



Retooling Community Energy: Analytical tools for planning through to implementation



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About the Authors

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Dr. Kirby Calvert is an Assistant Professor in the Department of Geography at the University of Guelph. Dr. Calvert is Co-Director and Principal Investigator of the Community Energy Knowledge-Action Partnership (CEKAP); a national partnership of Canadian universities, municipalities, and other non-academic partners with shared interests in improving the process and outcomes of community energy planning (www.cekap.ca). He has studied energy policy issues in Ontario and elsewhere using both qualitative and quantitative techniques for approximately eight years, with a focus on land-use issues and the trend toward decentralized energy governance.

Ian McVey is a Project Manager with the Ontario Climate Consortium (OCC) based within the Toronto and Region Conservation Authority. In his role with the OCC Ian leads efforts to support Ontario municipalities with low carbon policy and planning through applied research and knowledge mobilization. Along with Dr. Calvert, Ian is the co-director of the SSHRC-funded Community Energy Knowledge Action Partnership (CEKAP). He is also a member of the Sustainable Energy Initiative at York University.

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About the Community Energy Knowledge Action Partnership (CEKAP)

The Community Energy Knowledge-Action Partnership (CEKAP) was established in spring 2016 with a *Partnership Development Grant* from the Social Sciences and Humanities Research Council of Canada (SSHRC). Combining strengths from Canadian universities, local and regional governance partners and civil society organizations across three provinces, CEKAP's overall goal is to improve thought and practice around community energy planning. CEKAP's research program is building from the principles of 'community engaged scholarship'. In this model, the non-academic community provides direct input into the research agenda: i.e., establishing core challenges that can be met with research (the big picture), articulating key themes (the research programs), and then identifying clear and timely research initiatives (the research projects). Input from non-academic partners is considered by the academic research team in light of existing resources and expertise to formulate near term research objectives (1-3 years) as well as a longer-term research plan (5-10 years).

Background

A core pillar of CEKAP's mandate is to facilitate knowledge exchange between communities of research, policy and practice. In line with this mandate, CEKAP delivered a cross-Canada workshop series in the fall of 2017 to explore the use of analytical tools for community energy planning, including energy economy modelling, Geographic Information Systems (GIS) mapping, and cost benefit analysis tools. Workshops were held in the following locations:

- Toronto - September 13, 2017
- Halifax – September 15, 2017
- Victoria – September 19, 2017
- Vancouver – October 19, 2017

Each of the workshops included presentations by academics and industry experts on the variety of different community energy planning and policy analytical tools.¹ By exploring three central questions, the workshop series was aimed at sharing expertise across the partnership, while engaging in conversation about how analytical tools might be improved by researchers to better enable decision-making in the community energy planning process, from planning and engagement through to implementation, monitoring and evaluation.

Workshop Questions:

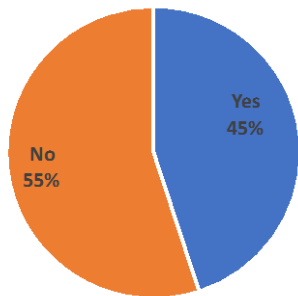
- What analytical tools are currently available to community and corporate energy managers to make decisions about local energy initiatives and policies?
- How have these tools been used in the decision-making process? That is, what questions are being asked and answered through these tools?
- What are the opportunities to improve these tools for local energy advocates and decision-makers?

Following the workshops, a survey was distributed to participants to seek additional input on these three questions. In this report, we will describe the survey methods and sample. We will then present the key findings and themes from the survey, and finish with some concluding thoughts and next steps.

¹ Note: for background on speakers and a link to their presentations, please visit

Results at a glance

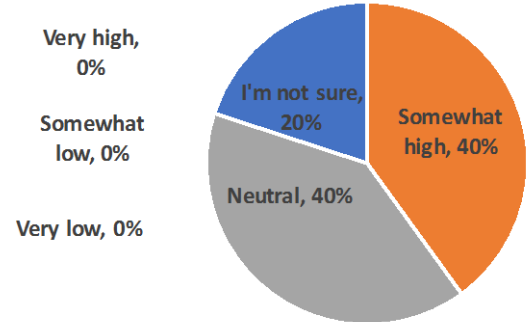
% of respondents with tool experience



Top 3 factors influencing use of tool results

1. Financial resources
2. Political context
3. Ability to understand results

Level of trust in analytical tools



Survey results suggest that there is a lot of room to grow and improve the use of analytical tools for community energy implementation in Canada. While many respondents have had limited experience working directly with tools or with the results of an analytical process, they suggested positive or neutral levels of trust in the use of tools. Furthermore, analytical tools are seen as a way to bring critical capacity to the planning process. That said, tools are not seen to improve capacity for implementation, which depends on factors that cannot be captured in the tool: e.g., capacity deficits related to resources and community buy-in, as well as social and political barriers to implementation. Still, tools are seen to serve as a focal point for dialogue across council, staff and the general public and as an entry point into these capacity issues. Based on these results, we see a desire to further leverage analytical tools in community energy when used appropriately. Our respondents provide some excellent insights into how analytical tools could be improved moving forward.

The results of this survey are not meant to be definitive. Instead, they serve as a glimpse into the challenges and opportunities of using analytical tools in this field, and as a foundation for future discussions on how to improve the use of tools.

Survey Methods and Description

The survey was administered online over a period of several weeks and circulated to CEKAP partners and community energy practitioners for completion on a voluntary basis. It consisted of 25 questions regarding respondents' experience with and perception of analytical tools in their field. A copy of the survey questions may be found at this link.

Our target sample was community energy practitioners in Canada, with an emphasis on those working at or for local governments. By limiting our sample to this group, we aimed to provide high quality observations that are reflective of those working in the realm of community energy. We gathered 15 complete sets of responses. This is a small but meaningful sample, as the pool of Canadian community energy practitioners with experience with analytical tools is fairly small.

Survey Results

Experience with tools

- Only 45% reported the use of an analytical tool to measure or evaluate the performance of policies or programs related to community energy.
- Within this group, GIS tools were most commonly reported (55%).
- Other types of tools used by respondents include spreadsheets tracking consumption or used to create inventories of greenhouse gas emissions, cost-based tools, and simulation or forecasting tools.
- Only 25% of all respondents reported having used complex energy-economy tools such as CIMS or CityInSight.

Factors influencing use of results from analytical tools

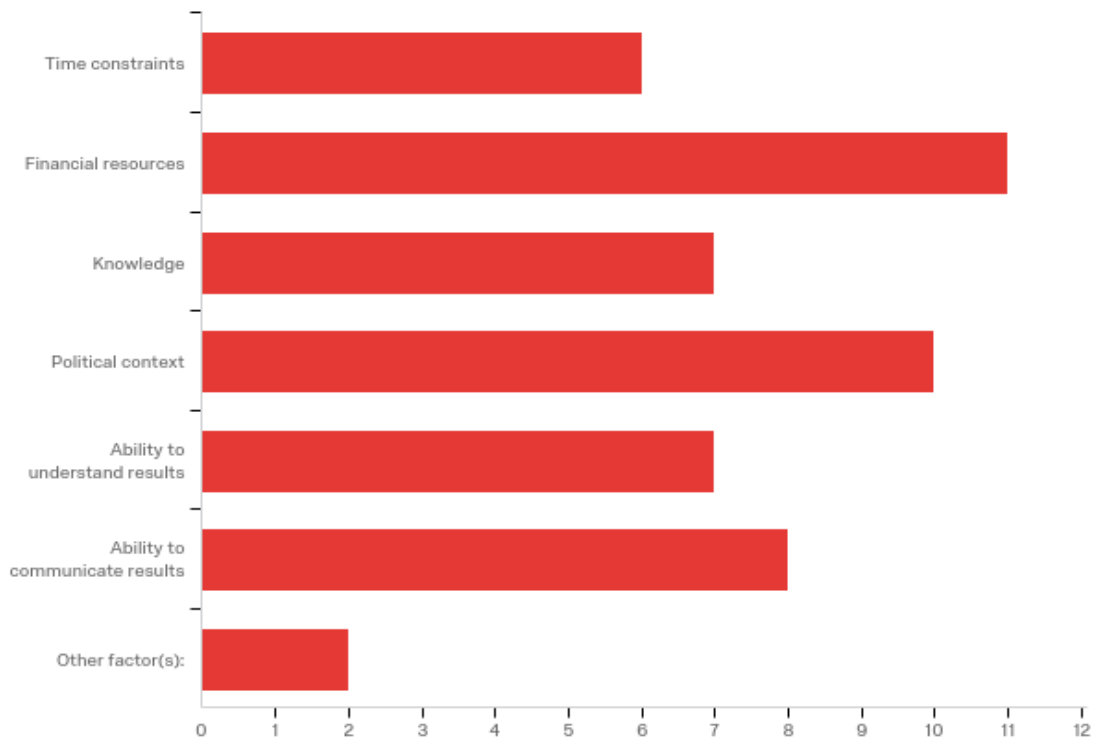


Figure 1: Number of respondents that selected the above factors as influencing whether or not the results of an evaluation of a community energy policy or program are likely to affect future decisions on community energy initiatives in their jurisdiction

Detailed responses show that **while tools bring capacity to the planning process, they do relatively little to fill the capacity deficit in implementation.** Results of analytical tools are only one factor, albeit an important one, in shaping community energy planning outcomes and implementation. As one respondent noted, “It often seems that political and time constraint factors are more important than the quality of results.” Another suggested that “Moving beyond awareness raising and communications activities requires a lot of time and money, both of which are in short supply within municipal government. The analysis tells us what we need to do, but there is a lack of resources to actually implement policies to achieve what the analysis suggests.”

Level of trust in analytical tools

In spite of their limited experience with tools, respondents generally indicated a trusting or, at least, a neutral attitude towards the results of analytical processes. Key factors influencing levels of trust are shown below.

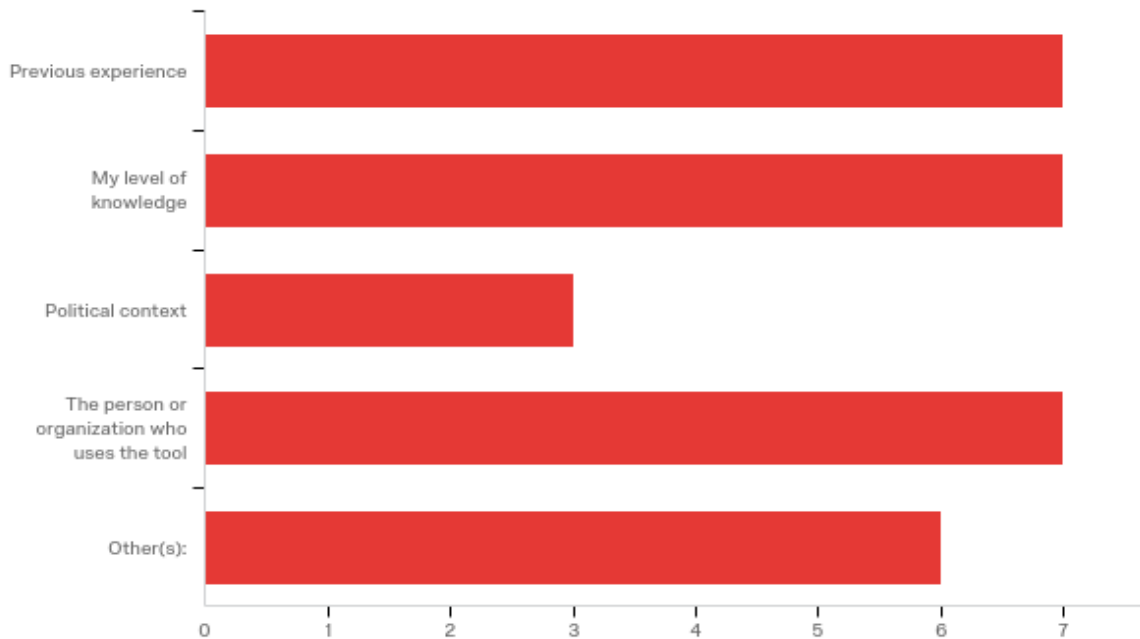


Figure 2: Number of respondents that selected the above factors as influencing their level of trust in analytical tools

Although no respondents indicated that they distrust analytical tools outright, qualitative explanations as to respondents’ trust in tools suggest that trust is dependent on the specific situation or case. For instance, one respondent indicated that “an analytical tool or model is only as good as the assumptions that go into it”. In other words, trust in analytical tools and results from those tools depends not only on the strength of the model itself (i.e., the extent to which it captures essential processes and relationships) but, perhaps more importantly, on the strength of the presumptions made by the model builders and the modelers more directly. This view was shared by another respondent, who expressed that their **concerns regarding the use of tools “is less about the tools, and more about the operators.”**

Gaps in the use of tools

A majority of respondents (60%) indicated that they have encountered a question or issue that they think should have been answered through the use of a tool, but was not. When asked to elaborate on how a tool might help bridge a gap, a wide variety of responses were entered. Some observations focused on ways in which tools could be better designed to answer questions, such as:

- “Expanding cost-benefit analyses to attempt an assessment of social benefits”
- “[working] with visualization . . . to improve the communication of results”
- “. . . standardization of tools at a regional level”

- Assessing “distributional impacts of CEP policies/programs in terms of benefits to lower income groups”
- “[visualizing and evaluating] future design and planning options in real time.”

Other responses pointed to specific instances in which a tool could help with a desired outcome, such as:

- “Community level analysis of what actions would be most effective for people to take”
- “We are focused on residential heating and cooling in older medium density neighbourhoods. The current tools do a poor job of identifying and modeling alternative thermal energy networks to address GHG emissions in these areas”
- “Mapping of community heat sources and sinks is lagging behind those for other sources of renewable energy”
- “Having a tool that defines the different energy profiles of buildings and industrial and institutional processes within a community could identify potential thermal network solutions that are not obvious today.”

Perceived usefulness of tools

All respondents found tools to be “Always or almost always useful,” or “Sometimes Useful” always in garnering public support. This indicates high political value of analytical tools. The perceived usefulness of tools in garnering public support or communicating internally was not as strong, though the majority (73%) found them to be “Sometimes Useful” or “Always or almost always useful.”

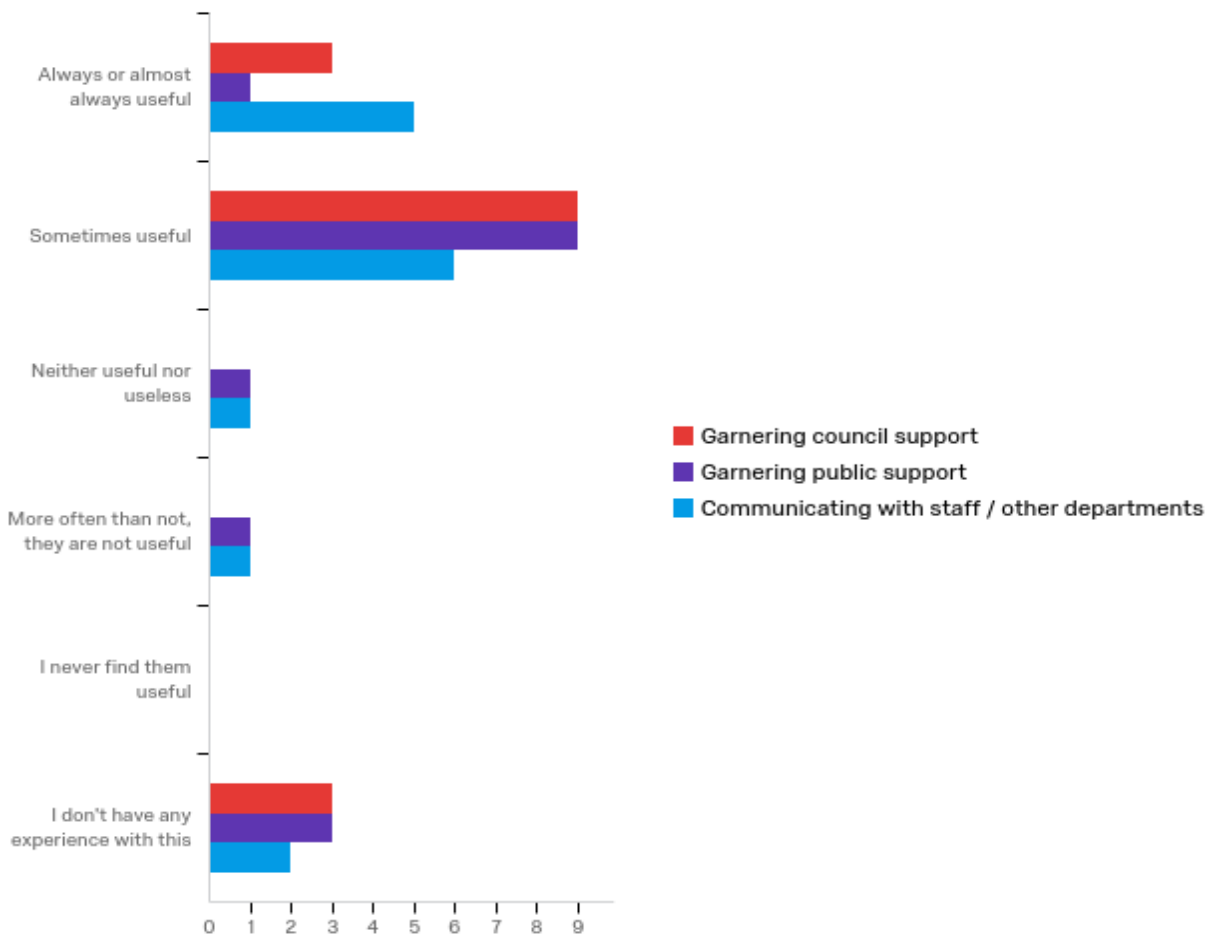


Figure 3: Number of respondents who indicated the extent to which analytical tools are useful for garnering council support, garnering public support, or communicating internally

According to many of our respondents, the results of analyses can provide a solid starting point for discussion. One respondent noted that “Being able to “show your math” . . . sets a high standard for discourse on topics.” Another respondent also weighed in on this theme: “Council participation in a workshop enables long term support for the plan in addition to understanding the potential impacts of actions. While communities are often disappointed in the low impact of the ‘easier’ actions, it serves the purpose of capacity building for key players and allows them to get started on achieving and reporting on their GHG emission reduction targets that they were required by the province to include in . . . their community plans.”

On the other hand, respondents identified important limitations of analytical tools. One respondent noted that political and social challenges are often left unanswered through an analytical process using a tool: “In my (limited) experience, the analytical tools tell us what the long-term game is, but don’t help us answer the near-term questions of how we overcome the political and public resistance to changing the status quo. So, the analysis tells us that it is technically possible to achieve low emissions, etc., but provides no intelligence on the

social/political pathway to actually realizing it. **That isn't a concern with analytical tools per se, but just a limitation in terms of their usefulness.**" Similarly, another noted that "In our experience, there is an upper limit of usefulness in a tool - they are very useful to guide decision-making and create five year (relatively short term) action plans. This field is evolving rapidly and assumptions will change. Political will often changes with election cycles."

Respondents also noted that the usefulness of tools varies depending on the audience. One observed that "The results of analytical tools are most helpful in communicating to staff and other technical experts. Politicians and general public are much more likely to reject analytics if the information presented differs from their philosophies and perceptions of the issue." This comment was reflected by another participant, who responded that "If a tool and its output is complicated, councils and the public will not understand. Case studies work better (what another, similar community has experienced)." As above, these responses also suggest that combining the results of an analytical tool with other communication tools like case studies can help build a robust case for a recommended action.

Conclusions and Next Steps for CEKAP

Survey results have helped us to better understand the role of analytical modeling tools in the CEP process. By way of concluding, we are confident in making two claims.

First, there is a need to understand the relationship between analytical tools and other capacity-building projects, including broad community engagement, key stakeholder engagement, and evaluation. It would be useful to address the following questions: how can analytical tools be designed and used to enable more effective engagement, in turn leading to more effective implementation of community energy plans? To what extent should engagement activities be used to help steer analysis (e.g., in choosing metrics that are important to the community; or in selecting scenarios and program options that stakeholder see as most feasible?). Armed with this understanding, there is a need to coordinate technical analysis with stakeholder engagement so as to build more trust and buy-in to the results emerging from analytical tools.

Second, where possible, analytical tools need to tie into geographic information systems. Either in terms of conducting spatial analysis, or in terms of using GIS to visualize results. Community energy planners and practitioners are more likely to have familiarity with GIS tools than any other tool, and municipalities have data needed to develop useful decision-support tools (e.g., energy demand maps, EV charging infrastructure maps, etc). Furthermore, visualization techniques, such as mapping outputs generated by GIS tools, can help convey messages more effectively than data and reports – they are intuitive forms of communication that represent information in ways that connect to places that are important to the people that need to be involved in implementation .

CEKAP researchers are undertaking two projects that will build on these conclusions. Dr. Calvert (University of Guelph) and the TRCA are developing a GIS toolkit to support technically rigorous and community-informed spatial plans for renewable energy development at local and regional scales. Dr. Jaccard and the Energy and Materials Working Group (Simon Fraser

University) are refining the GIS module of their energy-economy modeling platform CIMS model to add a spatial visualization component to the work and to better incorporate key spatial information into the analysis (e.g., bus routes, spatial distribution of heat demand relative to heat sources, etc).

Looking forward, CEKAP will aim to undertake projects that link technical data analysis to community and stakeholder engagement initiatives and other capacity building activities through case-study research. We want to understand how technical analysis and social engagement can work together to mobilize more robust plans that lead to better outcomes in terms of emissions reductions, and other socio-economic objectives.