

FROM STREAM TO STEAM

EMERGING CHALLENGES FOR BC'S
INTERLINKED WATER AND ENERGY RESOURCES

Summary

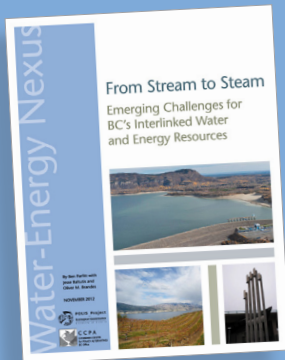
This summary is a synthesis of the publication *From Stream to Steam: Emerging Challenges for BC's Interlinked Water and Energy Resources*, which explores British Columbia's interconnected water and water-derived energy resources. The full report identifies and explains challenges and opportunities facing the province's water and energy resources, and argues for policy coherence and governance reforms to ensure their sustainable management, now and into the future.

THE WATER-ENERGY NEXUS IN A NUTSHELL

Just as water produces energy, energy provides water services. This relationship, known as the water-energy nexus, is of increasing importance to British Columbia as our water and water-derived energy resources show signs of being under increased stress across the province.

In BC, the majority of electricity is produced by hydro power, and there has been a significant increase in water-intensive natural gas development projects, underscoring the priority of the water-energy nexus. Currently, many municipalities are missing valuable opportunities to better integrate water and energy planning and reap benefits such as extracting water and energy from sewage through a process known as resource recovery. The interconnected nature of water and energy will continue to become more apparent as pressures on these resources increase, including:

- **CLIMATE CHANGE:** Changing temperature and precipitation patterns may alter water availability and the power derived from water.
- **POPULATION GROWTH:** Growing urban populations will potentially demand more water, leading to more energy requirements to pump and treat water and wastewater.
- **AGRICULTURAL ACTIVITY:** Rising water and energy consumption could occur as farmers are forced to respond to altered temperatures and soil moisture regimes due to climate change or as farmers switch to different crops.
- **INDUSTRIAL DEMANDS:** Growth in water- and energy-intensive industrial developments in BC, most notably in the natural resource sector, threatens to put added strain on existing electricity supplies and water availability in many regions of the province.



Download the full report
at: [poliswaterproject.org/
publication/503](http://poliswaterproject.org/publication/503)
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POLIS Project
on
Ecological Governance
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There are consequences to inadequately managing BC's water and energy resources, including potentially significant impacts on *community prosperity and social equity, the provincial economy, provincial climate change policies and goals, food security, and the healthy functioning of watersheds.*

OBJECTIVE OF THE REPORT

From Stream to Steam sheds light on emerging areas of concern around the water-energy nexus in BC, with the goal of:

- introducing and providing specific examples of actions that are underway in the province which are having significant bearing on BC's water-energy nexus;
- catalyzing a broader dialogue about where BC is heading regarding the management of its interlinked water and energy resources; and,
- spurring innovative thinking about possible policy solutions and legal and governance reforms to better address the challenges and opportunities of the water-energy nexus—solutions that are economically, socially, and ecologically sustainable.

The report provides a number of on-the-ground examples from around the province where the interplay between

HOW A LACK OF DATA UNDERMINES MANAGEMENT OF OUR WATER AND ENERGY RESOURCES

A lack of reliable, publicly available, and regularly updated water-use data in BC is troubling when viewed against the sometimes conflicting policy initiatives which have been launched by the provincial government in recent years. These include the *Clean Energy Act*; a modernized *Water Act*; and the *BC Jobs Plan*, which is built around expanded resource industries. Currently, province-wide estimates on water use are not based on actual usage, but instead on the volumes of water that were licenced for use. In many cases actual water use is unknown. For example, of the 31 water-use licences issued to pulp and paper mills across BC, only one is required to meter its water use.

water and energy is apparent. These case studies demonstrate the diversity of ways in which BC's water and energy resources are inextricably linked, across a variety of sectors and industries. Both positive and negative examples are highlighted. They were also central to informing the report's four recommended action items that government can take today to start addressing critical priorities and ensure we are protecting water and energy resources in BC (see *Recommended Actions for Improved Governance of BC's Water and Energy Resources* on page 4).

RUNNING HOT AND COLD: CASE STUDIES ON THE WATER-ENERGY NEXUS IN BC

A series of case studies from across BC captures some of the challenges and opportunities ahead relating to the water-energy nexus in the province. Two core themes can be found throughout the case studies: the need for concerted conservation efforts and the need to improve governance, including better integration of water and energy management activities through coordinated policies.

MUNICIPALITIES AND THE WATER-ENERGY NEXUS:

Abbotsford and Mission are experiencing sharp increases in their populations, leading the municipalities to implement conservation-oriented initiatives such as bi-monthly water bills; smart meters that provide hourly water-use data; landscape and irrigation audits; lawn sprinkling restrictions; and a short-lived two-tiered water pricing system in the high water-use summer months. *Municipalities can save water and energy as a result of concerted efforts to reduce water demand in the community.*

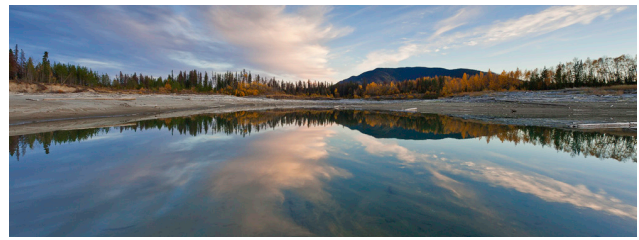
DOWN ON THE FARM: Agricultural operations are the third largest consumers of water in BC, with irrigation accounting for 84 per cent of the water consumed in the industry. To address water availability issues, and in response to a series of droughts, the South East Kelowna Irrigation District (SEKID) installed water meters and provided orchardists with meters that monitor soil moisture and provide data which helps reduce over-watering of crops. In 2000, SEKID introduced a flat water rate for "basic" water allotments. For water used beyond the basic amount, users are charged a "volumetric" rate. Under this pricing system, the number of "large abusers" of water for irrigation has dropped to zero. *Water meters and pricing are proven tools to reduce water demand in the agricultural sector, and thus reduce the energy required for pumping.*

INCREASING COMPETITION FOR WATER AND POWER IN THE NATURAL RESOURCE SECTOR: BC's natural resource sector has historically been the economic bedrock of the province and it is expanding. For example, the natural gas industry, which uses water-intensive hydraulic fracturing methods, is expected to grow rapidly, giving rise to tensions over competing demands for water and water-derived power in the province. This rapid growth signals a crucial need for coherence between those government policies aimed at safeguarding BC's water and energy resources and meeting the province's goals for reducing greenhouse gas emissions (e.g. *Clean Energy Act*, a modernized *Water Act*, *BC's Jobs Plan*). Energy is critically important to the economic growth of the province—but not at the expense of depleting water resources and degrading watersheds. *Policy coherence and improved governance arrangements will be essential to responsibly manage the development of energy projects while ensuring proper watershed health and function across BC.*

WATER POWERS THE PROVINCE: Water is the overwhelming source of power in BC and will remain so for the foreseeable future. Were it not for the water impounded in reservoirs behind dams on the Peace River and Columbia River, BC Hydro (BC's biggest power provider) would be without 80 per cent of its current power production. Hydroelectric power production is often inaccurately referred to as a renewable resource, yet there is significant variation in power production—a range of nearly 25 per cent—across BC Hydro's hydro power facilities. This range in production underscores the challenge of meeting demand due to population growth and increased economic activity, especially in low-water years. *Planning for future energy requirements in BC requires a careful analysis of the projected water availability in the province's hydroelectric dams based on low-water year averages.*

BC'S SHIFTING POLICY TERRAIN AND THE WATER-ENERGY NEXUS

Important initiatives are underway in BC to safeguard water and energy resources including the *Clean Energy Act* and an effort to modernize the *Water Act*, both of which are impacted by the *BC Jobs Plan*. In certain respects, however, the initiatives are sometimes in conflict, especially in light of the impacts that climate change may have on the province's water and water-derived energy resources. The conflicts highlight the need for greater coordination and coherence in government policies as they relate to managing BC's



interlinked water and energy resources. Water and energy management and decision-making must be integrated in order to be effective.

CHARTING A NEW COURSE

In light of the challenges outlined in the case studies, the lack of data on water use and lack of policy coherence between water and energy resource management indicate that significant barriers exist to effectively manage these interlinked resources. To successfully address the water-energy nexus and achieve positive change in how BC's water and energy resources are governed, clear and consistent water, energy, and climate policies are a prerequisite. Policy initiatives must be linked and driven by common principles that guide decision-makers, political leaders, and policy analysts as reforms are made to the way water and energy resources are managed in BC. Bottom-up governance is also required to ensure that those people, communities, and regions directly impacted by decisions about the allocation and use of water and energy resources have a stronger say in such decisions.

KEY MESSAGE

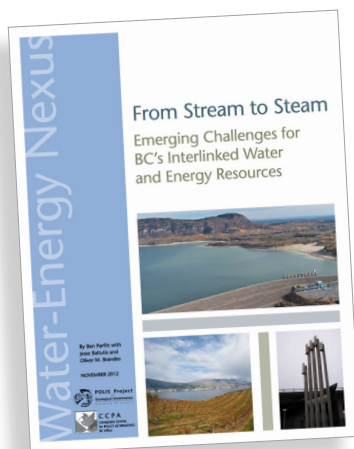
Governance arrangements over water and energy resources in the province of BC are inconsistent with the goal of lowering provincial greenhouse gases. Efforts at revising water and energy policies, while trying to achieve reductions in greenhouse gas emissions and foster expanded economic activity in the province's traditionally strong resource sectors, appear to be uncoordinated at best, and at worst in conflict with one another.

Improved governance of water and energy resources should be a top public priority. Changes in both top-down and bottom-up governance structures are needed to ensure there is consistency between different policy objectives and that local and regional knowledge is effectively utilized.

RECOMMENDED ACTIONS FOR IMPROVED GOVERNANCE OF BC'S WATER AND ENERGY RESOURCES

From Stream to Steam recommends four actions that the provincial government can take immediately which will begin the shift towards more effective governance while broader changes to governance approaches and structures are considered:

1. **PUBLISH ACCURATE AND TIMELY REPORTS ON ALL PROVINCIAL WATER USE:** The critical lack of data undermines the sustainable management of BC's water and water-derived power resources.
2. **APPROPRIATELY PRICE WATER AND ENERGY RESOURCES:** Setting higher prices results in greater conservation, and may result in water utilities saving tens of millions of dollars each in increased infrastructure investments to pump and treat water and on-going associated energy costs. However, price increases must be applied equitably to ensure, for example, that low-income households or households with higher numbers of family do not face undue financial burden; or that residential water and hydro users do not subsidize industrial water and energy users.
3. **PROMOTE RESOURCE RECOVERY TO CONSERVE WATER AND ENERGY RESOURCES:** Resource recovery projects reduce demands on our water and energy systems by utilizing energy in waste streams and reusing wastewater.
4. **PRIORITIZE WATERSHED HEALTH AND FUNCTION:** Protecting lands surrounding community water supplies greatly improves prospects for water resources being conserved and protected, with implications for water and water-derived energy resources in future years.



Download the full report at: poliswaterproject.org/publication/503 or policyalternatives.ca/water-energy

From Stream to Steam: Emerging Challenges for BC's Interlinked Water and Energy Resources was written by Ben Parfitt with Jesse Baltutis and Oliver M. Brandes, and co-published by the POLIS Project on Ecological Governance and CCPA-BC.

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