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Understanding lay-public perceptions of energy storage technologies: Preliminary results of a questionnaire conducted in Canada

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Abstract

'Grid-scale' energy storage technologies (ESTs) provide energy storage at scales, capacity and power levels necessary to support the operation of electricity grids, particularly those with substantial renewable (e.g., wind and solar) generation capacity. Public perceptions of new and innovative technologies are known to influence their commercial success, yet there is little existing literature into perceptions and antecedents of grid-scale electricity storage among the general public. In this paper, we report on the findings of an online survey distributed to a diverse sample of the Canadian public ($N = 1,022$), focusing on perceptions of four specific ESTs (i.e., compressed air energy storage, flywheels, lithium ion batteries, and pumped hydro storage) and the factors that influence intentions to accept ESTs. This research is part of a larger joint-project between researchers at the University of Waterloo and the University of Surrey designed to investigate the similarities and differences in public perceptions of grid-scale ESTs in Canada and the UK. This paper compliments an earlier one that presented the findings for the same survey conducted on a diverse sample of the UK public.

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Keywords: Energy storage; Public perceptions; Attitudes; Acceptance

1. Introduction

'Energy storage' comprises an array of different technologies and processes that allow us to control the accessibility and availability of certain forms of energy so that they can be used to provide services on demand [1]. 'Grid-scale' energy storage technologies (ESTs) are those with sufficient scalability, capacity, and/or power that they may be used to provide services to the electricity grid. Broadly speaking, these services include short-term (i.e., seconds) ancillary services like voltage regulation, short to medium-term (i.e., hours) load following (or 'bridging power'), and medium to long-term (i.e., days or longer) bulk energy management. All of these services are

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crucial to the effective and efficient operation of modern electricity grids, particularly so where intermittent sources of energy, such as wind and solar power, provide substantial contributions to overall grid energy [2]. Accordingly, as concern about mitigating the climate change impacts of our energy systems through the incorporation of more low-carbon energy sources has increased, so too has the interest in energy storage.

While some grid-scale ESTs have been in commercial use for decades (e.g., pumped hydro storage), others are at earlier stages in the commercial availability or active use in electricity grids [3,4]. The large body of literature on the social acceptance of new, unfamiliar, and innovative energy technologies has demonstrated that public perceptions and opinions toward such technology can exert strong influence on the pace and extent of their development. Understanding how members of the general public perceive grid-scale ESTs is therefore important in the design of engagement and education strategies to facilitate their inclusion in transition toward low-carbon electricity systems in a sustainable and socially acceptable manner.

The study of the social acceptance of energy storage is in its infancy [5–7]. Given this, researchers at the University of Waterloo (Canada) and the University of Surrey (United Kingdom) conducted a joint, online survey of public perceptions toward ESTs in Canada and the United Kingdom (UK) in 2018. Results from the UK survey are available elsewhere [5]. In the present paper, we present results from the Canadian survey, note similarities and differences with perceptions in the UK, and outline future steps for further analysis.

2. Methods

2.1. Participants and demographics

A broadly representative sample of the Canadian adult population (in terms of age, gender, and regional distribution) was recruited via an online survey-platform provider. A total of $N = 1022$ eligible respondents completed the survey. Eligibility was determined by: (a) being a resident in one of 13 Canadian provinces/territories; and, (b) appropriately completing all survey questions. See Table 1 for key demographics of the sample.

2.2. Survey design

The survey was designed to gather lay-public perceptions of grid-scale energy storage in general and of select ESTs (compressed air energy storage, flywheels, lithium ion batteries, and pumped hydro storage) in particular. The questionnaire comprised of an introduction, six main sections, and a final debrief. The introduction contained an overview of the purpose of the survey and relevant ethics and consent statements. The debrief identified that there were different framing conditions built into the survey and provided links to websites where respondents could learn more about ESTs.

2.2.1. Demographics

The first of the six main sections collected some basic demographic information (e.g., age, education, employment, political views, and province of residence). All responses were categorical, except a political preference question that was scored on a sliding scale (1 = very left wing; 10 = very right wing).

2.2.2. Introductory EST information

In the second section, respondents were presented with a short, written overview of energy storage, as well as pictures of the four target energy storage technologies. Respondents were then randomly distributed into one of four different ‘framing’ groups, each of which were presented with further information about energy storage that emphasized one of the following four contexts: environmental sustainability, energy security, technological innovation, or economic development [8]. A fifth ‘control’ condition was also included which received no additional information about ESTs. As with the earlier paper on perceptions in the UK [5], results of the framing manipulation are not presented here, and all analyses below are conducted on the entire sample.

2.2.3. Initial attitudes toward ESTs

In the third section, respondents were asked about their initial awareness (had they heard of energy storage previously, yes/no/not sure), the extent of their knowledge of energy storage (1 = nothing at all; 5 = a great deal),

Table 1. Key demographic details of the sample ($N = 1022$).

		N	%			n	%
Age (years)	18–24	106	10.4	Occupation	Employed[1]	606	59.3
	25–34	162	15.9		Retired	231	22.6
	35–49	365	35.7		Homemaker	44	4.3
	50–64	177	17.3		Student	53	5.2
	65+	212	20.7		Other[2]	80	8.6
Gender	Male	494	48.3	Education	≤ Secondary	225	22.0
	Female	519	50.8		College	248	24.3
	Other[3]	9	0.9		Undergraduate	315	30.8
					Postgraduate	196	19.2
					Other	34	3.7
Region	Ontario	399	39.0				
	Quebec	221	21.6				
	Prairies*	168	16.4				
	BC & Territories[5]	150	14.7				
	Atlantic[6]	84	8.2				

[1]Employed: Full/Part/Self-employed & Military; [2]Other: Out of work, Unable to Work, Other; [3]Other: n = 5 "Other", n = 4 "Prefer not to say"; [4]Prairies: Alberta, Saskatchewan, Manitoba; [5]BC & Territories: n = 147 "British Columbia", n = 3 "Territories"; [6]Atlantic: Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island.

and where and how they had first heard of energy storage (eight categories, including television, friend or relative, and print newspapers). Respondents were asked about their perceptions of a set of five possible problems with their provincial/territorial electricity grid, and then about their belief that ESTs could contribute to resolving the same issues (for both sets: 1 = strongly disagree; 5 = strongly agree + do not know (DK)). This section concluded with a set of seven statements to assess components of respondents' 'global attitude' toward energy storage (1 = strongly agree; 5 = strongly disagree + DK) (Cronbach's $\alpha = 0.78$, excluding attitude certainty, reverse coding of items 2 and 6):

- All things considered, I believe that the use of ESTs in my province is a good thing
- Overall, I just feel uneasy about the use of ESTs in my province's electricity network
- I believe that the use of ESTs in my province is necessary for the future of the electricity network
- I am happy that people are willing to invest financially in ESTs for my province's electricity network
- I would generally accept the installation of an energy storage facility within 1.5 kilometres of my home
- All things considered, I feel there are more risks than benefits to using ESTs in my province's electricity network
- I am certain of my opinions about the use of ESTs in my province's electricity network

2.2.4. 'Flashcard' EST information and questions

In the fourth section, respondents were provided with four 'flashcards' (randomized order) which provided summary information about the four storage technologies noted above and their potential role in electricity grids (See Fig. 1.) Respondents were asked to assess the quality of that information, to register their attitude to each technology (1 = very unfavourable; 10 = very favourable), to pick a favourite technology from the four (including 'none'), and the extent to which they relied on each facet of the flashcard in making their determinations (e.g., power quality rating, general description) (1 = strongly disagree; 5 = strongly agree + DK). Definitions of the services provided by each technology were based on United States Department of Energy (DOE) data [9].

2.2.5. Intentions to support ESTs

Section five presented a series of 32 statements to assess respondents' intentions to support ESTs (e.g., "I am willing to support the use of ESTs in my province"); social norms (e.g., "I think that there is general support among the public in my province for the use of ESTs"); self-efficacy (e.g., "I believe that the general public in my province has the ability to influence decisions regarding the use of ESTs"); positive affect (e.g., "For me, using ESTs in my province just feels right"); negative affect (e.g., "I feel worried about the use of ESTs in my province");

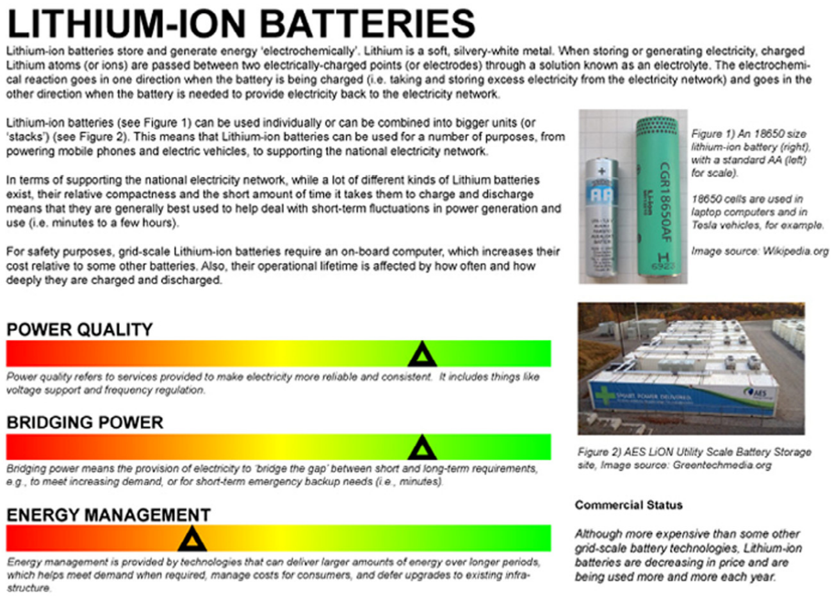

Fig. 1. Example flashcard for lithium ion batteries, providing a brief description of the technology, approximations of its suitability for different applications, pictures, and a statement on current commercial status.

personal and societal benefits and risks (e.g., "I believe the use of ESTs in my province holds benefits/holds risks"); financial costs (e.g., "I believe that financial investment in ESTs for use in my province is justified"); and trust in developers (e.g., "I trust that the people responsible for the use of ESTs in my province know what they are doing"). These 32 items mapped to constructs identified as being key antecedents of public perceptions of technology within the comprehensive technology acceptance framework [10]. All responses were made on a 5-point scale (1 = strongly disagree; 5 = strongly agree + DK); see Appendix A for a full list of items and scale reliabilities. The section concluded with respondents re-completing the 'global attitude' questions from section three of the survey (Cronbach's $\alpha = 0.83$).

2.2.6. *Personality characteristics*

The sixth and final section of the survey gathered personality characteristics from respondents, including assessments of environmental values (5 items: e.g., "The balance of nature is delicate and easily upset") and 'green' identity (4 items: e.g., "I think of myself as an environmentally friendly person") (1 = strongly disagree; 5 = strongly agree + DK); energy security concerns (6 items: e.g., "To what extent are you concerned that future energy will become unaffordable"), and their concern with societal and personal impacts of climate change (1 = not at all; 4 = very concerned + DK).

3. Results

3.1. *Awareness and problem perception*

Initial self-claimed awareness of ESTs was low. In each region, the portion of people who had not heard of energy storage (42%–49%) was larger than those who had heard of ESTs (28%–37%) or those who claimed they were unsure (20%–27%). When asked to assess how much they knew about energy storage, all regions had mean responses lower than the midpoint of the scale, indicating moderate to low levels of knowledge. Interestingly, this was true even of respondents who claimed to have heard of energy storage previously, as shown below in Table 2.

Respondents were then polled on their perceptions of a series of problems in their province's electricity networks, and the extent to which they thought ESTs would be helpful in resolving each problem. One-sample t-tests (vs. scale midpoint) revealed that respondents generally agreed that their provincial electricity system was costly for

Table 2. Based on what you knew before or have just read, how much would you say you know about energy storage technology? (By whether respondent had or had not heard (+ unsure) of ESTs previously).

	Have Heard			Have Not Heard + Unsure		
	*Mean (SD)**	*Sig (p)*	*n*	*Mean (SD)**	*Sig (p)*	*n*
Canada	2.66 (0.81)	<.001	326	1.95 (0.72)	<.001	692
Ontario	2.80 (0.85)	.008	131	1.99 (0.75)	<.001	268
Quebec	2.62 (0.79)	<.001	68	1.89 (0.79)	<.001	151
Prairies	2.50 (0.74)	<.001	62	1.94 (0.74)	<.001	106
BC & Territories	2.61 (0.77)	.002	41	1.93 (0.56)	<.001	107
Atlantic	2.54 (0.72)	.004	24	2.02 (0.70)	<.001	60

* Means compared against scale midpoint (3.0); 1 — 'Nothing at all' ; 5 — ' A great deal'.

Table 3. Mean evaluations of electricity network problems and the perceived role of ESTs in resolving them.

	Problem Perception		ESTs as Solution		Correlation	
	*Mean (SD)**	*Sig. (p)*	*Mean (SD)**	*Sig. (p)*	*Corr. (r)*	*Sig (p)*
Environmentally unsustainable	3.05 (1.06)	.124	3.40 (1.04)	<.001	.249	<.001
Restrictive to economic growth	2.95 (1.07)	.140	3.25 (0.97)	<.001	.214	<.001
Old and outdated	3.16 (1.04)	<.001	3.24 (1.15)	<.001	.255	<.001
Insecure and unreliable	2.68 (1.02)	<.001	3.32 (0.97)	<.001	.249	<.001
Costly for consumers	3.67 (1.01)	<.001	3.45 (0.91)	<.001	.186	<.001

* Means compared against scale midpoint (3.0); 1 = 'Strongly disagree', 5 = 'Strongly agree'.

consumers and old and outdated, and disagreed that it was insecure and unreliable. Respondents were generally undecided on whether the system was environmentally unsustainable or restrictive to economic growth.

On average, respondents agreed (as they had in the UK sample) that ESTs could play a role in resolving all the issues. Bivariate (Pearson) correlational analysis confirmed that there were significant, though weak, positive correlations between respondents' problem perceptions and the perceived role of ESTs in addressing them. Table 3 lists the relevant means and significance values for these analyses.

3.2. Initial attitudes

Respondents were favourable to all EST options presented. One-sample t-tests confirmed that the mean attitudes of all four options were significantly greater than the mid-point of the scale, $ts \geq 11.07$, $ps < .001$. The mean favourability of pumped hydro storage was significantly greater than for all other options (Mean $_{\text{Diffs}}$. ≥ 0.45, $ps <$ .001). Of the other technologies, lithium-ion batteries were notably preferred to compressed air storage (Mean $_{\text{Diffs}}$. ≥ 0.32, $p < .001$) but only marginally preferred to flywheels (Mean $_{\text{Diffs}}$ ≥ 0.13, $p = .065$). Flywheels were also marginally preferred to compressed air storage (Mean $_{\text{Diffs.}}$ ≥ 0.19, $p = .002$). These preferences were reflected in responses to the forced favourite technology question, where pumped hydro storage was most favoured, followed by lithium ion batteries. For the relevant means and frequency data associated with these analyses, see Figs. 2a and 2b.

This same basic preference order exists across each region in Canada as well, with only minor differences (e.g., the relative ratings between flywheels and lithium ion batteries differ slightly in some regions). Pumped hydro storage is ranked the most favourable EST across all regions although was most notably preferred in provinces with electricity systems that are predominately hydroelectric (e.g., British Columbia, Newfoundland and Labrador, Quebec, and Manitoba). Except for Manitoba, the share of respondents choosing pumped hydro as the favoured technology within these predominantly hydroelectric provinces all exceeded 40% (see Fig. 3).

3.3. Explaining intentions to support

Overall, intentions to accept ESTs were positive across five different regions: Atlantic provinces (M = 3.56, SD = 0.75); Ontario (M = 3.62, SD = 0.75); Quebec (M = 3.49, SD = 0.74), Prairies (M = 3.52, SD = 0.81) and

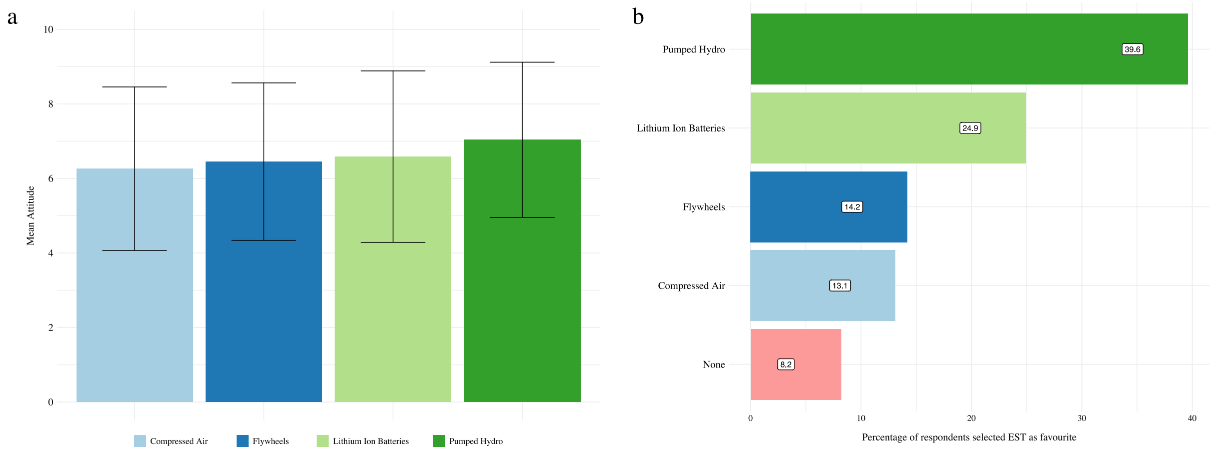

Fig. 2. (a) Mean attitudes towards each of the four ESTs (1 = very unfavourable; 10 = very favourable); Fig. 2(b) Percentage of people selecting each EST as their favoured option for use in their home province (forced choice, including 'none' option). Note: Scale-midpoint for Fig. 2a = 5.50.

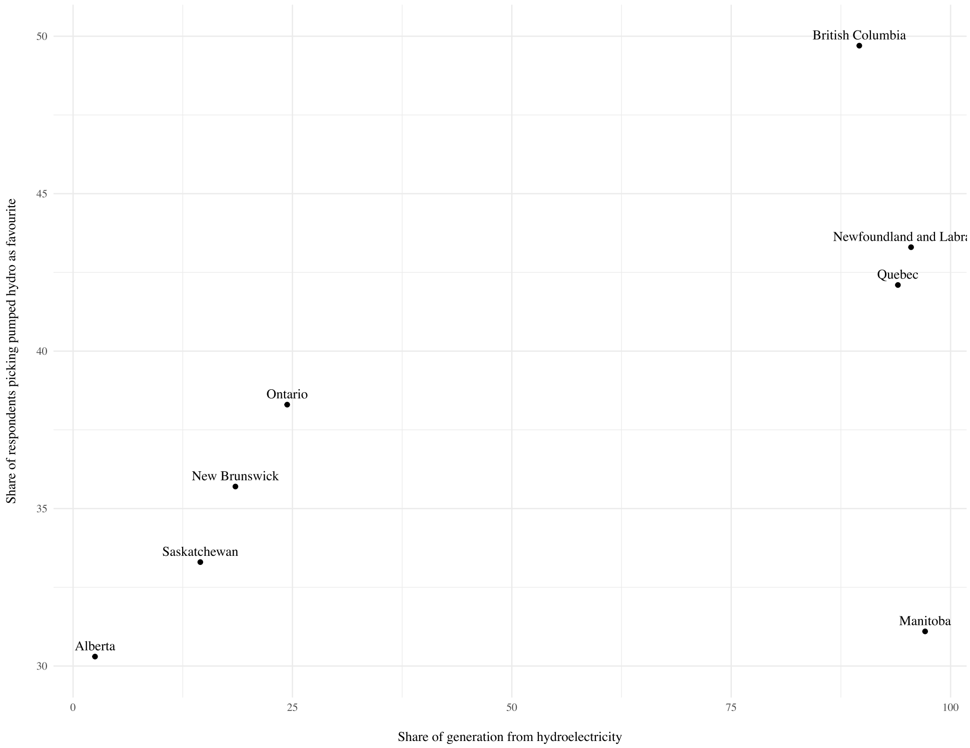

Fig. 3. Percentage of respondents picking pumped hydro storage as the favourite EST by share of territorial hydroelectricity generation (2018); Note: Nova Scotia & Territories omitted due to small sample; Prince Edward Island omitted due to no domestic generation.

BC & Territories (M = 3.53, SD 0.68). All means were above the scale midpoint (*ps* < .001, one-sample t-test vs. 3.0)

As with the UK survey results, multiple linear regression (MLR) analysis was used to explain the variance in respondents' intentions to support the deployment of ESTs in Canada. A total of 14 independent variables were entered as predictors in the model. These included personal characteristics (i.e., environmental values, perception of climate change, self-claimed awareness of energy storage) and constructs from the comprehensive model of

Table 4. Summary of regression model explanatory variables.

Variable	*beta*	*t*	Sig (*p*)	Variable	*beta*	*t*	Sig (*p*)
Positive affect	.26	7.49	<.001	Perceived risks*	−.06	−1.87	.061
Perceived benefits	.29	5.94	<.001	Trust in developers*	.02	1.10	.269
Social norms	.11	3.88	<.001	Environmental values*	−.04	−1.51	.131
Attitude	.23	5.09	<.001	Negative affect*	−.04	−1.39	.162
Costs (justified)	.10	3.86	<.001	Climate change*	.00	0.36	.716
Self-claimed knowledge	.40	2.46	.013	Self-efficacy*	.01	0.44	.654
Problem perception	.05	2.14	.032	Costs (better spent elsewhere)*	.00	0.14	.882

* Not retained

technology acceptance (i.e., social norms; self-efficacy; perceived benefits, risks, and financial costs; trust in developers; positive and negative affect; global attitude [at time 2]). A composite measure of problem perception was also included.[1]

The regression model explained 71% of the variance in intentions, R^2 adj. = 0.712, F (14, 780) = 138.1, $p < 0.001$. Standardized coefficients showed that positive affect, perceived benefits, social norms, global attitude, perceptions that costs of ESTs were justified, self-claimed knowledge, and problem perception were retained as significant predictors. Perception of risks was marginally statistically significant (see Table 4).

In summary, greater intentions to support ESTs was shown among those who had stronger positive attitudes and positive affective responses, perceived there to be more general benefits and who saw investment in the technology to be warranted, who perceived ESTs as a potential solution to grid problems, and who claimed to have awareness of ESTs upon commencing the survey. There was also a trend of those perceiving greater risk to be less inclined to accept ESTs. Except for trust in developers and social norms (positive relationships with intentions in the UK study) and environmental values (negative relationship in the UK), the retained predictors were largely the same in both countries.

4. Discussion

This paper presents the results of analyses conducted on Canadian public opinion survey data regarding grid-scale ESTs. As in our earlier UK paper, our aims in this study were to investigate: (a) the nature and antecedents of public perceptions of grid-scale energy storage, and; (b) the comparative favourability of four grid-scale energy storage options (i.e., compressed air energy storage, flywheels, lithium ion batteries, and pumped hydro storage). In this discussion, we seek to not only summarize the key findings from the Canadian data but also to draw some initial, tentative comparisons between the Canadian and associated UK data [5].

Broadly, our findings were like those in the UK study. Overall, respondents in both countries were positive toward energy storage in principle, and to the four ESTs examined. There were some differences in respondents' perceptions about the status of their domestic electricity networks. UK respondents were undecided about the insecurity and unreliability of the UK electricity system, whereas the Canadian respondents disagreed that the electricity grid was insecure. In both countries respondents strongly agreed that the electricity grid was costly, and there was broad agreement that ESTs could provide a potential solution for all five problems identified.

On technological perceptions, both UK and Canadian respondents rated pumped hydro storage most favourably. In fact, the hierarchy of favourability among the technologies was similar in both countries, with lithium ion batteries ranking second, followed by flywheels and compressed air storage (on both the individual preferences for each technology measure, and the forced favourite measure). As noted, the same basic preference order exists by region in Canada as well, with pumped hydro storage as the clear favourite and compressed air storage the least favourite in each region, though there were some regional differences in preferences for lithium ion batteries versus flywheels.

In the UK paper [5], we speculated that preferences for pumped hydro storage may be related to familiarity with hydroelectricity, or a belief that it is more 'natural'. Across Canada, each province administers their own electricity system and each has a different capacity profile. Several provinces are predominately, if not essentially exclusively,

[1] Internal reliability analysis (Cronbach's alpha) was used to ensure the feasibility of forming composite measures of each variable. As with the UK survey, this indicated that the two financial costs items should be treated separately, and that one behavioural intention and one social norm item should be discounted from the analysis.

hydroelectric (i.e., British Columbia, Manitoba, Quebec, Newfoundland and Labrador). With the exception of Manitoba, these provinces exhibit the strongest preferences for pumped hydro storage on the forced favourite measure (50% of respondents choosing this technology as their favourite in British Columbia; 43% in Newfoundland and Labrador; and 42% in Quebec). This finding supports the suggestion that familiarity with hydroelectricity might relate to preferences for pumped hydro storage; however, this hypothesis warrants further and more specific investigation.[2]

Results of the regression analysis on the Canadian sample were also broadly in line with those from the UK, though there were some minor differences. In the Canadian sample, trust in developers and environmental values were not retained as significant predictors, although 'social norms' were. This finding could reflect a difference in who the UK and Canadian public trust in relation to discussions about grid-scale ESTs. Specifically, whereas the UK public would appear to be more influenced by their trust in those responsible for developing the technology, Canadians' perceptions are ostensibly more affected by their beliefs about the (apparent) opinions of other Canadian citizens. This finding could hold implications for public communication efforts about ESTs (e.g. in terms of source selection).

In terms of the relationship between environmental values and intent to accept ESTs, while this was not significant in the Canadian sample, it was – as in the UK study – negative. We posited in our earlier paper [5] that this could indicate a perception of energy storage as being an undesirable 'techno-fix' to an environmental issue. While results from the Canadian study are inconclusive, they would appear to lend some support to this speculation. Indeed, another study conducted on media framing of ESTs (drawing on the same data collected in these surveys) found that ESTs are very much framed as 'techno-fixes' for modern energy and climate change studies [12].

Future research is now required to clarify the relationships between the explanatory factors examined in both studies and to further investigate the similarities and differences between the Canadian and UK samples. In view of this, we are further analysing these data using path-analysis (structural equation modelling) to: (1) model the causal relationships between the antecedents of respondents' intentions to support grid-scale ESTs; and (2) investigate the comparability of these relationships within the two national samples. Within these analyses, we intend to focus on the role that trust in developers has on public acceptance of grid-scale ESTs. This is not only because trust has been commonly identified as a key predictor of technology acceptance in Western cultures [10] but also because perceptions of trust would appear to be a potentially differentiating factor between our two national samples.

We are also conducting a closer examination of the (potential) impacts of contextual framing of grid-scale ESTs (e.g. in terms of climate change or energy security benefit) on perceptions of electricity grid problems, ESTs as a solution for those problems, and on relative preferences for different ESTs [8]. Research in relation to public perceptions of other emergent technologies (e.g. CCS) provides evidence of how such framing can affect opinions and how there can be differences in the effects observed dependent upon the national context [13].

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Technology acceptance items

Details of the 32 items (presented in a broadly random order) used to help profile the factors affecting respondents' general perceptions of energy storage are listed below. All responses were made on a 5-point scale (1 = strongly disagree; 5 = strongly agree + DK). Cronbach's alpha was used to assess the internal reliability of the

[2] It should be noted that there is presently only one operating pumped hydro storage project in Canada (though several have been proposed or are under development [11]).

items relating to each construct. Notes: Ⓡ = reverse coded item; * = item removed from scale following reliability analysis.

A.1. Intention: (1) I am willing to support the use of ESTs in my province; (2) I would not intend to support the use of ESTs in my province if asked Ⓡ*; (3) If asked, I would actively endorse the use of ESTs in my province (Scale: 3 items $\alpha = .71$; 2 items $\alpha = .75$). *A.2. Social Norm:* (1) I believe that people who are important to me think that the use of ESTs in my province is a good thing; (2) I think that there is general support among the public in my province for the use of ESTs; (3) I think that people in my province are generally not supportive of the use of ESTs Ⓡ* (Scale: 3 items $\alpha = .52$; 2 items $\alpha = .64$). *A.3. Self-efficacy/Perceived Behavioural Control*: (1) I do not feel that I have the power to influence decisions being made about the use of ESTs in my province Ⓡ; (2) I believe that if I wanted to, I could personally affect decisions being made about the use of ESTs in my province; (3) I believe that the general public in my province have the ability to influence decisions regarding the use of ESTs (Scale: 3 items $\alpha = .68$). *A.4. Cost:* (1) I believe that the financial investment in ESTs could be better spent on improving my provincial electricity network in other ways Ⓡ; (2) I believe that financial investment in ESTs for use in my province is justified (Items treated separately within the analysis). *A.5. Risk:* (1) I feel that there are risks to public health and safety from the use of ESTs in my province; (2) I feel that there are health and safety risks for me and my family from the use of ESTs in my province; (3) I believe that there could be personal financial risks associated with the use of ESTs in my province; (4) I believe that the use of ESTs in my province holds risks for the natural environment; (5) I believe that there are financial risks to the use of ESTs in my province (Scale: 5 items $\alpha = .82$). *A.6. Benefits:* (1) For me, the use of ESTs has benefits for ensuring a secure electricity supply for 'end users' in my province; (2) I believe that ESTs stand to have a positive effect on supporting the electricity network in my province; (3) For me, the use of ESTs in my province holds benefits for the national economy; (4) For me, the use of ESTs in my province holds benefits for advancing technological innovation in my province; (5) I do not believe that ESTs stand to have a positive impact on issues within my provincial electricity network Ⓡ; (6) For me, the use of ESTs in my province holds benefits for the provincial economy (repeated item); (7) For me, there are environmental benefits to the use of ESTs in my province (Scale: 7 items $\alpha = .88$). *A.7. Positive Affect:* (1) For me, using ESTs in my province just feels right; (2) I just feel good about the use of ESTs in my province (Scale: 2 items $\alpha = .75$). *A.8. Negative Affect:* (1) I feel worried about the use of ESTs in my province; (2) For me, using ESTs in my province just feels wrong. (3) I feel worried about the use of ESTs in my province (repeated item) (Scale: 3 items $\alpha = .85$). *A.9. Trust in developers:* (1) I trust that the people responsible for the use of ESTs in my province know what they are doing; (2) I trust that the people responsible for the use of ESTs in my province have the public's interests at heart; (3) I trust that I would be properly consulted should an EST be proposed to be sited near my home; (4) I trust that the people responsible for the use of ESTs in my province will locate them fairly across the nation (Scale: 4 items $\alpha = .86$).

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