

CHALLENGES

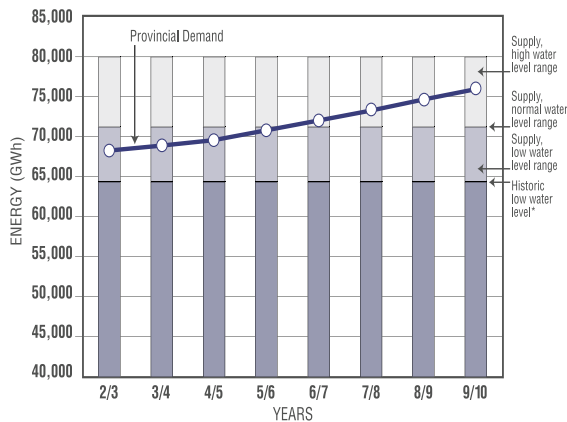


ENERGY FACT

A large industrial consumer, such as a pulp mill, might use 400 GWh of electricity annually, equal to the consumption of 40,000 households.

Demand for electricity is rising at an average 1.7 percent per year

PROVINCIAL ELECTRICITY SUPPLY / DEMAND OUTLOOK



*Includes supply from all sources
Source: Energy Task Force Working Group on Electricity, based on data from BC Hydro and Utilicorp Networks Canada.

The B.C. energy sector faces new and ongoing challenges with respect to maintaining energy security, low electricity rates, and a clean environment. These challenges must be addressed if we are to seize on opportunities to develop the sector and strengthen our economy.

THE NEED FOR ENERGY SECURITY

B.C. needs secure, reliable energy to help revitalize the provincial economy.

The development of abundant energy resources was instrumental in establishing our resource-based economy and high standard of living. Key industries, such as forestry, mining, aluminum and chemicals require reliable and affordable energy to keep their economic advantage in world markets. For emerging technology industries, electricity reliability is especially crucial. Secure and reliable energy supplies are needed to drive the new digital economy and support a modern lifestyle that depends increasingly on electric energy for work and leisure.

After a decade of poor economic performance, the government aims to restore B.C. to a leadership position among Canadian economies. Stronger economic growth will mean more demand for energy. Energy development and use that preserve the economic advantage of our industry and provide opportunities for new investment, jobs, revenue and regional growth are integral to the Province's economic policy.

With growing energy demand and aging facilities, investment in new supply is critical.

BC Hydro customer demand is rising at an average 1.7 percent per year.⁷ Most of the Crown corporation's generating facilities have been operating for 30 years or more. Significant capital expenditures are required to upgrade existing generation and transmission, so that B.C. consumers will continue to have reliable electricity. Even with this upgrading, the pressing need for power on Vancouver Island (see box) means that additional generation must be installed by 2004.

Similarly, the natural gas supply system is strained, with heavy loading of pipelines at certain times. BC Gas expects demand to grow by one percent annually until 2007.⁸ New pipeline capacity must be built to ensure reliable natural gas supplies at reasonable prices for provincial consumers. In addition, northern roads and gas processing facilities must be upgraded to enable exploration, development, and production of natural gas.

Unless new domestic supplies are developed, B.C. will become more dependent on imported energy and vulnerable to price swings.

Imports fulfill a useful role in B.C.'s energy picture. Most of the oil and refined petroleum products (gasoline, diesel fuel, aviation fuel, etc.) we use are imported from Alberta. About 90 percent of these products, consumed in central and southwestern B.C., are transported by pipeline from Alberta.

In the past two years, BC Hydro was a net importer due to low water levels. These imports were necessary to meet domestic electricity requirements. However, over-reliance on imports at wholesale spot market prices could expose B.C. consumers to price volatility in western power markets. The province

The Power Need on Vancouver Island

Vancouver Island's population has grown by 20 percent since 1991, creating more demand for electricity. Electric heating loads are heavier on the Island because natural gas for home heating has only been available for a decade. Total demand on the Island is rising by 30 to 40 MW annually – enough power to light and heat an extra 30,000 to 40,000 homes a year.

With the recent addition of the natural gas-fired Island Cogeneration Plant, local generation currently meets 33 percent of Vancouver Island's power needs. The remainder is supplied from generation on the Mainland via submarine cables, some of which are now more than 45 years old. These cables are due for retirement, and BC Hydro has determined that new electricity supply to replace them will be needed by 2004.

must develop new generation to serve rising demand, or we may experience electricity shortages similar to those in other jurisdictions.

California's recent difficulties with high prices and rolling blackouts show what can happen when poor electricity market design combines with insufficient resources for demand growth. Over the past decade, local opposition to energy development prevented the state from building new power plants. Since the crisis of 2000/01, California has taken steps to restore energy security, including expediting the siting of new in-state power plants.

To avoid costly public investments, governments everywhere are looking to the private sector for new energy development.

In B.C., as in most other provinces, private investment has developed the oil, natural gas and coal industries, while public investment has dominated electricity because of the high cost of large-scale power systems. Given competing priorities for public funds, the government is interested in shifting the responsibility for new power development to the private sector. The advent of new small scale power plants, such as efficient combined cycle gas turbines and small hydro plants, is making it easier to match electricity supply with gradually growing demand. These plants are lower risk and lower cost than the much larger facilities that were the norm of the past. Private power producers, who can compete to bring forward projects to meet B.C.'s growing demand, have the capability and core competency for developing smaller generation resources as an alternative to public investment by BC Hydro.

Access to energy resources is hindered by uncertainty over land use planning and First Nations claims to rights and title, as well as poor quality roads in the North.

The fossil fuel industries require physical access to land to explore for and develop resources. Without access to areas of high resource potential, such as the Muskwa-Kechika Management Area in the Northeast, the oil and gas sector will

not be able to sustain its growth. This requires timely land use planning to provide more certainty for exploration and development. Better access is needed not only in traditional areas, but also in regions of the province that are new to particular resource development (e.g., interior and offshore oil and gas basins and coalbed methane across the province).

Poor road networks limit access to resources in northeastern B.C. Most of these public roads were not built to withstand heavy use by the oil and gas industry. Seasonal road bans are getting longer and severely restrict industry activity.

KEEPING ELECTRICITY RATES DOWN

Frozen since 1996, BC Hydro rates require scrutiny in a public process to ensure that they reflect the true costs of electricity.

Under the rate freeze, the BC Utilities Commission has not been able to fulfill its mandate to publicly examine BC Hydro rates. Recently, BC Hydro costs have increased as demand has grown, new supplies have been added and existing facilities have required maintenance. Keeping energy costs down is essential to maintaining B.C.'s economic advantage. Returning BC Hydro to independent oversight by the BC Utilities Commission will ensure that rates remain as low as possible.

Continued trade and access to US markets is necessary for low and stable rates.

The export market provides income to supplement domestic power revenues and maintain low rates. In the United States, proposed new market rules will require an independent entity, separate from generation and distribution, to control the transmission system. This is part of a series of changes being implemented by the US Federal Energy Regulatory Commission, or FERC (see box). B.C. is participating in the development of the western Regional Transmission Organization (RTO West). The Province recognizes the value of integration with US power markets in the revenue, ratepayer and reliability benefits that can be realized.



Environmental responsibility and no nuclear power sources

ENVIRONMENTAL PRIORITIES

Low electricity rates discourage conservation and energy efficiency. Reducing energy use improves the environment, while saving consumers money.

Conservation means cutting energy use, for example by turning down a thermostat or shutting off lights. Energy efficiency means getting more productive use out of energy consumed, for example by purchasing a new furnace that uses less fuel to heat a home. Besides directly lowering consumer energy bills, these activities reduce demand and defer the need for new supply. This avoids costly energy investments and the environmental impacts from development.

Low power rates based on the blended cost of old and new electricity supplies provide a poor price signal for encouraging energy-saving activity. The reason is that, under blended rates, consumers do not see the cost of new electricity supply when deciding how much energy to use. With B.C. electricity rates roughly half the cost of new production, there is currently little incentive for increased conservation and energy efficiency.

Strategies are needed to protect provincial airsheds and watersheds from the effects of energy development and use.

Fossil fuel production and power generation are B.C.'s fastest growing source of the manmade greenhouse gas emissions that have been linked to global climate change. The development and use of energy also have significant implications for sensitive airsheds, such as the Lower Fraser Valley. Province-wide, the largest contributor to local air pollution is energy use in transportation, accounting for almost half of smog-forming pollutants.⁹ For community watersheds, a key concern is the impact of hydroelectric power operations on fish habitat, recreation and tourism and other water uses. Effective strategies are required to manage all of these environmental impacts.

Unclear or overly prescriptive environmental standards and inefficient regulatory processes impede sustainable energy development.

To meet the needs of a growing economy, new energy supplies must be developed in a timely, cost-effective, and environmentally responsible manner. Energy developers are

US Market Rules and Regional Transmission Organizations

For the past decade, the US Federal Energy Regulatory Commission (FERC) has been developing rules to make US power markets more competitive and efficient. In 1996, electric utilities regulated by FERC were required to open up access to their transmission systems. Another ruling in 1999 encouraged the transfer of operational control to an independent Regional Transmission Organization, or RTO. Having a large geographic region operated by one independent transmission entity helps ensure a coordinated planning to reduce transmission bottlenecks, facilitate trade and increase reliability. It also encourages private power development through access to competitive wholesale markets.

In August 2002, FERC released a proposal for standard electricity market design, to address transmission under-investment, discriminatory access, and other problems in wholesale power markets. Proposals include the independent operation of transmission, a single open access tariff for all transmission users, and procedures to ensure the long-term adequacy of power supplies. For B.C., this means trade and power development opportunities, reliability benefits of integration and non-discriminatory access to competitive export markets to keep rates low and preserve access to B.C.'s heritage energy.

B.C. has been taking part in the development an RTO covering the Pacific Northwest. RTO West will operate US transmission systems on behalf of their owners, as well as the region's wholesale power market. In September 2002, FERC accepted most of the current RTO West proposal. Independent governance is expected to be in place by the fall of 2004, with a fully operational RTO by 2006.

ENERGY FACT

B.C.'s greenhouse gas emissions per capita is 29% lower than the national average.

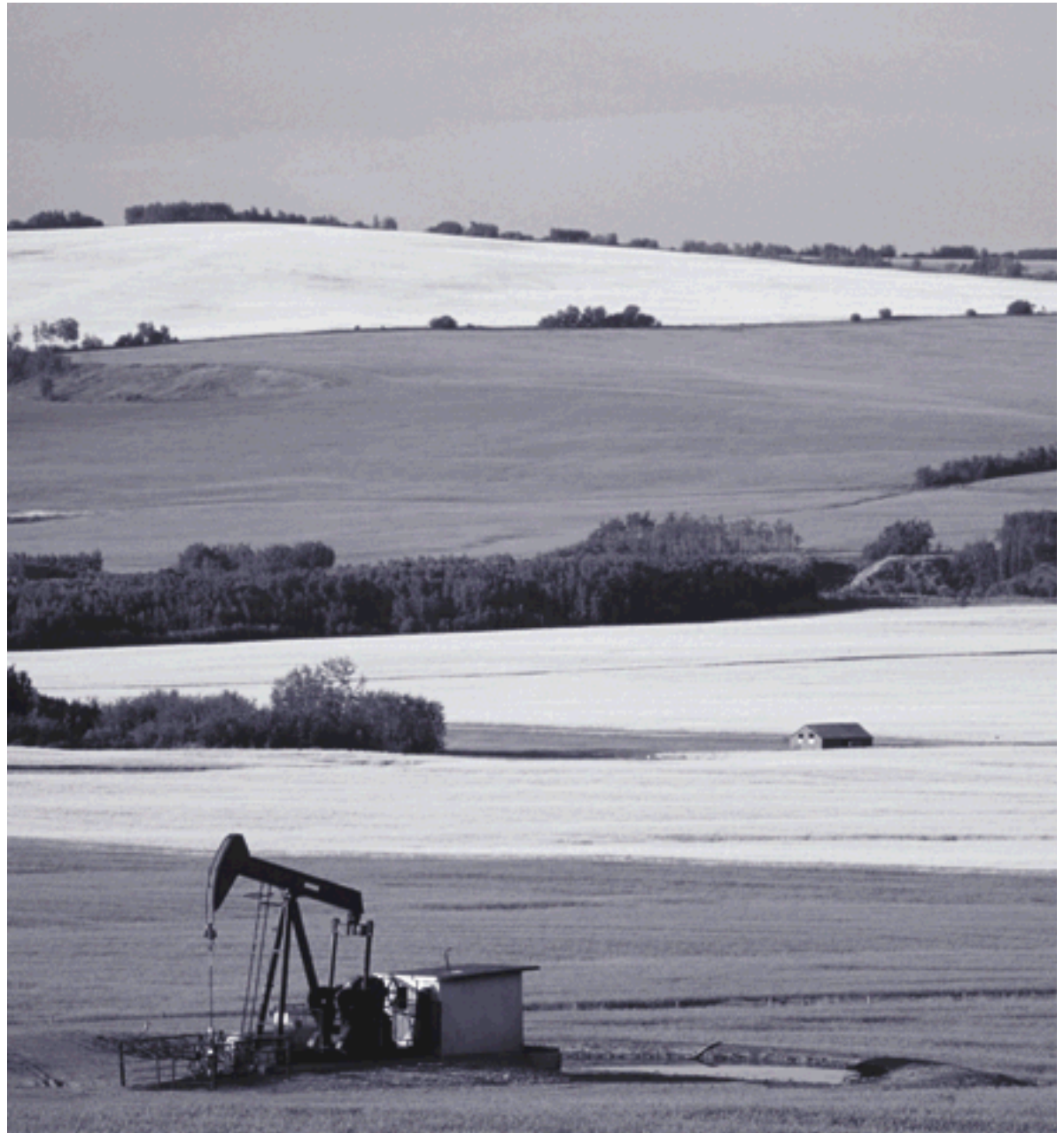
seeking clear, scientifically based environmental standards. The coal industry, as an example, has requested final air emission standards for coal-fired boilers, consistent with those adopted in Alberta, to provide more certainty for potential electricity development in B.C. Long environmental assessment reviews, backlogs in water licensing, and other regulatory inefficiencies currently add to the costs of energy projects, including those where the impacts and mitigation measures are generally well understood (e.g., small hydro plants).

⁷ BC Hydro. www.bchydro.com/policies/demandgrowth/demandgrowth771.html.

⁸ BC Gas, BC Gas 2003 Revenue Requirement application, excluding Centra Gas and Burrard Thermal.

⁹ 2000 Emission Inventory for the Lower Fraser Valley Airshed.

Unclear or overly prescriptive environmental standards and inefficient regulatory processes impede sustainable energy development



OPPORTUNITIES

B.C.'s large, untapped energy sources include oil, natural gas and coal, as well as coalbed methane and other clean sources such as small hydro, wood residue, wind and ethanol.

The energy sector has the potential to generate new investment, increased trade, and economic growth in an environmentally responsible manner. *Energy for Our Future: A Plan for BC* needs to support efforts to take advantage of these opportunities for the benefit of all British Columbians.

ENERGY FOR A STRONGER ECONOMY

B.C. electricity can be made even more reliable in support of a growing information economy.

Reliable power supply is increasingly important in the move to a digital economy. B.C. electric utilities are developing specialized products and services to offer higher-than-normal reliability for customers such as technology firms. Continued integration of the western electricity market will help to facilitate trade and coordinate transmission planning to remove bottlenecks. It will ensure better access to low-cost generation throughout the western power system.

Our natural resources, talent and technology provide many diverse opportunities for meeting demand growth as efficiently as possible.

B.C. is fortunate to have a growing natural gas industry, significant hydroelectric and alternative energy resources, and large deposits of coal and coalbed methane. We also have considerable potential to save more energy through cost-effective conservation and energy efficiency. Homegrown technologies and expertise can help develop a more diverse and innovative energy system.

With smaller natural gas-fired plants, it is possible to site new generation close to customer demand, reducing transmission costs. Energy efficiency, alternative energy and coalbed methane can generate jobs and investment in regions new to energy development. Overall, there are opportunities to develop new energy resources throughout the province.

Increasing energy trade can improve domestic reliability, enhance continental energy security, and create economic benefits for British Columbians.

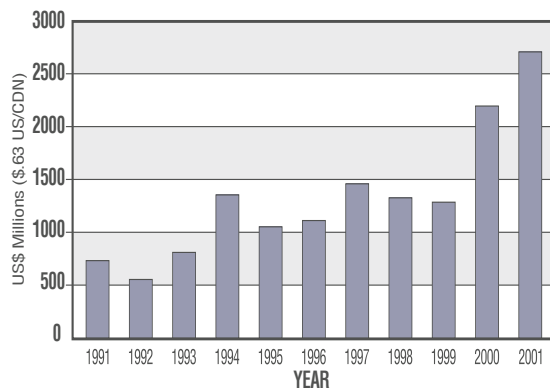
In the United States, natural gas use is forecast to grow by more than 50 percent through the year 2020.¹⁰ For electricity generation alone, over 90 percent of planned power plant additions are expected to be fuelled by natural gas. With its conventional natural gas basins in decline, the US is looking to its frontier areas, such as Alaska and the deep Gulf of Mexico, as well as to Canada for new supplies. Modernizing and expanding delivery networks for both natural gas and electricity are part of the US energy policy, which will provide better access to markets for our energy exports.

US electricity demand is projected to rise by more than 45 percent by 2020.¹¹ Some 22,000 MW of new generation, twice the electrical capacity of BC Hydro, is currently under construction in Western North America.¹² Among other things, these capacity additions have resulted in electricity prices returning to normal levels. Since most of the new facilities will be gas-fired generation, the additional fuel demand could be a boon to our natural gas exports. B.C.'s storage capability, together with north-south differences in production costs and the timing of electricity demands and prices, will ensure ongoing opportunities for trade. Aside from the benefits for provincial consumers, increased access to US wholesale markets can support private power development in B.C.

The private sector has the financial and technical ability to provide new investment in energy supply, with opportunities for jobs and economic growth across B.C.

Since the late 1950s, private companies have invested billions of dollars to develop successful, market-driven fossil fuel industries in the province. The recent high levels of investment in natural gas drilling are expected to continue with expanding demand in domestic and export markets. Exploration and development of oil, natural gas, and coalbed methane outside the Northeast, including interior and offshore basins, can generate investment, jobs, and economic spin-offs throughout B.C.

OIL AND GAS EXPENDITURES FOR 1991 - 2001



Historically, as a Crown corporation, BC Hydro was able to access low-cost capital to build its extensive hydroelectric system dominated by mega-projects. Today, with new small generation technologies and more sophisticated capital markets, public investment is no longer required. Independent power producers are willing and able to develop new generation in the province, providing they have reasonable access to the transmission system and there is a level playing field for public and private investment. Compared to large centralized power plants, the development of many scattered IPP projects can mean more jobs and greater opportunities for regional development. Despite the recent difficulties of some energy companies in North America, the private sector has a useful role to play in B.C.'s electricity future.

Land use and pre-tenure planning, closer cooperation with First Nations, and road upgrades can improve access to energy resources.

Pre-tenure plans are required only in the Muskwa-Kechika Management Area, before oil and gas tenures will be

Performance-based Rate Regulation

Until recently, electricity and natural gas rates were set through cost-of-service regulation and adversarial public hearings. The utility would estimate the costs, including a rate of return, required to serve its growing system. After a public hearing before the BC Utilities Commission, rates would be established for the different classes of customers depending on their share of demand.

Utility rates are typically now determined through negotiated settlements and using performance-based regulation (PBR), which sets targets or caps for pricing. Under this approach, rates are allowed to increase by the inflation rate plus a factor for system growth, minus an efficiency factor. If the utility is able to do better than the specified efficiency factor, then it can retain the cost savings for its shareholders and/or ratepayers in the period between rate settings.

issued. A pre-tenure plan identifies sensitive resource values and strategies for environmentally responsible resource development. Both pre-tenure and land use planning processes enable better access to energy resources by clarifying the conditions under which exploration and development can occur. Efforts are also underway to work with First Nations on economic opportunities from resource development. Public-private partnerships will continue to improve road networks in the Northeast.

ENSURING OUR ECONOMIC ADVANTAGE

B.C.'s existing low-cost generation is a source of long-term benefit for provincial consumers.

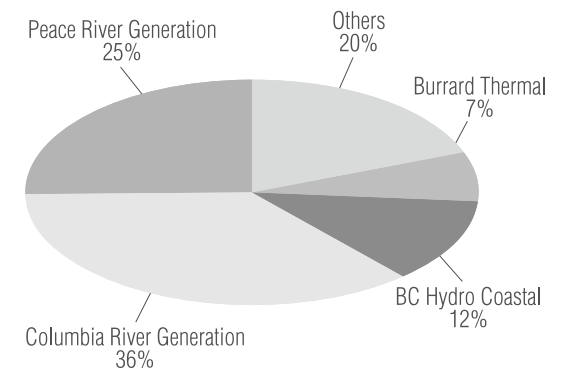
Unlike some other jurisdictions in North America, the province is not encumbered with large unpaid investments in high-cost generation (e.g., nuclear power) that have driven up electricity prices. Instead of stranded investments there are stranded benefits captured in our heritage power assets. These benefits arise from the difference between what it currently costs to produce electricity on the BC Hydro system and what it would cost to replace that electricity in the marketplace (natural gas-fired generation). There are mechanisms available to secure these benefits for BC Hydro ratepayers over an extended period.

Performance-based regulation offers an efficient regulatory tool for getting power rates right.

The provincial Utilities Commission Act (UCA) is designed around inquiries and adversarial public hearings as the basis for regulating energy utilities. In recent years, however, the Utilities Commission has increased its use of negotiated settlements and performance-based regulation. PBR employs multi-year pricing targets and interest-based negotiations among stakeholders, rather than costly adversarial hearings. This form of regulation better aligns shareholder and ratepayer interests by allowing utilities and customers to share the savings from cost efficiency, encouraging further investment and helping to keep energy rates low.

B.C.'s economic advantage includes low cost electricity and public ownership of BC Hydro

BC's 2001 ELECTRICAL GENERATION CAPACITY

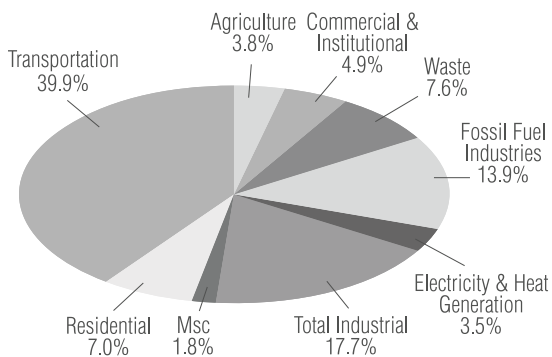


ENERGY FACT

A compact fluorescent light bulb uses one-quarter the energy of a standard incandescent bulb.

Environmental responsibility and no nuclear power sources

BRITISH COLUMBIA'S GREENHOUSE GAS EMISSIONS BY SECTOR (2000)



Source: Environment Canada, Canada's Greenhouse Gas Inventory 1990-2000, June 2002

EFFICIENT ENVIRONMENTAL MANAGEMENT

B.C. has the capability for more aggressive conservation, energy efficiency, and alternative energy development, as cost-effective ways to protect the environment.

Since the late 1980s, provincial utilities have amassed experience with conservation and efficiency through programs offering rebates and other customer assistance (e.g., Power Smart, Power Sense, Homeworks). Expertise is also vested in private energy service companies and B.C. businesses have initiated their own energy-saving activities. BC Hydro estimates that 10 percent of total electricity demand could be economically reduced by the year 2015. There are opportunities for more aggressive conservation programs by distribution utilities, stronger energy efficiency standards for appliances and equipment and other energy-reducing strategies.

While conservation and energy efficiency avoid impacts on the environment, alternative energy results in smaller environmental impact than conventional energy development (i.e., coal, oil, natural gas, and large-scale hydroelectricity). B.C. has significant resources of small hydro, wood residue, wind, solar and tidal power, some of which could be developed at costs that are competitive with conventional power. BC Hydro has voluntarily agreed to meet 10 percent of new energy requirements between 2001 and 2010 from clean energy purchases. BC Hydro's requests for power to date have met with an overwhelming response from the private sector.

Alternative electricity rate structures offer better price signals to encourage energy-saving investments and behaviour.

Stepped power rates that charge a higher price as energy consumption increases give consumers the incentive to undertake conservation and energy efficiency without increasing the average electricity rate. Time-of-use rates that charge a different price for power depending on the time of day or season encourage consumers who can manage the

timing of their electricity use to shift away consumption from higher-priced periods of peak demand. Both of these rate structures have been used successfully in other jurisdictions to save consumers money, reduce utility costs and protect the environment.

Greenhouse gas and airshed management, as well as land and water use planning, can help control the environmental impacts of energy development and use.

Cost-effective actions are available to manage air emissions. For example, through measures such as AirCare, cleaner automobile emissions, and cleaner factories, air pollution in the Lower Mainland has declined by about 40 percent since 1985.¹³ The Province has committed to manage the growth in BC's greenhouse gas emissions, and to protect threatened airsheds. These commitments underscore the link between sound energy and environmental policies.

In the Northeast, land use and pre-tenure plans are reconciling industry access to energy resources with concerns for environmental protection. Similarly, BC Hydro is conducting 23 multi-stakeholder water use planning processes to determine hydroelectric operating rules that balance power production, fish habitat, recreation, and other water uses. This process is scientifically based, engages multiple interests in the resource, and will amend existing water licences to reflect contemporary values. A total of nine completed water use plans are anticipated by winter 2003, with the rest expected to be completed by winter 2004.

Clear environmental standards, streamlined approval processes and results-based regulation can ensure lower-cost, environmentally responsible energy development.

Explicit, scientifically determined standards for air emissions, water discharges, and other impacts can be used to screen out environmentally unacceptable projects. Then, efficient regulatory processes can reduce development costs for projects that are considered prudent. Provincial processes, including environmental assessment reviews, air emissions

permitting, and oil and gas development approvals are all moving to results-based regulation. This approach sets clear standards and then allows flexibility for finding the most economical means to achieve them.

Nuclear power is not part of B.C.'s energy future.

Nuclear power is supported by some as a way to satisfy growing energy generation and address climate change, since this form of thermal generation does not produce greenhouse gas emissions. However, the financial and environmental

problems experienced in other jurisdictions that have invested in nuclear power make it a risky proposition. The province rejects nuclear power as a strategy to meet the needs of British Columbia.

¹⁰ US National Energy Policy.

¹¹ Ibid.

¹² Northwest Power Planning Council and Cambridge Energy Research Associates.

¹³ Lower Fraser Valley Ambient Air Quality Report.

Energy and greenhouse gas emissions

Energy production accounts for about 17 percent of B.C.'s greenhouse gas emissions, lower than the national share (34%) because of our extensive hydroelectric system. While transportation makes up the largest share (40%) of provincial emissions, the electricity and fossil fuel industries are expected to be the fastest growing sources of continuing emissions growth, with their combined emissions forecast to double between 1990 and 2010.

The rapid growth in energy sector emissions reflects the shift to efficient gas turbines for electricity generation and expansion in natural gas production and exports. Although the province's natural gas exports represent clean energy to US buyers, displacing coal and oil, the emissions upstream production and transmission add to provincial emissions.

The energy sector is acting to voluntarily reduce its greenhouse gas emissions production. For example, BC Hydro has committed to offset half the emissions from new gas-fired plants on Vancouver Island through energy efficiency, fuel switching, and other measures. The oil and gas industry has adopted standards to control the emissions from flaring of natural gas that accompanies production. The Ministry of Energy and Mines promotes the reinjection of acid gas into existing natural gas wells to reduce harmful air emissions.



ENERGY FACT

Air pollution in the Lower Fraser Valley are estimated to have declined by approximately 40% between 1985 and 2000.

