Locating Community in Community Energy Planning

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Abstract

Community energy planning (CEP) is a process that integrates energy concerns with urban design and planning. It offers an integrated approach to energy planning on a regional, municipal, or neighbourhood scale considering the energy impact of the built-environment and integrating energy supply planning with demand-side management, efficiency, and conservation. Widespread implementation of CEP certainly has the potential to change the face of Canadian cities but does it offer a transformation toward sustainability? I argue that transforming the energy system requires re-conceptualizing energy networks as socio-technical systems and pursuing both technological and social innovation. While CEP advocates for substantial change in the material and technological configuration of energy systems its ability to support social and institutional change is less clear. To tease out the opportunity for social change in CEP methodology, I analyze the use and meaning of the concept of community in three CEP tools. From my analysis, I conclude that although there is virtually no mention of social or institutional change in any of the tools, at least one offers a broad enough interpretation of community to at least suggest the possibility of social innovation.

The Canadian energy system is comprised mainly of large-scale, centralized electricity and natural gas utilities. Natural resources fall within the jurisdiction of provincial and territorial governments hence energy utilities tend to be organized at a provincial scale. Despite the unbundling of electrical generation, transmission, and distribution and the move towards increased privatization in the 1990s, particularly in the natural gas sector, the Canadian energy system remains based on large-scale provision by a handful of utilities. Natural gas and electricity utilities are separate, and even competing, industries with little overlap in the regulation or provision of either.

Canada also has a highly resource-intensive infrastructure that includes sprawling cities, automobile dependency, and a relatively inefficient building stock. Infrastructure coupled with an abundance of natural resources, particularly hydroelectric potential and fossil fuels, and low energy prices has allowed the country to maintain an exceptionally large energy footprint. Compared with the OECD average, Canadians use almost twice the total primary energy per capita (International Energy Agency, 2006).

The multiple influences on energy use mean that reducing energy consumption and the resulting greenhouse gas emissions is a complex problem that will require substantial change in Canadian energy policy and planning. The argument presented in this paper is based on the premise that in order to reduce greenhouse gas emissions to meet international agreements and mitigate climate change, the Canadian energy system will need to undergo a radical transformation. It will not be enough to improve technological efficiency. Rather, we need to take a close look at the historical practices and expectations of energy supply and demand with an eye towards fundamental rather than incremental change.

One approach, with the potential to significantly change the energy system is community energy planning (CEP), also referred to as community energy management. In the broadest sense CEP is the integration of energy concerns with urban design and planning. The Community Energy Association defines community energy planning as

> the consideration of energy supply and demand in regional, urban and neighbourhood design and development. It involves land use and transportation planning, site planning and building design, infrastructure design and efficiency, and new green energy sources all working cohesively toward the goal of planning for a more sustainable and environmentally-friendly community (Community Energy Association, 2007).

CEP represents a departure from the last half-century of energy planning in Canada. It offers an integrated approach to energy planning on a regional, municipal, or neighbourhood scale. It looks at the energy impact of the built-environment and integrates energy supply planning with demand-side management, efficiency, and conservation. In short, it combines energy considerations with urban design and urban form. What is the transformative potential of CEP? Certainly widespread implementation of CEP would change the energy system but to what extent does it offer an approach that is significantly different from Canada's current energy-intensive path? To explore this question, this paper interrogates the most ambiguous and potentially the most radical aspect of CEP—community.

Without the term community, CEP becomes just energy planning, indistinguishable from the type of supply-focused forecasting and utility-driven demand-side management of the last three decades. However, the concept of community offers energy planning something more than a linguistic shift. Depending on how it interpreted conceptually and in practice, community holds within it a radically different way of envisioning the energy system as a socio-political as well as a technical system. Embedded within it are new possibilities for size and structure of energy networks and for the institutional, ownership and decision-making structures that support them. The extent to which these possibilities are taken up and promoted by CEP is the question at hand.

What of community energy planning if its transformative potential is not enacted? With the significant changes that it proposes to urban form, it is possible that CEP will create a number of unintended and undesirable impacts. More than likely however a non-transformative community energy planning will continue with the momentum of the current energy system and offering little in the way of change or innovation. In this scenario CEP might expand the reach of energy planning to urban form but remains essentially unchanged in its overall approach to energy systems.

Transforming the Energy System

Science and technology studies (STS) provides a framework for understanding how technology and society are interdependent and mutually constructed. Social groups, institutional forms, human identity and experience are all deeply connected with the technological systems that we create and use. Indeed the STS literature would tell us that social structures co-evolve or are co-constructed with technological structures—that it is impossible to understand and change technological systems without understanding and changing their socio-political contexts and vice versa.

Similarly, notions of sustainability and our ability to enact sustainability are dependent on technologically mediated knowledge and experience. Therefore to say that we are aiming to transform the energy system towards sustainability, or more broadly to create sustainable cities, is to undertake both a technological and a socio-political project. We can not expect the social structure of cities to change without a corresponding change in physical and technological infrastructure. Similarly, technology alone can not create livable cities.

Energy planning in Canada has historically been understood as a mainly techno-economic activity. That is to say that it has been primarily concerned with technological solutions that maximize cost-benefit ratios. This has had a tendency to produce technologically deterministic responses to issues. For instance, energy efficient appliances and more insulation are proposed in response to high residential energy consumption. The human dimension of energy systems has entered the equation primarily as individuals making choices within a techno-economic system i.e. individuals choosing whether or not to purchase energy efficient appliances and install additional insulation. What has been largely absent from the calculation is the socio-political and institutional nature of energy systems. This is not to say that it is not recognized, but rather that it has not become a consideration in energy planning. On the supply side, new energy sources are considered and on the demand side more efficient end-use devices and behavioural change are on the agenda. What is rarely on the agenda is the overall approach to energy including the socio-political relations governing the provision and use of energy.

This was Amory Lovins' point over thirty years ago when he said "[t]he most important, difficult, and neglected questions of energy strategy are not mainly technical or economic but rather social and ethical" (Lovins 1976, p. 95). Lovins was asking us to rethink our overall approach to energy systems and to consider the type of world we are creating and perpetuating with that approach. He advocated for particular "soft" technologies in part because of the values he saw embedded within those technologies but also because of the type of social and institutional relations that could be constructed around them. Although the deeply political and social nature of energy systems has been studied extensively (see for instance Hughes 1983 and Nye 1990 and 1998), Lovins' challenge to reconsider the underlying moral and political commitments of energy systems has not been widely taken up within the practice of energy planning.

This is where the concept of community has the potential to offer radical change in energy planning. The socio-political implications of term community offer a way to understand energy systems as socio-technical systems rather than as techno-economic systems. It provides the opportunity to reflect on and potentially reconsider the moral and political commitments embedded within the energy system. But this is only one possibility. The concept of community is ambiguous and can be interpreted in multiple ways to

multiple ends. A recent study by Walker et al. found that British policy-makers supported community energy mainly for the instrumental purpose of gathering public support for otherwise opposed renewable energy projects. However, it also found a limited number of policy-makers who supported community energy because of a normative commitment to a re-envisioned energy system (2007).

Certain interpretations of community, particularly those based on geographical or physical attributes, do not challenge the current energy planning paradigm. They may even support it by collapsing community down to generic or one dimensional characteristics thereby promoting technologically deterministic solutions. For instance, green space or housing density alone will not create a socially cohesive and desirable community.

My argument is that the transformative potential of CEP depends on its ability to recognize energy systems as socio-technical systems and on its openness to novel social and institutional arrangements. CEP is highly supportive of new technologies and new possibilities for urban form, however without envisioning corresponding changes in the social relations of energy systems, it falls back into a technologically deterministic mode of transition. In essence, it becomes a quest for efficiency rather than sustainability.

Community is a lens with which we can illustrate how open CEP is to socio-political transformation. In the following sections, I consider definitions of community and how it mobilized within the CEP literature.

Definitions of Community

Most definitions of community are based on characteristics of human association or geography. The dictionary of human geography defines community as a "social network of interacting individuals, usually concentrated into a defined territory" (Johnston et al. 2000, p.101). The dictionary does acknowledge that the uses of the term are multiple and that the territorial attributes of community have been called into question in many contexts.

The materiality of energy systems means that the geographical or physical attributes of community are generally retained within the energy context. Energy systems occupy space and require geographical boundaries even if the boundaries themselves are disputable. For instance, a district energy system, a coal mine, and an electrical grid each have a specific geography although the impacts of each are not necessarily confined to their own territory.

Community is also used in the energy context to refer to specific institutional or social arrangements. For instance, Bolinger describes community wind as "locally owned, utility-scale wind development on either the customer or the utility side of the meter" (2004, p. 3). Within this definition he acknowledges ownership characteristics along with the physical attributes of scale and connection to the grid.

Definitions of community wind, or community energy more generally, differ from community energy planning in that the former tend to refer to an energy source such as a wind turbine or a district energy system whereas CEP refers to a process or methodology. CEP does not advocate for one particular type of solution but rather for the process that integrates energy considerations into urban design, land-use, utility infrastructure, and transportation decisions. How the term community is defined and mobilized within the CEP literature is indicative of how open the process is to social and institutional transform to parallel the proposed technological transformation.

Locating Community

To evaluate the potential for social innovation in community energy planning, I analyzed how community is interpreted and mobilized in three CEP guides. Each document provides an overview and justification for CEP, offers general instruction on how to undertake CEP including who might, and in some cases ought, to be involved, and contains illustrative case studies.

Although the guides all advocate for the integration of energy considerations within urban design, they have been developed by different organizations, emphasize different priorities, and endorse slightly different methodologies. Therefore while each may be considered CEP, together they present a range of approaches. Comparing a diversity of approaches illustrates how each may be more or less open to social and institutional transformation.

Community Energy Association

The first tool was created by the Community Energy Association (CEA), a registered charity organization with a mandate to "raise local government awareness with respect to energy efficiency, community energy planning and relationship building" in the province of British Columbia (Community Energy Association 2007). The CEA membership is comprised of British Columbia utility industries and planning institutes with local and provincial government representation. The guide, titled, "A Tool Kit for Community Energy Planning in British Columbia" was first produced in 1997 by the CEA's predecessor organization and updated in 2006.

The CEA Took Kit does not provide a definition of community nor of community energy. It does state that

> Community Energy Planning, or CEP, involves community or energy strategies that can be applied at the local level by planners, engineers, and developers in cooperation with utilities. It involves land use and transportation planning, site planning and building design, infrastructure design and efficiency, and planning for new energy supply options. It can be applied either comprehensively or incrementally and it can be adapted to suit any community large or small. (Community Energy Association 2006, p.4)

Like the CEA definition of CEP quoted in the introduction of this paper, the description above is a highly technical, expert-oriented conceptualization of CEP. It clearly states the audience and instigators of CEP as professionals, local governments, and utilities.

The implied definition of community in the above excerpt and the document as a whole, is a territorial definition. Here community is understood as a scalar concept referring to a defined geographical area such as neighbourhood or a city.

Despite the expert and professional orientation of the guide, it does discuss public roles and participation. Public outreach is promoted as a means to create support and buy-in for the planning activities. The public is given the static and passive role of indicating preferences and offering support for the organizations and professionals undertaking CEP.

Overall the CEA guide promotes fairly radical change to urban form. It also advocates a change to the planning process but adheres to an expert process with limited and rather passive forms of public participation. It very clearly lays out roles for various organizations and individuals reinforcing the institutional and political status quo.

Natural Resources Canada

The second CEP guide was produced by Natural Resources Canada (NRCan), the Canadian federal department responsible for natural resource strategy and policy including much of the energy efficiency policy developed at the nation level. Produced in 2005, the NRCan guide is titled "Community Energy Planning: A Guide for Communities". In the credits, the authors acknowledge the CEA for providing incentive to produce the guide, illustrating the connection between organizations promoting and undertaking CEP in Canada.

Although the NRCan guide advocates the same type of activities as the CEA guide, it places a stronger emphasis on human side of community. It states that

> A 'community' can take many forms, but for the sake of this guide it is considered to be a group of bodies that act together and contain a common theme. Thus, a community many be as large as a city; it may be as small as a neighbourhood, or it may be a region that embraces several local areas of population. A community is any area or group with common interests that engages it members. A community is where we eat, sleep, shop, go to school, go to work, enjoy the outdoors, and get together for mutual activities: it's where we live. (Natural Resources Canada 2005, p. 6)

This excerpt illustrates the NRCan guide's broad interpretation of community. Of note in this definition is the combination of human association or social elements and the geographical and scalar elements. This encompassing definition leaves the audience of CEP wide open. The NRCan guide states that CEP methodology can be undertaken by municipal and city planners, consultants, development and utility professionals, community groups, and the general public.

Overall the guide describes a methodology for producing a community energy plan. Although it offers specific recommendations for what should be included in the plan, it clearly states that the community planning team, however that is comprised, set out the criteria for sustainability, evaluate the relative priorities of environmental, social, and economic impacts, and decide from that point how to move forward.

Using a balance-sheet approach (i.e. weighing costs and benfits) this guide provides a structured process from which to evaluate options and chose a course of action. The emphasis is on changing the built environment and providing the most efficient infrastructure. However, the NRCan guide also emphasizes the interconnectedness of energy related activities and insists on including social and economic impacts alongside environmental impacts. It does not explicitly advocate social and institutional change however the methodology presented does not dictate specific roles and therefore remains open to the possibility.

PLACE^{3}S

The Planning for Community Energy, Economic and Environmental Sustainability (PLACE^{3}S) methodology was jointly developed by the state energy offices in California, Oregon and Washington and by two consulting teams based out of Portland, Oregon. The document I analyzed was produced in 1996 and is titled "The Energy Yardstick: Using PLACE^{3}S to Create More Sustainable Communities".

> The premise of PLACE^{3}S is that urban design and planning can shape communities for efficient energy productions, distribution and use. By intentionally conserving all forms of energy and promoting reliance on renewable resources in planning and design choices, cities can

> simultaneously improve their economies, environments, and quality of life. These widespread benefits are due to the integral nature of energy in communities where efficiency gains in one sector lead to related improvements in other sectors. (U.S. Department of Energy 1996, p. 3)

The PLACE^{3}S methodology is fundamentally an energy accounting method. It allows for a calculation of the energy impact of planning decisions. The PLACE^{3}S guides pays significant attention to participation and is explicitly supportive of collaborative planning exercises. It claims the outcome is a "well-informed, inclusionary public process that balances community values and integrates environmental, economic and social goals" (U.S. Department of Energy 1996, p. iv). However it also states that in a sense the PLACE^{3}S methodology "simply adds an energy dimension to existing community planning goals" (U.S. Department of Energy 1996, p. 1). From this we can infer that the transformative impact of the PLACE^{3}S methodology relies on the transformative impact of community planning process and not on the methodology itself.

Within the PLACE^{3}S document "community refers not only to a single jurisdiction or neighborhood, but also to the metropolitan region" (U.S. Department of Energy 1996, p. 2). This is a geographic or territorial definition. Although the human aspect is implied it is in a generic, non-specific way. As a whole the document uses the term community ambiguously to referring often territories but also to describe simplified attributes of regions such as community values and community goals.

Although the PLACE^{3}S guide endorses public participation it does not itself support novel institutional roles or configurations. In addition, the calculative and quantitative emphasis virtually guarantees the process will be structured by professional planners thus upholding current roles and socio-political configurations within the planning process.

The Meanings of Community

Of the three CEP tools analyzed two, PLACE^{3}S and the NRCan guide, offer an explicit definitions of community. Each guide also uses one or more implicit definitions so the lack of explicit definition in the CEA guide should not be interpreted as a flexible definition. Considered as a whole, CEP does make diverse use of the term community. However within the individual guides community tends to take on specific meanings. In particular the concept tends to be flattened out to its physical or scalar aspects and in doing so limits the opportunity to rethink social and institutional structures.

Within the CEP guides, community is used to refer to three main characteristics: scale, integration, and participation. The first two have both geographical or technological and socio-political connotations while participation refers to social interaction.

The first characteristic, *scale*, refers to size either in terms of the physical size and reach of infrastructure, the size of generation in MW, the physical size of the area being considered or number of people involved. In reference to scale, community implies a mid-range size. The implication for energy is that community energy planning falls somewhere between household level energy production and regional or provincial energy systems. The social and institutional aspects of scale might refer to the number of people connected to an energy system, involved in decision-making, or providing input into a process. In addition scale may refer to the magnitude of the institutional bodies governing the energy system.

All three guides use community to describe a generic geographic scale usually referring to the area that is to be studied or planned. This is the most common and explicit use of term community. Implicitly the

NRCan guide also refers to the scale in terms of the number of people engaged with the process. It suggests multiple audiences and the possibility that CEP can be undertaken within community (i.e. small, non-professional) groups as well as part of larger municipal and regional planning initiatives.

The second characteristic described by the term community is *integration*. The term community implies a certain amount of inclusiveness or the bringing together of diverse elements. Integration can also refer to the type of connection between elements of the system. It is the structure and form of the network. This has three potential implications for CEP. The first is integration of energy services and planning. Rather than have gas, electrical, and transportation planning occur in separate domains, an integrative approach combines these and takes advantage of resulting synergies. Integration can also imply a diversity of actors and institutions involved in energy planning. Finally, it can refer to the means of connection between elements of an energy system, for instance reverse metering on the electrical grid.

The integrative nature of CEP means that all of the guides advocate reconsidering the elements and structure of the network. In this sense, community means looking at energy use across multiple elements; a holistic approach to energy analysis. This includes considering previously separate planning activities in conjunction with one another, considering the proximity of the energy sources, and how all the physical and technical aspects of the planning site fit together.

To the extent that utility professionals and municipal professionals are brought together CEP can also be considered a socially integrative process. While it could definitely be argued that CEP is calling for novel configurations of the technical network with a tendency toward distributed generation, the possibility of novel social configurations is not present within the CEP guides. Thus the integrative aspects of community generally refer to technical or physical integration with only a limited social component. Thus this represents a fairly flat, technical version of community.

The final characteristic of community within CEP relates to *participation*. The socio-political connotations of community imply shared input, responsibility or decision-making. For community energy planning this might suggest moving away from a model of utility or government-driven planning toward a process that involves a diversity of professionals and citizens. It may also refer to governance suggesting joint or cooperative ownership models or new institutional models and relationships.

Again in reference to technical and professional participation, the net is widely cast. Design charrettes are suggested as a means to bring together experts and professionals that would not traditionally be consulted in energy planning. The treatment of public participation varies considerably over the guides. The CEA guide refers to public participation however it discusses it mainly as a means to achieve public support rather than to enrich the process. The PLACE^{3}S guide highly emphases public participation but in a conservative sense. For instance, in a fictional planning scenario, residents of a neighbourhood are solicited to participate in a planning exercise and are then guided through a process of developing a neighbourhood plan with experts developing all the options and dictating the process. There is absolutely a role for the public in this version of CEP however that role is highly managed by professionals. The NRCan guide differs in that it also places a large emphasis on participation but is careful not to dictate roles or expectations. Thus it offers the most flexible and open definition of community participation.

This analysis describes the various meanings and connotations of the term community within the community energy planning literature. Although community is a highly ambiguous term that could create both possibility and flexibility of interpretation, it can also be used to downplay aspects of the energy system.

Both the CEA and PLACE^{3}S guides tend to limit the use of the term community to its geographical and technological aspects. When using community to refer to scale and integration both guides tend to mean physical scale and physical integration. They do make use of the participatory aspects of community but in a limited and controlled way. In doing so, they also limit the possibilities of novel institutional structures and social relations emerging from the physical and technological changes they promote. Implicit within these two guides is a static and conservative idea of what community is and how it might contribute to sustainability. This approach runs the risk of endorsing what Marvin and Guy call the myths of new localism by adopting an unquestioned belief that solutions lie at the local scale, a generic and flat use of community, and a tendency to rely on quantitative calculations and technical solutions (1997). Countering the myths requires attention to the entirety and complexity of issues rather than adopting overly simplified and partial (i.e. technical) solutions.

The NRCan CEP guide is different in that it opens the definition of community up to include both the technical, geographic, and social aspects. More importantly it keeps the definition open leaving room for the possibility that community could be interpreted in a radically transformative sense. Although it still maintains a focus on the physical and technological attributes of energy networks, the methodology it advocates does not preclude the possibility for social and institutional innovation.

It is interesting to note the context within which the guides were produced. The CEA guide, developed by the municipal and utility professionals that have a stake as well as a professional role in community energy planning, is the most institutionally conservative. On the other hand, NRCan does not have the jurisdiction to undertake CEP activities and would likely be involved only in a supportive capacity, if at all. Its guide maintains the broadest interpretation of community and therefore the most flexibility in terms of social and institutional structures. This illustrates the institutional momentum of energy systems and how social relations tend to be self-preserving and to re-produce themselves even when promoting supposedly novel planning approaches.

Conclusion

Community energy planning encompasses a broad range of activities that can be generally described as integrating energy planning with urban design. One way to understand the differences between approaches is to consider how the concept of community is positioned within the literature. An analysis of the CEP literature illustrates how different approaches to CEP may variously limit the scope of and interpretation of community.

Coming from a tradition that is expert-driven and technically-focused, the momentum is to perpetuate a techno-centric approach to energy planning. This is witnessed in the fairly radical changes that CEP proposes to the physical make-up of the urban environments but a tendency to assume static institutional and social relationships. This results in proposals that embody a technologically deterministic perspective whereby social, environmental, and economic sustainability are all to be achieved by rearranging the physical infrastructure of urban environments

While there is little doubt that widespread implementation of CEP would change the Canadian energy system, this paper argues that in order to have a transformative effect on the scale necessary to realize sustainability in a meaningful way, CEP must conceptualize the energy system as a socio-technical system. This involves parallel attention to socio-political and technological structures in the planning processes.

This analysis has shown that current CEP literature does not adequately address the social and institutional aspects of energy systems. Rather than challenging or even re-considering the expected decision-making, management and ownership roles, it generally falls back on conservative notions of public feedback and consultation. However, in the end, the NRCan community energy planning guide, although still focused on physical and technological efficiency, leaves room to hope that CEP might yet help us transform the energy system.

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