
# Green Energy Projects and Utilities:

An Investment and Governance Guide
for BC Local Governments and First Nations

## Volume 1:
## Making Investment and Governance Decisions

Prepared by

Community Energy Association

Funded by:

British Columbia
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Pine Beetle Epidemic Response Branch

Southern Interior Beetle Action Coalition
SIBAC

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Columbia Basin Trust
a legacy for the people

Cariboo Chilcotin Beetle Action Coalition

Omineca Beetle Action Coalition

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# Contents

## About This Guide

The *Green Energy Projects and Utilities: An Investment and Governance Guide for BC Local Governments and First Nations* (Volumes 1 & 2) has been created to provide information and analysis on financing and implementing green energy to rural communities and First Nations throughout the Mountain Pine Beetle epidemic zone to help these communities identify and develop local green energy opportunities.

The guide is presented in two volumes:

- Volume 1: *Making Investment and Governance Decisions*
- Volume 2: *Case Studies in Financing and Ownership of Clean Energy Solutions*

For the purposes of this guide, a green energy **project** is one where green power or heat is generated for local government or First Nations facilities or where the project is specific to one building or set of related buildings and there are no additional customers or billing. A green energy **utility** is one where green power or heat is distributed to buildings external to the project and/or a utility has been established to bill for that service.

**Volume 1** of the guide (*Making Investment & Governance Decisions*) introduces the reader to the green energy systems (stages, integration and motivation) and provides detailed information to support decisions about ownership and operation, legal and financial considerations and public engagement.

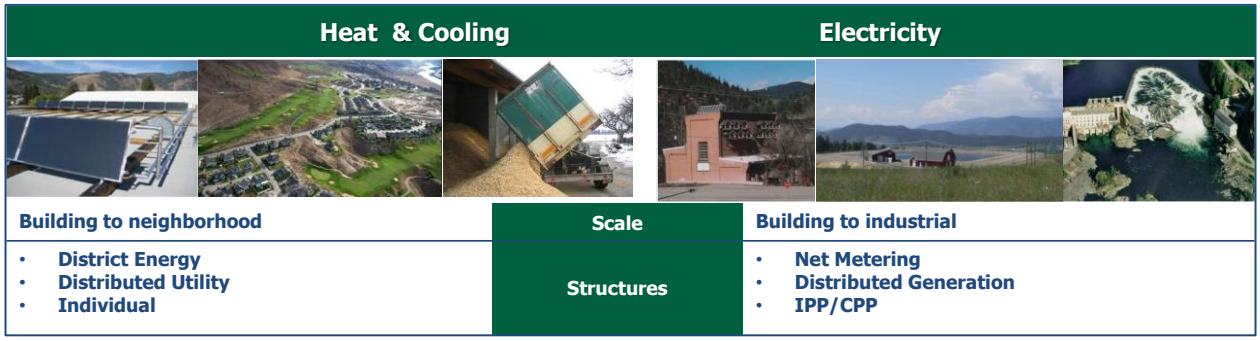
To develop **Volume 2** of the guide (*Case Studies in Financing and Ownership of Clean Energy Solutions)*, fundamental information was captured for 38 green energy projects or utilities located throughout the province. (Appendix A.) Projects on the list were evaluated and a total of 13 projects and utilities selected for detailed case studies. To be included in Volume 2, a project or utility must have:

- had some involvement from either a local government or First Nations,
- been operational and considered 'successful,'
- been willing to contribute to the case study by providing detailed information, including financial information, and
- been a good representation of project type.

Case studies are provided for each of four ownership categories: Privately Initiated, Joint Venture, Full Ownership and Full Ownership with Contracted Operation. Each case study summarizes energy system attributes, governance structure and system financing and provides some detailed information on system development and lessons learned.

# Executive Summary

Green energy systems are comprised of either heating or electricity systems or sometimes both (co-generation). Both heating and electricity systems can exist at multiple scales from individual buildings to neighborhoods or, in the case of electricity, industrial scale operations. Different frameworks are applied at each scale, as outlined in the graphic below.




At the building scale (project in the parlance of this guide), decisions on ownership and governance are relatively simple. Moving to neighborhood, or larger, scales involves more complex ownership, risk management, governance and financing questions. A summary of the key ownership structures and their relative strengths is provided below.

**Legend**: Community = First Nations or Local Governments, Color coding: green=good, red=poor, yellow=moderate.

| Consideration | Community Department | Community Company | Private | Joint Venture / P3 |
|---|---|---|---|---|
| **Financial** | | | | |
| Access to capital – initial build | | | | |
| Access to capital – expansion | | | | |
| Cost of borrowing | | | | |
| Non-tax revenue source | | | | |
| Access to grants | | | | |
| Local government financial risk | | | | |
| Can withstand years of losses | | | | |
| Ability to capture offsets | | | | |
| **Operational** | | | | |
| Technical expertise | | | | |
| Operational flexibility | | | | |
| Admin and monitoring scale | | | | |
| Insulation from operating risk | | | | |
| Alignment with public interest | | | | |
| **Simplicity** | | | | |
| Complexity of structure | | | | |
| Overall simplicity for LG/FN | | | | |
| **Other** | | | | |
| BCUC regulation burden | | | | |
| Transparency of rate setting | | | | |
| Limits political interference | | | | |
| Political risk | | | | |

The table below summarizes considerations noted by case study participants (described in detail in Volume 2 of this guide) as well as those uncovered through additional research.

| Case Study participants recommendations | Additional recommendations from research |
|---|---|
| ✓ Solution developers have emphasized the importance of leadership, communication and accountability. Partnerships and good relationships between partners are key. Project leads should stand firm on essential program elements, but be flexible otherwise.<br>✓ Local capacity and experience, including local suppliers, is an advantage for any project. Local fuel sources lead to economic benefit but making sure fuel sources are reliable is absolutely essential.<br>✓ Do your homework, but don't overdo it. While feasibility studies are essential, they cannot predict everything. Several participants noted that both good and bad luck on timing had significant impacts on projects.<br>✓ When dealing with multiple funding partners, hitting milestones can be challenging. Subsidies and incentives have been essential to all projects profiled.<br>✓ Develop an informed, confident community, especially youth members. Projected profits can be very good at convincing council to take a risk but setting customer rates is complex.<br>✓ Project scale affects both affordability and benefits. Scalability – the ability to expand a system in the future – is essential. Often one successful project leads to another.<br>✓ Both developing and operating a system involves steep learning curves.<br>✓ It is important to conserve energy first and innovate second. | ✓ The business model includes a large initial capital cost followed by years of losses before profitability is achieved. An energy utility is a long-term play.<br>✓ Return is typically linked to risk. Not all investments share the same risk; some will earn more return.<br>✓ Local governments in BC have access to low cost debt through the Municipal Finance Authority but this comes with strict borrowing limits (25% of previous year's revenue) which can limit the size of the utility and the ability to expand in future years.<br>✓ Ownership structure of the utility can affect tax treatment which can be the difference between a utility that is viable and one that is not. First Nations and Local Governments do not pay the same income tax as private sector companies.<br>✓ Ownership is not a decision that can be put off until the end. Some grants will require certain ownership structures and utilities offering to pay for the cost of initial studies will often require an exclusive right to develop the system if it is viable.<br>✓ Set aside more time than you think you'll need for public consultation, particularly if combustion is involved.<br>✓ If there is a need for multiple equity partners, consider a limited liability partnership as the corporate structure to more clearly insulate parties from risks and to take advantage of any profits being taxed in the hands of the partners rather than the company. Electricity generation is the most common type of utility requiring multiple equity partners.<br>✓ If multiple energy utilities are being contemplated or if there is a desire to further insulate the utility from local political shifts, consider establishing a development corporation to be the entity that negotiates and holds the equity positions in the partnerships.<br>✓ Seek professional tax, business, and legal advice when considering establishing an energy utility or project.<br>✓ Energy Service Companies (ESCOs) will write performance contracts to eliminate risk on energy utilities…for a price. |

# 1. Introduction to Clean Energy Solutions

The purpose of the Green Energy as a Rural Economic Development Tool project is to increase rural knowledge of green energy opportunities and facilitate increased rural benefits from green energy development in the Mountain Pine Beetle (MPB) epidemic zone of BC. Transitioning British Columbia to a green energy powerhouse and facilitating green energy development are priorities for the BC government. These goals are reflected in the BC Energy Plan and the BC Climate Action Plan.

While most analysts see rural BC as having competitive advantages for growth compared to other jurisdictions, a recent Globe Foundation report *(Powering our Province: An Analysis of the Clean Energy Business & Workforce Opportunities for Communities in British Columbia*, 2012) concluded that the vast majority of BC's current "green economy" is clustered in the Lower Mainland/Southwest region of the province. Additional action is required to ensure that the benefits of the green economy extend out to the other regions of the province.

Rural communities, First Nations and the provincial government are all interested in exploring how green energy development can contribute to regional and community economic growth and diversification. This is especially true in the interior of BC where - as a result of the MPB epidemic - local governments and First Nations are keenly interested in facilitating economic growth and diversification. There is also considerable interest amongst many rural communities and First Nations in the MPB epidemic zone to explore the options of creating and operating community-owned green energy utilities.

For the purposes of this guide, **a green energy project** is one where green power or heat is generated for local government or First Nations facilities or where the project is specific to one building or set of related buildings and there are no additional customers or billing. A **green energy utility** is one where green power or heat is distributed to buildings external to the project and/or a utility has been established to bill for that service.

The guide is presented in two volumes:

- Volume 1: *Making Investment and Governance Decisions*
- Volume 2: *Case Studies in Financing and Ownership of Clean Energy Solutions*

This guide has been created to provide green energy information and analysis to rural communities and First Nations throughout the MPB epidemic zone and to assist them with the identification and development of green energy development opportunities in their communities.

**Volume 1** was written specifically for local government and First Nations leaders and staff addressing the unique legal, financial and governance issues to be aware of when becoming financially involved in green energy projects. The final section of Volume 1, *Making Project Investment and Governance* decisions, addresses high-level issues associated with green energy project investment and governance, including consideration of issues around organizational capacity, cultural influences, decision-making processes, availability of resources and political influences.

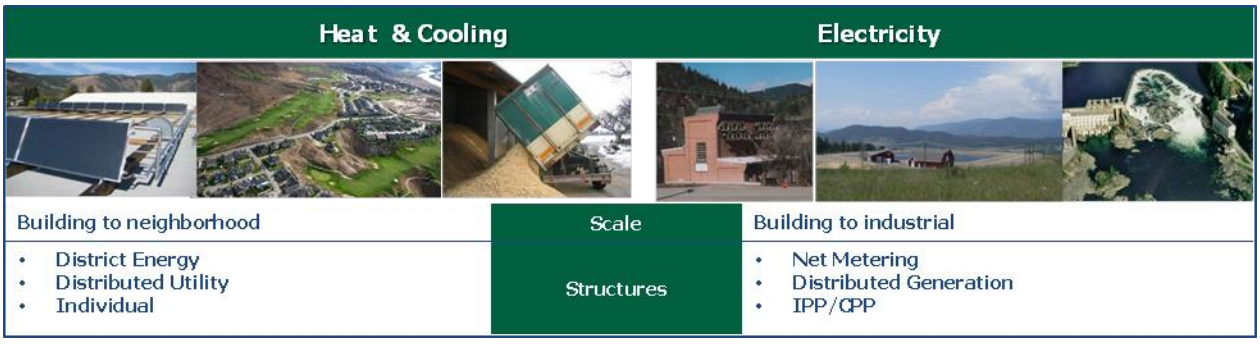
In response to interest from local government and First Nations leaders represented on the Beetle Action Coalitions, **Volume 2** (*Case Studies in Financing and Ownership of Clean Energy Solutions)*, was developed to present detailed case study information on how rural communities and First Nations have established and operate their existing green energy projects, in order to inform other community leaders on those lessons learned. To develop Volume 2 of the guide, fundamental information was captured for 38 green energy projects or utilities located throughout the province. Projects on the list were evaluated and a total of 13 projects and utilities selected for detailed case studies. To be included in Volume 2, a project or utility must have:

- had some involvement from either a local government or First Nations,
- been operational and considered 'successful,'
- been willing to contribute to the case study by providing detailed information, including financial information, and
- been a good representation of project type, via a reasonable combination of
    - length of operation
    - number of customers (diversity – small, medium)
    - diversity of revenue sources
    - smaller community (preferably outside of Metro Vancouver and CRD)
    - green energy source (variety of, not just biomass)

Case studies are provided for each of four ownership categories: Privately Initiated, Joint Venture, Full Ownership and Full Ownership with Contracted Operation. Each case study summarizes energy system attributes, governance structure and system financing and provides some detailed information on system development and lessons learned.

## Green Energy Systems, Stages and Integration

Green energy systems can be comprised of either heating or electricity systems or, in the case of co-generation, heating *and* electricity. These systems exist at multiple scales – serving individual buildings or neighborhoods or, as is often the case with electricity, industrial scale operations. Structural frameworks for governance and financing tend to differ according to scale, as outlined in the graphic below.




Typically, green energy systems at the building scale are **projects** and systems at larger scales are **utilities**. For the purposes of this guide, a green energy project is one where green power or heat is

generated for local government or First Nations facilities only or where the project is specific to one building or set of related buildings and there are no additional customers or billing. A green energy utility is a project where green power or heat is distributed to buildings external to the project and/or a utility has been established to bill for that service.

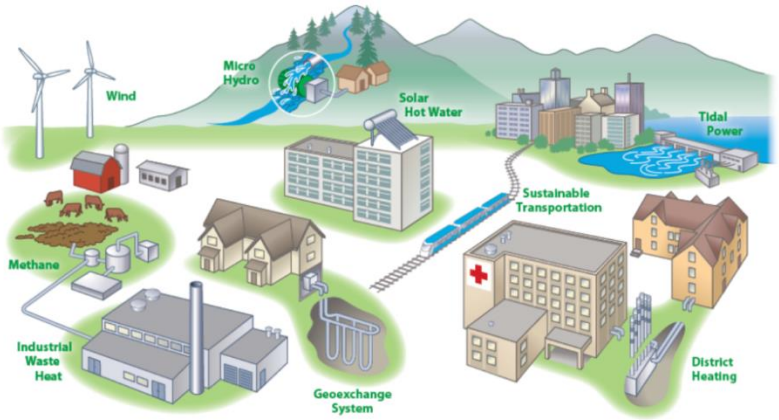
The chart below outlines the main development stages of green energy systems and typical sources of financing at each stage.

| Plan | Design | Build / Install | Operate & Maintain |
|---|---|---|---|
| • Utility grants<br>• Development trusts<br>• Federation of Canadian Municipalities Green Municipal Fund<br>• Borrowing<br>• Local government or First Nation operational budget<br>• Gas tax<br>• Provincial grants (Infrastructure Planning,...) | | • Federation of Canadian Municipalities Green Municipal Fund<br>• Utility Grants<br>• Borrowing<br>• Private sector risk capital or investment<br>• Gas tax | • Electricity Purchase Agreement OR customer heat charges<br>• Taxes<br>• Community economic development<br>• Production credit<br>• Offsets<br>• Net metering credit? |

Individual green energy projects can benefit from a broader context if they fit into an Integrated Community Energy System. Quality Urban Energy Systems of Tomorrow (www.questcanada.org) provides a coherent and forward thinking perspective on locally-based integrated community energy systems which recognizes that significant benefits can be realized by thinking in an integrated way about energy in a community.

QUEST has developed the following principles for successful governance of local energy systems:

1. Match land use needs and mobility options. Understand energy interactions between land use and infrastructure for water and wastewater, waste management, personal mobility, goods movement and building design decisions.
2. Match energy options to local context. Building on land use choices, consider local climate, industrial structure, availability of local sources of waste and renewables.
3. Send clear and accurate price signals. Consumers should see and pay full real costs, including external costs.
4. Manage risks and be flexible. Maintain technological and fuel diversity, pursue cost-effective opportunities first and incorporate learnings, assume the need to adapt quickly to



Community Energy

market and technological surprises.

5. Emphasize performance and outcomes in policy and regulations. Avoid prescribing specific fuels and technologies.
6. Pursue policy and program stability. Maintain a consistent and predictable decision-making environment to sustain investor confidence.

These principles illustrate that energy systems are more than just hardware in the ground. They impact and are impacted by many government decisions at the local level. First Nations and local governments each have roles to play in establishing a vision for their communities and encouraging energy systems that support that vision. They can also play a significant role in establishing which green energy resources are developed in their area and how they are developed.

## Green Energy Motivation

The motivation for local governments and First Nations to participate and champion community energy systems can be as variable as the leadership and administration of these governments. Typically however, the following motivations are mentioned:

- a political desire to achieve or work towards carbon neutrality for local and First Nations governments as well as commercial and residential energy users in the community,
- financial incentives to participate in the BC Climate Action Charter (Climate Action Revenue Incentive Program),
- a desire to assist public sector organizations with legislated carbon neutrality goals,
- a desire to maximize the use of local resources,
- a desire for local energy security,
- the potential to reduce on-going energy costs for buildings,
- the possibility of non-tax revenues, and
- the desire to support local economic development.

Many local government leaders recognize that climate change is happening and that there is a need to act locally in the light of uncertain federal government direction. In many cases, they also recognize that community energy systems are crucial to addressing the larger issues of energy independence and security for the country as a whole.

The motivations and abilities of local governments and First Nations to advance community energy systems may be self-evident. But the motivations, expectations and availability of third parties that must often be engaged in partnership to implement successful community energy systems can be quite different. Partner motivations, expectations and abilities must be carefully considered and managed to reduce potential roadblocks, dead ends, confusion and misunderstandings during system development.

Community energy systems for heat, electricity generation, or co-generation can provide a number of benefits to a local community. Some of these benefits, taken from the *Clean Energy for a Green*

*Economy* guide published by Community Energy Association with funding from the RuralBC Secretariat, are outlined below

**Building Community Capacity**

| | |
|---|---|
| **New partnerships and collaboration** | Clean energy projects provide opportunities to engage key people and supportive organizations, and build new partnerships and collaboration within the community, with neighbouring communities, with provincial regulatory authorities, other agencies, institutions, and businesses. |
| **Local energy** | Fossil fuels are sourced from outside a community. Energy or fuel such as biomass is often sourced within the community or region, resulting in ongoing local investment with associated job benefits. |
| **Energy security** | Customers of the system may see stabilized and potentially reduced energy bills. The community will also have partly diversified the sources from which it obtains its energy. |
| **Confidence in your future** | The leadership you are showing by developing an implementation plan for your clean energy project will help articulate a direction for a local green economy, while at the same time building new expertise, experience and confidence in your community's economic future. |

**Local Economic Development**

| | |
|---|---|
| **Clean energy service centre** | Undertaking a clean energy project will lead to a net increase in specialized knowledge and practical experience within your community. The expertise gained can lead to the creation of a regional clean energy service centre, providing training, capacity-building and project management services to neighbouring communities interested in their own clean energy initiatives. |
| **Economic Development** | In the pre-feasibility and feasibility stages, there is the potential for creating new biomass-related technical expertise<br>During construction there may be potential for manufacture and sourcing<br>In Operations / Maintenance, creating new technical expertise<br>And throughout, there is Community Economic Development: Attraction of related companies; Increased local tax base and/or non-tax revenue stream; Partnerships and collaborations with neighbouring local governments, First Nations and the private sector; Enhanced community profile and branding. |
| **Local Capital Investment** | Tens of thousands to millions of dollars of community investment at start-up. Major components will be imported to the community, local contractors may be used, and other components may be sourced locally, e.g. building materials. Ongoing investment will also occur with system expansions. |
| **Attracting investment** | A clean energy project will attract business and investment capital that can be leveraged by the community. In addition, a range of funding grants and below-market loan programs are available for clean energy and energy efficiency programs. These funding streams can be used to attract other investment partners to your community. |
| **Competitive advantage** | Showing leadership in developing a local green economy can give your community a competitive advantage by attracting green investment and developing a green community brand. Forecasts for employment and investment growth in the clean energy sector in North America and world-wide are uniformly high for the foreseeable future. Clean energy can position your community to take part in this growing sector of the economy. |
| **Business expansion and development** | Business expansion and new business development can also result from undertaking a clean energy project and related service infrastructure upgrades, helping to diversify and strengthen the local economy and retain existing businesses. Opportunities exist for specialized manufacturing and knowledge-based businesses, training and education services, as well as local suppliers of goods and services. |

**Environmental and Community Health**

| | |
|---|---|
| **Greenhouse Gas Reduction** | Many forms of renewable energy are carbon neutral or considered carbon light and, as such, is not subject to the carbon tax. Public Sector buildings (Province of BC, Schools, Universities, Colleges, Crowns, and Hospitals) will reduce their carbon offset liability when replacing fossil fuels. |

| | |
|---|---|
| **FireSmart** | Biomass DH systems can help contribute to community fire risk reduction. They can provide an additional source of funding for community wildfire mitigation activities if the biomass generated can be economically transported to the DH system, and they can provide a market for logging slash piles that may otherwise represent a fire risk. |
| **A healthier community** | Efficient land use and transportation planning (that support district and renewable energy) can also promote walking and cycling opportunities, thus promoting a healthier lifestyle and viable alternatives to the automobile. |

**Community Priorities**

| | |
|---|---|
| **Municipal revenue** | A project or utility owned by the local government, if successful and priced to generate a utility rate of return, may provide a non-tax revenue source after initial capital is paid off in 10-20 years. |
| **Local government commitments** | A project or utility can help local governments meet their commitments by reducing community and corporate greenhouse gas (GHG) emissions. Through the Local Government (Green Communities) Statutes Amendment Act (Bill 27), local governments are required to set GHG targets, policies, and actions in their Official Community Plans and Regional Growth Strategies. The voluntary Climate Action Charter commits local governments to becoming carbon neutral in their own operations, and creating compact, energy efficient communities. |
| **Quiet, unobtrusive, and AQ maintained** | A well designed and installed project or utility, using modern and clean technology, will likely be quiet and unobtrusive when installed and show no noticeable impact on air quality. |

(Content from "Clean Energy for A Green Economy," with modifications. Source: Community Energy Association 2010)

The following list of questions from the *Clean Energy for a Green Economy* guide is a good starting point for considering both the potential benefits and viability challenges of a green energy system.

| System | Clean Energy Questions | Green Economy Opportunities |
|---|---|---|
| **District Energy** | • What are my community's sources of low-cost heat?<br>• Are these available for the long-term?<br>• Is there a mixed-use development fairly close to available heat source(s)?<br>• Is there a hospital, rink or pool close to mixed-use development?<br>• Can public sector buildings (that share a carbon neutral commitment) serve as an anchor for a broader district energy system?<br>• Are there new developments that can be encouraged to incorporate district energy?<br>• Can we time the laying of district energy pipes to coincide with regular infrastructure improvements, or with new infrastructure installations, to save installation costs?<br>• How can our local government or band play an active role to encourage district energy?<br>• Should the local government or band own and/or operate the district energy utility, fully or in part?<br>• What are potential community concerns and how should the community be | • **Plan / Design**<br>○ R&D in local colleges, universities and manufacturing firms<br>○ Creation of new local industry skills to serve surrounding communities<br>• **Build / Install**<br>○ Installation of district energy system<br>○ Building of local industry skills to serve surrounding communities<br>• **Operations / Maintenance**<br>○ Establishment of a local energy utility<br>○ Utilization of local energy resources to fuel the system, including supporting local industry through use of waste heat or waste biomass<br>○ Ongoing operation and maintenance of the system<br>• **Community Economic Development**<br>○ Attraction of related clean energy companies to form a clean energy hub<br>○ Increased local tax base and/or non-tax revenue stream<br>○ Partnerships and collaborations with neighbouring communities, First<br>○ Nations and the private sector |

| | | |
|---|---|---|
| | engaged? | • **Enhanced community profile and branding** |
| **Small Scale Hydro** | • Where is there opportunity for small hydro given present water licenses?<br>• Does the community water supply present opportunities?<br>• Is there sufficient energy in the water for economically viable power generation?<br>• What permits are required?<br>• What capital cost is required and how can that capital be raised?<br>• What ecological and terrain issues must be managed?<br>• What are potential community concerns and how should the community be engaged? | • **Plan / Design**<br>○ Local design jobs<br>• **Build / Install**<br>○ Local construction jobs<br>○ Construction-related services (backhoe rentals, cement manufacture, etc.)n related to construction<br>• **Operations / Maintenance**<br>○ On-going maintenance of the power facility<br>○ Power generation revenues flowing to the local government or First Nation<br>○ Potentially increased security of local power supply<br>• **Community Economic Development**<br>○ Attraction of related clean energy companies<br>○ Secure local power supply could be a positive factor in attracting and retaining local business<br>○ Increased local tax base and/or non-tax revenue stream<br>○ Partnerships and collaborations with neighbouring local governments, First Nations and the private sector<br>○ Enhanced community profile and branding |

If answers to the above questions suggest there is potential for green energy systems in your community, this guide will help you through the making decisions and considering trade-offs regarding ownership and governance of green energy systems.

## Ownership Choices and Trade-Offs

There is no one right answer for all situations and all ownership choices involve trade-offs. Taking time at the beginning, to develop an understanding of the utility business model (large capital cost, years of losses, followed by profits) and what trade-offs your local government or First Nation is willing to make over the long term, is worthwhile.

Sometimes decisions about ownership structure are required in the earliest stages of investigation, particularly if a private utility is offering to fund feasibility studies in return for exclusive rights to the system. Ownership choices may also influence which grants are available to the project. The chart below provides a simple overview of broad utility ownership models, some of the key considerations and trade-offs involved and a high level comparison of each ownership model.

**Legend**: Community = First Nations or Local Governments, Color coding: green=good, red=poor, yellow=moderate

| Consideration | Community Department | Community Company | Private | Joint Venture / P3 |
|---|---|---|---|---|
| **Financial** | | | | |
| Access to capital – initial build | | | | |
| Access to capital – expansion | | | | |
| Cost of borrowing | | | | |
| Non-tax revenue source | | | | |
| Access to grants | | | | |
| Local government financial risk | | | | |
| Can withstand years of losses | | | | |
| Ability to capture offsets | | | | |
| **Operational** | | | | |
| Technical expertise | | | | |
| Operational flexibility | | | | |
| Admin and monitoring scale | | | | |
| Insulation from operating risk | | | | |
| Alignment with public interest | | | | |
| **Simplicity** | | | | |
| Complexity of structure | | | | |
| Overall simplicity for LG/FN | | | | |
| **Other** | | | | |
| BCUC regulation burden | | | | |
| Transparency of rate setting | | | | |
| Limits political interference | | | | |
| Political risk | | | | |

# 2. Making Investment and Governance Decisions

Local and First Nations' governments are uniquely positioned to assist and promote the interests of community energy by:

- accessing grants and low interest loans that are not available to private third parties,
- adding administrative capacity and endorsement to fledgling proposals,
- facilitating energy distribution through community rights of way,
- identifying energy needs in their respective communities, and
- aligning and coordinating community energy utilities with local and First Nations controlled utilities sharing the same space.

Local governments and First Nations often struggle with knowing how to proceed when: a) approached by a utility company interested in exploring district energy within their community, b) engaging with a utility would help bring their renewable energy project or utility to fruition, or c) choosing to move forward with the project or utility on their own. This chapter addresses legal, financial, governance and public engagement considerations associated with establishing green energy utilities and provides recommendations for moving forward.

## Governance Choices

Governance, at its most essential, is the set of rules for decision-making. Questions that should be considered in a discussion about energy system governance include:

- What will be the process, basis and responsibility for rate setting?
- How will decisions be made regarding system expansion?
- What will be the process and approach and for selecting energy sources (renewable or non-renewable or both and long term plan)
- How will obligations, debts, profits and risks be assigned?
- Who has responsibility for management decisions and what is the scope and authority or this role?
- Who represents the owner(s) of the system?
- What are guiding principles, goals and objectives for the system and how are they measured and reported on? How does this influence other decisions?
- How is accountability defined and implemented?

**DEFINITION**

**Governance** is the act of governing. It relates to decisions that define *expectations*, grant power, or verify performance. It consists of either a separate process or part of decision-making or leadership processes. In modern nation-states, these processes and systems are typically administered by a government.

When discussing governance in particular organisations, the quality of governance within the organisation is often compared to a standard of good governance.

In the case of a business or of a non-profit organisation, governance relates to consistent management, cohesive policies, guidance, processes and decision-rights for a given area of responsibility. For example, managing at a corporate level might involve evolving policies on privacy, on internal investment and on the use of data.

To distinguish the term govern*ance* from govern*ment*: "governance" is what *a* "governing body" does. A governing body might be a geo-political entity (nation-state), a corporate entity (business), a socio-political entity (chiefdom, tribe, family, etc.), or any number of different kinds of governing bodies. For all of these **governance is the way rules are set and implemented.**

Source: Wikipedia

- What are the scope and expectations for defining and ensuring accountability to stakeholders?

There are varying degrees to which a local government or First Nation may choose to become involved in an energy utility. The degree of involvement will clearly affect governance and decision-making rights. The graphic below illustrates a **spectrum of engagement** for First Nations and local governments regarding green energy systems within their territory or jurisdiction.


This diagram illustrates that local governments and First Nations always have a role to play in green energy systems in their territory or jurisdiction. This guide aims to provide guidance on selecting the role for the local government or First Nation in a green energy system.

## Why Choose Full Ownership?

In a full ownership model without an operating contract, a local government or First Nation chooses to own all of the generation and distribution assets associated with a project or utility. All regulatory and operational control resides with the local government or First Nation and they will both operate and maintain the system.

If a local government or First Nation is considering full ownership of a green energy project or utility, they should be aware that:

- Full ownership for local governments and First Nations carries a high level of accountability to the community.
- Considerable financial resources are required to overcome start-up costs. Staff will need to identify and apply for grants and/or loans, a time consuming process.
- Managing the requirements of multiple funders can be time consuming.
- Learning curves can be steep. Staff expertise will be required for design, planning, construction and operation.
- Processes will need to be managed for hiring trusted consultants and advisors and managing projects.
- Some case study interviewees recommend getting second opinions on feasibility studies and

**Factors that mitigate or justify the additional risks of full ownership:**

- strong political & community support
- grants or loans available to support start-up
- availability of a reliable local and low cost fuel supply
- equipment to be used is well understood and y easy to operate
- potential for community and economic co-benefits such as support for a local wood pellet industry, keeping a community asset that might otherwise be lost, or reduced operating costs
- electricity purchase agreements with a guaranteed long term price
- project is a pilot supported by grants

business plans.

The table below compares full ownership to a joint venture for a range of financial, operational, management and regulatory considerations related to green energy projects and utilities.

| Consideration | Full Ownership vs. Joint Venture |
|---|---|
| **Financial** | |
| Access to capital – initial build | **Reduced:** Joint ventures can bring additional resources to the table. |
| Access to capital – expansion | **Reduced:** Joint ventures can bring additional resources to the table. |
| Cost of borrowing | **Neutral:** Interest rates available to local government or First Nation unchanged |
| Non-tax revenue source | **Possible:** If the utility is profitable. Expect that years or decades will be required before capital debt is paid down and the entity is profitable. Note that rate-payers may view excessive rates as indirect taxation. |
| Access to grants | **Reduced:** Leveraging funds from other sources can improve ability to get grants. |
| Local government financial risk | **Increased**: Local governments will experience increased financial and development risk; there is a need to consult with experts throughout planning, development and operation. |
| Can withstand years of losses | **Reduced**: Local government or First Nation may consider selling the asset if losses persist over a number of years. Private partners have larger portfolios and are better able to absorb losses. |
| Ability to capture offset attributes | **Possible**: Capturing offsets possible under both joint venture (JV) and full ownership but only if the JV contract explicitly assigns environmental benefits to your organization. Also, be sure to read the fine print in grant applications. Most contracts with utilities will assign environmental benefits to the utility. Note that offsets generally are only applicable to heat generation or remote (off-grid) electrification. |
| **Operational** | |
| Technical expertise | **Neutral:** Private partners have broad experience in renewable energy implementation; however a local government may consult with various experts throughout planning, development and operation (although this will increase costs somewhat). |
| Operational flexibility | **Neutral:** In some cases, greater local government or First Nation control can increase the ability to be responsive to local conditions. In other cases, private sector control can increase access to solutions to operational difficulties. |
| Admin and monitoring scale | **Reduced:** A joint venture may have benefits over full ownership if the private sector partner is involved in multiple utilities and has established central monitoring, customer care, and back-office (billing, accounting, IT) to support multiple utilities. |
| LG/FN insulation from risk | **Reduced:** Local governments and First Nations can address lack of knowledge by consulting with experts but overall financial risks (e.g. cost overruns) are higher in full ownership models. |
| Alignment with public interest | **Increased:** Greater local control of the resource means that more benefits stay local. |
| **Simplicity** | |
| Complexity of structure | **Reduced:** Local control reduces the need for complex agreements. |
| Overall simplicity for LG/FN | **Neutral:** Full ownership may reduce the need for extensive consultation and agreements, but at the same time a trusted private sector partner can run with a project, reducing the need for local government or First Nation decision making. |
| **Other** | |
| BCUC regulation | **Reduced:** Local governments and First Nations do not need BCUC oversight for fully owned projects and utilities. |
| Transparency of rate setting | **Neutral:** Local rate setting is transparent; BCUC rate setting is transparent. |
| Limits political interference | **Neutral:** Political interference may occur throughout planning, development and operation but joint ventures are not insulated from political interference either, particularly in planning stages. |
| LG/FN political risk | **Increased:** Financial risks in particular are increased. |

### *Advantages and Disadvantages of Full Ownership*

The main advantages of this model are:

- Control over the project, including the ability to expand the system and make technology selections.
- Lower cost and greater flexibility of capital for local governments, which can access low-cost financing from the Municipal Finance Authority.
- Both local governments and First Nations are better placed than private companies to access grant monies from senior levels of government.
- First Nations can have additional tax advantages compared to private sector organizations associated with ownership.
- Flexibility and synergies with other operations. For example, staffing needs may be reduced by integrating staff across the project and other operations.

However, in directly owning and operating the energy project, the local government or First Nation takes on all the risks, both financial and legal, associated with running the project. The local government or First Nation must have, or be able to acquire, significant in-house expertise to commission (and perhaps design and build), operate and manage the system. There may be a need to add a core municipal function, which requires public and political support.

There are also costs associated with acting as an energy utility. Depending on how the system is structured, these are likely to include the purchase and placement of infrastructure, operation and maintenance, administrative costs (including metering and billing), as well as regulatory and governance costs. Cost savings can be achieved if existing utility structures, such as a local hydro supply or history of managing a utility, are in place.

### *Full Ownership with Contracted Operation*

An energy project may also be structured by vesting total ownership of the system and its assets in the local government and contracting out the servicing and operation of the system to a third party.

Advantages of full ownership with private operation:

- Council maintains some control, for example through setting rates through bylaws and operating policies, but less so than in the above models since Council would be constrained by contracts signed with the service provider
- Potential to benefit from private sector expertise in delivering energy services
- Avoids the extra steps required to receive BC Utilities Commission approval
- Relatively cheap capital, as above

In the case of First Nations, if a nation building approach is preferred, ensuring that the private operator is a member of the Nation will help the community reap employment benefits from the project.

### *Full Ownership of Utilities – Special Considerations*

Services provided by a local government or First Nation within its own boundaries are specifically excluded from the definition of public utility and are therefore outside the scope of the *Utilities Commission Act.* This means that if a local government provides alternative energy services to a

neighbourhood within its municipal limits, it will not be regulated by the Act. This has important implications, because the BCUC regulates prices and the capital structure of utilities (that is, the debt/equity ratio and other finance concerns). Local government utilities are therefore free to determine their own priorities and tolerance for risk. Since local government utilities are not subject to regulation by the BCUC, the utility also has significant flexibility in terms of planning and setting its own rates.

Local government or First Nation ownership of a utility provides an opportunity to promote sustainability objectives, bolster local energy security, and potentially contribute to local economic development by keeping energy dollars circulating locally.

Local governments and First Nations can have longer time horizons and lower discount rates than the private sector. By virtue of their public-service position, they have the flexibility to look beyond immediate bottom line considerations and balance investment return with preferential customer rates, long-term energy security and environmental considerations.

Local governments in British Columbia have a long history of operating water, sewer and solid waste utilities. Only recently, however, have local governments ventured into the provision of energy services (with some notable exceptions, such as the Cities of New Westminster and Nelson).

Local governments and First Nations have been involved in the development and operation of several different types utility companies:

**District heating utilities**

District heating systems (sometimes called 'community energy systems') can offer a good opportunity for many local governments and First Nations to create sustainable energy utilities. District heating is a long-established technology, providing heat to the residents of many European cities. Several local governments and First Nations in Canada already own and operate a district heating utility.

**District electricity utility or "micro-grid"**

A government or First Nation can establish an electric utility that serves a new development or small neighbourhood. Similar to a district heating utility, the local government or First Nation could own the generation and distribution assets and provide customer services and billing. The system would include renewable energy generation (e.g. through a biomass co-generation system or solar photovoltaic panels) and would distribute electricity to customers connected to the system. Such a utility could be connected to the main grid. This would enable it to 'import' power from the grid in case of a power shortfall and 'export' power to the grid to sell any surplus power (through BC Hydro's Standing Offer Program).

## Decentralized utilities

Utilities do not necessarily own and operate a single integrated system. There are models in which the utility owns and operates a portfolio of decentralized small energy systems. This can work with both heat and electricity technologies.

A local government or First Nation utility can install renewable energy equipment such as solar water heaters or ground-source heat pumps in buildings throughout the community and charge for their use. The utility would pay the upfront costs of installation and would own the energy system. Customers would pay either a flat rate or would pay an energy bill based on their energy use. Utilities of this kind are most successful when the customer experiences immediate savings over their previous energy system.

## Independent power production

Local governments or First Nations can act as Independent Power Producers (IPPs), and develop renewable electricity projects that sell power to BC Hydro. BC Hydro buys power in a number of ways, but the most relevant for local government IPP projects are the *Call for Power* process and the *Standing Offer Program*.

***Standing Offer Program***

BC Hydro introduced the standing offer program in 2007, to encourage small, decentralized renewable energy projects. Projects with an electricity generating capacity of 50kW to 10MW are eligible but must sign a minimum 20-year Electricity Purchase Agreement at a guaranteed price. A utility can also generate energy for its own use and sell excess power to BC Hydro under this program.

***Calls for Power***

BC Hydro issues periodic calls for power, in which it invites IPPs to propose power projects and selects those from which it will undertake to sign an Electricity Purchase Agreement.

For most local governments and First Nations, the IPP model will only be possible in partnership with a private sector partner, because of the level of expertise needed to develop an IPP project.

### *Steps to Establishing a Utility*

The process for establishing a municipal utility will be unique in each jurisdiction and will be influenced by the way in which ownership and operation of the system is structured. In every case, however, there are certain common steps that must be considered, irrespective of the ultimate form that the utility takes. These include:

| | |
|---|---|
| **1. Identify possible projects** | Community Energy Association guides and Natural Resources Canada's RETScreen tool can help evaluate potential projects. |
| **2. Complete prefeasibility study** | A prefeasibility study provides a high level scan of possible energy sources and demand. This can be done in-house if resources are available or a consultant can complete the work. |
| **3. Contact potential partners** | Contact potential partners to confirm interest and/or project support. District heating utilities will need to confirm interest from potential customers, an IPP will need to confer with BC Hydro. |
| **4. Establish steering committee** | This group should include at least one elected official, staff members and key partners and/or customers. |
| **5. Contact relevant authorities** | Environmental regulatory authorities, such as BC Ministry of Environment or the federal Department of Fisheries and Oceans should be contacted early. |
| **6. Investigate sources of funding** | Including funding to support detailed studies as well as capital financing and funding. |
| **7. Feasibility studies for viable options** | If potential is evident, a detailed feasibility study provides a thorough evaluation of social, economic and environmental costs and benefits as well as financial viability and risk analysis. |
| **8. Secure financing** | Various guides are available to assist with identifying capital funding and financing. |
| **9. Create governance structures.** | Partnerships essential to system development and operation should be clarified and acknowledged via partnership agreements. Governance structures should be identified and put in place. |
| **10. Begin project development** | |

### *Full Ownership for First Nations – Additional Considerations*

BC First Nations, at the local and provincial level, have participated in the development of organizations integral to economic development, including

- sector-specific organizations and action plans,
- First Nations funds,
- lending and financing institutions,
- First Nations education, training and human resource development organizations, and
- First Nations policy, political and advocacy groups.

All of these initiatives and organizations have developed strategic and action plans, most of which include a distinct economic development focus. Their participation, experience, and expertise are essential to the success of this Plan, and many of these organizations have been instrumental in its

development. First Nations, who often live in remote communities, have several reasons to consider full ownership in renewable energy utilities[1]:

- Rising energy costs for community members
- Reduction of energy costs to the Band/First Nation spent on building heating and electricity
- Opportunity to develop a business to export power (on-grid)
- Control of local electricity source (off-grid)
- Improve local energy security

In spite of the significant interest in reducing costs and developing alternatives in aboriginal communities, there remain a number of barriers to this development. The extent to which a barrier may or may not apply is community specific, but common issues are outlined below:

| | |
|---|---|
| **Limited Access to Capital** | Some Aboriginal communities, like many towns and villages, have limited access to capital that is not already needed for other community projects. Accessing the capital required for large energy projects depends heavily on government support or the ability to attract an outside partner. |
| **Uncertainty around Funding Programs** | Programs for Aboriginal communities can be accessed either directly (as was the case of the Aboriginal and Northern Community Action Program (ANCAP)) or indirectly through Aboriginal Business Canada (ABC). These programs can be of great assistance to projects but uncertainty in funding procedures and decisions and seasonal issues can cause significant delays. |
| **Limited Scope of Decision-making and Funding Programs** | There are a wide variety of funding windows to different agencies. Decision making tends to be top down and rarely involved the community. Funding programs are often limited to specific mandates – for example, the ANCAP could not fund residential projects and its predecessor, the Aboriginal and Northern Climate Change Program, could not fund capital purchases. |
| **Leveraging Required** | Programs that do allow for capital purchases often provide a small portion of overall project costs, with the intent being to use these funds to leverage further investment. This is not helpful in cases where commercial partners don't exist and communities have limited ability to raise funds from traditional lending sources. |
| **Need for a Long Term Champion** | Energy projects are long-term projects and are often complex. It is important for a "project champion" to emerge from within the community who will see a project through to completion. Steps required include fundraising, obtaining community buy-in, regulatory matters and project management. A lack of human resources to dedicate impede a project's progress. |
| **Short Election Cycles** | The two-year election cycles for chief and council can disrupt progress. New leaders may have different priorities or require time to understand project benefits and history. |
| **Consistency over Time** | Resource data collection takes at least a year to complete and often more. Having consistent local resources to collect data but can be difficult as individuals move in and out of the community. |

[1] *Aboriginal Energy Alternatives Summary Report 2008* (Pembina Institute) http://www.pembina.org/

## Why Choose a Joint Venture?

The table below compares joint ventures to full ownership for a range of financial, operational, management and regulatory considerations related to green energy projects and utilities.

| Consideration | Summary: Joint Venture vs. Full Ownership |
|---|---|
| **Financial** | |
| Access to capital – initial build | **Improved:** Profitable joint ventures will have access to local government and First Nation sources as well as private sources |
| Access to capital – expansion | **Improved:** Profitable joint ventures will have access to local government and First Nation sources as well as private sources |
| Cost of borrowing | **Neutral:** Interest rates available to local government or First Nation unchanged |
| Non-tax revenue source | **Possible:** If the utility is profitable. Expect that years or decades will be required before capital debt is paid down and the entity is profitable. Note that rate-payers may view excessive rates as indirect taxation. |
| Access to grants | **Improved:** Access to grants can be improved if other sources have been leveraged |
| Local government financial risk | **Reduced**: Joint ventures are a good way to transfer risk to experienced private utilities or ESCOs |
| Can withstand years of losses | **Improved**: Private partners have larger portfolios and are better able to absorb losses |
| Ability to capture offset attributes | **Possible**: Capturing offsets possible under both JV and full ownership but only if the JV contract explicitly assigns environmental benefits to your organization. Also, be sure to read the fine print in grant applications. Most contracts with utilities will assign environmental benefits to the utility. Note that offsets generally are only applicable to heat generation or remote (off-grid) electrification. |
| **Operational** | |
| Technical expertise | **Improved:** Private partners have broad experience in renewable energy implementation |
| Operational flexibility | **Neutral:** In some cases, greater local government or First Nation control can increase the ability to be responsive to local conditions. In other cases, private sector control can increase access to solutions to operational difficulties |
| Admin and monitoring scale | **Improved:** A joint venture may have benefits over full ownership if the private sector partner is involved in multiple utilities and has established central monitoring, customer care, and back-office (billing, accounting, IT) to support multiple utilities. |
| LG/FN insulation from risk | **Improved:** Private partners have broad experience in renewable energy implementation |
| Alignment with public interest | **Reduced:** Greater local control of the resource means that benefits stay local |
| **Simplicity** | |
| Complexity of structure | **Increased:** Greater complexity of structure requires more resources and expertise upfront (and sometimes longer timelines) to structure a project |
| Overall simplicity for LG/FN | **Neutral:** Full ownership may reduce the need for extensive consultation and agreements, but at the same time a trusted private sector partner can run with a project, reducing the need for local government or First Nation decision making |
| **Other** | |
| BCUC regulation | **Increased:** Private utilities must get approval from the Commission; this does ensure reasonable rates. |
| Transparency of rate setting | **Neutral:** Local rate setting is transparent; BCUC rate setting is transparent |
| Limits political interference | **Neutral:** Political interference may occur while choosing partners and establishing agreements but will be reduced during construction and operation |
| LG/FN political risk | **Reduced:** Financial risk is significantly reduced |

A joint venture is a commercial enterprise undertaken jointly by two or more parties who otherwise retain their separate identities. In a joint venture, partners work together to develop a new entity and

new assets by contributing resources over a specified time period. Partners exercise control over the enterprise and may share profits, revenues, expenses and assets. A project may begin as a joint venture but partners may buy or sell their interest, as long as contracts and agreements have a buy-out clause or can be amended.

Joint ventures are well suited to electricity generating projects and utilities because of the very high capital costs of these projects. It is less common to use the joint venture approach to building-scale projects or district energy (heat) projects and utilities.

Developing a green energy project or utility involves risk at all major stages:

| Financing | Construction | Operation |
|---|---|---|

Risks include those associated with resources and time required to meet regulations, oversight on energy pricing, and changes in demand (energy market) or fuel supply prices. A comprehensive list of risks is provided in Appendix B.

### *Advantage and Disadvantages of Joint Ventures*

Case studies subjects that used a joint venture approach chose this approach either because the level of risk was neither financially nor politically acceptable and/or they did not have the resources or expertise required for project start-up. In general, joint ventures make sense for local governments or First Nations when:

- risks associated with preferred technology and operations are high,
- start-up costs are high,
- local and in-house expertise is low, and
- grant and loan opportunities are limited.

Joint ventures offer the ability to mitigate financial, technical and operational risk through partnership agreements. These agreements specify upfront financing and technical expertise related to construction and operations. Local governments or First Nations can use joint ventures to leverage reserve funds, grants or loans with private sector investment.

Often private sector partners that have identified a business opportunity are willing to dedicate funds to initial studies that help determine the technical and financial feasibility of the project. Local governments or First Nations can benefit from knowledge gained without investing wholly into the project. If the project is feasible, and a local government or First Nation is willing to accept its associated risks, a private sector partner may provide development funds as long as agreements are in place that guarantee the benefits they require to justify the investment.

### *A Local Government Perspective*

BC local governments are empowered by guiding legislation to form partnerships with the private sector to deliver services.

Partial local government ownership can take several forms. In some cases, a local government may choose to own only some assets and not others. For example, a local government could own the distribution system in a district heating system, while a private partner might own and operate the heat generators. Alternatively, partial ownership can mean that a local government and private investors each hold equity in the project. This model will usually involve establishment of a subsidiary corporation.

The level of ownership a local government chooses often depends upon whether there are advantages to removing a project from the balance sheet, how much control of the project or utility is desired and/or how much accountability is acceptable to Council and the community. For strategic reasons, the public sector will often keep control of the entity (at least initially), even if a joint venture company owns the assets.

**Five elements of community governance that attract investors are:**

- stable institutions and policies
- fair and effective dispute resolution
- a separation of politics from business
- a competent bureaucracy
- a cultural match between governing institutions and their constituents, to generate community support and prevent politicization

A local government can also maintain control while transferring a majority of the shares to the private sector. In this case, the private sector partner will want to ensure that it can manage the entity effectively and will likely require powers of veto or weighted voting rights on certain issues. Typically, operation and maintenance functions are delegated to the private operator through a management contract.[2] Rights attached to shares and the rights held by shareholders are typically set out in a company constitutional document and/or shareholders' agreement.

Local governments choose to approach the Municipal Finance Authority (MFA) for financing. If this approach is desired, any restrictions on borrowing from MFA should be determined before any joint venture agreements are considered. It is unlikely that a private partner would be able to access capital at rates as favourable as those provided by the MFA, so capital brought in by the private partner can increase the overall capital cost for the project comparatively speaking.

### *A First Nation Perspective*

The foundation for relationships between BC First Nations and private sector development has evolved over the last ten to twenty years.

- First Nations have developed a clear resolve to reap benefits from resources in their traditional lands and have recognized that development of renewable local energy systems reduce their dependence on imported fuels.
- Developers now recognize Aboriginal and Treaty rights and the Crown's duty to consult and accommodate First Nations interests. Industry-initiated projects that do not reach agreements with First Nations have a higher level of investor risk.

[2] http://ppp.worldbank.org/public-private-partnership/agreements/joint-ventures-empresas-mixtas

- First Nations are linking their interest in sustainability to resource development. Development of renewable energy projects and utilities on First Nation land is often approached from this perspective and reciprocity is considered a keystone of sustainability.
- First Nations are often entitled to mitigation and/or compensation benefits from projects on their traditional lands. The degree of benefits required typically depends upon the degree of impact (from project development) to the First Nation's aboriginal rights.

Taking a **Nation building** approach to economic and community development tends to work better than seeking solely to generate economic activity. Nation building, a comprehensive approach that collectively addresses a First Nation's long term vision, creates an environment that supports development. Community leadership sets direction and builds an understanding of the difference between political, business and community accountabilities. Community institutions, policies and plans create the conditions that will attract investment in business. While nation-building doesn't guarantee economic success, it can improve the chances that economic development will take root and be sustainable.

First Nations interested in developing renewable energy resources seek benefits such as business opportunities, employment, training and financial participation. Interests of First Nations can include provisions to:

- establish a consultation process and promote measures intended to minimize impacts on the exercise of aboriginal and/or treaty rights,
- maximize benefit from business opportunities associated with all phases of the project,
- maximize financial benefit from the resource itself and maximize compensation for project impacts on First Nation traditional lands,
- establish implementation processes to guide the ongoing relationship between the parties, including a dispute resolution process,
- provide ongoing opportunities for First Nation members to become qualified for and secure employment opportunities during all phases of the project, at all job levels and to reduce barriers to First Nation member's employment, and
- establish and promote measures to minimize adverse environmental effects.

Separating business from politics is important. Businesses and Nation members must be clear about their roles and responsibilities and business managers must be free from political interference. Creating an economic development corporation responsible to a board of directors that includes outside expertise along with local knowledge can help achieve this. Separate advisory boards representing outside business experts can counsel the board of directors.

Successful joint ventures are built on a foundation of trust and respect and years of relationship-building. First Nations often require a pool of

**Principles for Good Partnerships**

Create benefits for both parties

Clarify objectives, expectations and boundaries

Learn about each other's culture

Be flexible where possible

Practice integrity

Understand the role of timing

Think long term

funding and expertise to develop and manage the nation-building facets of economy, resources and administration while corporations seek to meet social responsibilities, create stability through shared goals and efforts, access land, resources and business opportunities and draw from labour and suppliers in the local area. Both parties are profit seeking. Often successful corporate/Aboriginal initiatives result from an open dialogue identifying objectives sought by each organization.

Applying for federal funding programs for assistance with capital, feasibility plans and business plans can provide varying rates of success. Financing is a major challenge for most First Nations on two fronts.

- Most Aboriginal communities do not own (in a fee simple sense) the land and resources that they occupy, use and manage, presenting a relatively high risk profile (because of lack of collateral) when approaching financial institutions. Even established First Nation contractors can have difficulty acquiring performance bonds.
- Debt financing is a relatively new practice for BC First Nations.

Often First Nations need guidance and support to securing financing. Lawyers and hired consultants, preferably those with expertise in First Nation law, can assist with coordinating funding proposals.

While other joint venture structures exist, in BC First Nation financial participation in renewable energy based joint venture projects is usually via either an equity or profit sharing agreement.

**Equity Agreement**

Having an equity stake in a project means ownership of all or part of a company. For public companies, interest is held through ownership of shares in the company. Both shares and options to purchase shares at fixed price with a determined period of time (stock options) can be issued to a First Nation. Payments from projects in which First Nations hold equity are calculated on a percentage of net profits, via share dividends or both. Acquiring equity in a company can be achieved in two ways.

- A First Nation owns equity via a percentage or number of shares.
- A First Nation purchases shares, which has the same impact as if shared were granted and interest was debt financed.

An equity participation payout is always made from net profits, meaning that the First Nation share depends on revenues and expenses of the project.

**Profit Sharing Agreement**

Sharing profits without acquiring stakes in ownership is common in many First Nation benefit agreements. Shares are expressed as a percentage of net profits less excluded items. Because profit share will fluctuate from year to year, many agreements include provisions for minimum annual payments to the First Nation, allowing implementation costs to be covered in years the project is not profitable. This does not increase the amount that a First Nation will receive over the life of a project because profit share calculations are cumulative.

### *Establishing Agreements*

Letters of agreement, joint venture or contractual relationships are common types of ventures between the corporate and aboriginal businesses. Often relationships are initiated via:

- a memorandum of understanding,
- a cooperation protocol, or
- a socioeconomic agreement outlining elements of mutual interest in working together.

These agreements are normally negotiated between a corporation and a band administration with broader political objectives in mind. First Nation communities often create a steering committee to coordinate the broader decision processes that affect the interplay between socio-economic and business objectives. Some things to consider when building an agreement are:

- Agreements should clarify business and decision-making processes, objectives, roles and responsibilities of the partners as well as any specific provisions around nation building.
- Cultural differences can mean that negotiating a business arrangement between Aboriginal businesses and corporations can take longer than expected. Shared or complementary objectives improves decision making, as does a prior relationship.
- Many partnerships use joint management committees to share information and provide broad direction. These committees generally do not participate directly in management of the venture.
- Experienced business professionals who can navigate between the Aboriginal and corporate cultures can help build the confidence needed to take risks and drive agendas forward.
- Be aware of business objectives and community participation opportunities. Most communities involve elders in community decisions of significance—particularly those involving environmental concerns.
- Joint initiatives can challenge organizations to make creative and purposeful decisions. Building more time and dialogue into the process improves outcomes. When obstacles are encountered, make sure that these issues are really important; sometimes the risk of eliminating a requirement is low and benefits are high.

When creating agreements, consider the following:

| | |
|---|---|
| **Motivation** | Venture partners must meet their own requirements for return on investment and project control. Identify shared objectives and make sure you know what non-shared objectives are. Ensure that any agreements specify non-negotiable municipal and community benefits. |
| **Communication** | Ensure transparency of financial and business transactions. Trust is essential to productive business relationships. |
| **Need for Advice** | Obtain good legal and accounting advice when developing agreements/contracts for:<br>• Financing (loan agreements, security)<br>• Contributions and degree of ownership (shareholder agreement, governance, capital structure)<br>• Dispute resolution and buy out clauses<br>• Management, operations and maintenance contracts (including consideration of any incentives, operator liability, scope of work compensation, separate fees, compliance, dispute resolution)<br>• Interconnection agreements<br>• Fuel supply contracts<br>• Technology operating licenses, if required<br>• Electricity purchase agreement, if relevant<br>• Planning permission and permits<br>• Any leases that are required for land or equipment<br>• Insurance (against risks that cannot be allocated, such as political risk, market)<br>• Performance bonds<br>• Subcontractor agreements<br>• Equipment warrantees<br>• Any certificates required for operation or carbon trading |

### *Assessing Readiness*

The tables below summarize measures for assessing readiness to establish a First Nations/Corporate joint venture[3]:

| | Corporate Readiness |
|---|---|
| **Leadership & Planning** | Obtain a clear and detailed mandate, budget allocations, action plan and accountabilities from senior management. |
| **Partnerships** | Look for political and community stability, and ensure the Aboriginal business possesses sufficient support for business development. Follow through on commitments and invest time in training/mentoring and communicating with the community to transfer knowledge. The resulting quality of the service or product will be superior. |
| **Risk & Confidence** | Have a back-up plan in case things don't work out. |
| **Resources** | Position the organization to meet the objectives of joint initiatives by planning and allocating resources. Consulting with various departments and operators and engaging them in the process early provides better language and understanding of concepts like tendering. |
| **Cultural Differences** | Remember that reaching a working agreement across different cultures can sometimes be complicated and time consuming. |

[3] *Making the Grade: A Guide to Success for Corporate-Aboriginal Initiatives* 2nd edition, April 2006 (Industry Council for Aboriginal Business) http://www.icab.ca/home

| First Nation Readiness | |
|---|---|
| **Leadership** | A strong chief and council who support business development and offer clear lines of accountability are essential. Policies and procedures of the band administration create the conditions for business development to occur. |
| **Partnerships** | Establish clear decision-making structures and accountabilities that consider the role of political leadership and the community relative to the business, conduct due diligence and learn about the potential partner's track record and select a corporate partner with the ability to invest and/or be creative in its approach to start-up. |
| **Planning** | Prepare a business plan and adequately capitalize your operation. Be conservative in your estimation of resources needed and expected returns. |
| **Risk** | Be prepared to assume risk. Find a way to develop a pool of collateral and come to the partnership with your own money. |
| **Resources** | Find a business manager who understands business and Aboriginal culture and who will work closely with the community to review options, and consider ways to benefit from the opportunities that business provides. Provide sufficient administrative and organizational resources to the business manager(s) and invest heavily in training that leads to meaningful employment. |
| **Cultural Differences** | Remember that reaching a working agreement across different cultures can be complicated and time consuming. |
| **Confidence** | Don't proceed unless you clearly understand what is required for the project to succeed and the possibility of financial losses |

## Legal, Tax and Incorporation Considerations

**Legal aspects of a clean energy project are about managing risk to the project and to the people behind it.**

Projects and utilities may be exposed to **contract liability** (arising from a party's failure to fulfill commitments made in a contract), **tort liability** (arising between parties without a contractual relationship, including negligence and nuisance), and **regulatory liability** (arising because a party engages in actions that are specifically prohibited by law or fails to perform actions that are specifically required by law). Joint ventures can mitigate these risks.

An outlier example demonstrates the wide scope of potential liability: under the doctrine of attractive nuisance, a wind developer in the U.S. could be exposed to tort liability if a child attempts to climb a wind turbine and is injured in the process. RETScreen[4] provides a high level overview of legal considerations for specific types of energy systems. These are summarized below.

**Liabilities & Risks Associated with Different Types of Energy Systems**

| Biomass | Hydro | Heating/Cooling |
|---|---|---|
| • Environmental impacts (emissions, ash disposal, hazardous waste)<br>• Fuel supply issues (type of fuel, resource assessment, fuel storage, fuel supply contract and pricing structure, off take and hedging agreements, transportation agreements)<br>• Particular siting issues (including proximity to population centres, odours, etc.)<br>• Agricultural issues (water supply, water discharge, waste discharge, fertilizer)<br>• Obtaining and handling cooling water required for thermodynamic power cycles and for distillation systems (e.g. for ethanol production)<br>• Political issues (crop diversion, food prices, etc.) | • Significant civil works may be required<br>• Seasonal variation in water flow<br>• Suitable sites maybe remote and require significant investment in transmission lines and roads<br>• Environmental impacts (disruption to fish, upstream and downstream flooding, indigenous rights, loss of flora and fauna) | • Fuel supply issues (type of fuel, resource assessment, fuel storage, fuel supply contract and pricing structure, off take and hedging agreements, transportation agreements)<br>• Environmental impact (emissions, hazardous chemicals, etc.)<br>• Differential legal documentation requirements based on project size<br>• Obtaining legal/regulatory rights to install underground systems<br>• Many similar issues as biomass, particularly when combustible fuels are used |

[4] RETScreen can be found at:
http://www.retscreen.net/ang/legal_aspects_of_energy_projects_e_textbook_chapter.php

## Legal Considerations for Various Ownership Options

Joint ventures with multiple equity partners are more common in electricity production (such as wind or run of river) than in heating related projects, in part because of the very high capital cost of these projects. It is rare to have multiple equity partners involved in building-scale green energy projects or district energy (heat) systems.

An energy system can operate as a department within an existing government structure like any other utility service. If multiple energy projects are expected, or if more insulation from shifting local politics is desired, a partnership arrangement would be beneficial. The table below summarizes the advantages and considerations of different forms of ownership.

**Legend**: Community = First Nations or Local Governments, Color coding: green=good, red=poor, yellow=moderate

| Consideration | Community Department | Community Company | Private | Joint Venture / P3 |
|---|---|---|---|---|
| **Financial** | | | | |
| Access to capital – initial build | | | | |
| Access to capital – expansion | | | | |
| Cost of borrowing | | | | |
| Non-tax revenue source | | | | |
| Access to grants | | | | |
| Local government financial risk | | | | |
| Can withstand years of losses | | | | |
| Ability to capture offsets | | | | |
| **Operational** | | | | |
| Technical expertise | | | | |
| Operational flexibility | | | | |
| Admin and monitoring scale | | | | |
| Insulation from operating risk | | | | |
| Alignment with public interest | | | | |
| **Simplicity** | | | | |
| Complexity of structure | | | | |
| Overall simplicity for LG/FN | | | | |
| **Other** | | | | |
| BCUC regulation burden | | | | |
| Transparency of rate setting | | | | |
| Limits political interference | | | | |
| Political risk | | | | |

When considering ownership options, remember that:

- Incorporation arrangements do not determine who operates the energy system on a day to day basis – operations can still be in-house or contracted out.
- Grants may have conditions which require either local government majority ownership or private sector partnership.
- With any of these forms, owners can choose to enter into a performance contract with an energy services company (ESCO) for the energy utility. ESCO's have provided building-scale energy performance contracts for decades and are now beginning to provide energy performance contracts

for utilities in BC. An ESCO will use conservative numbers to generate a performance contract target. Because owners will be exposed to less risk, returns will be relatively lower.

Local and First Nations governments can add significant value to community energy proposals and greatly assist with coordination, implementation and, in many cases, financing, construction and operation of these systems – all to the community good. As the challenge of addressing climate change becomes increasingly evident, more and broader community based solutions are needed to make real progress. Local and First Nation's government roles in this area will grow over time.

## Setting Up a Joint Venture with Multiple Equity Partners

If a partnership approach is preferred, local governments, utilities and any other program partners should begin by understanding each other's motivations.

**Motivations of energy utilities and corporations include:**

- Ability to make a profit
- Cost effectiveness
- Customer satisfaction
- Internal green energy targets
- Timing entry into market
- Meeting BC Utility Commission and Provincial requirements

**Local government motivations include:**

- Reducing energy use and greenhouse gas emissions
- Improving local energy security and self-sufficiency
- Creating jobs and simulating a clean-tech economy
- Meeting other sustainability and economic development goals
- Creating local benefits with acceptable risks

**First Nation motivations include:**

- Nation building
- Improving local energy security and self-sufficiency
- Creating jobs and simulating a clean-tech economy
- Meeting other sustainability and economic development goals
- Creating local benefits with acceptable risks

These goals can align nicely with each other even if the way in which each party measures progress or the timeline for measuring progress may differ.

Utilities are often subject to reporting requirements from the BC Utility Commission or another regulatory body that requires plans outlining how they intend to meet their goals. Utility goals are typically annual goals, whereas local governments may have longer-term goals or goals that are stated in terms of emission reductions.

Essentially, joint ventures are partnerships. They can be initiated with a memorandum of understanding, letters of agreement, cooperation protocols, socioeconomic agreements or a contract. Whichever approach is chosen, it should outline elements of mutual interest in working together and establish the structure for the partnership. Joint ventures are typically negotiated between a corporation and a local government or band administration with broader political objectives in mind. More information on structuring joint ventures and legal liability issues is included in the 'common questions' section below.

Joint initiatives can challenge organizations to make creative and purposeful decisions. Some things to consider when building an agreement are:

| | |
|---|---|
| Clarify terms | Commercial agreements should clarify business and decision-making processes, objectives, roles and responsibilities of the partners. Align policies and systems with the needs of the partnership. |
| Share objectives | Having shared or complementary objectives improves decision making, as does a prior relationship. |
| Set broad direction | While most partnerships use joint management or steering committees to facilitate information sharing and broad direction, these committees are rarely involved directly in management of the venture. |
| Seek experience | Having business expertise at the helm contributes to success. Business professionals who can build help the confidence needed to take risks and drive agendas forward are valuable. As communities reap the benefits of making and managing sound financial investments over time, they can begin to appreciate the ways that business can contribute to community aspirations. |
| Involve the community | Awareness of business objectives and opportunities for community participation is important for both local and First Nation governments. |
| Take time | Building more time and dialogue into the process will improve outcomes. When obstacles are encountered, ensure that issues associated with the obstacle are really important; sometimes the risk of eliminating a standard requirement is low and the benefits are high. |
| Ensure fuel supply | Fuel supply contracts and provisions addressing any possible interruptions in supply are an important consideration, particularly if biomass is the fuel of choice. Insulating the system owners from supply risk is important. |
| Assign ownership | Ownership of environmental benefits and trading offsets should be clearly stated. At this point (2013) this is typically a small part of the financial considerations and applies mostly to heating/cooling projects in BC. There are minimal offset opportunities for electricity generation in BC because of BC Hydro's low-carbon generation system of dams. |
| Manage construction risks | Construction contracting can be critical to the success of an energy system. Construction often takes longer than expected or goes over budget. Sometimes deficiencies in the final product create risk of liability. All these factors should be addressed, along with insurance, before construction begins. |
| Address complexity | Having multiple equity partners makes the structure of ownership more complex and requires careful consideration. A Limited Liability Partnerships (LLP) can be a good vehicle to hold energy utilities when there is more than one partner involved |

Several options exist for structuring an entity that owns an energy project in BC. The primary ones – with links – are listed below. Rows highlighted in green are a good fit for BC green energy projects; yellow and red rows are less so.[5]

| Structure | Advantages | Considerations |
|---|---|---|
| B.C. Company[6] | • Limited liability<br>• Ability to easily add equity investors through sale of shares<br>• Community contribution companies may become an alternative form of organization that embeds the social purpose within the constitution of the company and may have favorable US tax treatment. | • The combined federal/provincial rate varies upward from about 20%.<br>• A tax strategy will be required to accumulate and carry forward losses from early years.<br>• Requires corporate reporting and administration. |
| Limited Liability Partnerships | • Limited liability for partners except the general partner<br>• Profits taxed in hands of partners – note that bands and municipalities do not pay income tax. | • Unlimited liability for the general partner<br>• More complex than a company to add new equity partners or to transfer ownership / sell entire entity at a later date.<br>• Requires careful clarity on establishing partner rights and obligations |
| Society | • May be viewed positively by customers because there is no profit motive. | • Profits remain within the entity for the purpose described in its constitution.<br>• Members and board required. |
| Cooperative Association | • Owned by members for the benefit of members<br>• Each member has one vote | • Requires strong interest from customers in having ownership of the entity<br>• Dilutes control of primary investors<br>• Often more complex to set up and administer than a company |
| Partnership / Proprietorship | • Simple | • Not applicable. Under law, a partnership is treated as a person. A joint venture is not. A joint venture is limited in scope; a partnership is generally an ongoing business relationship that exists between persons carrying on common business.<br>• Unlimited liability |
| B.C. Unlimited Liability Company | Favorable US tax treatment | Not applicable unless owner is US-based |
| Extra-provincial Company | Enhanced ability to operate beyond BC | Not applicable unless there are plans to operate outside of BC |

A BC Company (first option in the table above) is a good choice if there are plans to sell the entity at some point or to attract additional equity investment. A BC Company may also limit liability/risk for investors. This is balanced with the costs of administration and taxation of profits at a corporate tax rate currently at approximately 10%.

[5] A generalized summary of the wide range of joint ventures possible in Canada is provided in Appendix C.
[6] BILL 23 2012 FINANCE STATUTES AMENDMENT ACT, 2012: http://www.leg.bc.ca/39th4th/1st_read/gov23-1.htm

Of the forms of incorporation available in British Columbia, a Limited Liability Partnerships (LLP) is a good vehicle to hold energy utilities when there is more than one partner involved. This is the form of partnership chosen by Dockside Green Community Energy System, described in Section 2(b). This form can potentially insulate partners somewhat from certain risks and allows profit, if there is any, to be taxed in the hands of the partner.

## Common Questions

**What are options in terms of structuring a joint venture company and what are the advantages and disadvantages of each of the options?**

- A BC Company and a limited liability partnership (LLP) are two good options.
    - A BC Company is a good choice if future equity investors are expected or if the entity is expected to be sold. A BC Company in theory may offer more limitation of liability to all investors than an LLP.
    - An LLP is a good choice to limit income taxation because profits are taxed in the hands of the partners instead of being subject to corporate tax. Income of local governments and First Nations is not taxed. The combined federal and provincial tax burden of approximately 20% of profits can make or break the financial viability of some projects.
- Joint ventures are only required where there is more than one entity that will have an equity position in the energy system. Typically, only electricity generation projects such as run-of-river have multiple equity partners.

**Are there specific legal structures that best protect local and First Nations governments?**

- Careful planning, diligent management and attention to how customer and supplier contracts are structured provide the best protection. Obtaining adequate liability insurance is important.
- Both BC Company and LLP structures can offer some limitation of liability depending on how they are set up. These limits and protections should not be overstated. A local government or First Nation with an equity stake in an energy system in its jurisdiction may be expected to take over a troubled system if the other equity partners fail or if the system does not perform financially as planned.
- Energy system performance risk can be reduced by entering into a performance contract. Several energy services companies (ESCOs), who have long provided contracted performance for building energy retrofits, have started writing performance contracts for renewable energy systems.
    - The lowest risk is to avoid direct involvement with an energy system. A local government or First Nation should seriously consider if it needs to own an energy system or if it should simply encourage the private sector to deliver it.

**What are the advantages and disadvantages of having a separate management contract to operate the joint venture company?**

- Clarity is required in the rights, roles, expectations, obligations, and contributions of all equity investors. A management contract can help clarify governance of day to day operations and key decisions. It can also guide management compensation for the energy system and recognize the

different approaches needed to manage the construction phase versus the operations phase of the system.

- The entity or entities that own an energy system may choose to operate it or they may choose to contract operations to a third party with experience in operating similar systems.

**How can one plan for potential disputes or buy-outs?**

- Clear dispute resolution and buy-out provisions should be structured into the joint venture agreement and company articles.
    - In all contracting, dispute resolution clauses must be structured carefully. Having clear and comprehensive clauses can make a difficult situation manageable.
    - If multiple entities have an equity position, buy-out provisions with clear rules on compensation, timing and obligations will be needed to provide future flexibility given the multi-decade nature of energy systems.

**What can be done to protect against failure of a joint venture utility or project?**

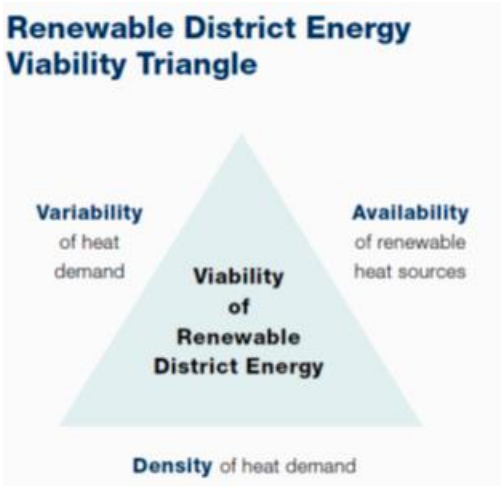
- Considering legal liability and fully evaluating risks will help mitigate impacts if a joint venture project/utility fails.
    - Contracts clarify relationships and expectations. Ideally, everything works well and they never have to be referred to. When things do go wrong, a clear contract clarifies how to proceed. An ambiguous contract that does not address specific circumstances does not.
    - An energy system may not perform technically or financially as expected. Having clear clauses that set out how a failure will be handled is highly recommended.
    - **Note that there are financial penalties for not delivering contracted energy or for exiting an energy contract, such as a BC Hydro electricity purchase agreement.**
    - Legal liability and public expectations are not always on the same page. Having clear exit clauses, processes and rules, including agreed upon compensation, is useful.

## Financial Implications

### Funding and Financial Viability of Utilities

The first step in developing a financial model for green energy systems (electricity and heat) is to ensure feasibility of the opportunity by completing pre-feasibility and/or detailed feasibility studies.

The next step, broadly speaking, is to invest a large amount of capital to build the system. The value of this capital is recouped over years or decades through sale of energy. The *Renewable District Energy Viability Triangle* illustrates key drivers of district energy costs and revenues.




Electricity that is not used locally can be sold to BC Hydro (or another local electrical utility) via electricity purchase agreements. Smaller scale generation is supported by Standing Offer Contracts and Electricity Purchase Agreements. For district heat, revenue is from sale of heat to customers or represented reduced operating costs.

Recommendations for improving the financial viability of green energy systems:

- ✓ Think long term.
- ✓ Set rates based on *levelized cost of services*, the price at which energy must be generated from a specific source to break even over the lifetime of the project.
- ✓ Have clear goals and make sure plans are clear on how goals will be achieved and measured.
- ✓ Use multiple grants from a variety of sources "stacked" together to leverage funding.
- ✓ For heating systems, reduce heat demand by making buildings the most efficient they can be and then determine the necessary output of the energy system. Design a renewable energy plant for base demand and use natural gas for peaking. Scale up as demand increases.

#### *Private Interests*

Private and commercial corporations participating in community energy systems expect a return on investment (ROI) between zero and 25%. Those that are strictly profit motivated, if they view the venture as risky, will seek higher (quicker) returns on investment as a result. Larger corporations (often utilities) who are transitioning to a lower carbon economy may be willing to consider the lower end of the ROI range. Often the ability to participate and share (or at the very least being seen to participate) in carbon emission reductions can be central to third party considerations when partnering with local and First Nations governments on community energy systems. Recognizing that carbon offsets can only be used once and are more lucrative in the hands of local governments (higher value placed by the Pacific Carbon Trust than available to commercial ventures on the commercial market) can be a consideration for each partner.

The sensitivity of customers to energy price is an equal consideration. Customer motivations can vary and, as a result, private sector customers for electrical and heat energy range widely in their appetite to purchase "green energy." Provincial institutional customers can avoid paying the provincial carbon tax to the degree they reduce their carbon footprint so have the same motivations as private customers.

While many customers are concerned strictly with the financial bottom line, a customer's desire to obtain "green labeling" should not be under estimated. Additional motivations/drivers of commercial customers can arise from:

- the timing and nature of their need to reinvest in electrical and heat components in their facility,
- reduced insurance considerations realized from reduced heating plant size (if achieved via a community energy system),
- reduced operations and maintenance realized from reduced plant size, and
- energy supply security needs and perceptions

For a district heat system, revenues from the system (primarily fees paid by customers) must be sufficient over time to cover capital and operating costs.

**Capital costs**

- paying down the capital debt
- servicing the capital debt (interest)
- providing private partners with a return on capital invested

**Operating costs**

- fuel costs
- operations and maintenance
- depreciation and renewal

## Capital Debt Drivers

Total capital debt required for a project is influenced by both costs and anticipated revenues.

**Capital Debt Drivers – Costs**

- Planning and Studies
- Distribution pipe
- Heat plant
- Client-side equipment and retrofits

### Planning (What is Feasible?)

Studies and detailed plans should address the size and risk of the contemplated system and the experience of the project proponent. Analysis can range from a simple calculation by a highly experienced proponent (e.g. Enderby case study) to a series of increasingly detailed studies for larger, more complex systems.

Costs for a pre-feasibility study (which assesses broad potential for a district energy system within a community) can cost in the range of $30 - $50k. A more detailed feasibility study of an opportunity, with specific technologies considered and more detailed financial analysis, costs significantly more.

The following graphic provides an overview of key questions that pre-feasibility studies often address.

**Heat demand and projection**

**Question answered**: How much heat is required where and when is it needed?
**Approach:** Review current and planned development patterns. Consider variability of heat demand – mixed use tends to smooth out peaks. Identify public sector buildings mandated to be carbon neutral. Identify industrial sites requiring or producing heat. Consider density of demand including volume of heat and distribution of buildings.

**Potential heat sources**

**Question answered**: What are the characteristics of the most economical renewable heat sources locally available?
**Approach:** Inventory renewable heat sources including water and wastewater infrastructure, industrial waste heat, heat pumps, solar hot water, etc. Estimate heat potential, characteristics and cost.

**Priority technologies and policies**

**Question answered:** Where does it make the most sense to start?
**Approach:** Matching heat requirements and sources, evaluating economics, identifying supporting policies and regulations to enable renewable district heat. This often involves a workshop for stakeholders, experts and local government staff, to review findings and identify priorities for further investigation.

**Utility structure options**

**Question answered:** Who should own the capital assets, operate the system and make decisions about it?
**Approach**: Leveraging the CEA *Utilities and Financing* guide, explore the pros and cons of different ownership, operation and governance structures. Explore local government priorities, capacity and resources.

**Next steps and integrated plan**

**Question answered:** What next?
**Approach:** Develop initial scope for a more detailed feasibility study, review grants that could be applied to the cost of the study and approaches for securing funding for implementation.

Utilities (such as FortisBC and Corix, companies active in BC) may offer to pay for studies providing that an exclusive agreement offers them ownership and operation of the system if results are promising and a system is implemented.

### Length of Distribution Pipe (Stay Close)

The cost of installing pipe in the ground is often one of the key limiting factors for a district heat system. Public works staff at the municipality or regional district may be able to provide insight on local costs. Most hot water systems are installed with insulated pipe that is sized for the expected load at build-out. Pipe installation cost, which is a significant portion of overall cost, can be reduced through coordination with other public works (street redesign / repaving or installation of other underground utilities). Costs per installed kilometer of pipe can be up to $1 million but vary widely depending on how much road or paved surface must be trenched and repaved. This cost is one of the reasons why heat

density (significant heat load close together) is an important factor in the viability of district heat systems.

For electricity generation systems, proximity of the project to existing transmission lines and interconnection sites has a similar dynamic.

### Start Small (Scalable Heat)

Purchasing and installing a heat plant itself is another significant capital cost. Renewable energy plants such as biomass and geo-exchange are typically cost more than natural gas boilers.

Most renewable plants are sized to meet the base heating load (often 70% or more of the total heat demand) and use natural gas for peak demand, allwoing the plant to achieve a high level of utilization while meeting the heating requirments of customers.

Because a heat plant can be a signficant part of the overall cost, an emerging best practice is to start with a small plant designed to meet the needs of the first set of customers and scale up as new customers are brought on. City of North Vancouver used this approach by building a system based on efficient, economic natural gas mini-plants that can be connected together and gradually shifted to renewables as critical mass is acheieved.

### Client-side Retrofits and Equipment (Think Ahead)

Retrofitting a heating and ventilation system not originally designed for district heat can be difficult and sometimes cost-prohibitive. Buildings to be connected to a district heating system must be identified and equipment needed inside the building (heat pumps, distribution systems) clarified, including who will pay for what. Connecting building designed from the start to operate with a district heat system is usually straight-forward. Local governments can encourage new development in future district-heat areas to design the buildings to work with the district heat system once it is built.

**Capital Debt Drivers – Revenues**

- Grants and zero interest loans
- Partner investments

### Grants (Stack to Match)

Grants apply to situations where local government or First Nations ownership in a utility is either full or partial. Grants can make projects more financially viable. Several communities including District of Lake Country and City of Prince George have had success in "stacking" multiple grants from a variety of sources. A good source of grants and resources available is the Community Energy Association's Funding Guide available online in the 'Resources' section at www.communityenergy.bc.ca.

### Partner Investments (Be Aware and Play Fair)

Partner equity investments can come in many shapes and sizes. Partners can also bring needed experience in the systems being contemplated including evaluation, design, and operation experience. But be aware of partner expectations and requirements. Utilities such as Corix and FortisBC typically file applications with the BC Utilities Commission, which reviews the costs of serving system customers and

sets rates to allow the companies to achieve a target return on equity. They may pay for everything, including up-front studies, if they have the exclusive rights to building and operating a system that proves to be viable. For electricity generation systems, partnerships are often required because of the capital and expertise involved in these projects.

With any investment, the more risk a party takes on, the more return they reasonably expect to achieve. Investing in earlier, riskier phases of a project typically requires higher expected returns given the uncertainty involved.

Below, the chart illustrates degree of project risk versus amount of investment needed to realize each of ten project stages. If stages are privately financed, increased risk would need to be compensated by a higher rate of return.

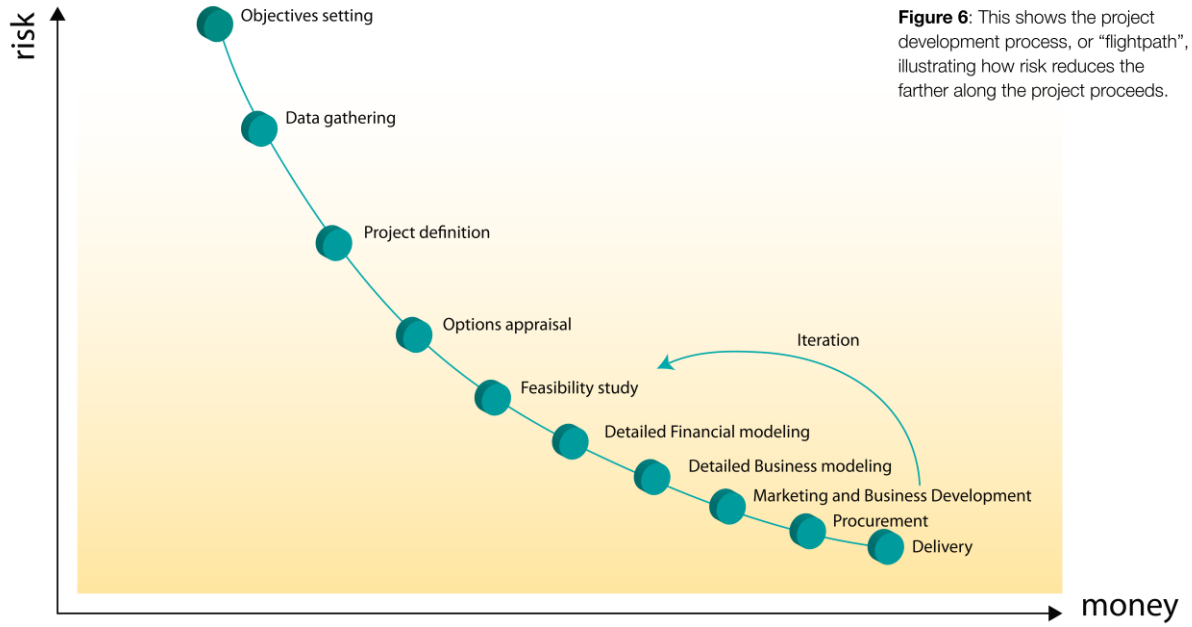



**Figure 6**: This shows the project development process, or "flightpath", illustrating how risk reduces the farther along the project proceeds.

*Image source: Community Energy: Planning, Development and Delivery*, International District Energy Association

## Operating Cost Drivers

Drivers of operating costs and revenues are outlined below.

**Operating Cost Drivers:**

- Cost of fuel
- Capital debt servicing
- Operating / maintenance
- Partner revenue requirements

### Cost of Fuel (Fee or Free?)

Many renewable energy sources are challenged to compete with the price of natural gas. (Its 2012 commodity rate was approximately $2/GJ.) Even 'free' heat sources have costs. Wood waste must be transported to the site. Heat extraction from wastewater, the ground or water (geoexchange) all require electricity to pump the heat transfer fluid. Industries may wish to charge for use of their waste heat.

Forecasting future costs of wood waste in a local area is challenging. Some operators are securing long-term supply contracts from forest companies and sometimes with a backup of a community forest. Others are adopting the European model of buying on the spot market. Both are valid strategies and are influenced by perceptions of both risk and future price direction. The City of Prince George is currently benefitting from its foresight in creating a contract with the local mill that requires the mill to provide heat to their system at an agreed upon price regardless of mill operations.

### Capital Debt Servicing

Servicing the capital debt incurred to build a green energy system is often a significant part of total costs in the early years of operation. The amount of this debt depends on total capital outlays, average cost of debt and time over which it is paid back. Reducing this cost through accessing grants and low or no interest loans can be a deciding factor in the viability and ownership structure of a utility.

### Operating and Maintenance (Lean Machines)

Efficient, lean operations with predictive maintenance plans and automated or highly efficient customer care, administration and billing processes are key to obtaining a profit margin, customer satisfaction and long term viability. These costs can be reduced by increasing scale – for example, by combining with existing billing, administration and customer care processes of a local government, First Nation or utility. Utilities can further reduce costs through centralized system monitoring for multiple systems. Expect some issues and extra costs as the system starts up or is commissioned.

### Partner Revenue Requirements (Regulated Returns)

P. Ostergaard,[7] in his 2012 whitepaper for the Pacific Institute for Climate Solutions (PICS), notes:

> *…for cost-of-service (rate base) regimes, utilities prepare a revenue requirement application, which is the forecast revenue needed from rates in order to meet forecast expenses and a target return on equity (ROE). The revenue requirement is tested in a public process and*

[7] Providing a review of district heat rates, the white paper can be found at http://pics.uvic.ca/sites/default/files/uploads/publications/WP_District_Energy_May2012.pdf

*adjusted by the regulator. A rate design may follow, which determines how rates should be structured among customer classes and consumption levels. The target ROE is set by adding a utility-specific risk premium to a benchmark rate of return based on long term Canada bond yields.*

**Operating Revenues:**

- Demand charges & Connection charges
- Offsets
- Local government taxation income

### Demand and Connection Charges

In a 2012 paper that contributed to a City of Surrey planning process, P. Condon[8] states:

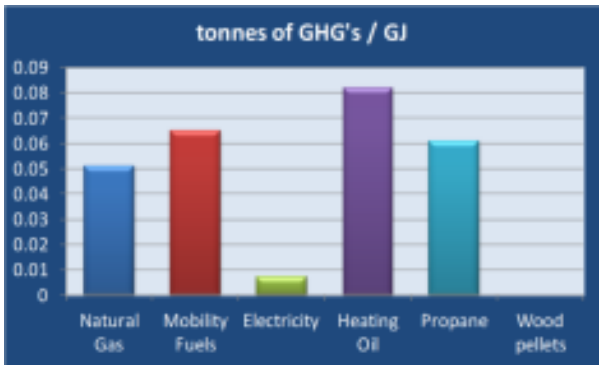
*Heating load density, dependent on a combination of the density of buildings (square meter of floor area per hectare) and the intensity of the heating load (kWh/year of heating load per $m^2$ of floor area), is a core requirement for any centralized system. A minimum energy density of 1,500 MWh per hectare is often suggested as the minimum size necessary to merit installation of a district energy system. A suitable threshold for viability is often suggested as an average peak energy intensity of around 700 kW/Ha (and floor space intensity of 70 W/$m^2$). As a core site for a new DE system is assembled, careful planning is needed to reach the requirements set above.*

According to the PICS whitepaper authored by P. Ostergaard (referenced on the previous page), total rates per MWh of heat are estimated to be in the range of $50 to $145 for current district heat systems in BC.

For electricity, BC Hydro's Standing Offer Program encourages the development of clean or renewable power projects of no more than 15 megawatts throughout British Columbia. Rates are set based on the last call for power and are available online.

### Offsets (More Bark than Bite)

Offsets are a mechanism to recognize the value of carbon emissions avoided or reduced through systems and projects. Offsets tend to be a small part of a much larger financial picture. Offsets are, for the most part, not applicable to electricity generation projects in BC due to the high proportion of low carbon electricity in the province as well as BC Hydro's capture of environmental attributes of projects through Electricity Purchase Agreements and the Standing Offer Program.




[8] *Speculation on expansion of the district energy system into Surrey's suburban fabric through sensitive in-fill* (P. Condon 2012)

In the case of district heat, municipalities and regional districts can count private sector client emission reductions toward carbon neutral goals through a "local reduction project" stream. For more information on this approach, see the "How" tab of the Becoming Carbon Neutral Workbook and Guidebook at http://www.toolkit.bc.ca/resource/becoming-carbon-neutral-workbook-and-guidebook).

To consider offsets as a revenue stream to the system, a much costlier and rigorous process is required. Pacific Carbon Trust is the typical buyer of offsets from a BC district heat system. At least 5,000 tonnes of emissions are required to consider a project due to the overhead involved. While Pacific Carbon Trust sells offsets at $25/tonne, they buy offsets in the $10-$15/tonne range. Natural gas emits about 0.051 tonnes per GJ, meaning that a system must displace at least 100,000 GJ of natural gas before selling offsets can be considered. Resulting offset sales would only amount to approximately $75,000.

### Local Government Taxation Income

If a local government does not own the utility, it can still tax it, providing a relatively small, but secure, long term revenue stream.

## Municipal Accounting Considerations

Accounting treatment for government-owned companies should be reviewed with the government Chief Financial Officer and/or an accountant experienced with Public Sector Accounting Board (PSAB) standards.

The sidebar to the right, taken directly from the BC Ministry of Community, Sport and Cultural Development website, provides further guidance.

Specific considerations for local governments establishing an energy utility department,

**Liabilities**

Liability servicing cost includes the average of the total principal and interest payments that are paid on capital commitments or guarantees plus amounts that represent the average principal portion of a contingency. Included in the calculation are:

- principal and interest payments for long-term debt
- principal and interest payments for short term capital borrowing
- the amount that would be paid if authorized but unissued debt were issued
- lease payments for capital leases
- payments under a capital agreement
- the amount that would be payable if capital contingencies or guarantees were realized

Specifically excluded are:

- operating leases, or the portion of an agreement that relates to operating costs
- employment contracts
- temporary borrowing, and
- obligations of the regional district or for which the regional district is joint and severally liable

Where an agreement or other obligation combines both operating and capital components, as is typical in many public private partnership (P3) (361 KB) agreements, only servicing costs related to the capital portion of the agreement are included in the liability servicing cost limit. While this is an improvement over previous limits, which captured the operating portions of these agreements, it requires the Financial Officer to make estimates of the annual servicing costs under the agreement and apportion these costs to capital components (which are included in the limit) and operating components (which are excluded from the limit).

This determination is based on the substance of the agreement, rather than the form of the agreement. This "substance over form" parallels accounting standards, which require the same considerations in determining whether a lease is a capital lease or an operating lease. This means that the Financial Officer needs to look further than the form of liabilities arising out of the agreement, and consider the substance of the overall agreement in making these determinations (e.g., one cannot assume that a P3 agreement is entirely operating even if the only liability arising out of the agreement relates to annual revenue guarantees to the private sector partner).

For both leases and other forms of agreements, Financial Officers may wish to consider the following questions in deciding if an obligation should be included in the calculation:

- Can the agreement/contract be cancelled on favourable terms?
- Does the local government compensate for risk or bear some of the risk?
- Do guaranteed payment amounts over the life of the contract constitute the majority of the value of the asset being used?
- Is the local government required to, or does the local government have the option to, purchase the asset at some point in the future?

Answering "Yes" to any of these questions is a signal that there is a capital component to the obligation and that it should be included in the calculation of the liability servicing limit.

**Professional accounting standards are of benefit in making some of these determinations.** Further information can be found in the Canadian Institute of Chartered Accountants' Handbook section 3860.18, Public Sector Guidelines 2 and 3 and in the Municipal Help Manual.

creating a wholly-owned development corporation or entering into a limited liability partnership or joint venture with another entity may wish to consider:

- Tax treatment and advantages of local governments and First Nations
- Recording liabilities / debt in accordance with BC regulations and PSAB standards
- Consideration of establishment of a reserve fund to support infrastructure renewal and expansion

## Municipal Borrowing Considerations

When considering entering into a capital-intensive investment such as a utility, a local government is subject to several requirements:

- Municipal expenditures must not exceed revenues. The financial plan for a municipality cannot plan for a deficit. Municipalities may borrow up to 25% of revenues from a previous year (5% of revenues for approval free zone) or borrow at preferential rates from the Municipal Finance Authority.[9] Local government in BC can also borrow through the Municipal Finance Authority via their regional district with joint and several obligations.
- The Community Charter (see box to the right)
- Three steps to borrowing:
  1. Create a loan authorization bylaw (council approval, provincial approval, electoral approval)
  2. Generate a certificate of approval
  3. Achieve a municipal security issuing resolution (for regional district approval)
- For more information, http://www.cd.gov.bc.ca/lgd/infra/statistics_index.htm

**Community Charter Sections Relevant to Borrowing**

- CC 165(5)
- CC. 174 & BC Reg. 254/2004 – Borrowing Power
- CC.175 – Liabilities under agreement
- CC.177 – Revenue Anticipation (RD's LGA 821)
- CC. 178 & BC Reg. 368/2003 – Short Term Capital (RD's LGA 822)
- CC. 179 – Loan Authorization Bylaw
- CC. 181 – Temporary Borrowing
- CC. 182 – Regional District Financing
- CC. 122 & 129 – Powers by Resolution & Conducting Business

### *First Nation Clean Energy Business Fund*

The BC *Clean Energy Act (CEA),* which received Royal Assent on June 3, 2010, enabled the creation of a First Nation Clean Energy Business Fund (FNCEBF). The fund has an initial appropriation of up to $5 million. The FNCEBF aims to promote increased First Nation participation in the clean energy sector within their asserted traditional territories and treaty areas through agreements between the BC Government and the eligible First Nations to:

- Provide capacity development funding to support First Nations to undertake activities such as feasibility studies or to engage with proponents of clean energy projects (capacity funding);
- Provide equity funding to qualifying First Nations to help acquire equity positions in clean energy projects or assist in the undertaking of their own community clean energy project (equity funding); and

[9] Rates as of Dec.17, 2012 range from a fixed rate of 3.03% for 5-30 years to a variable rate of 1.72% for up to 5 years.

- Share in the revenues from clean energy projects based on new, net incremental revenues to government derived from water rentals, land rents and eventually wind participation rents (revenue sharing).

## Public Engagement Implications

The fact that most local and First Nations governments conduct their affairs in the public view may help reduce negative public perceptions that can damage the credibility of a community energy system.

For local and First Nation governments partnering to carefully consider the public and its role in the overall planning process. It's also important that third parties partnering with local and First Nations governments be informed of the role of public consultation and its possible impact on the process. Typically, these third parties are not as informed respecting the public's role so it falls to local governments to explain this clearly to them – both in regards to a) the public's ability to influence decisions on community energy systems through representation on Boards and Councils and b) the public's role and ability to affect the project through consultation/approval provisions of the *Community Charter*.

The *Community Charter* includes certain provisions against local governments providing assistance to business. It also contains provisions that require public approval processes for:

- contractual agreements in excess of five years,
- loans in excess of five years, and
- loans in excess of $5 million.

With this in mind, and given that many community energy projects involve just such matters as listed above, it is important for local governments to consider these provisions in community energy planning processes. In particular, developing a community consultation strategy is advisable to assure that local government costs and benefits arising from community energy proposals are understood and agreed to by the public prior to commencing agreements with third parties. It is equally important that third party partners in community energy system projects understand these constraints and the timelines and approval risks they imply.

Similar constraints apply to First Nations' governments with added impairments arising from Canada's role in designating leases to third parties on reserve lands. This can significantly delay availability of land for plant construction.

Both First Nations and local governments can also have additional constraints placed on them with respect to project timelines and disposition of project assets under grant and loans offered by senior governments. Community works funds, for example, which are popular for implementing community energy projects, include provisions for claw back of grants should assets constructed or purchased using grant funds be leased or sold to third parties.

In most cases where partnerships are involved, a local and First Nations partner may be, of necessity, on a different time line than their private partners. This can have a divisive and limiting effect on potential partnerships and in some cases can prevent local and First Nations' governments from aligning with emergent and commercial opportunities. It is generally true that local and First Nation governments' involvement will incur both a resulting lengthened schedule and considerably more public scrutiny than private sector partners may be used to. As partners that will, by association, be participating in these processes, private partners and third parties need to be appraised of these constraints.

While many, larger private and crown corporations are familiar with and have the administrative capacity to work with local and First Nation governments through and extended public process, many smaller private corporations, particularly start up enterprises with a single technology, do not.

It is important for local and First Nations governments and private partner proponents to assess the effect the public process has on timelines and resources. It may also be necessary for the private partner to participate in the public approvals process both to explain the project and to demonstrate their competency financial capability to deliver. Partners should be chosen with care and kept well informed.

## 3. Recommendations

Key considerations when deciding on an ownership and financing structure include:

| | |
|---|---|
| Think long term | ✓ The energy utility business model includes a large initial capital cost followed by years of losses before profitability is achieved. An energy utility is a long-term play. |
| Risk affects returns | ✓ Return is typically directly linked to risk. Not all investments share the same risk profile; some will earn more return. |
| Low cost borrowing has limits | ✓ Local governments in BC have access to low cost debt through the Municipal Finance Authority but this comes with strict borrowing limits (25% of previous year's revenue) which can limit the size of the utility and the ability to expand in future years. |
| Ownership affects taxes | ✓ Ownership structure of the utility can affect tax treatment which can be the difference between a utility that is viable and one that is now. First Nations and Local Governments do not pay the same income tax as private sector companies. |
| Early decisions are necessary | ✓ Ownership is not a decision that can be put off until the end of building the system. Some grants will require certain ownership structures and utilities offering to pay for the cost of initial studies will often require an exclusive right to develop the system if it is viable. |
| Public consultation takes time | ✓ Set aside more time than you think you'll need for public consultation, particularly if combustion is involved. |
| If many partners, limit liability | ✓ If there is a need for multiple equity partners, consider a limited liability partnership as the corporate structure to more clearly insulate parties from risks and to take advantage of any profits being taxed in the hands of the partners rather than the company. Electricity generation is the most common type of utility requiring multiple equity partners. |
| Development corporations can provide insulation | ✓ If multiple energy utilities are being contemplated or if there is a desire to further insulate the utility from local political shifts, consider establishing a development corporation to be the entity that negotiates and holds the equity positions in the partnerships. |
| Seek professional advice | ✓ Seek professional tax, business, and legal advice when considering establishing an energy utility or project. |
| ESCOs can help | ✓ Energy Service Companies (ESCOs) will write performance contracts to eliminate risk on energy utilities…for a price. |

Local and First Nation governments can improve their chances of achieving a successful outcome by:

- **Obtaining good information before going to market.** This should include a thorough analysis of the engineering, legal and economic viability of the proposed project that is prepared by credible professional advisors. This could, and should, include evaluation of reasonable alternatives to administrative or third party based proposals and sensitivity analysis around financial assumptions for each proposed approach. Preferably, these would be tested at pre-feasibility, feasibility and pre-design stages – recognizing that increasing levels of certainty will be needed as public interest increases. Going to market before business fundamentals are confirmed creates uncertainty, increases risk to third parties and could derail the project entirely. Getting a second opinion on a feasibility study is a relatively small expenditure (less than a full feasibility study and much less than costs associated with a failed project) and can increase confidence in the recommended approach.

- **Carefully considering the advantages and disadvantages of different governance models at the beginning and selecting an approach that is the best fit for your community.** Whether considering full ownership or a joint venture, there should be clear consideration of community goals for today and in the future as well as a frank assessment of resources available to ensure proper oversight and management of operation and staff and tolerance for risk.

- **Ensuring that the motivations of each partner are understood.** While private sector and public goals can align nicely with each other, the way in which each party measures progress toward those goals or the timeline for measuring progress may differ. Utilities are often subject to reporting requirements from the utility commission or other regulatory body that requires them to develop plans that will outline how they're going to meet their goals. Utility goals are typically annual goals where local governments may have longer-term goals or goals that are stated in terms of emission reductions.

- **Developing and following a good communication strategy.**

**Case Studies: Lessons Learned**

- ✓ Project and utility developers emphasized the importance of leadership, communication and accountability. Partnerships and good relationships between partners are key.
- ✓ Project leads should stand firm on essential program elements, be flexible otherwise.
- ✓ Local capacity and experience, including local suppliers, is an advantage for any project. Local fuel sources lead to economic benefit but making sure fuel sources are reliable is absolutely essential.
- ✓ Do your homework, but don't overdo it. While feasibility studies are essential, they cannot predict everything. Several case study participants noted that both good and bad luck on timing had significant impacts on projects.
- ✓ When dealing with multiple funding partners, hitting milestones during project development can be challenging. Subsidies and incentives have been essential to all project profiled but identifying relevant programs is difficult and program come and go.
- ✓ Develop an informed, confident community, especially youth members. Projected profits very good at convincing council to take a risk but setting customer rates is complex.
- ✓ Project scale affects both affordability and benefits. Scalability – the ability to expand a system in the future – is essential. Often one successful project leads to another.
- ✓ Both developing and operating a system involves steep learning curves.
- ✓ Conserve energy first and innovate second.

A communication strategy should be considered as important as engineering, legal and financial analysis. Without it, the best project proposal could suffer serious difficulties. This strategy can inform the public but can also inform project proponents and local government councils on the public perspective. It can also, if properly designed and implemented, test and affirm project assumptions and, in the best case scenario, provide new and valuable information that can be used to improve a project's performance.

- **Knowing when to be flexible and when to hold firm.** While early project phases are characterized by flexibility and re-analysis of basic concepts, once completed it is necessary to firm up finances, terms of partnerships, formal approval for borrowing, energy supply agreements and customer contracts. It is at this point that sound preliminary analysis and public consultation demonstrate their value. While avoiding the appearance of being rigid, it is advisable to stick to the basic original project concept unless significantly more promising alternatives are presented, supported by good engineering, and legal and environmental analysis. A general approach of flexibility may be necessary or advisable, particularly given local and First Nations procurement constraints. In other words, flexibility in partnerships is advisable, but flexibility on the original and researched project concept is less so.

- **Being prepared for new third party interests as a project reaches final stages**. Once final stages of project implementation are approached (particularly if a significant amount of grants or public borrowing is in place), new third party interests and input can surface and seek redress through the project. These can take the form of:
  - Private investment seeking a share of ownership and control or a greater share of ownership and control
  - Third parties promoting a latest or greatest technology, presumably not "fairly" considered in preliminary analysis
  - Late requests to expand project or reduce project scope
  - Politically motivated artificial deadlines
  - Emergent grant or loan opportunities that could require major re-evaluation of the project
  - Agencies seeking to be visibly aligned with the project

  As a project moves from feasibility towards reality, it can attract a significant level of new and aggressive commercial, institutional and public interest. This level of interest, while easily managed if the project was strictly a private enterprise, can easily escalate, delay and otherwise sidetrack a local and First Nation's government project that requires social license to proceed.

  New or emergent technologies, grant or loan sources, investors and customer interest will need to be addressed in a very public setting. Here the benefit of thorough, early analysis and public consultation efforts will pay off because many of these opportunities will have been evaluated and publicly discussed during early stages of the project. If not, new scenarios can be analyzed within the previously established constraints to make sure that new decisions are defensible.

Rural communities, First Nations and the BC government are all interested in exploring how green energy development can contribute to regional and community economic growth and diversification. It is our hope that this guide answers some of the fundamental questions that arise in the conceptual stage of green energy project and utilities and provides direction for moving forward.

## 4. Further Resources

- **BC Climate Action Toolkit**: http://www.toolkit.bc.ca/
- **Clean Energy for a Green Economy:** http://www.communityenergy.bc.ca/
- **Industry Council for Aboriginal Business*:*** http://www.icab.ca/home
- **Public Private Partnership: A Guide for Local Government** http://www.cscd.gov.bc.ca/lgd/policy_research/library/public_private_partnerships.pdf
- **Rural BC Green Energy website:** http://www.ruralbcgreenenergy.com/

# Appendix A: Projects/Utilities Reviewed for Potential Case Studies

## Single Ownership Projects

| Name | Location | Pop. | Project / Utility? | Elec, Heat Both | Joint Venture | Project Lead | Joint Ownership | Operating Agreement | Approx. Length of Operation | Number of Customers | Revenue Sources | Energy Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOTE: To generate a focus on smaller communities and projects with a track record, the 'population' and 'length of operation' categories have been colour coded either green (go); yellow/orange (caution) or red (stop). Red and orange highlighting may be a reason to exclude a project/utility as a case study. | | | | | | | | | | | | |
| **Projects - Not Joint Ventures** | | | | | | | | | | | | |
| District of Lake Couty Micro-Hydro Project (DLC), in drinking water supply system | Lake Country | 12,000 | P | E | **N** | LG | **No** | **No Operated by LG** | 2 yrs | 400 homes | $1.1m - loans; $1.9m Gas Tax - Innovations Fund; $512K grant Gas Tas Community Works Fund; $500K loan Green Municipal Fund. once debt paid off annual net revenus to be deposited in Climate Action Fund. | hydro |
| T'souke First Nation Solar hotwater and photovoltaic | T'Sou-ke Nation | 160 | P | B | **N** | FN | **No** | **No** | 3 yrs | 25 homes; 3 community buildings | $1.5m from 15 governmental and non-profit sources . | solar hw & ph |
| Wood Biomass at the Lillooet Recreation Centre | Lillooet | 2,400 | P | H | **N** | LG | **No** | **No** | 1 yr | 1 | $467k from Gas Tax Agreement General Strategic Priorities and Innovations fund; $147k from the Rec Centre Capital Reserves; $50,000 via annual Gas Tax funds. | biomass |
| Saanich Peninsula WWTP effluent heat Recovery | CRD | 340,000 | P | H | **N** | LG | **No** | **No** | 1.5 yrs | 1 Pool saving >$100k in nat gas | $2.98m from Gas Tax Innovations Fund and self-funding: total cost $3.3m; 30 yr payback. | heat recovery |
| Kimberley micro hydro in water supply | Kimberley | 6,700 | P | E | **N** | LG | **No** | **No** | ~3 yrs | sells electricy to bc hydro | Planning grant for feasibility study; Green Municipal Fund for micro-turbine and to replace chlorination system. | hydro |
| Burns Lake Arena | Burns Lake | 2,120 | P | H | **N** | LG | **No** | **No** | <1 yr | 1 | Total cost $419k: $126k Towns for Tomorrow | biomass |
| Bone Creek Run of River (Simpcw First Nation and TransAlta) | Blue River | 240 | P | E | **N** | UT | **No** | **No** | 1 yr | Bone Creek has a 20-year PPA for all power. | PPA purchase agreement for 20 yrs. Contribution agreement via ecoEnergy for Renewable Power program. | hydro |
| Fort St. John | Fort St John | 20,000 | P | H | **N** | LG | **No** | **No** | 1 yr | 1 | SolarBC | solar air heating |
| Geothermal City Halls | Langley, Kaslo, Elkford, Castlegar, Nakusp | 106,000 | P | H | **N** | LG | **No** | **No** | 1-5 yrs | 1 | Various | geo |
| Richmond Oval Waste-Heat and Water Re-use | MV | 198,000 | P | H | **N** | LG | **No** | **No** | 2 yrs | 1 | Olympic funding. The total cost of the project was $178m. | heat recovery |
| Cache Creek Outdoor Pool SHW&ASHP | Cache Creek | 1,100 | P | H | **N** | LG | **No** | **No** | 2 yrs | 1 | Self-funded: 8 yr payback | solar & ashp |
| Vancouver Convention Centre sea water cooling heat pump system | Vancouver | 651,000 | P | H | **N** | LG | **No** | **No** | 3 yrs | 1 | $883m expansion funded by Province ($540m), federal gov't ($222m), Tourism Vancouver ($90m) & projected revenues of $30m. | heat pump |
| Houston Rink and Leisure Centre | Houston | 3,000 | P | H | **N** | LG | **No** | **No** | 4 yrs | 1 | $32k BC Hydro | waste heat |
| RD of Kootenay Boundary rec/pool/rink: efficiency, SHW, heat recovery | Kootenay Boundary | 31,850 | P | H | **N** | LG | **No** | **No** | 5 yrs | 1 | $75k Recreational Infrastructure Canada program. | solar hw, heat pumps heat recovery |
| City of Kelowna landfill gas to electricty - microturbine pilot | Kelowna | 122,000 | P | E | **N** | LG | **No** | **No** | 7 yrs | 1 | Excess electricity sold to FortisBC. | landfill gas |
| Golden Amenity Hubs campground and bike share | Golden | 3,930 | P | B | **N** | LG | **LG** | **No** | 2 yrs | 1 | Self-funded? | geo solarhw solar pv |
| Catalyst Power Bio-methane Plant 110,000 gj /yr. Receives manure from 5 km radius. | Abbotsford | 124,000 | P | H | **N** | P | **PR UT** | **No** | 1 yr | Sale of 'green gas' to FortisBC | Fixed price with FortisBC. | ag. waste |

## Joint Venture Projects

| Name | Location | Pop. | Project / Utility? | Elec, Heat Both | Joint Venture | Project Lead | Joint Ownership | Operating Agreement | Approx. Length of Operation | Number of Customers | Revenue Sources | Energy Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOTE: To generate a focus on smaller communities and projects with a track record, the 'population' and 'length of operation' categories have been colour coded either green (go); yellow/orange (caution) or red (stop). Red and orange highlighting may be a reason to exclude a project/utility as a case study. | | | | | | | | | | | | |
| **Projects - Joint Ventures** | | | | | | | | | | | | |
| Cedar Road Landfill-Gas-to- Electricity Facility (Nanaimo) | Nanaimo | 87,000 | P | E | **Y** | LG | **Yes** | **Yes Cedar Road LFG & BCH EPA** | 3 yrs | BCH EPA | Total cost $3.6m. RD of Nanaimo & Cedar Road LFG partnership. BCBN loan $400k+1.6m loan. $585k from FCM. RDN transferred carbon credits to FCM. | landfill gas |
| Run-of-river: Canoe Creek | Tla-o-qui-aht First Nation | 345 | P | E | **Y** | FN | **Yes** | **No Partnership: Tla-o-qui-aht FN (75%) and Swift Water Power Corp (25%)** | 1.5 yrs | Electricity for 2,000 homes | ecoENERGY and Aboriginal Business Canada $1m funding for business plan, an EPA, and interconnection study. | hydro |
| Juan de Fuca Pool, Arena and Curling Club | CRD | 52,200 | P | H | **Y** | LG | **Yes** | **No** | 10 yrs | 3 | Partnership of Colwood, Langford, Metchosin, Highlands, Juan de Fuca Electoral area and View Royal. | heat recovery |
| Hartland Landfill Gas Utilization Project | CRD | 340,000 | P | E | **Y** | LG | **PPP** | **Yes P3 w Maxim and CRD** | 8 yrs | Enough for 1,600 homes | BCH EPA. CRD 1.9 million; Maxim $800k. CRD royalties are $250,000 to $2 million+ over the 20-year project life,depending on quantity of power. | landfill gas |
| Run-of-river: China Creek | Port Alberni | 18,000 | P | E | **Y** | FN | **No** | **Yes Upnit Power Corp - FN,LG,Synex partnership** | 7 yrs | 2,400 homes per year (6,000 at peak) | $8.5m debt syndicate via VanCity Capital: BCH EPA plus provincially-funded study, federal funding for planning, hydro survey & Ecotrust Capital $250k loan. | hydro |
| Eagle Lake Micro hydro project | West Vancouver | 42,130 | P | E | **Y** | LG | **No** | **Yes (Pacific Cascade Hydro)** | 9 yrs | Equiv to 90 single family homes | District of West Vancouver: $328k. BCH EPA. | hydro |
| Burns Bog Landfill Gas Collection | Vancouver | 651,000 | P | B | **Y** | LG | **PPP** | **Yes Maxim** | 8 yrs | Greenhouses 100,000 GJ/yr heat and BCH EPA-5.5MW/yr | Maxim invested $10m. Vancouver will receive revenues of approx. $400k per year over 20 yr contract. | landfill gas |
| Solar Colwood (solar, ductless heat pumps, EV's) | Colwood | 16,720 | P | B | **Y** | LG | **No** | **No** | 1 yr | NA | 3.9m from Natural Resources Canada; in-kind from Royal Roads, BC Hydro, & T'Sou-ke FN. | solar ashp |

## Utilities – Single Ownership and Joint Ventures

| Name | Location | Pop. | Project / Utility? | Elec, Heat Both | Joint Venture | Project Lead | Joint Ownership | Operating Agreement | Approx. Length of Operation | Number of Customers | Revenue Sources | Energy Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOTE: To generate a focus on smaller communities and projects with a track record, the 'population' and 'length of operation' categories have been colour coded either green (go); yellow/orange (caution) or red (stop). Red and orange highlighting may be a reason to exclude a project/utility as a case study. | | | | | | | | | | | | |
| **Utilities - Not Joint Ventures** | | | | | | | | | | | | |
| Westhills Langford DE Sharing System | Langford | 22,500 | U | H | **N** | LG | **No** | **Yes. Sustainble Services Ltd. (sub of Westhills Land Corp.)** | 3 yrs | 200 | Private investment of $3m (about $15k per home). Energy savings expected to pay back the additional capital costs in 10-15 yrs. | geo |
| Ty Histanis DE energy geoexchange (Tla-o-qui-aht First Nation). Only FN DES in Canada. Geothermal plant operates via hydro electricity. | Tofino | 345 | U | H | **N** | FN | **No** | **Yes** | 1 yr | 10 homes, 1 community building as of 2010. Up to 215 in total. | ICE Fund investment $750k. Total project value - $3m. An EQuilibrium project supported by Natural Resources Canada and CMHC. | geo & hydro |
| FinkMachines in Enderby - Biomass DE | Enderby | 2,900 | U | H | **N** | UT | **No** | **No Private utility** | 1 yr | 11 | Private via Fink Machines | biomass |
| Sun Rivers Community Development Corporation : Initial partnership between Tk'emlúps FN, federal government and developer. | Kamloops | 85,000 | U | B | **N** | P | **No** | **No Corix owns and operates** | 12 yrs | Around 600 now, 2000 eventually | Standard development financing. | geo |
| Whistler Athlete's Village DES | Whistler | 10,000 | U | H | **N** | LG | **No** | **N** | Since 2007? | Phase 1: 300 units (now) Phase 2: 600 units (planned) | DE cost of $4.1m was absorbed into total building costs, which were shared by Province & Vancouver Olympic Committee ($35m), RMOW ($8m) and the MFA ($100m loan). RMOW received a 2 yr extension to repay a MFA loan. | waste heat |
| City of Richmond Alexander DEU | MV | 198,000 | U | H | **N** | LG | **No** | **Yes** | <1 | ~250 units (1 development) | $4m capital funding City of Richmond | geo |
| Southeast False Creek NEU | MV | 651,000 | U | N | **N** | LG | **No** | **No** | 2 yrs | In 2020: 560k m2 of space | $10.2m Gas Tax Fund; 20 year loan for $5m from Green Municipal Fund; self-funded $17.5m via own Capital Financing Fund. | heat recovery |
| Geo-exchange District Energy Utility for Upper Gibsons | Sunshine Coast | 4,100 | U | H | **N** | LG | **No** | **No** | 2 yrs | Phase 1: 100 units | $1.4m system:$244m Island Coastal Economic Trust; $325m Innovative Clean Energy Fund; $256k Gas Tax Agreement; $190k Gibsons; $385k from developer. | geo |
| Lonsdale Energy Corporation | MV | 51,000 | U | H | **N** | LG | **No** | **No** | 8 yrs | 11+ buildings | $4m GMF; $204k Rural Infrastructure Fund for solar hw | natural gas & solar |
| Nelson Hydro Electric Utility | Nelson | 9,800 | U | E | **N** | LG | **No** | **No** | Since 1892 | 4,400+ | Historic | hydro |
| Revelstoke Community Energy System | Revelstoke | 7,300 | U | H | **N** | LG | **No** | **N** | 7 yrs | Several commercial and institutional buildings, including a school & community centre. | RCFC Holding Co. $1.25M; City Pref Share Purchase $1.20M; FCM GMF Loan @ ~3.5% $1.35M; Revelstoke Credit Union $1.00M; FCM GMF Grant $1.81M; Towns for Tomorrow grant $0.38M= Total $6.99M | biomass |
| City of New Westminster Electrical Utility, Kelowna Electric Utility, Grand Forks Electric Utility | MV | 4,000 - 68,000 | U | E | **N** | LG | **No** | **N** | long term | ~ 200,000 | These long term utilities do not generate their own electricity. | various |
| **Utilities - Joint Ventures** | | | | | | | | | | | | |
| Dockside Green Community Energy System | CRD | 84,000 | U | H | **Y** | 3 | **Y** | **Yes. Corix contracted by DGE for operation, maintenance and customer service.** | Since 2007, but not on biomass | About 200 now; 1,100 at completion | Cost: $6.1m:federal Technology Early Action Measures program ($1.5m). Dockside Green Energy LLP (DGE) joint partnership of VanCity Capital Corp., FortisBC and Corix. | biomass |

## Appendix B: Risks Associated with Green Energy Project/Utility Development & Operation

Risks associated with green energy projects and utilities are outlined in the table below. Deciding which financing and governance approach to choose depends in part upon the perceived level of risk from each type.

| Risk Type | Details |
|---|---|
| **Project investors** | Commitment, competence, credit worthiness |
| **Financial** | Interest rates, grant timing, cost overruns |
| **Credit** | Risk of default |
| **Grants** | Change in timing or availability |
| **Construction** | Timing, cost, performance, unforeseen complications, planning approval delays |
| **Operations** | Unexpected costs, higher than expected costs, fuel source issues, environmental impact, performance below expected, oversized/undersized equipment |
| **Market** | Demand for energy, price pressures, change in price of competitive fuels, availability of fuel and price of renewable fuel, purchase price of energy |
| **Environmental** | Emissions higher than expected, public complaints, problems meeting permit requirements, waste disposal |
| **Regulatory** | Meeting needs of BC Utilities Commission and other regulations, possible delays |

## Appendix C: Overview of Primary Canadian Legal Forms of Joint Ventures

Adapted from *Structuring Joint Ventures*, Blakes Law Firm , accessed February 2013. http://www.blakes.com/index2.html

| Form and Principle Characteristics | Advantages | Disadvantages |
|---|---|---|
| **Corporation with Limited Liability** | | |
| • Legal entity separate and apart from its shareholders<br>• Can contract, sue and be sued in its own name<br>• Rights, powers and privileges of a natural person<br>• Separate taxpayer; must file separate corporate tax return (even if no taxable income) | • Higher market acceptance and certainty<br>• Limited liability<br>• Perpetual existence<br>• Separation of ownership from management<br>• Relatively easy to create and issue various classes of equity<br>• Inter-corporate dividends generally flow tax free between Canadian corporations<br>• Tax-deferred rollovers possible | • Less flexible than other options<br>• Unclear whether many statutory provisions can be waived<br>• Canadian residency requirements for directors in certain jurisdictions<br>• Incorporation requires public filing of articles |
| Unlimited Liability Corporation (ULC) | | |
| • Separate legal entity<br>• Only available in Alberta, British Columbia and Nova Scotia<br>• Shareholders/members jointly and severally liable<br>• No distinction from corporation with limited liability for Canadian income tax purposes | • Perpetual existence<br>• No Canadian directorship requirements under Nova Scotia and British Columbia legislation<br>• Able to elect flow-through treatment for U.S. tax purposes that may result in U.S. tax advantages | • Unlimited liability for current and former shareholders/members<br>• Filing and renewal fees can be higher than for limited liability corporations<br>• Recent changes to Canada–U.S. Tax Treaty have undermined some tax benefits from a U.S. tax perspective |
| General Partnership | | |
| • Not a separate legal entity• Relationship between persons carrying on business in common with a view to profit<br>• Agency relationship: every partner is an agent of both the general partnership and the other partners<br>• Partnership calculates its profit or loss for Canadian income tax purposes for the fiscal period and allocates it among the partners<br>• Partners are taxed directly; partnership is not a taxpayer | • Few formalities to establish<br>• No Canadian director residency requirements<br>• Dissolution is simple and inexpensive<br>• Not subject to mandatory rules imposed on corporations | • Significant commercial risk for partners: (a) unlimited liability for all partnership debts, (b) each partner is an agent of the other partners, and (c) corporate governance protections may not be available<br>• Where no agreed fixed term for duration of partnership, any partner may terminate the partnership upon written notice to the other partners<br>• Withdrawal or retirement of a partner may create a new partnership and dissolve the existing partnership<br>• Subject to agreement to the contrary, transfers of partnership interests require approval of all the other partners<br>• Partners must decide collectively which discretionary deductions (e.g., CCA) to claim for Canadian income tax purposes in a fiscal period<br>• No tax-deferred rollover unless all partners are Canadian residents |

| Form and Principle Characteristics | Advantages | Disadvantages |
|---|---|---|
| Limited Partnership | | |
| • Not a separate legal entity<br>• Formed by complying with provisions of governing legislation<br>• Consists of one or more general partners and one or more limited partners<br>• Limited partners cannot take part in "control of the business" without losing limited liability status<br>• Partnership calculates its profit or loss for Canadian income tax purposes for the fiscal period and allocates it among the partners<br>• Partners are taxed directly; partnership is not a taxpayer | • Liability of each limited partner is limited to the value of its investment (provided the limited partner does not take part in the "control of the business")<br>• Admission of limited partners and transfer of partnership interests more permissive than for corporate and general partnership entities<br>• No Canadian director residency requirements | • Most jurisdictions require the filing of a public declaration that typically requires renewal<br>• Greater expense and formality in dissolving a limited partnership than a general partnership<br>• Unlimited liability for limited partner if taking part in "control of the business"<br>• General partner must bear full residual liability<br>• Dissolved dissolution of a corporate general partner, unless replaced<br>• Partners must decide collectively which discretionary deductions (e.g., CCA) to claim for Canadian income tax purposes in a fiscal period<br>• Corporate governance protections may not be available<br>• Potentially restrictive application of the "at-risk" rules<br>• No tax-deferred rollover unless all partners are Canadian residents |
| Contractual Joint Venture | | |
| • No separate legal entity<br>• Venturers hold title to relevant assets<br>• Parties agree by contract to provide one or more services, operations or assets, usually on a long-term basis<br>• Examples: outsourcing, strategic alliances, licensing and distribution arrangements and franchising systems<br>• Special GST/HST rules apply | • Flexibility in formation and operation<br>• Not a separate taxable entity<br>• Income or loss calculated at owner's level – joint venture does not file separate tax return<br>• Flexible for profit-loss offsets<br>• At-risk rules not applicable | • Uncertain legal status<br>• May be characterized as a general partnership<br>• Venturers can have joint liability<br>• All issues must be addressed in contractual documentation |
| Co-Ownership | | |
| • Parties co-own assets (i.e., hold undivided interests)<br>• Vehicle of choice in the areas of mining and oil and gas exploration and production<br>• Special GST/HST rules apply | • Flexibility<br>• Not a separate taxable entity<br>• Income or loss calculated at owner's level – joint venture does not file separate tax return<br>• Flexible for profit-loss offsets<br>• At-risk rules not applicable | • Uncertain legal status<br>• May be characterized as a general partnership<br>• Venturers can have joint liability<br>• All issues must be addressed in contractual documentation |