Place-based Power Production Deliberations in Saskatchewan: Engaging Future Sustainability

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Research Article

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Abstract

This article reports research results from two day deliberative focus groups in three Saskatchewan communities addressing power production planning, in the context of climate change and sustainability. Mixed methods included pre and post-focus group surveys, coding and analysis of discussions, and the creation by each focus group of a strategy for sustainable power production in the future. Results of comparative case study analysis provide strong support for renewables and illustrate place based differences.

All communities strongly supported wind, solar and hydroelectricity. Estevan, located in the south of the province in proximity to coal, oil and gas production and coal power generating plants supported coal, and coal with carbon capture and storage (CCS). Saskatoon (situate in the middle of the province) and Regina (the center of government and between the other two) stressed the importance of engaging the public in decision making, education, providing information, and the importance that all costs, risk, benefits across the entire lifespan of the power production source be considered. In contrast, Estevan was concerned about the cost implications of power production source choice across the entire socio-economic system, including the social cost of job loss on the welfare system. Public participation in decision making in Estevan was not a priority. The reflexivity of the focus groups in Estevan brought closer together divergent views and increased support for coal and coal with CCS.

Highlights

Two day focus groups engaging in energy deliberations given climate change demonstrate learning

A coal, oil and gas community prioritizes job loss and welfare costs in energy transitions

Livelihood loss within a community engenders support for carbon capture and sequestration

Full cost accounting is an important consideration for alterative power production sources

1. Introduction

Saskatchewan is a province of 588,239 square kilometers ranging from semi-arid dryland in the south east to boreal forest in the mid latitude, and permafrost and tundra in the north. While the north is home of the world's second largest uranium mining industry, the south of the province boasts vast supplies of easily accessible lignite coal (TCE 2020). The province and crown owned utility, SaskPower, successfully achieved the first post combustion power production plant with carbon capture and storage (CCS) in 2008 at a coal power plant in Estevan, Saskatchewan (one of the study communities). The province has transitioned from over 70% of its power production supply being attributable to coal, to a mix of renewables, hydro, and natural gas (Hurlbert et al. 2020). The provincial utility is subject to increasing regulatory requirements to shut down coal without CCS by 2030 (CER 2020). In the context of climate change and sustainability, Saskatchewan's options are narrowing.[1]

Natural gas regulations are incrementally being introduced by the federal government such that after 2024 no new natural gas power production will be built and Saskatchewan's power production options are narrowing.[2] Increased import of hydro electricity from neighbouring Manitoba with necessary transmission development has recently been contracted and more is possible with expansion of northern Manitoba dams. Saskatchewan, Ontario, New Brunswick and Alberta have recently signed a memorandum of understanding to coordinate in exploration of small modular nuclear reactors (SMRs) and demonstration projects are advancing with potential availability in 2026 (Djuric 2019). With coal fired generation facing shut down (without expensive CCS modifications and SMRs on the horizon), and natural gas following thereafter, the Province offers an interesting landscape for case studies on people's perceptions of power production and insights into the 'wicked' or 'messy' problem (Urquiza et al. 2018) of power production in the face of climate change. Saskatchewan's extremely cold temperatures, short daylight hours in winter, and large electricity grid with few customers belies a problem defying complete definition, with elusive solutions that generate further issues (Rittel and Webber 1973).

The question of how to mitigate and adapt to climate change cannot be answered by science alone, as organizing policy response is difficult without a shared understanding of the messy problem of climate change (Shaw and Corner 2017). Society plays an active role in accelerating or preventing new decarbonized energy technologies (Pellizzone et al. 2017; Shaw and Corner 2017) and social science provides insights into the hopes, concerns, expectations, and resistance underscoring this role (Pellizzone et al. 2017). People's narratives expressed in energy discussions can provide accurate understandings of their cultures, lifestyles and decisions in relation to decarbonized energy technologies (Pellizone 2019; Allansdottir 2019; Moezzi et al. 2017; Sovacool et al. 2015). People's perceptions of risk and benefits is important in relation to acceptance of new clean energy technologies and energy infrastructure (Osazuwa-Peters et al. 2020; Linzenich et al. 2020).

One important development in the literature surrounding new renewable energy technology is the importance of people's sense of place attachment and the development of place theory (Devine-Wright 2011). Place theory explores peoples' place based symbolic meanings in relation to renewable power production technology and place attachments, including bonds people have with their 'place' and with each other and constructed sense of identity of place (Devine-Wright 2005, 2011).

Increasingly, addressing the gap in renewable energy implementation involves people in decision making whereby mechanisms of reflection, anticipation, inclusive deliberation in and around processes of research and innovation are employed (Owen et al. 2012). Decision making processes surrounding new renewable energy technologies require sustained and diffuse efforts from all stakeholders and need to overcome a series of technical, economic, cultural, and political barriers posed by mainly fossil fuel locked in energy systems (Pellizone 2017; Lehman et al. 2012). New thinking about problem definitions and new forms of knowledge are being created through public participation. Participation has emerged both theoretically (Chilvers et al. 2018) and methodologically through practices of reflexivity and two-way information flows (Urcan and Dryzek 2015; Urquiza et al. 2018). Dialogues of interested parties can

facilitate experimentation, learning, and change (Dietz et al. 2003), where people become co-creators of innovation (Pellizzone 2019).

Although there is a lack of consensus defining learning, literature identifies it both at 1. an individual level, involving cognitive change and often a social relational process (Armitage et al. 2017); and 2. at a meso, group or organization level (Baird et al. 2014). When learning occurs as a social relational process, it is termed social learning (Cundill and Rodela 2012). This social relational process occurs when issues are framed, alternatives analyzed, and choices debated in an inclusive, deliberative process (Keen et al. 2005).

Reflexivity is a mechanism advancing social learning; it is “the ability of a structure, process, or set of ideas to reconfigure itself in response to reflection on its performance” (Dryzek and Pickering 2017: 353). Cognitively, reflexivity occurs through deliberation, or a dialogue amongst people aimed at producing reasonable and well-informed opinions through discussion, exploration of new information, and claims made by fellow participants. Participants must be willing to revise their preferences in light of discussion (Chambers 2003).

Much community energy acceptance research has concentrated on explaining local objections to actual renewable energy proposals (Devine-Wright and Wiersma 2020), advancing understanding of the gap between expressed support for renewable energy, and its actual implementation (Wustenhagen et al. 2007; Devine-Wright 2011; Bell et al. 2013; Hurlbert et al. 2020). Literature surrounding public participation in energy decisions also often focuses on programs and policies of government (Chilvers et al. 2018; Chilvers and Longhurst 2016; Hurlbert 2014). There is rich literature on public and deliberative engagement in relation to energy, the characteristics and procedures of this engagement (Dryzek and Pickering 2017), descriptions of formats wherein people are engaged as subjects, objects or in performance of participatory collectives (Chilvers and Longhurst 2016), and synthesis of literature categorizing these models into ‘ecologies of participation’ (Chilvers et al. 2018). There is less ‘upstream’ research surrounding the potential for renewable energy projects before (not after) they are proposed (Devine-Wright and Wiersma 2020) and less knowledge surrounding peoples’ perceptions of a whole system portfolio, or future energy scenarios addressing climate change (Pidgeon et al. 2014). This research asks the question: How does place attachment inform perceptions, learning and values underpinning power production sources and the formulation of a strategy into the future, given climate change?

[1] Many climate mitigation scenarios to maintain global warming well below 2 degrees Celsius rely on combinations of CCS (IEA 2018; Koelbl et al. 2014), renewables, and nuclear (Tavoni et al. 2012); nuclear is argued to be essential to achieving net zero carbon in a cost-effective manner (MIT 2018).

[2] Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity (SOR/2018-261)

2. Methods

Two day intensive focus groups were held in three locations (Estevan, Regina, and Saskatoon) across Saskatchewan in late 2017. Estevan is located centrally to coal, oil and gas development (Estevan 2020); Regina is the government capital located between Estevan and Saskatoon (Regina 2020); Saskatoon is the furthest north bordering on the boreal forest (Saskatoon 2020). The participants, their gender and location, appear on table 1. These participants were selected randomly and attended two full day sessions one week apart. Focus groups were facilitated by an expert facilitator. All sessions were recorded and the transcripts coded using Nvivo software in respect of individual power production sources, actors, and climate change.

Table 1 number and gender of participants

City	Estevan	Regina	Saskatoon	Total
Male	9	6	6	21
Female	8	8	6	22
Total	17	14	12	43

The comparative case studies can provide evidence of social context and complex social processes, as well as preferences and interests that shape energy systems and their transitions (Sovacool 2014; Geels 2010). The advantage of comparative case studies over other methods (such as a provincial survey of attitudes or individual interviews) is the opportunity to explore context and use multiple methods to gather data (Kaarbo and Beasley 1999).

The purpose of the focus groups was to collect opinions on clean energy options in Saskatchewan, first by obtaining participant perspectives through survey, then providing some background knowledge through presentations by two power production utility experts (first day), and then an independent power producer expert (second day). Each community received the same presentations and followed the same procedure whereby the expert left the room after the presentation giving participants an opportunity to formulate questions. This method was employed to advance reflexivity. It is recognized that these processes cannot be wholly dominated by citizens, nor dominated by experts in order to open up, rather than close down conversation surrounding science (Blue and Medlock 2016). After discussion of the presentation with the expert outside of the room, the expert then returned and answered questions formulated by participants and posed by the facilitator. At the end of day two, the participants prepared a group strategy for power production in Saskatchewan and in closing, completed the same survey surrounding perceptions of power production sources.

Dialogues amongst participants were facilitated and the underlying premise was dialogue cannot be one hundred percent consensual, but must contain contested elements for re-evaluation and reflection (Dryzek and Pickering 2017). In order to arrive at a final group strategy, all participants were allowed five votes and were able to vote on the most important aspects of the strategy (section 3.4). The elements recounted in this article are the top five strategic priorities based on votes received.

3. Results

3.1 What Community Power Production Looks Like

The case study communities were consistent in their support for renewable energy. Ranked from highest preferred source to lowest were: solar energy, wind energy, hydroelectric energy, coal, natural gas, and nuclear. Figure 1 depicts the support, or lack of support for power production sources at the beginning of day one, and then again at the end of day two.

Solar and wind energy received the greatest support in all three focus group communities. Interestingly, while Solar was ranked highest followed by wind on day one, by the end of day two, wind was ranked higher than solar (albeit in Saskatoon wind and solar remained even). This result may be partly due to: 1. discussion with the experts surrounding winter in Saskatchewan and the challenges of power production at temperatures of minus 40 degrees Celsius, when the sun isn't shining, or the wind isn't blowing; 2. the lack of storage capacity for power production (including battery); and 3. the nature of the Saskatchewan electric grid joining sparse customers over very far distances (and resultant energy losses). Participants did express support for wind because of Saskatchewan's strong wind resource.

Similarly, with hydro, experts pointed out that further expansion of Saskatchewan's hydro resources are limited. This could explain the decrease in support for hydro from day one to day two. However post-citizen jury participants expressed a lower degree of support for hydroelectric energy. There are several reasons apparent in the transcripts of the citizen juries for this: 1. the potential new source of hydroelectricity in Saskatchewan are very limited and would have to be imported from Manitoba, the neighbouring province over a long distance; and 2. there was some discussion surrounding the impacts on traditional livelihoods of Indigenous people, the flora and fauna, as a result of hydroelectric dams.

Coal power production support was based on place and location of the community. Estevan, clearly supported coal, even at the end of day two. In fact, there was a shifting in favour of coal in Day two in Estevan even after discussions around climate change and the federal government phasing out coal power plants. Estevan's support for coal is much stronger as compared to Regina and Saskatoon. This is partly due to the fact in deliberations, participants in Estevan focused on their coal, oil, and gas economy (Estevan 2020). An Estevan participant stated:

"This is in Estevan, this is a bit of a hot spot here, you come in here and stand up and say you are going to stop coal and, you know, everybody here has got something affiliated to coal. You've got to be a little bit brave, you know."

One Estevan participant stated, “I live in Estevan so I want to keep the power plant going; the people who work there hire me to repair their houses.”

Nuclear energy was discussed in relation to SMRs and the fact they were still in development. One exchange between the expert presenter and participant is of note:

Participant: Where do the small modular reactors exist right now?
Expert witness: They do not exist. They are in the design phase.
Participant: They do not exist? [Expert: They do not exist]. So why are we even talking about it? –

In a previous term, the government determined that large nuclear plants were not appropriate for the Saskatchewan grid. This decision related both to the fact power production is dispersed over a great distance and power production sources no larger than 300 MW exist on the grid (Hurlbert 2009). In Estevan conversation surrounding nuclear centered on the perceived reduced number of jobs associated with nuclear, as a risk. One participant stated:

“You know, what it is. Employment, you know; we put increase or decrease, you know, if it’s truly efficient you are going to lose jobs, right. It doesn’t take a lot of people to run a nuclear plant once its built. You know, that is bad, or is it going to bring in more people, is it cost efficient?

3.2 Learning and social learning

The facilitated process of the focus groups advanced the social relational process necessary in social learning (Armitage et al. 2017) which was inclusive, deliberative, and reflexive with ideas revised based on reflection (Pinkerton 1994; Keen et al. 2005; Dryzek and Pickering 2017). This social relational process was orchestrated by the facilitator as well as the consistent expert presentations made in each community. The experts framed issues in relation to future power production options in the Saskatchewan context given climate change and increasing mitigation concerns. However, the alternatives, their analysis and ultimate choices (Pinkerton 1994; Keen et al. 2005) were determined by focus group participants. As outlined in 3.2, the pre and post survey results did evidence cognitive change of participants as support changed in relation to solar, wind and hydro based on expert presentations.

In relation to coal, significant differences occurred between Regina and Saskatoon, where coal continued to be opposed both pre and post focus group and Estevan. In Estevan support for coal marginally increased between pre and post focus group. Disregarding the expert presentations on climate change, the focus in Estevan was on jobs (see quotation above in 3.1) and also the discussion and support in Estevan for CCS. As the site of the world’s first post combustion power production CCS plant, participants embraced the continuation of coal given the potential for its ‘cleaner’ production and the significance for their local economy. This finding illustrates the importance of location to reflexivity and focus group outcome and co-creation of innovation (Pellizzone 2019). The people of Estevan’s attachment to their coal, oil, and gas economy was apparent in respect of their acceptance of coal and CCS (Devine-Wright 2011). Perhaps due to the potential for Estevan to be significantly affected in the future as a result of

climate change, and the fact Estevan is the oil, gas, and coal community, Estevan also was marginally more apt to agree that it is “important for ordinary citizens to be involved in reaching decisions on complicated technical issues.”

3.3 Governance, trust and actors

Although facilitated discussions focused on participants’ learning of power production and climate change issues, and participant’s perceptions of future strategy surrounding power production, discussion surrounding current power production actors occurred in each location. Focus was on the institutional actors (state, market, and civil society), the multi-level perspective actors (regime, niche, and landscape actors), and multi-level governance actors (local, provincial, and national) (Fischer and Newig 2016).

In respect of governance actors, groups in all three locations expressed strong support for continuation of the Crown owned power corporation, SaskPower, and didn’t wish to see it privatized. Further, Regina and Estevan didn’t want production to be privatized, not even with further expansion of the role of independent power producers (IPPs). Having a Crown or government owned utility with the ability to turn the switch off and on in managing power produced and fed into the power system when needed was clearly seen as an advantage in all three communities. The centralized model that SaskPower has adopted since the mid 1960s was seen to guarantee that people everywhere across the province pay comparable power rates and was strongly supported by participants. In these two locations, no change in the institutional actors (state, market and civil society) was desired or envisioned.

Saskatoon, however, did envision institutional change, and was very supportive of IPPs. In Saskatoon, on the first day of the focus group, the issue most discussed by participants was the politics of energy in Saskatchewan and the fact IPPs are blocked from providing renewable energy in the form of wind and solar in the province. In addition to IPPs, support was expressed for the idea of ‘prosumers’ and individual decentralized power production:

“It’s very political here in Saskatchewan. Should we be letting the government pick and choose the energy alternatives…. Or should we let privatization do it and actually there is a whole alternative and that’s energy self-sufficiency. Energy self-sufficiency means that every person like every household will generate all their energy needs in terms of electricity and that kind of stuff.”

Regina participants were less optimistic about the potential role of prosumers. Participants reflected on the excessive energy consumption of modern society and the propaganda war fought over the issue of climate change for the past 15 or 20 years that has resulted in inaction in transitioning to cleaner technologies. One Regina participant stated, “Governments aren’t acting because the public isn’t convinced, and the public isn’t convinced because they are being lied to constantly.” So, while support for SaskPower was clear, divergence relating to the existence and role of IPPs, and all three locations discussed issues surrounding trust in government, information, and decision making. Each will be discussed in turn.

Although participants supported the crown ownership model of power production in the province, there was still distrust expressed surrounding SaskPower, the government and decision making. Regina participants expressed a strong lack of trust for government decision making and frustration with SaskPower's decisions. Here the frustration was with SaskPower's low solar target. The province was seen as only reactive on environmental issues, not proactive, and taking action to reduce GHG emissions. Issues of multi-level governance emerged with disdain expressed that the province waited for the federal government to force the issue and make climate change policy.

In Regina when discussing the $1 or 1.2 billion dollars invested in CCS one participant stated it was, "because our government wanted to support the coal and energy, natural gas industries and so instead of retiring these awful plants, they decided to spend money on them." The sentiment of the Regina group was that without the politics of the oil and gas industry, the money would have been invested in solar and wind. In Regina (the government capital (Regina 2020)) there was sentiment that SaskPower wasn't fully disclosing information about energy options and their plans, partly due to being under the direction of the provincial government.

In Saskatoon there was also distrust and 'politics' cited as the cause for perceived inaction by SaskPower on renewables (rooftop solar and micro-grid development) and failure to collaborate with neighbouring provinces like Manitoba for development and import of hydro-electric power. In Saskatoon the government was blamed for the non-development of the province's nuclear potential and removing energy conservation requirements from Saskatchewan's building code.

In contrast, Estevan participants expressed a lack of trust in the federal government due to its decision to shut down coal plants. They felt it was due to 'politics' or only because closure is the popular Canadian choice, and not necessarily good for Saskatchewan people and the local economy. Participants noted this decision gave China and Russia a competitive advantage, as they continue to produce energy cheaply. One participant stated, what they found most surprising and interesting was, "how little input the public will have on energy production; it will end up all political." So, while all three focus groups were accepting of the multi-level actors (particularly SaskPower and its current regime), aspects of federal government climate change action (multi-level governance) and surrounding 'politics' distressed Estevan participants, but in Saskatoon and Regina 'politics' and lack of trust surrounding provincial government failure in relation to renewable energy. Separating politics from actors in technological innovation systems such as power production is contrary to much literature (Kern 2015; Markard et al. 2015) and perhaps naive on the participants' part.

Social trust of decision makers and information providers is key in understanding motivations and mechanisms underpinning social behaviours and attitudes (Greenberg 2014). In Regina, information in respect of climate change was regarded as an issue. It was acknowledged that there was so much scientific information out there, but people didn't necessarily have access to the best of it and other information was put forward by people who don't have enough knowledge. One participant stated:

“The problem is there is basically been a propaganda war fought over the issue of climate change for the past 15 to 20 years resulting in a lot of inaction in transitioning to cleaner technologies because of the massive investments that people have in existing technologies, in oil and gas production and as a result, there is still a lot of people who don’t believe that climate change is real, even though this has been you know a scientific based established fact for 20 years and scientists have been warning about this, governments aren’t acting because the public isn’t convinced and the public isn’t convinced because they are being lied to constantly.”

Saskatoon also expressed mistrust of information and education based on who was providing it. They felt leaders of the government would provide the education to convince people to their side. In Saskatoon participants asked for more than a bare minimum of transparency in decision making processes. One critical suggestion was that of setting criteria before making policy (which they believed SaskPower hasn’t done). Estevan also supported informed decisions:

“this is very important to us because without informed decisions or information people will make the wrong decisions where it becomes politically motivated and you hear biased political propaganda. So, politics does sway things in certain directions which gets into the propaganda; all governments want to be voted in again and again. So, we need the public to be informed.”

In Saskatoon, the onus was agreed to be on individuals to do some research by themselves.

This theme in relation to decision making in the future will be taken up and expanded on in the next section.

3.4 Strategy for a Sustainable Power Production Future

A significant amount of time during the focus groups were dedicated to facilitated discussion surrounding a strategy for a sustainable power production future in Saskatchewan. On day one after the first expert presentation, and again on day two after the second and third expert presentations, participants worked in groups to determine the most important factors for a good Saskatchewan power production policy. Each group presented their factors on worksheets and thereafter the entire group was given five votes to allocate to the most important factors. Factors that received the majority of votes appear in Table 2.

Table 2 Most Important Factors for Good Power Production Policy

	Estevan	Regina	Saskatoon
Most important factors for a good power production policy – after presentation 1 – Day 1			
Cost	**Cost** effectiveness; product efficiency Providing employment Benefits to the population	Public ownership of crown corporation to **control cost;** More information on all energy options and lifecycle **costs** (and reliability, pollution costs)	C**ost/benefit** analysis of present and future
Decision-making	Different sustainable power options If the **decision** makes sense economically and without political interference (even if not politically correct)	Transparent and honest **decision making** Energy companies, scientists, research community, and public to develop a team to make decisions	Develop **decision-making** criteria based on research, environmental safety, diversification, sustainability Develop public education for informed population to make informed decisions Transparency in public energy policies, leadership, decision making
Environment			Phase out fossil fuels, invest in renewables; more environmental impact assessments accountable to the public
Most important factors for a good power production policy – after presentation 2 and 3 – Day 2			
Cost	**Cost efficiency** to the customer If there are no jobs there is no economy	Need to take into account all **costs** across the life span and future generations	Power efficiency of coal, gas, solar, wind, CCS, nuclear and biomass that informs cost, efficiency Research is key in knowing what is effective, sustainable, **cost efficient**, safe (social & environmental impact)
Environment	Environmental issues are very expensive which results in absolute higher taxes; see the bigger picture	Preserve clean air, water, and take into account effects on human health; consider impact on wildlife and habitat	
Education		Knowledge is key and knowing the facts	Public education
Decision-making	Invest in proven technology (don't reinvent the wheel)		Transparent decision-making

While costs, decision-making, environment, and education themes were discussed both days, (Table 2) and appear in the recommendations (Table 3), public participation in decision making shows up only in recommendations made on day 2. Differences exist within these themes based on the local of the focus group. Most significantly, Estevan has a different perspective on costs, environment issues, and public participation in decision making.

3.4.1 Decision Making

In Saskatoon participants engaged with setting transparent goals and criteria to help energy policy and direct decision making. These criteria should be developed based on research, environmental safety, diversification, sustainability, cost/benefit analysis of the present and future. Criteria included social impacts on people in proximity and creation of jobs. “We have to have the public involved in setting the policies, ..keep the people educated and involved.” Saskatoon participants indicated, “We have to have more independent power producers…. More incentives for IPPs.. more emphasis on local power production.” In summation one participant rapporteur stated, “Saskatchewan needs a clear definition of policy criteria available and understood by the public. Decisions should be made based on the different locales. Saskatoon should be different from Estevan. Transparency in public energy policies, leadership in public decision making.” One Saskatoon participant concluded, “People generally have a lot of misconceptions of the different types of energy, how they work, their infrastructure and the cost.”

Transparency and honesty in decision making was also a theme in Regina. Regina participants also noted that politics should be removed from decision making and recommended education and accountability in decision-making:

So, remove politics from the decision so that in turn the decisions that are made are truly in the best interest of us, the people that are paying the bill. Educating the public to make sure that what you are doing, we all understand to some degree, not that we need to know it from start to finish 100%, but so we understand it. Make sure that whatever they choose is sustainable.

Another added, “We think university researchers, the expert, we invest in our universities, we’ve got all these great grad programs and researchers, and the power companies with their internal experts should be creating the policies. It shouldn’t be the government.” On day one it was concluded that a team of energy companies, scientists, research community and the public should make decisions. One specific solution was better inter-provincial cooperation. For instance a participant suggested that a cooperation be created with Manitoba in order to create storage options.

In Estevan the discussion and concluding points in respect of decision making centered on technical solutions. It isn’t surprising Estevan’s sentiments were to support technology, “even if not politically correct.” Given Estevan’s comments surrounding jobs and their oil, gas, and coal economy, it isn’t surprising that participants felt any new energy resource should be sustainable (albeit their focus on sustainability was in relation to jobs and economy see 3.4.2).

Table 3 Recommendations for Future Saskatchewan Power Production Sources

	Estevan	Regina	Saskatoon
Final Recommendations. - end of day 2			
Costs (All) & Environment (Regina and Saskatoon)	Shouldn't choose a **cheaper option** if reduces jobs and impacts economy Job loss will increase public service costs in welfare, healthcare, social programs which required working people paying taxes Operating **costs** need to be reasonable to avoid increasing cost to consumer Entice corporations to Saskatchewan to replace job loss and support the economy	**Consider all costs** (environment, affordability, impact on indigenous people, wildlife, global and health Provide incentives to reduce carbon Cost should not take priority over the environment	Present public with **cost benefit analysis** (all costs cradle to grave)
Decision-making	Decisions should be based on technology not politics All technology must continue to be progressive and forward thinking Any new energy resource should be sustainable	Leave it to the experts not politicians; unbiased university and researchers Consider all risks, benefits and how decisions impact society and future No privatization of power production	Transparent decision making based on local criteria and impact Make environment assessments accessible to the public Clear definition on policy and criteria available to the public
Public involvement and education	Keep public informed More research into pros and cons of pollution		Two way accessible public feedback \outreach program for energy consumption
Specific policy recommendations		Consult the public more and allow participation in decision making Educate on energy options in school Get a trusted source to educate the public (not the government)	Research alternatives to the status quo and commit to continuous improvement based on evidence

	Wind power should be 30% by 2030	Phase out fossil fuels and invest in renewable resources and production More incentives and resources for IPP More emphasis on local production

3.4.2 Costs of Power Production

All three focus groups discussed costs at length and this theme appears in both of Table 2 and 3. However, the discussion and conclusions surrounding costs are different as between Estevan and the other two cities of Regina and Saskatoon.

In Estevan priority was very much on local economy and jobs. The focus group discussion concluded the environment was healthy and focus should be on jobs. This discussion started very early in the focus group and continued until its finish:

The rivers are clean, the air is pure, you have to have people working to keep that 47 in healthcare in other words. So, so much of this is in my opinion, in our opinion, is coal bad? Shut down coal burning power plants, hundreds of people are out of work, not contributing that 27, 37 % income tax, and it just goes on and on – Citizen's Jury Day 1, Estevan).

Concern was over the vicious cycle of lost jobs, cessation of spending, rising welfare costs, and a poor economy. It was summed up as: "So that's what we talked about and we talked about the fact that if we were going to lose the jobs then everybody doesn't benefit." Even if a more expensive option was chosen, it was acceptable if there were more jobs involved. Estevan concluded that 'Job loss will increase public service costs in welfare, healthcare, social programs which require working people paying taxes." The solution was seen as enticing corporations to Saskatchewan to replace job loss and support the economy. Neither Regina or Saskatoon expressed the same sentiments.

Saskatoon was interested in 'cradle to grave' costs or understanding the entire cost and not just the initial cost of power production sources. Doing a cost and benefit analysis of the present and also the future was important. "Sustainability, consistent, reliable sources and supply… being sustainable, you need people's buy in, so community participation and engagement" were key criteria. Transparency in information and costs and benefits was also stated as important.

In Regina, 'all' costs were a key focus of discussions. It was stated, "life cycle costs, as cost that's considering the ongoing maintenance and replacement. Reliability, mentioned before. Environmental impact…. We are looking at the society impact, which is how it affects the lower income people." Future

generations and their cost burden was also considered. Figure 2 depicts the relation of these constructions of power generation costs.

3.4.3 Environment

Environment and its protection was a key theme in Regina and Saskatoon and Tables 2 and 3 reflects this. One rapporteur on day two in Regina stated:

“Okay, I got a question for all of you, this group wants to understand how can we reduce carbon emissions and slow climate change? Anybody got an answer for me? Switch to renewables like wind and solar. It will reduce that carbon emissions. And this is a big impact on my people, First Nations people. This is our livelihood. We got to keep our wildlife there for us to hunt. We eat this and if we don’t have clean air and water for our people, you are getting a lot of news about that now, because no clean water, some First Nations are struggling because they don’t have this. And the clean water would also deal with the fish and all that….Yea. Because I have seen a lot of my people, my age, younger than me, they don’t look their age anymore. They are older, even if they are younger than me, they look older than me and this is what I see is happening. These three things really impact my people, First Nations people. This is something that I don’t really understand. How do I reduce carbon emissions? Okay, this is a learning part of my being here, okay. But this here is very very very important to me.”

While in Regina the conclusion was that costs should not take priority over the environment, in Estevan it was different. The focus group concluded, “Environmental issues are very expensive which results in absolute higher taxes.”

3.4.4 Education, Research, and Public Involvement

Regina participants suggested education occur on energy production in school, researchers and experts should make decisions (with citizen engagement), and a trusted source should educate the public about climate change and energy (not the government). One rapporteur stated, “You want someone you trust. Not necessarily the politicians themselves [laughs].” Another stated at the end, “We need the experts, not the politicians.”

Saskatoon participants’ discussion included: researching which alternatives were effective, sustainable, cost efficient, and safe in relation to social and environmental impact, which were efficient, which had better costs from cradle to grave, and how to provide more incentives and resources for IPPs. The final recommendation of Saskatoon included more emphasis on local production. ‘Honest unbiased research” was the solution to removing politics from decision-making processes. In Regina it was acknowledged that there was so much scientific information out there, but people didn’t necessarily have access to the best of it and other information was put forward by people who don’t have enough knowledge. Both Saskatoon and Regina made final recommendations that the public be involved in decision making. One Regina participant stated:

“If we want to involve the public in decision making about technologies, people actually need to be informed and not misinformed about the technologies available and the environmental impacts of those technologies.

More research to figure out options and what the effect of decisions on the environment and everything else is needed. The final statement included, “We need a trusted source to educate the public, not the government.” And lastly education, from school age to seniors, so the public can be consulted and we don’t have biased decisions. There was less focus on the issue of education, research, and public involvement in Estevan. One of Estevan’s bullet’s appearing on Table 2 and 3 is to “keep public informed.”

4. Conclusion

People’s sense of place and attachment to place has been shown to be an important factor in the success of renewable energy development (Devine-Wright 2011) and while socio-ecological and technology community characteristics are important in responding to climate change and in clean energy transitions (Sovacool et al. 2015; Linzenich et al. 2020), less is known about place attachment and ‘upstream’ or pre-project research surrounding potential for renewable energy, clean energy projects, and people’s perceptions of whole power production system portfolios (Devine-Wright and Wiersma 2020; Pidgeon et al. 2014). This paper attempts to address part of this gap, through three focus groups conducted in three diverse communities in Saskatchewan, Canada.

Surveys ranking participant’s support for power production sources before and after the focus groups demonstrated that the participants did learn from the expert presentations. The utility experts and IPP expert that presented to the focus groups stressed the unique context of Saskatchewan’s power production socio-technical regime. All communities were consistent in their support of renewable energy including solar, wind, and hydro-electricity. This support continued after the presentations, but hydroelectricity support moderated when participants discovered there were no significant remaining hydroelectric assets in Saskatchewan; support for solar waned, given Saskatchewan’s winter and lack of battery storage. However, support for wind increased due to Saskatchewan’s strong wind resource.

The community with coal power production (also located centrally to coal, oil and gas resources) substantially differed in results in several significant aspects. First, Estevan continued to support coal power production even after discussion of climate change and the challenges of decarbonizing electricity. This is in part due to the fact Estevan has the world’s first post-combustion coal CCS plant. Participants were very favourable to this as a means to keep their local economy going while responding to climate change. Second, all communities focused discussion on costs. However, Estevan focused on the entire costs to the economy including welfare, if jobs were lost. The other two communities stressed life cycle and future generation costs of power production sources. Third, Estevan only supported the idea that people be informed, not that people be involved in power production decision making (as was supported in both Regina and Saskatoon).

While all communities expressed strong support for the continuation of SaskPower, the Crown owned electric utility, Saskatoon differed in its support for IPPs and prosumers, as well as its wish for institutional change. All three focus groups wished for politics to be taken out of decision making, contrary to the literature (Kern 2015; Markard et al. 2015) and perhaps naively. In Regina, the Estevan CCS plant was cited as an example of bad politics and support for the oil and gas industry; in Estevan CCS was regarded as a proven technology and referenced in Estevan's final recommendations in relation to advancing technology (even if not politically correct). Almost in a reconciliatory tone, Saskatoon advanced the notion that local communities should determine the power production sources in their community. (Each focus group occurred independently of each other).

All three communities wished to see more research. For Regina and Saskatoon it was research on the complex and difficult decisions surrounding future power production sources and for Estevan it was technology and pollution. Further, all three expressed trust in universities and research, with less trust in government. Transparency of decision making, clearly defined and communicated criteria of decision making, and more education were supported in Regina and Saskatoon. Typical of extractive industries' political economy underpinnings, Estevan's recommendations did not concern transparency, political accountability and concern for the environment (Schrecker et al. 2018).

It is clear from this research that what power production is desirable, in which community, may be highly divergent (Haggett 2016), but contrary to van Veelen and Haggett (2018) reflexivity within a focus group may bring together divergent thoughts and opinions. Further place attachment significantly correlates to an already industrialized mining landscape, such as Estevan's.

Further research on power production and the future given climate change and Canada's increasingly stringent carbon pricing policy is warranted. Within a provincial jurisdiction, can diverse community contexts be accommodated? Can one community's desire for more IPPs and decentralization and another's for more coal with CCS be workable?

Declarations

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Figures

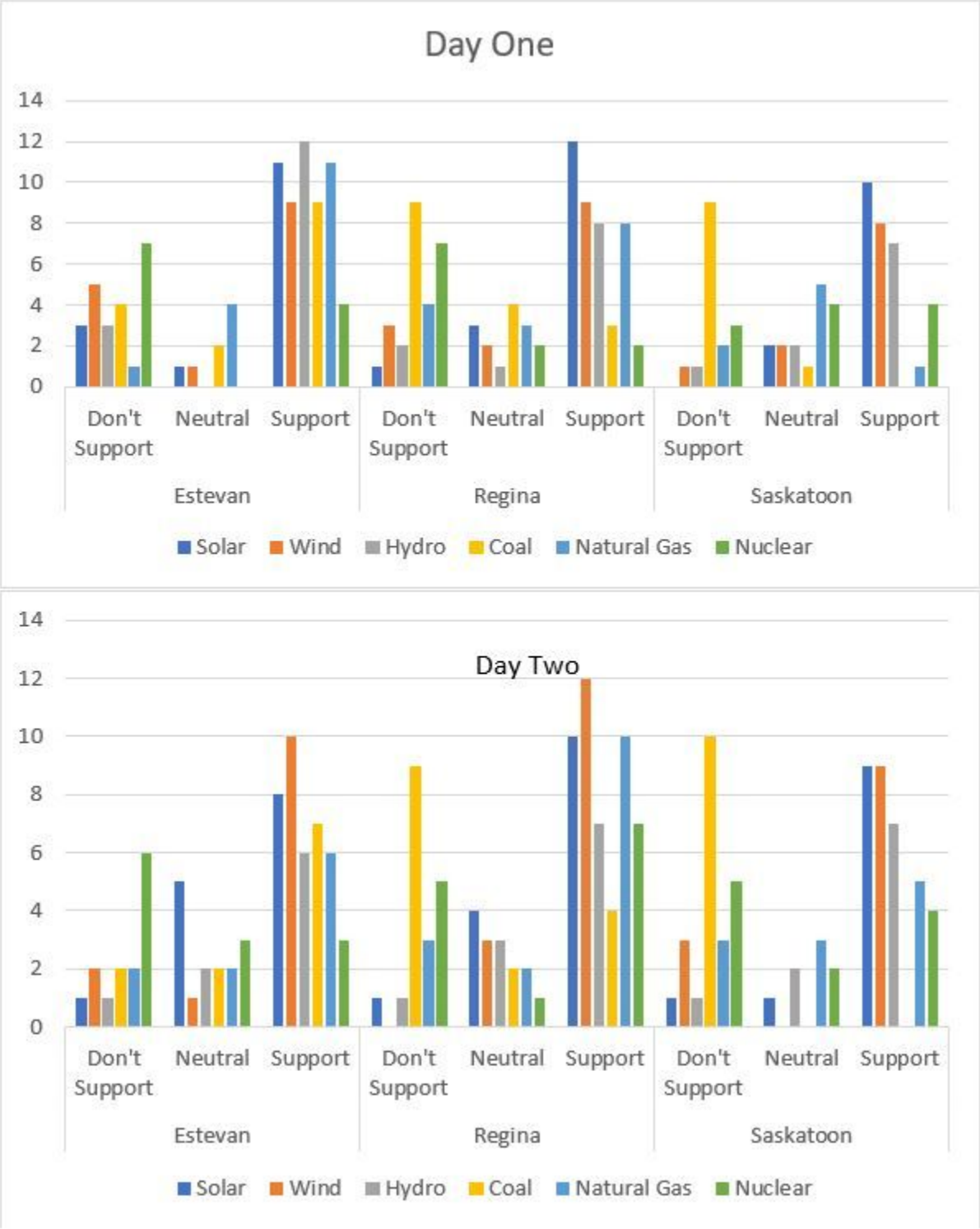

Figure 1

Support for power production sources on Day One and Day Two

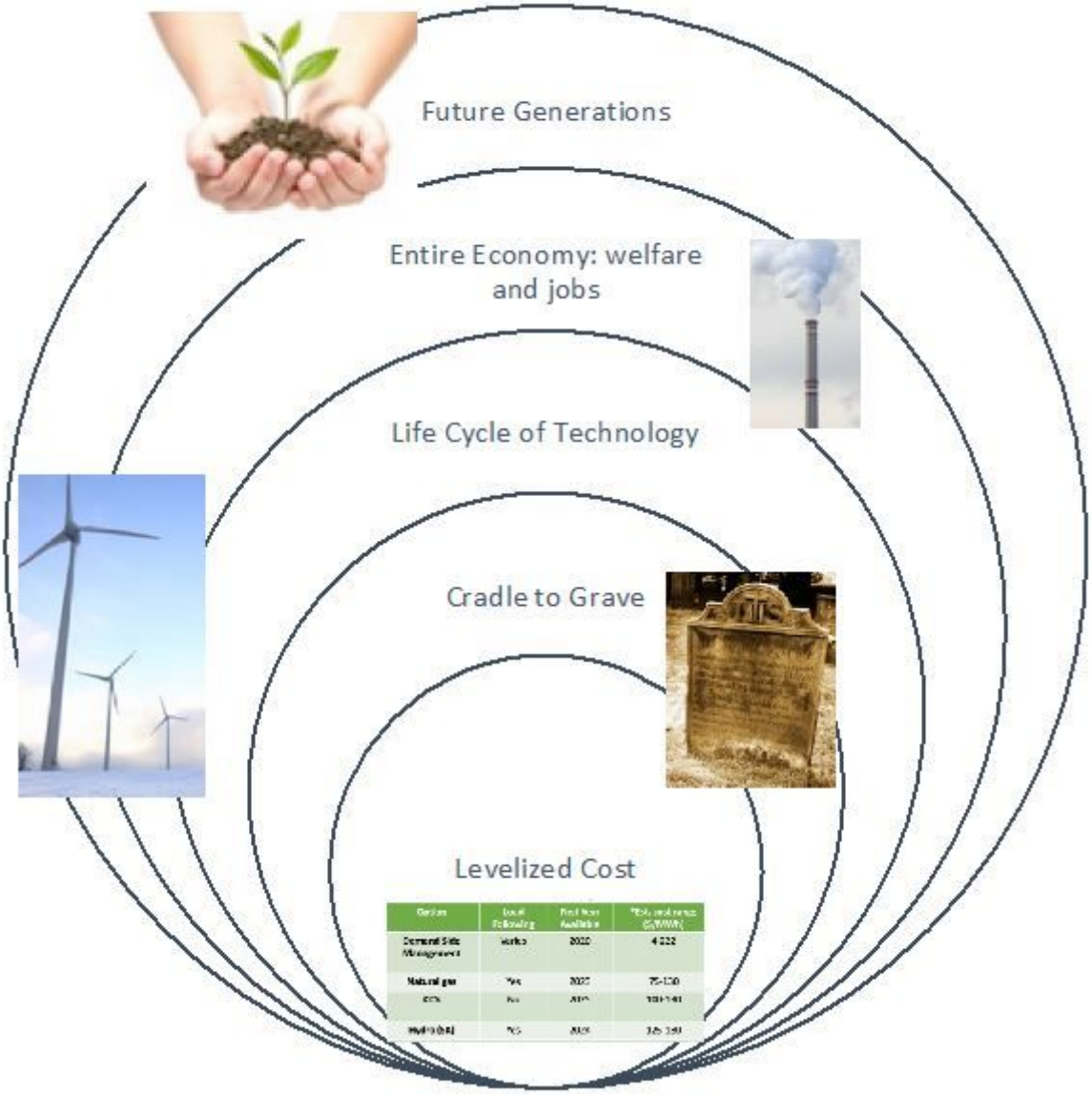

Figure 2

Perceptions of costs