have closed, victims of competition from larger, more modern Edmonton refineries whose products—gasoline, diesel fuel, turbine fuel, and MTBE (an octane enhancer)—can now move to the Lower Mainland through the Trans Mountain pipeline. Northeast B.C. crude oil provides less than 20% of B.C.’s petroleum needs, although advances in technology (e.g., directional drilling, enhanced oil recovery using water and natural gas injection) have temporarily reversed production declines.

Alberta-based Pembina Pipelines now owns or controls all crude oil pipelines out of northeastern BC, including the Taylor to Kamloops pipeline. On August 1, 2002, this pipeline ruptured near the Pine River, about 90 km upstream of Chetwynd. With cleanup and restoration costs exceeding \$26 million, plus several million dollars in longer term costs of remediation and claims settlement, the Pine River spill is likely the most expensive oil spill in Canadian history. Although service to Husky was restored later that summer, and to Kamloops in mid-2002, the long-term integrity and economic viability of this pipeline is being questioned. Meanwhile, Husky faces the challenges of capital upgrades, small throughput, emission reductions to improve air quality, an increasingly sour (i.e., higher sulphur content) crude oil feedstock, and reformulated gasoline standards that are designed to reduce tailpipe emissions.

Propane is an important byproduct of refineries and natural gas processing plants. In the Central Interior, it has both motive and space heating applications. Propane powered vehicles tend to be cost-effective for high mileage fleets and emit fewer harmful emissions provided they are properly maintained. Granisle is one of four municipalities in B.C. with a propane distribution grid utility; like Whistler, Revelstoke and Port Alice, current consumption levels preclude connections to distant natural gas lines. Propane is transportable by rail or truck, and bottled propane is a significant space heating resource in rural and mobile homes. Unlike natural gas, propane prices are largely unregulated and are subject to weather-driven price vagaries across North America.

Natural Gas

As with electricity, the Central Interior's location between a major producing region (northeast B.C.) and metropolitan markets (Greater Vancouver and the U.S. Pacific Northwest) meant that the region was an early beneficiary of the resource's availability.

In October 1957, Westcoast Transmission Co. Ltd. (now Westcoast Energy Inc.) completed construction of its natural gas pipeline from Fort St. John to the Lower Mainland and the Northwest Pipeline export interconnect at Huntingdon/Sumas. The pipeline required export volumes to be economic, and today over half of B.C. gas production is exported to the western United States. In 2001, both the Westcoast gas transmission system and its affiliated distribution utility were purchased by Duke Energy Corporation, a major American pipeline and energy firm.

Natural gas is a clean-burning hydrocarbon that meets about 20% of the Central Interior's energy needs, primarily for space heating and industrial applications such as kiln drying. It is also the feedstock for the Methanex methanol plant in Kitimat. Methanol is a clean burning alternative transportation fuel and gasoline additive.

Two trends characterize the North American gas sector; both have implications for the Central Interior. Deregulation has driven down production costs, burnertip prices, and stimulated exploration in northeastern B.C. Competition has created a continental gas market where thousands of buyers and sellers use hedges, futures, swaps, and the sophisticated pipeline infrastructure to gain competitive advantages. Most regional gas markets are no longer beholden to one production area, although the Central Interior is an exception. Natural gas prices throughout North America react quickly to events such as a cold snap in the eastern U.S. or reduced production from the Gulf of Mexico.

Until 1985, domestic gas prices were set by the Province, exports were heavily regulated, and producers needed to demonstrate gas inventories before export licenses were issued by both the Province and the National Energy Board. B.C. producers sold their gas to the Crown-owned B.C. Petroleum Corporation at fixed prices. After deregulation, prices were set by market forces, export controls were effectively removed, and producers competed for buyers.

Central Interior industries were among the first in North America to contract directly for natural gas supplies, with the pipelines and utilities performing the delivery service only. In 1987, Northwood, Prince George Pulp and Paper, and Husky Oil in Prince George wanted to take this a step further, by building their own "bypass" pipeline directly from the Westcoast transmission pipeline, thereby avoiding entirely Inland Natural Gas, the distribution utility. After a British Columbia Utilities Commission hearing, the Province developed a "bypass" policy which has been adopted in other jurisdictions: if a bypass pipeline is economic for an industrial customer, the utility is to charge a lower "bypass" rate that is reasonably competitive with the cost to the customer of a bypass pipeline. The industry benefits from a lower rate while avoiding the cost and environmental impacts of a duplicative pipeline, and the distribution utility keeps its industrial customers, albeit at a reduced profit margin.

Two distribution utilities serve the Central Interior. BC Gas Inc. was formed when Inland Natural Gas bought the much larger

Lower Mainland Gas Division of BC Hydro, which the Social Credit government privatized in 1989. BC Gas serves Highway 97 communities. Pacific Northern Gas ("PNG") is a Westcoast/Duke controlled company which taps into the Westcoast mainline at Summit Lake, serving Highway 16 centres west to Prince Rupert and Kitimat. With a small residential customer base, PNG relies on the industrial loads at Eurocan, Methanex, and Skeena Cellulose to keep its rates to residential/commercial customers competitive with oil and electricity. However, Methanex now has other plants in offshore locations that enjoy lower gas prices, Skeena Cellulose may or may not reopen, and Eurocan is attempting to cut costs to remain viable.

On an energy (gigajoule) basis, natural gas prices are significantly lower than electricity or oil, and are lower in real terms than they were in the 70s and early 80s. Both utilities are under pressure from customers to keep these burnertip prices low, although deregulated commodity prices account for about one half of residential customers' bills. A proposal by BC Gas and its regulator to charge more for gas in winter and less in summer, in an attempt to reflect the true cost of service through seasonal price signals, was rejected by customers who perceived it as an unfair levy on living in the north.

Upstream producers, traditionally price takers because they have been captive to the Westcoast system, seek to diversify markets by moving natural gas east into Alberta and from there into new pipelines (e.g., the proposed Alliance pipeline) to the U.S. mid-west and northeast. For municipalities, natural gas can be a large revenue generator, as up to 3% of the value of natural gas sales within municipal boundaries are payable as franchise fees.

Pressure is also exerted from unconnected rural residents and communities, such as the Hazeltons, wanting gas service. However, utilities are tightening their system extension tests to reduce cross-subsidies by existing ratepayers. In the past, the Province has subsidized extensions through a "Gas Extension Assistance Program", but renewal is unlikely given scarce provincial funds. The Regional District of Fraser Fort George has successfully pioneered a "gas by tax" arrangement where landowners pay extension costs over and above the amount allowed under the utility extension test on their property tax bills, similar to a benefiting area water or sewer system levy.

Cognizant of pressure from producers, utilities, and industrial customers, Westcoast/Duke is becoming more competitive in its gas gathering, processing, and pipeline transmission costs.

Mainline looping and compression expansion projects will be less frequent as Westcoast seeks efficiencies in its existing system and as the northeast B.C. production basin matures.

Natural gas is the primary feedstock for hydrogen fuel cell technology, which may soon begin to displace the internal combustion engine in both motor vehicle and remote thermal-electric generation applications. "Distributed" generation fuel cells may provide inexpensive, cleanly generated power in isolated settlements, mines, and work camps, reducing the need for new environmentally disruptive transmission lines. If fuel cell technology can be commercialized at low cost it may become the future power source that B.C. Hydro speculated, in its 1967 publication, that nuclear power could become.

Several areas of the Central Interior, such as the Bowser and Nechako basins, contain large quantities of sedimentary rocks. Due to their high degree of disruption and lack of subsurface geological and geophysical information, their hydrocarbon potential remains unknown. If gas prices rise as the "hydrogen economy" evolves, and as geophysical exploration techniques become more sophisticated and less expensive, the Central Interior may yet become a gas-producing region.

Biomass

The forest industry in the Central Interior produces bark, sawdust, slash, and other wood "wastes" as byproducts of its operations. Combustion of these residues and of pulping liquors (created in the pulp making process) supplies about two-thirds of the industry's energy needs, with electricity and natural gas providing the remaining share. Improving energy efficiency and consuming biomass can potentially lower costs, but the capital investments needed to achieve these savings tend to have marginal returns. Excess wood residue has traditionally been incinerated in beehive burners, long a fixture of sawmill operations. However, small diameter particulate matter of the type found in wood smoke is increasingly viewed as a health hazard. Incineration to produce steam and/or electricity can burn the waste more completely and reduce local air pollution.

In the Central Interior, this residue constitutes a potential power resource similar in scale to a major new hydroelectric dam, but at a significantly higher financial cost than alternative generating options. The Inland Pacific wood residue generating station at Williams Lake enabled the closure of several beehive burners when

it was built in 1991. However, it was feasible only after the provincial government asked BC Hydro to offer a higher price ("environmental premium") in its long-term contract for this electricity. In effect, BC Hydro ratepayers are subsidizing the disposal of these residues. Similar plants have been proposed in Houston, Mackenzie, and Prince George. Increasingly, the forest industry is being held accountable for environmentally responsible replacements for beehive burners. In the Central Interior, alternatives that have been explored include medium density fibreboard plants, pellet manufacturing, ethanol plants, landfilling, and centralized incineration without energy recovery.

Solar and Wind Technology

Energy from the sun can be converted to electricity and hot water through a variety of photovoltaic and generation technologies. In the Central Interior, they are not likely to be developed extensively because the region's climate and latitude make them even less reliable and less cost effective than conventional sources, or solar or wind projects in sunnier or coastal locations. Moreover, most Canadian alternate energy demonstration projects have relied on government funds, which will be increasingly scarce as government energy policies become less interventionist. One emerging application for solar, wind and small hydroelectric generation lies in "net metering", whereby an owner would sell the surplus from the generation source to BC Hydro at certain times of the day or year, while still buying from BC Hydro when it is needed to meet the owner's load profile.

Northeast Coal

Except for the rail line to tidewater, Northeast coal infrastructure is connected more to the Peace River region than the Central Interior. Moreover, the produced coal is often not perceived as an "energy resource" for the province because it is consumed exclusively in distant Pacific Rim markets. However, there are some noteworthy aspects of the Northeast coal development that influenced the evolution of the Central Interior's regional economy in the 1980s.

The Bullmoose and Quintette coal mines were the beneficiaries of public infrastructure assistance in the form of new and upgraded highways, a new electrified railroad through and across the Rockies, and a new electricity transmission line from the Bennett

Dam. Most significantly, the construction of the instant town of Tumbler Ridge—probably the last “single resource industry” town-site to be built in the province—was chosen over work shift commuting programs from established communities. A proposal to connect the mines by road to Prince George via the McGregor River valley was rejected, in part because of the existence of a BC Hydro flood reserve.

Infrastructure construction in the early 1980s did benefit the Central Interior economy, particularly by mitigating the effects of the recession in the region at that time. However, policy decisions to link the mines geographically to northeast BC and northwest Alberta may have reduced their long-term economic viability. As prices for Northeast coal moved towards global market prices through the elimination of price premiums paid by Japanese buyers, the Quintette mine was no longer viable and closed in October 2000. In retrospect, Northeast coal mine life might have been prolonged with smaller operations using transportation infrastructure largely existing at that time, plus commuting programs to modular camps from Central Interior and Peace River communities. Meanwhile, Tumbler Ridge is attempting to redefine itself as a retirement, tourist, and outdoor recreation community.

Conclusions

A stable and diverse energy supply is critical to the Central Interior. Energy projects and infrastructure expansions from the 1950s through to the 1980s facilitated a rapid expansion of the forest products and minerals sector, and contributed to the growth of larger centres, the creation of instant towns, and the stagnation of many smaller communities. The provision of safe, reliable, convenient, and inexpensive energy—achieved through aggressive gasification and electrification programs—also improved the quality of life.

This energy network came with environmental costs by alienating lands, waters, and resources for reservoirs and rights of way. It is not inconceivable, however, that some of these facilities and reservoirs may ultimately be decommissioned should future technological advancements (e.g., hydrogen fuel cells) render them redundant or expensive.

Public policies using energy projects or energy subsidies to attract new energy intensive industries (e.g., smelters) or maintain existing resource employment remain politically opportune in the cyclical resource economy of the Central Interior. However, as

energy policies become increasingly market oriented, as energy security is no longer a public issue, and as government and utilities are less inclined to spend money on uneconomic energy infrastructure, the future use of energy as an instrument of public policy in the Central Interior may be less frequent.

With efficient and low cost energy transportation systems, and continental or global commodity pricing of energy, proximity to energy sources is no longer a significant factor in most locational decisions for economic activities. Proximity to energy infrastructure continues to be a dominant factor.

The Central Interior's changing environmental values, and concerns over the long-term sustainability of its resource base, also cast doubt upon future energy megaprojects. Instead, the region's future incremental energy facilities will likely be characterized by small, clean, efficient, and urban-sited installations.

Notes

1. The Nanika, a tributary to the Morice River, is in the upper Skeena system. The *Industrial Development Act* gave Alcan the right to dam the Nanika at a point upstream of Kidprice Lake and reverse the flow south into the Tahtsa reservoir.

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