



# Community Energy - A Learning Framework for Community based Low Carbon District Energy

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## Purpose: Framework for Developing Community-based Energy Systems

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- A collaborative initiative between Natural Resources Canada and APEC economies to develop interactive and inter-disciplinary educational framework to assist in the development of District Energy (DE) systems at the community level.
- The framework will emphasise the economic benefits as well as the use of local and renewable resources to develop low carbon community based energy systems.
- The framework will provide information to raise the level of community and stakeholder understanding and support detailed and confident interactions between community and consultant.

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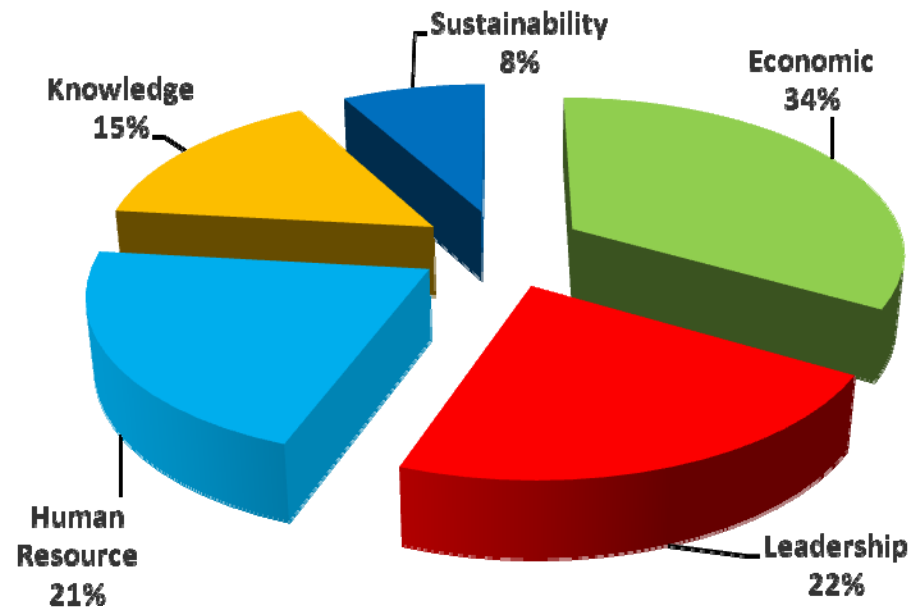
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## Background:

### Barriers to moving a Community's Energy Vision Forward

- Research by Natural Resources Canada's CanmetENERGY and the Canadian District Energy Association (CDEA)\* revealed that (in Canada) the lack of basic developmental information and business awareness are the primary challenges (Knowledge, Sustainability & Leadership) to the implementation of effective community-based low carbon energy systems such as district energy (DE).
- Discussions with others suggests that the barriers also exist in member economies



\* An Action Plan for Growing District Energy Across Canada  
[https://www.cdea.ca/resources?solsort=ds\\_created%20desc](https://www.cdea.ca/resources?solsort=ds_created%20desc)

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## Key Information Gaps:

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Developing a community's energy vision is hindered by the lack of:

- **Understanding of the development continuum, from energy vision to design, implementation, operation and maintenance.**
- **Understanding of the value and social, economic and environmental impacts of local resources and energy distribution systems and how the benefits enhance energy sustainability, security and efficiency within the community by contributing to employment and investment opportunities.**
- **Comprehensive understanding of the impact of technologies, energy resources, generation and distribution techniques by policy and decision makers, financiers, planners and developers.**

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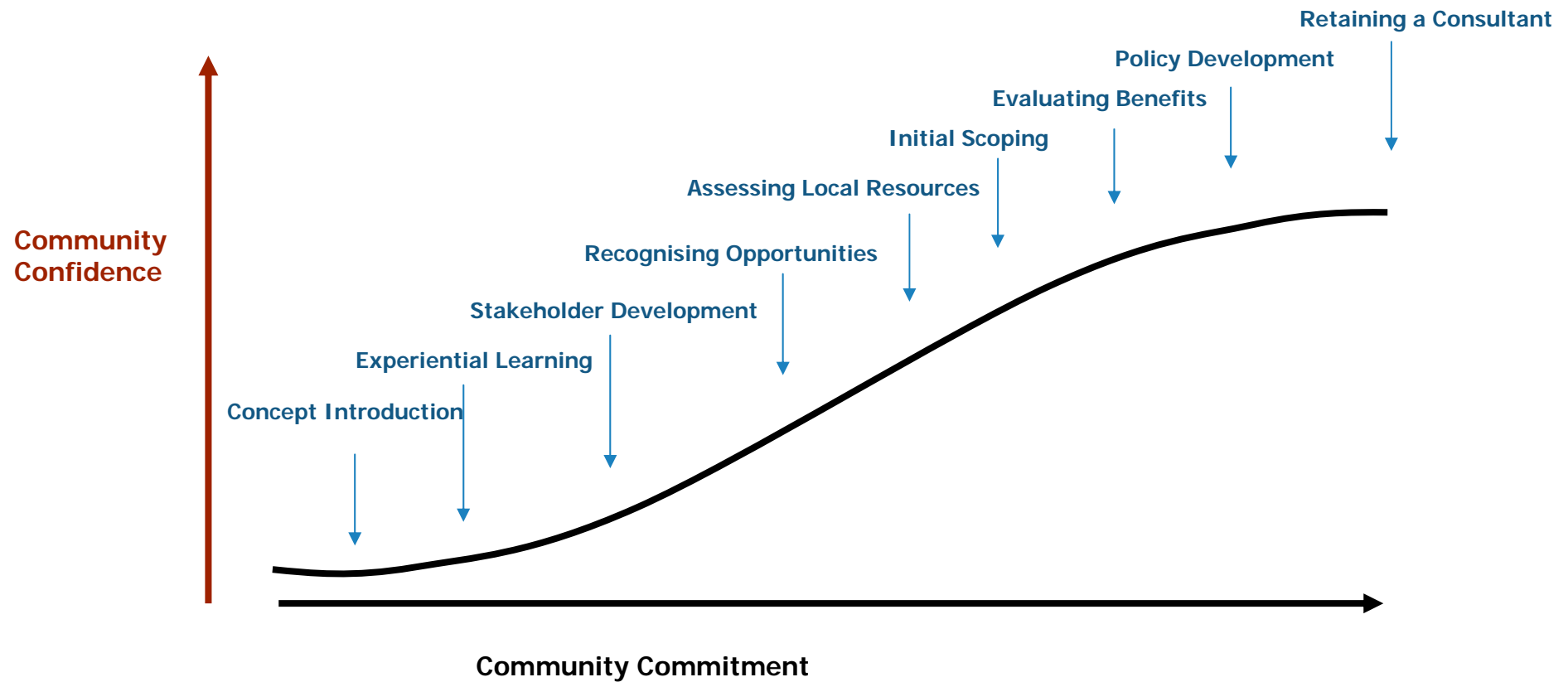


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# Scope of Proposal



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## Suggested Material

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- **Introductory workshop materials**
- **Technology Fact-sheets**
- **Energy System & Business Case Studies**
- **Scoping Tools, Models & Methods**
- **Resource Assessment Procedures & Templates**
- **Financial and Economic Templates**
- **Bibliography & Contacts**

**The framework would draw upon existing material or develop new material where gaps exist.**

**Exact content to be decided by a APEC –EWG Steering Committee  
Material would be available through the EWG website**

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# Methodology

- **Steering Committee (APEC economies & invited experts), Terms of Reference for Steering Committee members, facilitation consultant.**
- **Issue RFP, assess respondents and select facilitation consultant.**
- **Review existing District Energy learning materials. Assess scope, completeness and relevance.**
- **Exploratory workshop (Vancouver?) to define scope of materials & barriers**
- **Finalize timeline, framework material, and schedule for review by Steering Committee.**
- **Develop the framework scope**
- **Identify potential authors and issue RFP. Select consultant.**
- **Draft material compiled and reviewed by Steering Committee**
- **Wrap-up workshop for APEC to demonstrate the framework**
- **Final material completed and delivered to member economies for dissemination.**

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# Budget & Schedule

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## Budget Requested

Labour	\$140,000
Travel	\$ 35,000
Publication	<u>\$ 20,000</u>
Total	\$195,000 US

## In-Kind

Canada	\$100,000
Co-Sponsors	\$

## Schedule

- Start February 2013
- End September 2014

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## Why Natural Resources Canada



- **Natural Resources Canada's CanmetENERGY is the Canadian leader in clean energy research and technology development. With over 450 scientists, engineers and technicians and more than 100 years of experience, we are Canada's knowledge centre for scientific expertise on clean energy technologies.**
- **Our goal is to ensure that Canada is at the leading edge of clean energy technologies to reduce air and greenhouse gas emissions and improve the health of Canadians. We are a leader in science and technology delivery within the federal government, serving as a provider and catalyst for a sustainable energy future for Canada.**

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## Natural Resources Canada



- Our involvement with international bodies such as APEC and IEA enables to support the development of energy policy, codes and regulations and act as a window to federal financing and work with our partners to develop more energy efficient and cleaner technologies
- Existing experience includes the development of learning materials for the Canadian District energy sector, the Equilibrium Communities initiative, Community Archetypes and District Energy Economic models.
- For more details go to:  
<http://canmetenergy.nrcan.gc.ca/buildings-communities/2218>

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## Contact

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# APEC Concept Note

**Please submit through APEC Secretariat Program Director. Concept notes of more than 3 pages (including title page) or incomplete submissions will not be considered.**

<b>Project Title:</b>	District Energy Development - Guiding Frameworks
<b>Source of funds (Select one):</b> <input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund	
<b>Committee / WG / Sub-fora / Task-force:</b>	Energy Working Group / New & Renewable Energy Technology
<b>Proposing APEC economy:</b>	Canada
<b>Co-sponsoring economies:</b>	New Zealand, Chinese Taipei
<b>Expected start date:</b>	February 2013
<b>Expected completion date:</b>	September 2014
<b>Project summary:</b> <b>Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location:</b>  <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	To advance the concepts of renewable energy driven district energy networks there is a need for increased awareness and understanding within local and regional planning and engineering sectors. A common understanding benefits communities in their move towards community based energy networks and grids, particularly those utilizing renewable energy to realize social and economic benefits beyond simply the use of low carbon energy. The proposal develops a series of educational modules aimed at local government, addressing key issues relating to the design, development and business management of a thermal network. Workshop material will be developed or adapted using expertise from APEC member economies to enable officials and staff to raise awareness to issues and techniques for assessing socio-economic growth within their community. Subjects considered will include: renewable and local resources for both heating & cooling, design & marketing, policy, economic & business models, related urban planning, retrofits and new developments.
<b>Total cost of proposal: (APEC funding + self-funding)</b> <b>USD \$295,000</b>	<b>Total amount being sought from APEC (USD): \$195,000</b> <b>By category:</b> Travel: \$35,000      Labour costs: \$130,000 Hosting:                                      Publication & distribution: \$30,000      Other:

**Project Proponent Information and Declaration:**

**Name:** Ken Church & Anna Munro

**Title:** Team Leader – Communities Group; Senior Manager – Business Development

**Organization:** Natural Resources Canada

**Postal address:** 580 Booth Street 13D-4, Ottawa, Ontario Canada K1A 0E4

**Tel:** (613) 947 8952      **Fax:** (613) 996 9909      **E-mail:** kchurch@nrcan.gc.ca

I declare that this submission has been prepared in line with the **Guidebook on APEC Projects**. If approved, I agree to develop the project in line with APEC project requirements.

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*Name of Project Proponent*

**Date:** March 2, 2012

# Project Synopsis

## 1. Relevance:

- District energy enables the economic deployment of renewable energy on the large scale but within communities supported by economies of scale not present within a distributed energy approach.
- District Energy is seen by many APEC economies as enabling the development of renewable and low carbon communities. The transition towards low carbon communities is initiated by local governments who recognise the social and economic advantages of accessing and using the renewable and other existing local resources.
- Municipalities in many economies are constrained in their capacity to initiate these energy systems. The use of local resources for energy production enhances their local economy but must be integrated with the regional or state run energy utility to ensure safety and reliability.
- APEC members have a goal of enhancing energy security through a widescale adoption of renewable or low carbon energy to reduce their dependency on fossil energy supplies. This approach facilitates economic development, green jobs and human resource development, all components of the APEC Leaders' Growth Strategy.
- Awareness building through awareness building and education will lead to the accelerated implementation of community based renewable energy / district energy networks and the alignment of standards and regulatory procedures and eventually market development for the renewable energy industry.

## 2. Objectives:

- To provide a practical procedural framework for a diverse group of stakeholders that addresses barriers and knowledge gaps inherent in their disparate roles in the development and distribution of renewable technologies.
- Enhance the common understanding between stakeholders and assist them in decision making by developing an awareness of the impact of design, development, ownership, financing and energy pricing issues and how they affect the viability of the system.
- To share knowledge and experience between experts within APEC member economies to ensure that content and applicability of the framework builds interest and provides relevant opportunities to communities.
- To encourage economic growth in both the renewable energy and district energy sectors within member economies through the development of low carbon energy systems.

## 3. Alignment:

- The project aligns itself with both the 2011 Leaders Honolulu Declaration and the 2010 Growth Strategy
- In 2011 the leaders declared the need to "...speeding the transition toward a global low-carbon economy in a way that enhances energy security and creates new sources of economic growth and employment". In the same declaration APEC Leaders committed to "Promote energy efficiency by taking specific steps related to transport, buildings, power grids, jobs, knowledge sharing, and education in support of energy-smart low-carbon communities".
- The 2010 APEC recognised the linkages between Balanced, Inclusive, Sustainable, Innovative and Secure growth. As part of Sustainable Growth the leaders proposed that "APEC economies should encourage new green industries and jobs, including by introducing market-based mechanisms as an important tool to achieve sustainable growth and address climate change. APEC should help to establish a low-carbon society in which we maintain economic growth while protecting the environment. It can do so by taking steps to facilitate the diffusion of clean energy technologies and systems, including by reducing barriers to trade and investment in energy efficient products, conducting international joint research, building capacity, promoting public-private partnerships, and providing appropriate incentives for investment in energy efficient and low-carbon energy supply, buildings, industry, and transport".
- By increasing awareness and encouraging the development of renewable based energy networks member economies can address many of the commitments listed above.

#### 4 **Methodology:**

Responsibility for the development of the educational / informational material will be shared amongst the participating APEC members and a consultant. The APEC funding sought for the project will be used to coordinate the activities within the project as well as to prepare and present the finished material. In-kind support has been offered by Canada, which has indicated an interest to host the exploratory workshop, likely in Vancouver. The timeline for the project is the following:

- Develop a Steering Committee comprised of expert parties from APEC economies. Establish Terms of Reference for Steering Group members and for operating agent and / or facilitation consultant to assist the process.
- Conduct a review of existing District Energy learning materials that are suitable to a cross-section of community stakeholders. Assess scope, completeness and relevance of the materials for existing or new developments.
- Issue RFP, assess respondents and select facilitation consultant.
- Work with facilitation consultant to develop exploratory workshop to examine the principal barriers to district energy development in APEC member economies. These barriers might include: local resources, technologies, local energy policy and the potential for technology transfer.
- Consultant compiles workshop findings including timeline, recommendations for list of required form of framework material, and schedule for review by Steering Committee. This material might include: verified case studies of existing systems, digital presentations, checklists and guidelines for community evaluations and feasibility studies, workshop notes, etc.
- Develop the framework scope identifying the required material and format for review by the Steering Committee.
- Identify potential authors and issue RFP. Review and select appropriate authors and issue contracts.
- Draft material compiled and reviewed for completeness by Steering Committee members and by invited experts for applicability to the target audience.
- Develop wrap-up workshop for APEC members to demonstrate the framework and finalise the mechanism for delivery to member economies.
- Final material completed and delivered to member economies for dissemination.

Timeline – February 2013 – September 2014

Stakeholders – The aim of the work is to raise awareness amongst the communities and energy utilities of member economies. Stakeholders will therefore be representatives of municipalities and local communities, utility associations, member economies and engineering associations.

Previous Activities:

Natural Resources Canada has worked extensively with the Canadian District Energy Association to develop a learning framework for the development of district energy within Canada. The development of 3 learning modules has been undertaken to date and delivered to municipal audiences. The response was such that the development of more modules has been requested and planned. This work would be expanded and adapted to reflect the needs of participating APEC economies.

NRCan's involvement as a member of the International Energy Agency Implementing Agreement on District Heating and Cooling since 1987 has provided intimate knowledge and expertise in the district energy sector. APEC member states, Korea and the USA also participate in the Implementing Agreement.

Communications:

For widest access to the material, a centralised location such as the existing APEC-EGNRET website could be used. This would allow steering committee members to access the materials linking them to organisations and associations within their economies. Steering committee members would be at liberty to use the materials in conferences and presentations as they see fit, further broadcasting the information.