Tweets and transitions: Exploring Twitter-based political discourse regarding energy and electricity in Ontario, Canada

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Abstract:

The article explores how Twitter data can inform the study of the socio-political dimensions of sustainability transitions. Twitter is a widely used microblogging platform that allows users to share short comments, media, and links, and that offers researchers significant data collection opportunities. Twitter-based research has been growing in application in many disciplines but has not been prominently used in relation to sustainability transitions or sustainable energy research. This study aims to characterize the Twitter-based conversations regarding energy issues and politics in Ontario, Canada. The analysis in this article is based on 6,946 tweets, from 2,841 unique users, which were collected between September 2, 2017 and January 12, 2018. The Twitter-based discourse regarding energy issues in Ontario is described by a minority of very engaged users contributing disproportionately to the conversation, the most engaged users contributing different types of tweets to the conversation, and overall engagement that varies based on news events. Coding based on manual interpretation of the tweets by the most engaged users and those tweets that were highly retweeted identified a discourse that was highly partisan and often highlighted economic issues associated with electricity costs. Topics commonly associated with sustainable energy transitions were not prominent in the Twitter discourse. Additionally, the analysis suggests that users lacking traditional political empowerment can influence the political discourse on Twitter through high levels of retweets; however, savvy and strategic use of Twitter communication, rather than simply engagement with an issue, is important in generating consistent amplification from other users.

Keywords:

energy politics; social media analysis; Twitter; sustainability transitions; Ontario, Canada

1.0 Introduction

Sustainability transitions involve multiple actors with competing understandings of the problems at hand, the targets for change, and the strategies to pursue [1,2]. While socio-political factors are widely acknowledged to influence sustainability transitions, there have been frequent and recurring calls to identify how these factors impact transitions in practice [1–6]. Through the analysis of competing narratives and the contestation of ideas and framing, discursive methodologies have been applied to studying the socio-political dimensions of sustainability transitions [3,7–14].

Discursive approaches to media analysis have been used to provide a perspective on public debates regarding specific policies or issues in relation to sustainability transitions [7,9,14–17]. Media discourse has a complex and indirect relationship to public discourse and public perceptions of political debates [18–20]. Therefore, media analysis can only offer one representation of the public discourse [20–22]. The recent development and growing use of social media platforms offer a novel space for analyzing public discourse based on user contributions. Additionally, these emerging platforms are increasingly being used as sources for news [23,24]. What narratives, ideas, and frames are deployed in relation to sustainability transitions on these new platforms, and what might they tell us about broader public discourse related to sustainability transitions?

Whereas only a small number of actors actively produce traditional media content, social media platforms, which are typically free to users, offer broad access to a space for users to broadcast their opinions and perspectives. However, despite the relatively-easy access to social media platforms, only a subset of the population engages with these platforms, and a subset of those users actively participates in any given topic of interest [25–28]. Although the analysis of social media discourse has its own limitations for gauging broader public discourse, the distinct characteristics of these platforms create an alternative data source that may offer unique insights to sustainability transitions research by establishing new forums for analyzing the broader public discourse.

Twitter is a social media platform, referred to as microblogging, which allows users to share short comments (i.e., up to 280 characters), embedded media, and links [29]. In 2017, there were 330 million active monthly Twitter users globally generating an estimated 350,000 tweets per day [30,31][1]. Given this large volume of data, researchers are working to understand the data's value and how they

[1] Although Twitter is the most prominently used microblogging platform in North America, Weibo, a similar microblogging platform, has a larger global user base, but is primarily used in China [29,76].

can be used productively. Researchers studying climate change, for instance, have embraced Twitter data to explore public sentiment and to describe actors, messages, and media promoted in climate debates [32–37]. A similar approach is not prevalent in relation to research of sustainability transitions and energy issues, although applications of Twitter data have increased in recent years [38], particularly in relation to nuclear power [39] and the 2011 emergency at the Fukushima Daiichi power plant in Japan [40,41].

The analysis of Twitter data offers a new means to gauge public discourse, and thus has the potential to contribute to understanding the socio-political dimensions of sustainability transitions. The research presented here will examine Twitter data surrounding energy issues in the province of Ontario, Canada. This study is primarily exploratory given that Twitter data have not been prominently utilized in sustainability transitions research. Exploratory methods are useful when researchers "have little or no scientific knowledge about the group, process, activity, or situation they want to examine but nevertheless have reason to believe it contains elements worth discovering" [42: 5]. The study aims to 1) describe prominent characteristics of Twitter discourse regarding energy politics in Ontario, 2) identify prominent themes within the Twitter discourse regarding energy politics in Ontario, and 3) consider the potential value of Twitter-based discourse for understanding sustainability transitions.

The following section provides details regarding the study design and a conceptualization of Twitter data. This is followed by a methods section, which describes the data collection procedures, the processing of data, and the methods of analysis. Next, the paper provides a results section and then a discussion section. The conclusion section reflects on the main findings and the broader potential for Twitter-based research to contribute to the sustainability transitions literature.

2.0 Study design

The study is designed to characterize the Twitter-based discourse related to energy issues in the province of Ontario, Canada. Ontario has been a leading jurisdiction for a number of progressive electricity policies: early adoption of smart meter technology, feed-in-tariff funding to support renewable generation, and establishing forums to promote smart grid policy [43]. Many of these progressive policies have complicated social acceptance histories that were often associated with the Ontario Liberal Party, as well as increasing electricity costs [44–50]. The Ontario Liberal Party governed Ontario from 2003 and remained in power during the study period; although, they were subsequently voted out of power in the 2018 provincial election.

While traditional media have been used to explore the discourse surrounding major electricity events in the province [9], there has not been an investigation of social media data. The *big data* characteristics associated with Twitter (and social media, in general) are in tension with discursive methodologies, which interpret the ideas and meanings embedded within communication (and practice) through in-depth reading and consideration for context [51,52]. Some automated approaches to data analysis, such as sentiment analysis, analyze the components of language within communications (e.g., specific words, punctuation) to estimate emotion, but these approaches are challenged to interpret the nuance of natural language [53,54]. In terms of considering *discourse*, automated approaches cannot offer equivalent analysis to manual interpretation of communications, which has been described as a *small data* approach [55]. Manual interpretation of big data has practical limitations related to resource requirements and potential to summarize findings. Additionally, data collection can limit the potential for researchers to appreciate the full context of a tweet, which might conceivably require reviewing a user's history of Twitter interactions, use of language [56], and their network. To be sure, balancing big data qualities of Twitter data and in-depth analysis of *discourse* on the platform is not without challenges and limitations, but manual interpretation can offer a distinct perspective on themes that would be missed through automated analysis.

To balance the limitations of automated analysis for examining discourse and the practical constraints associated with manual interpretation of big data (or *biggish* data[2]), a mixed methods approach was pursued for this study. Quantitative descriptors of the Twitter discourse were combined with a focused analysis, applying manual interpretation, to quantify prominent themes identified in the tweets collected. Rather than dedicating resources to analyze each tweet in the dataset, the manual interpretation focused on tweets produced by two groups within the dataset: those of the most engaged users (those tweeting the most) and those of the most retweeted content (those tweets most amplified by other users). Through this approach, the study aims to summarize key features and prominent actors discussing Ontario energy and electricity issues on Twitter.

2.1 Conceptualizing Twitter data

As a social media platform, Twitter creates a digital space where users can share short messages and media. These messages are referred to as *tweets,* and they can be made publicly or privately. While

[2] Bruns notes "…the boundaries of what is 'big' in 'big data' have remained notoriously undefined – one not entirely tongue-in-cheek definition, however, is of "big data" as anything that exceeds the maximum of 1,048,576 data rows that are allowable in current versions of Microsoft Excel." [73:.6]

private messages are a feature of Twitter, because they are not publicly available, these tweets are not usually included in Twitter analysis.

Twitter-based discourse is influenced by the platform, the technology, and its users [57]. The limited character space influences the types of messages that are shared on Twitter and has led to abbreviations and the development of hashtags for organization [29]. Tweets are collected on users' pages; however, Twitter is structured around mobile applications and *following* [29]. The Twitter interface is broadly organized to make the most recent information the most readily accessible (with some algorithmic tweaking), which influences how information is shared and consumed on Twitter.

Following on Twitter does not need to be a reciprocal relationship [58]. As a result, there are some indications that users are more likely to select users to follow based on topics of interest and to use Twitter as a source for information and opinions, rather than – or in addition to – following family and friends and using the site for social networking [25,58].

In terms of understanding Twitter conversations, Bruns and Moe [57] have conceptualized three overlapping layers of conversations: meso, macro, and micro. The meso-layer of conversation describes the most common level of communication on Twitter. At the meso-layer, users share tweets with their network of followers. While it is possible for other users to view these tweets, the user is only actively directing the message to their network.

At the macro-layer, users can include *hashtags* in their tweet by preceding a keyword with the '#' symbol. While the tweet is still only directly shared with followers, by including a hashtag a user is adding a searchable marker that contributes to broader conversations on the platform. Bruns and Moe [57] describe the macro-layer of communication as *ad hoc* public forums that develop for the discussion of specific topics.

At the micro-layer, users can direct tweets to another user by preceding that user's name with the '@' symbol. While the tweet is still publicly shared and sent to the user's entire network of followers, the use of the @ symbol indicates a narrower intent for the message.

Twitter offers users a space to contribute to public discourse, and to share thoughts and opinions with one's followers and into the *ad hoc* public space, but it also facilitates certain interactions among users that create opportunities for feedback. Users can *like*, *reply to*, or *retweet* a tweet. Likes allow users a means to indicate approval for a tweet through a single click; they also serve to save the tweet for their later review. Replying to a tweet allows users to have a conversation about a tweet with

the original *tweeter*, or other users replying to the same tweet. Replies are grouped together to allow for a multi-user conversation. Retweets allow a user to share a tweet with their network of followers. Conceptually, a retweet allows a user to spread a tweet to their own meso-layer network as a means of encouraging their network of followers to see the contained information. It is also possible for other users to then interact with the retweeted content.

3.0 Methods

The research for this study is based on Twitter data collected from September 2, 2017 to January 12, 2018, inclusive. To reduce the data to relevant tweets, #onpoli – a prominent hashtag for Twitter discussions related to Ontario politics – was used in addition to three keywords: electricity, energy, and hydro.[3] (The term "hydro" is often used interchangeably with electricity in Canada.) The sample for this period includes 7,840 tweets, by 2,841 unique users. The timeline was selected in anticipation of the release of the 2017 Long-term Energy Plan, a major policy document for the province that was eventually released on October 26, 2017. Because the exact release date for the Long-term Energy Plan was not announced in advance, the collection of data before the release was required. Data from before and after the Long-term Energy Plan release were included in the study to provide greater contextualization of Twitter-based discourse regarding energy and electricity in the province.

Given these collection parameters, it should be recognized that the Twitter data included in the analysis represent only a subset of the Twitter discussions related to the topics in question. More specifically, the tweets collected represent an unknown subset of the total tweets related to energy issues in Ontario during the collection timeframe. Some users who are interested in and tweeting about these issues may not include #onpoli in their tweet and will be excluded from the sample, which is a known limitation in hashtag based approaches [59]. However, there is value in focusing on tweets that are being made at the macro-layer of conversation (i.e., using #onpoli), since these users are directing their tweets towards a broader conversation (the *ad hoc* public space) through the use of a hashtag and noting the political nature of their message, which suggests that these tweets are intended to contribute to political discourse. Thus, though the data analyzed in this study should be understood as a subset of the Twitter discourse regarding Ontario politics and electricity and energy issues, the dataset will nevertheless be referred to as Ontario Twitter energy politics for the sake of simplicity.

[3] Data collection can be understood as tweets including "#onpoli" AND ("electricity" OR "energy" OR "hydro").

3.1 Removing repetitious tweets

In total, 7,840 tweets (3,490 original, 4,350 retweets) from 2,841 users were collected in the dataset. However, user activity in the sample was highly skewed. The top two users contributed 10% of the collected tweets, 425 and 368 respectively. Upon review these users were repeatedly tweeting the same content with very little variation; both accounts were for radio stations and appeared to be linked and automated. All tweets from both users included the text "… J Reno – Hydro Bills #onpoli #hiphop #hits…" as well as an attached image depicting a cartoon of the former premier of Ontario, Kathleen Wynne, sitting in front of piles of money with the words "hydro bills" written above and signed J Reno. Because of the repetitive nature of the content, these users significantly impacted the dataset. While these users contributed significant numbers of tweets to the dataset, they were not regularly shared by other users. The combined 793 tweets of this nature, account for 22% of all original (i.e., non-retweet) tweets in the complete dataset, but they were retweeted only 37 times, less than 1% of retweets in the total dataset.

Automated Twitter accounts, referred to as bots, are a common source of noise in Twitter data [60–62]. Given the potential for these repetitive tweets to skew the data analysis, reviewing data and removing bot activity is a recommended approach to managing Twitter data [60]. The dataset was reviewed and tweets that were contributed by a single user with little variation (e.g., inserting "…" into a tweet that was otherwise unchanged) or no variation were removed. On the other hand, if a user retweeted content that they had previously shared, those tweets were not removed since the retweet format indicates that the tweet is repetitious. A total of 894 tweets from 24 users were removed from the dataset through this process. The majority of the removed tweets (788) were from the two users mentioned above, leaving five original tweets from these users in the dataset. The third most prominent user in the complete dataset, described as a Canadian news, analysis, and opinion magazine, had 47 tweets removed (45 of its unique tweets remained in the dataset). An additional two users – an Ontario-based current affairs TV program and a user with no stated affiliation – had 15 and 14 tweets removed. The remaining 19 users with tweets removed contributed 30 repetitive tweets in total, with 15 of those users only repeating a single tweet. Approximately 11% of the original sample collected was repetitious content and thus removed; however, most of the repetitious content was contributed by a small number of very active (presumably) bot accounts. The analysis in this paper focuses on a dataset of 6,946 tweets, which does not include repetitious tweets. Figure 1 provides an overview of the data collection and processing sequence.

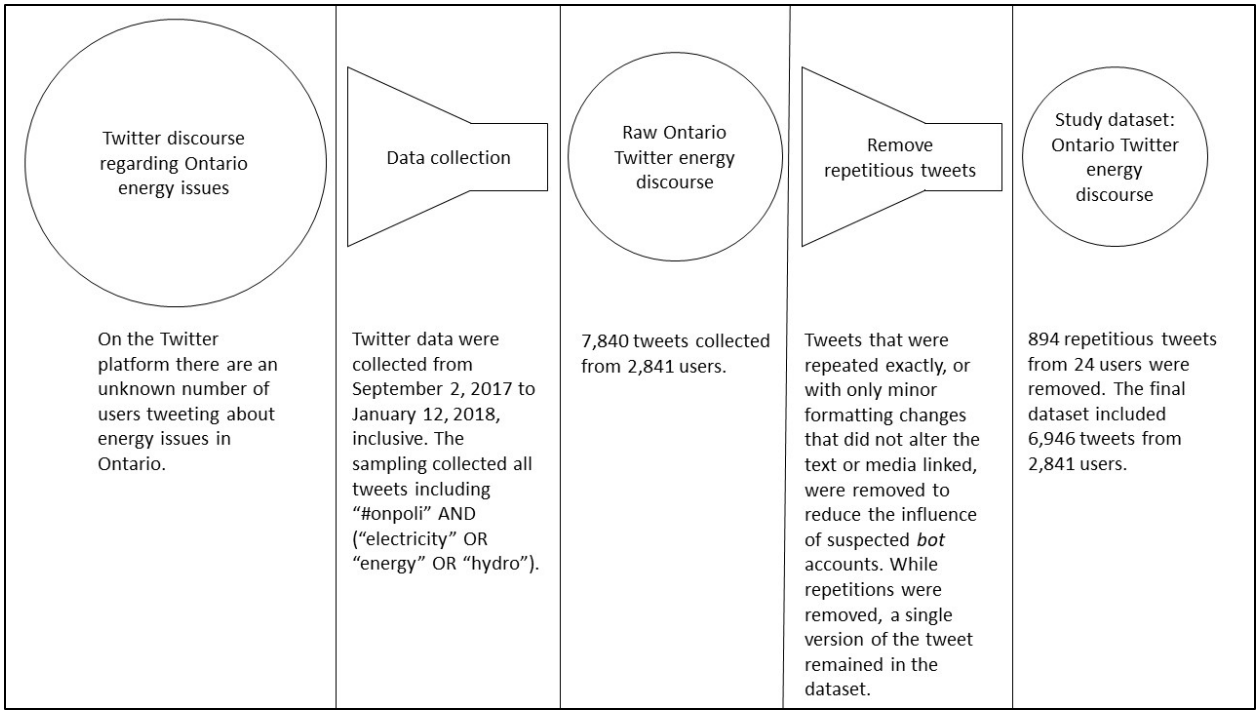

Figure 1 - Data collection and processing

3.2 High activity analysis

High activity days were defined as dates with more tweets than 1.5 times the interquartile range of daily tweets collected (including original and retweet content) across the 133 days of the study. To summarize activity and identify topics of interest on high activity days, a random sample of 20% of the original tweets and highly retweeted content were reviewed to establish a preliminary context for Ontario Twitter energy politics on the days being examined. The sample of tweets and embedded or linked media were reviewed to identify if the tweet referenced or reacted to a specific topic (e.g., an event or energy issue). Topics identified in less than 10% of the sample for a specific high activity day were considered non-prominent and not included in the analysis. When identifying common topics during high activity days, there was no attempt to distinguish sentiment.

3.3 Focused analysis of the most engaged users and the highly retweeted content

The *most engaged* users were defined as the 28 users (the top 1%) who contributed the most tweets (sum of original tweets and retweets) to the dataset. Highly retweeted content was defined as original tweets that received 10 or more retweets.

The users in the first group and the users producing the tweets in the second group (some of which overlap) were categorized based on affiliations presented in their user descriptions. The categories were developed based on common self-reported descriptions of occupation or affiliation. The

categories included *news media* (journalists, news media accounts), *no affiliation* (individuals that do not state an official role in their description or note that their tweets are their personal opinions), *policy researcher* (individuals identifying themselves as policy researchers or policy consultants, or accounts for research organizations), *political* (politicians, official party accounts, and individuals identifying their official party affiliation), *political advocacy* (individuals describing themselves as advocates associated with an organization, organizations without official political affiliation but describing themselves as having a political mission or describing themselves as an advocacy organization), *other institutions* (non-political government organizations, private energy organizations, government communications consultants). To be sure, relying on self-reported descriptions is not without limitations, but the categories provide a first approximation of different user types and affiliations that were used to inform further analysis.

A qualitative assessment of tweets from these two groups was conducted to identify descriptive themes within the Twitter discourse being analyzed. The analysis was based on language used within the tweet and a review of embedded media. If external links were included, analysis took into consideration the title and subtitle of articles or other media but did not include reading of full articles. A preliminary review was conducted using an inductive approach to identify prominent themes and issues associated with energy issues within the Twitter discourse. Based on this review, a highly partisan discourse was observed. Rather than identifying specific topics or energy issues that anchored the Twitter discourse, energy issues discussed varied throughout the study period, but there was consistently references and framing of political actors in tweets.

The tweets from the two groups were reviewed a second time and coded based on political actors identified (explicitly or implicitly) in relation to an energy issue, either as the provincial governing party, the provincial non-governing parties (Ontario Progressive Conservative Party, Ontario New Democratic Party, and Ontario Green Party), or other actors. Each reference to one of these actor groups was then identified as having positive, negative, or neutral framing with regards to the *energy issue* discussed in the tweet. While partisan framing was the most noted theme in the dataset, negative economic framing was included as a subcategory of negative frames used in relation to energy issues because it was also perceived as a secondary theme that emerged in the qualitative assessment. A detailed explanation of the coding process is included in the codebook (Appendix A). To situate the prominence of partisan framing and negative economic themes, additional analysis was conducted to

quantify tweets mentioning energy issues that are commonly associated with sustainable energy transitions: electricity generation technologies, climate change, and the Long-term Energy Plan.

4.0 Results

4.1 Describing Ontario Twitter energy politics

In total, 6,946 tweets were included in the complete dataset. Of the three keywords used for data collection, "hydro" was the most prominently used (3,885 tweets), followed by "energy" (1,730 tweets), then "electricity" (1,081 tweets), an additional 734 tweets did not include any keywords within the text, but were captured in the dataset because they linked to content with at least one keyword. Table 1 provides an overview of the collected data (464 tweets included two keywords and 10 tweets included all three keywords). Approximately 37% of the total dataset was original tweets, rather than retweeted content.

In total, 2,841 unique users contributed to the dataset. However, contributions to the dataset by individual users were uneven. Users were segmented using a 1/9/90 categorization that distinguishes users based on their level of engagement (i.e., sum of original tweets and retweets contributed) in Ontario Twitter energy politics [27]. The *most engaged* 1% of users in this sample directly contributed 16% of the total tweets. The next 9% of *highly engaged* users contributed 31% of the total tweets. The remaining 90% of users, the *least engaged*, contributed 52% of the sample. Rather than amplifying other users' content through retweets, the *most engaged* users were more likely to contribute original tweets (60%), than either the *highly engaged* (46%) or the *least engaged* (23%) (Table 2).

Table 1 - Overview of data collected

Dataset	***Total***	***Electricity***	***Energy***	***Hydro***	***Linked keyword***
Complete	6,946	1,081	1,730	3,885	734
Original tweets	2,596	373	783	1,361	294
Retweets	4,350	708	947	2,524	440

Table 2 - Contribution to dataset based on engagement categorization

	Number of users	***Percent of users***	***Max tweets in group***	***Min tweets in group***	***Average number of tweets***	***Total tweets contributed***	***Percent of total tweets***	***Percent original tweets of group's total tweets***
Most engaged	28	1%	84	21	40.25	1,127	16%	60%
Highly engaged	256	9%	21	5	8.54	2,185	31%	46%
Least engaged	2,559	90%	5	1	1.42	3,634	52%	23%

The number of tweets collected per day varied across the collection period of 133 days (Figure 2). An average of 52 tweets was collected each day, with a maximum of 456 tweets collected on Tuesday, October 17, 2017 and a minimum of five tweets collected on Saturday, September 16, 2017. Eleven days, which include clusters around three periods and two lone dates, were identified as high activity days (defined as 1.5 times the interquartile range). The high activity days occurred in three clustered time periods (i.e., October 17-19, 2017; October 26-27, 2017; and November 22-25, 2017), as well as two individual dates (i.e., September 26, 2017; and December 5, 2017). While the October 17-19 cluster and the October 26-27 cluster were mostly each focused on a single topic of interest, the November 22-25 cluster included a number of different topics of interest that varied through the days. Additionally, the two individual dates with high activity included multiple topics of interest. In contrast, the top four most active dates of Twitter engagement (i.e., October 17, 2017; October 26, 2017; October 18, 2017; October 27, 2017) appeared highly focused on single topics of discussion. Although an in-depth exploration of the specific topics discussed on high activity days is beyond the scope of this study, a brief summary of activity and topics of interest during the high activity dates is included in Appendix B.

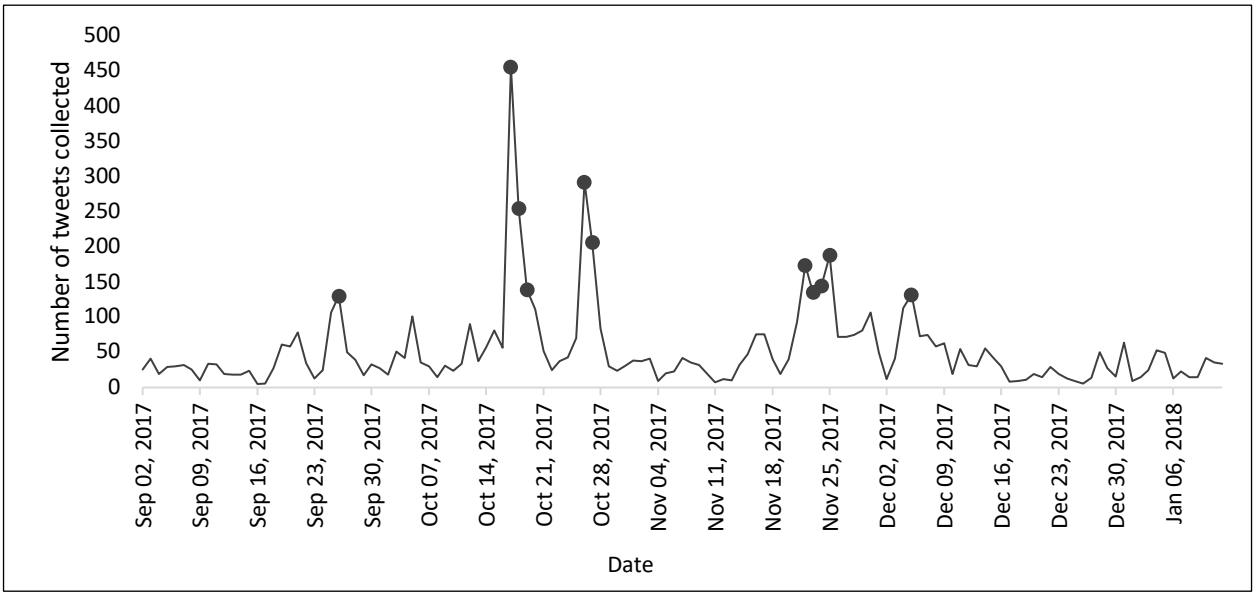

Figure 2 - Number of tweets collected per day (dates written are Saturdays). High activity days indicated with markers (●)

4.2 Comparing the most engaged users and the users generating highly retweeted content

Collectively the *most engaged* 28 users contributed 1,127 tweets, which represents 16% of the total dataset. The highly retweeted content included 106 tweets (4% of the original content in the dataset), which represented original content from 46 users. In total, these 106 tweets were shared 2,822 times and represent 41% of the total dataset.

Figure 3 indicates the user affiliation categorizations of the *most engaged* users and the highly retweeted users. In comparing the two user groups, the *most engaged* users were primarily (50%) users with no stated affiliation, although political users accounted for 25% of the group, with less representation of political advocacy users (11%), news media users (7%), and policy researcher users (7%), whereas, the highly retweeted users group was less dominated by a single category of users. Political users (28%) and news media users (26%) were the largest categories of users producing highly retweeted content; however, political advocacy users and users with no stated affiliation each made up 15% of the category, as well.

Nine of the *most engaged* users shared highly retweeted content and were included in both groups. Although users with no stated affiliation were prominent in the *most engaged* users analyzed, only one of these users was highly retweeted. Two news media users were included in the *most engaged* user group, but neither was highly retweeted, despite media organizations being more represented in the highly retweeted users group. When considering political users, four of the seven users that were *most engaged* were also highly retweeted. Both of the policy researcher users in the *most engaged* group were highly retweeted, and two of the three political advocacy users were also highly retweeted.

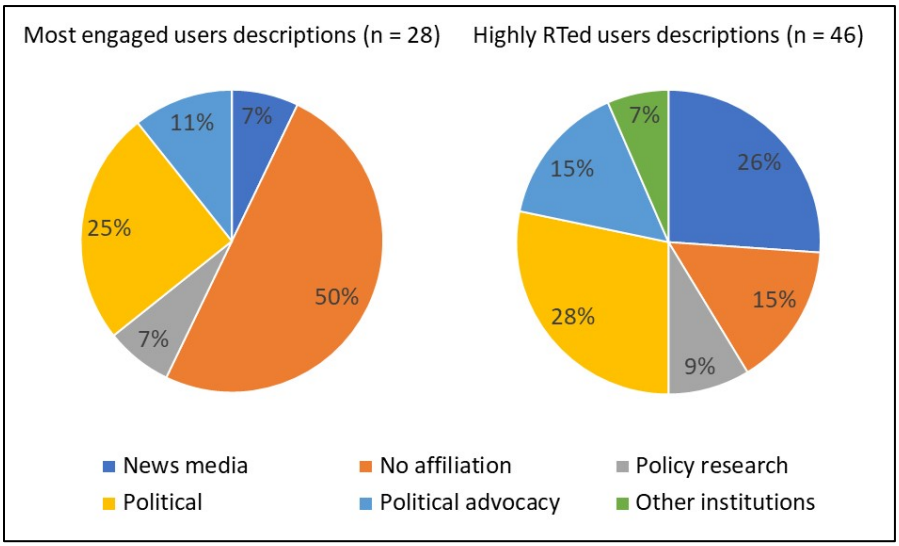

Figure 3 - Affiliation of users based on profile descriptions for the most engaged users and the most retweeted users

4.3 Focused analysis of the most engaged users' tweets and the highly retweeted content

The review of most engaged users' tweets and highly retweeted content for themes identified a highly partisan discourse in the data. For comparison, Table 3 identifies the number of tweets by the most engaged users that reference some issues of potential interest when evaluating sustainable energy

transitions, including various forms of electricity generation, renewable energy deployment, climate change, and the Long-term Energy Plan. Of these topic areas, the Long-term Energy Plan and broad discussions of renewable energy received the greatest number of tweets. While some tweets discussing the Long-term Energy Plan touched on policy issues or projections, all these tweets included negative frames of the governing party (39) or were neutral announcements about the Long-term Energy Plan (7). An equal number of tweets (46) referenced renewable energy (or clean energy or green energy) as a category of technologies: the majority of these tweets (34) included negative frames of the governing party, four tweets included partisan framing referencing other parties, while six included no partisan framing. It is possible that the partisan nature of the discourse may reflect the data collection process; perhaps users engaging with energy issues associated with sustainability transitions are less likely to use this study's specific data collection keywords. However, based on the data reviewed, Ontario Twitter energy politics does not focus on issues related to electricity generation, renewable energy deployment, climate change, or long-term energy policy. Rather, Ontario Twitter energy politics is better described through an analysis of partisan framing.

Table 3 - Tweets (original and retweets) by the most engaged users (n=1,127) discussing alternative sustainable energy transitions issues of interest (note: tweets may include more than one listed topic of interest)

Sustainable energy transitions issues of interest	***Number of tweets***	***Percent of most engaged users' tweets***
Climate change	11	0.98%
Coal generation	11	0.98%
Long-term Energy Plan	46	4.08%
Natural gas generation	14	1.24%
Nuclear generation	26	2.31%
Renewable generation	46	4.08%
Smart meters	16	1.42%
Solar generation	14	1.24%
Wind generation	19	1.69%

Table 4 shows the political actors referenced and how these actors were framed in relation to energy issues by the *most engaged* users. The most prominently mentioned political actor group was the governing Liberal Party. When the governing Liberal Party was referenced, they were overwhelmingly referenced in negative terms. The *most engaged* users referenced the governing Liberal Party negatively in 77% of their tweets. Figure 4 shows the percentage of tweets including a negative framing of the governing party by the number of tweets of the *most engaged* users in the dataset. The majority of the *most engaged* users (24/28) negatively framed the governing party in 60% or more of their tweets. The remaining four *most engaged* users negatively framed the governing Liberal Party in

less than 40% of their tweets. In contrast, an equal number of the *most engaged* users (four) negatively framed the governing party in every one of their tweets. A large portion (78%) of the negatively framed tweets by the *most engaged* users referencing the governing party highlighted economic issues. The negative economic framing primarily focused on electricity issues, including the high cost of electricity, wasted spending by institutions in the electricity sector, the cost of the recently released *Fair Hydro Plan*, rising electricity costs impacting jobs, and energy poverty or customers not being able to afford their electricity bills.

Table 4 - Actors referenced and framing of the most engaged users' tweets (n=1,127)

Tweets of most engaged users	***Positive framing of energy issue***	***Negative framing of energy issue***	***Neutral framing***	***Unclear framing***
Tweets referencing governing party (explicit[4])	4 (0)	875 (655)	7 (7)	2 (0)
Tweets referencing non-governing party	125	30	3	0
Tweets referencing other organizations or non-political actors	1	145	17	1

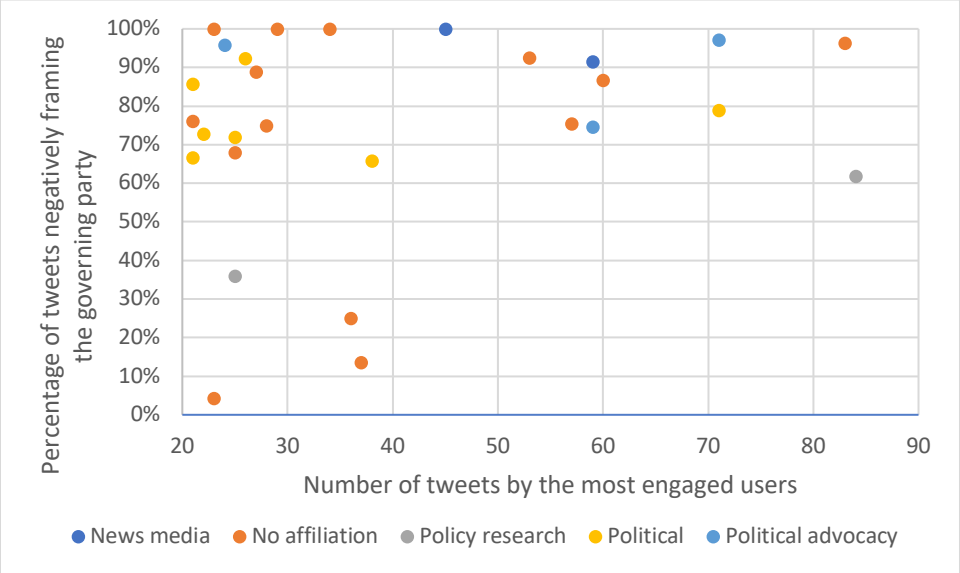

Figure 4 - Percentage of tweets negatively framing the governing party by the most engaged users (n=28)

Non-governing provincial parties were mentioned in approximately 14% of the *most engaged* users' tweets. Non-governing provincial parties, in contrast to the governing party, were more frequently referenced in positive terms. Tweets that referenced other actors or organizations without identifying a provincial political party made up 14% of the *most engaged* users' tweets. These organizations and actors were primarily framed negatively (88%). A large portion (45%) of those tweets

[4] Explicit tweets mention either the governing Liberal Party, individual politicians from the Liberal Party, or refer to the Ontario government. See codebook (Appendix A) for more details.

referenced government institutions that are not overtly partisan, most notably Hydro One, the publicly owned (recently partly privatized) electricity transmission and distribution company in Ontario.

Similar frames and party alignment were observed in the highly retweeted content. There were 106 tweets from 46 users that received 10 or more retweets. The majority of the tweets, 89 (83%), included references to the governing Liberal Party, and 84 of those tweets included negative framing of the governing party, whereas only five had positive framing. In addition, tweets with negative framing of the governing party were more amplified in the dataset. The 84 negative tweets were retweeted 2,347 times (average ~28 retweets each) whereas the five positively framed tweets were retweeted 55 times (average 11 retweets each). Sixty-one of the negatively framed tweets (74%) referencing the governing party highlighted economic issues. The negatively framed tweets referencing economic issues were on average retweeted approximately 31 times each, whereas the negative tweets referencing other negative issues were retweeted approximately 21 times each.

Approximately 12% of the highly retweeted content referenced non-governing provincial parties. These tweets were overwhelmingly positive (92%) in their references. The only non-positive reference to a non-governing party was a neutrally framed announcement of an upcoming response by a non-governing party leader. The positively framed tweets referencing non-governing parties were retweeted 281 times (average ~23 retweets each). The majority of the content (91%) was generated by organizations or actors directly related to the political parties being framed positively. Tweets presenting non-governing parties positively also usually (75%) included negative framing of the governing party. While non-governing parties were positively represented in the most retweeted content, the original content for those tweets tended to be produced by political actors or organizations affiliated with the non-governing party referenced.

Twelve tweets (11%) referencing other actors or organizations without mentioning provincial political parties were identified in the highly retweeted content. Eight of these tweets were negatively framed, three were positively framed, and one was neutrally framed. The majority (75%) of the negatively framed tweets referenced Hydro One.

While there were 46 users who generated content that was highly retweeted, the total number of retweets of each of these users was highly variable. For comparison, Table 5 displays some relevant information about the five most retweeted users in the dataset. The single most retweeted user, an online-based political advocacy organization, received 738 retweets, which represents approximately

10% of the total dataset. This user was included in the *most engaged* user group, contributing 36 original tweets and retweeting 21 tweets, and 15 of their 36 original tweets received 10 or more retweets. This user had more than double the total number of retweets of the next most retweeted user and more than four times the retweets of the third most retweeted user. Every tweet by this user that was highly retweeted used negative economic framing referencing the governing Liberal Party. The second, third, and fourth most retweeted users each contributed between 19 and 22 tweets to the dataset; one of these users was classified as *most engaged* while the other two were classified as *highly engaged*. Each of these users was associated with traditionally empowered institutions in political discourse: news media and political parties. The fifth most retweeted user was also described as associated with political advocacy and included in the *most engaged* group but, in contrast to the most retweeted user, did not have a single tweet that was highly retweeted.

Table 5 - User description and amplification of most retweeted users

User description	***Number of retweets received***	***Percent of total tweets in dataset***	***Tweets contributed***		***Number of highly retweeted tweets***
			Original	***Retweets***	
Political advocacy	738	10.6%	36	35	15
News media	336	4.8%	18	1	10
Politician	169	2.4%	18	4	5
Politician	168	2.4%	21	0	4
Political advocacy	158	2.3%	52	7	0

None of the political users identified in the *most engaged* user group and the highly retweeted content group were associated with the governing Liberal Party. Kathleen Wynne, the Ontario Premier during the sample period, was referenced in 1,831 tweets (26% of the dataset), including 407 @replies using her Twitter username. Similarly, Glenn Thibeault, the Ontario Energy Minister during the sample period, was @replied 116 times in the dataset. Neither of these politicians contributed to the Ontario Twitter energy politics dataset though each had an active Twitter account during this period. The official Liberal Party Twitter account only contributed three tweets to the dataset, all three being retweets from other users.

5.0 Discussion

5.1 Describing Ontario Twitter energy politics

Ontario Twitter energy politics is highly skewed: a small number of individual users contribute disproportionately to the Twitter discourse. While the study collected tweets from 2,841 users contributing to Ontario Twitter energy politics, the *most engaged* 1% of users contributed 16% of the

overall data collected. The *most engaged* and the *highly engaged* users (together, the top 10% of users) combined to contribute approximately 48% of the dataset. Previous research indicates that a small number of users often dominate Twitter discourse while the majority of users contribute a small number of the overall tweets [25,63] (similar patterns of user activity have also been noted in Facebook groups dedicated to emerging energy technologies [64]). Ontario Twitter energy politics reflected this common characteristic of Twitter discourse. Given this common feature of Twitter discourse, future transitions research utilizing Twitter data should continue to expect a minority of users to dominate the conversations of focus. Rather than forums for collecting *the public* discourse, social media may be better understood as a forum for collecting *an engaged public* discourse.

Additionally, this research identified that the more engaged users tend to contribute to the conversation in distinct ways. The *most engaged* users contributed mostly original content, whereas the *least engaged* users contributed mostly retweeted content. Hashtags associated with sports and major media events have been identified as having large proportions of users contributing original tweets, suggesting that users are using Twitter to comment about the event in a public space [27]. Alternatively, hashtags associated with "breaking news" events tend to be associated with greater proportion of retweets, suggesting users are trying to amplify information by sharing the information contained within the tweet with their follower network [27]. Producing original content allows users to react to events and share their thoughts and opinions in a public space, whereas retweets allows users to amplify information, and these two forms of Twitter interaction can be understood as serving distinct forms of engagement with the Twitter discourse.

Therefore, in this case, the most engaged users are, to a greater extent, utilizing #onpoli as an *ad hoc* public space for political discourse, where they are contributing their own ideas and perhaps reacting to political events, similar to users reacting to sporting events or major media events. In contrast, the *least engaged* users are less focused on contributing their own thoughts and opinions on energy issues to the *ad hoc* public space and are more likely to amplify other users' content, similar to activity associated with "breaking news" events. To that extent, high engagement in Ontario Twitter energy politics is associated with a different form of interaction with the discourse in addition to greater active contribution to the discursive space. In future research, distinguishing various forms of user engagement, by examining original tweets or retweets, may provide additional insights into how users are participating with a specific conversation of interest.

Engagement with Ontario Twitter energy politics was highly variable over the course of the study, and specific news events appeared to drive users to contribute to the Twitter conversation. Twitter engagement associated with on-going political hashtags, like #onpoli, have been observed to fluctuate in response to media coverage of political events or issues [27], and in general, focusing events have been known to amplify Twitter user engagement for specific topics [33,65,66]. In reviewing the sampling of topics of interest for the high activity days, the top four most active days mostly focused on a single topic. For the remaining high activity days, save one, the activity was driven by multiple topics that each received moderate engagement but combined to create a high activity day. Ontario Twitter energy politics displayed engagement spikes in response to major Ontario energy news events, and on the days with the most activity the Twitter conversations appeared most focused on reacting to a specific topic of interest.

5.2 Comparing the most engaged users and the users generating highly retweeted content

For some types of users, amplification in the Twitter discourse appears to mirror those who have traditionally been empowered in political discourse: established media and prominent political actors. User engagement in Ontario Twitter energy politics is not, on its own, a good indicator of impact on the discourse, as measured by amplification by other users through retweets.

Users with no stated affiliation that were part of the *most engaged* users group had little success generating highly retweeted content. Only one of the 14 *most engaged* users with no stated affiliation was included in the highly retweeted group. Generally, it appears that the *most engaged* users with no affiliation had little impact on Ontario Twitter energy politics, as measured through retweets, despite their large individual contributions to the discourse.

The two news media users that were included in the *most engaged* group did not generate highly retweeted content. Neither of these users represented well-established news organizations: a local radio station based in a relatively small community in Ontario and an online magazine established in 2016. In contrast, the 12 highly retweeted news media users included mostly well-established, Toronto-based (the largest city in Ontario) or national news organizations; although, the group did include one online news site. For news media users, association with well-established news organizations appears to be an important component in impacting Ontario Twitter energy politics.

Political users that were *most engaged* in Ontario Twitter energy politics and highly retweeted included two official party accounts and two accounts for party leaders. The political users that were

part of the *most engaged* user group but who were not highly retweeted, included an electoral district party president, a political candidate, and an electoral district political association. For the *most engaged* political users, those with greater public recognition appear more likely to be amplified in the Twitter discourse. Additionally, many political users that were not included in the *most engaged* group were highly retweeted. Political users do appear to have significant capacity to impact Ontario Twitter energy politics but being highly engaged in the subject of energy issues was not, in itself, a means to high amplification.

While many of the users that generated highly retweeted content included actors that are typically empowered in political discourse, Twitter does offer a venue where savvy users can impact the discourse of an issue, at least on the platform. Ontario Twitter energy politics was disproportionately impacted by a single user, described as a political advocacy organization. This user was one of the *most engaged* users but also effective in generating highly retweeted content. In comparison, the fifth most retweeted user, also identified as a political advocacy organization, produced a large number of tweets that cumulatively received many retweets, but no single tweet was itself highly retweeted. As explored below, the content of both users included predominantly negative framing of the governing Liberal Party. Despite many similarities, one user was significantly more amplified and generated wider amplifications from individual tweets. The data analyzed reinforce the finding from previous research that savvy users can disproportionately impact discourse on Twitter [67]. For these users, retweets were not simply a reflection of engagement or the framing of content, which suggests that other factors, such as strategy, organization, and networks, may explain the variability in user impact on Ontario Twitter energy politics.

5.3 Focused analysis of the most engaged users' tweets and the highly retweeted content

The coding of the tweets of the *most engaged* users and highly retweeted content highlighted the highly partisan frame that dominated Ontario Twitter energy politics. Issues that might broadly be defined as important to sustainability transitions (e.g., deployment of renewable energy technologies, climate change, long-term energy policies) were only addressed in a minority of the tweets reviewed. Instead, negative sentiment for the governing provincial Liberal Party was a prominent feature within Ontario Twitter energy politics. The majority of the critiques of the governing Liberal Party included economic concerns associated with the perceived high cost of electricity in the province. Polling data collected prior to the study period (November 15 to 19, 2016) had indicated the cost of electricity was

the most important issue for Ontarians [50]. A similar concern was reflected in the data analyzed given the prominence of negative economic framing of energy issues in Ontario Twitter energy politics.

When reviewing the tweets of the *most engaged* users, the near complete lack of positive framing for the governing Liberal Party is striking. Every one of the *most engaged* users included some negative framing of the governing party in relation to energy issues, and the majority of the *most engaged* users appeared highly focused on criticizing the governing Liberal Party. Although non-governing parties were, when referenced, more commonly presented with positive framing, most of these tweets were generated by political users associated with the positively framed party. While some of the *most engaged* users were associated with non-governing parties, prominent representatives from the governing Liberal Party were absent from Ontario Twitter energy politics entirely. Rather than being characterized by a partisan sentiment in favour of non-governing parties, it was negative sentiment for the governing Liberal Party that was most prominent.

Negative framing of the governing Liberal Party was also a large component of the tweets that were highly retweeted. While the highly retweeted content included some positive framing of the governing Liberal Party, these tweets were less common and were retweeted less on average than the negative tweets. Only positive frames for non-governing parties were identified in the highly retweeted content, but these were less numerous and less retweeted than negative framing of the governing party. Research indicates that climate change discourse on Twitter often occurs in a polarized 'echo chamber' [68], whereas examinations of Swiss nuclear policy discourse identified active interaction between Twitter users from competing positions [39]. Ontario Twitter energy politics seems to be better described as an 'echo chamber' with large proportions of the *most engaged* users' tweets and the highly retweeted content reflecting similar, largely negative, political framing.

6.0 Conclusion

Twitter offers a platform where users can easily share, and researchers can relatively easily collect, their opinions and thoughts related to topics influencing sustainability transitions. When considering the potential value of Twitter data for assessing political discourse and considering the socio-political dimensions of sustainability transitions, there is a need to understand the characteristics of Twitter data and Twitter users.

Twitter discourse, like examinations of media discourse, tends to be dominated by a minority of individuals. Our case-study confirmed this observation. In terms of gauging public perception, 2,841

users contributing nearly 7,000 tweets may seem to represent a large volume of data. However, the relative size of these datasets should be understood as a small proportion of the 10.2 million registered voters who were eligible to participate in the 2018 Ontario provincial election [69]. Despite the relatively low barriers for the public to contribute to Twitter discourse, only a small proportion of the public will choose to do so. Additionally, Twitter data can be influenced through various means, such as bot activity, which complicates data analysis. While acknowledging these limitations, the emergence of social media platforms has created new forums for public discourse with distinct characteristics that can provide researchers with additional perspectives of public debates regarding important issues.

Twitter activity tends to respond to outside events. The analysis of Ontario Twitter energy politics identified high activity responding to focusing events. Since Twitter users tend to react to outside events, one potential area of future research may be to evaluate *which* events garner Twitter users' reactions, and *which* events do not attract responses. Is Twitter engagement a response to well-connected users, such as politicians and journalists, driving user interaction on the subject, or are some events driven by wide engagement unassociated with well-connected Twitter users?

Additionally, this study analyzed the tweets of two groups of users: those users contributing the most to the discourse and those tweets that were highly amplified in the discourse. Whereas, many of the *most engaged* users had no stated affiliation and seemed to use the platform as a space for sharing their thoughts and opinions, the majority of these users were not able to impact the larger discourse through high amplification of their tweets. The users that were most amplified in the discourse included a larger proportion of users that have traditionally been empowered in political discourse. However, an online-based political advocacy user, without a well-established position in political discourse, was the most amplified user in Ontario Twitter energy politics. Thus, Twitter does appear to have created the potential for users that have not traditionally been empowered to influence the discursive space; however, savvy and strategic use of Twitter communication, rather than simply engagement with an issue, appears to be important in generating consistent amplification from other users. Although Twitter has created a new discursive space with a relatively low barrier of entry, the data examined here suggest that an elite minority of users, most traditionally empowered in political discourse but some novel, were highly amplified in Ontario Twitter energy politics; however, most unaffiliated users who were highly engaged in Ontario Twitter energy politics were not highly amplified in the discourse.

As described above, Twitter does not represent a direct reflection of the *public* discourse; however, examining discourse across diverse forums including social media platforms may provide

broader insights into understanding how important topics are understood and prioritized by the general public. The analysis of the tweets in this case-study identified a discourse that was highly partisan, critical of the governing Liberal Party, and often highlighted economic issues associated with electricity costs. While the Ontario energy sector had been characterized by a number of progressive policies, closely associated with the governing Liberal Party, it was resentment for perceived high electricity costs that dominated the Twitter discourse. These findings may reflect a Twitter discourse endemic to Ontario, or they may be artifacts of the data collection, but topics associated with sustainability transitions (e.g., various forms of electricity generation, renewable energy deployment, climate change, and the long-term energy policy) were not prominently observed in the Twitter discourse. While this lack of focus may be discouraging when considering future applications of Twitter-based research, determining the salience of these important topic areas to general public discourse (or lack thereof) should be seen as a key component to understanding the politics of sustainability transitions. In terms of considering the significance in relation to sustainability transitions research, this initial examination of Ontario Twitter energy politics suggests issues associated with sustainability transitions were not salient in the discourse; rather, users shared tweets that were highly partisan and focused on economic concerns.

Future transitions research exploring the activities and discourse on digital platforms should recognize the dynamic nature of these spaces. Digital platforms, like Twitter, are socio-technical systems where social behaviour is influenced by and influences the technological system [70–72]. In comparison to other socio-technical systems, such as large technological systems (e.g., energy systems, transportation systems), with significant physical infrastructure, the technological structure of digital platforms can be changed and updated much more readily [73]. Additionally, as relatively new social forums, the rules, norms, and values associated with social interaction in these spaces continue to evolve. Users, including political actors and media organizations, continue to gauge the value of their approach to utilizing these spaces. Historical precedent suggests that policies governing researcher access and the costs associated with gathering Twitter data are changeable [70,74]. Major digital platforms, such as Twitter and Facebook, are privately owned; therefore, access to data for future research is dependent on corporate policies, and potentially changing regulatory environments.

Researchers using Twitter data also need to consider the ethical implications of sharing user data. While the data collected are publicly available, many users will not have considered or known that their data may be used for research purposes [74,75]. However, it is also true that many Twitter users

are public figures who use the platform for messaging. Researchers should consider the reason and benefit for identifying users, especially in relation to users who do not otherwise have a prominent public profile [74,75]. For the purposes of this study there did not appear to be a strong case for identifying individual users; instead, profile descriptions were used to categorize users according to their stated institutional affiliations.

It is important not to overemphasize the representativeness of the data, but digital platforms, such as Twitter, do offer data rich sources to explore *forums* of public discourse. Twitter-based research is growing in a number of fields and new Twitter-based methods are being developed and improved. Researchers interested in exploring the socio-political dimensions of sustainability transitions should continue to monitor developments in Twitter-based research and consider potential applications.

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Appendix A: Tweet framing codebook

Coding included two components for each tweet: 1) identifying relevant actors being referenced in each tweet; 2) identifying positive or negative framing of energy issues in relation to the referenced actor. Tweets can reference more than one actor or group of actors, and they can also frame energy issues in distinct ways in relation to the referenced actors. Tweets might also reference a single actor, but employ multiple, or even contrasting, framings of energy issues in relation to that actor. Therefore, each tweet can include both multiple actors, and potentially multiple framing codes associated with each actor.

Actor codes	***Description***	***Examples (note: links have been removed)*** ***[underlined italics indicated actor reference example]***
Governing Liberal Party – Explicit	Governing Liberal Party explicit references mention either the Liberal Party, individual politicians from the Liberal Party, or referring to the Ontario government.	*@Kathleen_Wynne* wow 6 whole supporters, yup seems about right. You arent liked in ONT. People will not forget the HYDRO rate increases Katy. #onpoli Hydro prices to keep rising, just a bit more slowly, *Ontario government* says #onpoli
Governing Liberal Party - Implicit	Governing Liberal Party implicit references point to a current energy issue or policy. The #onpoli indicates that the tweet is political, therefore both positive and negative tweets about current energy issues or policy have an implicit association with the current government. When tweets referenced public institutions, such as Hydro One, these were deemed implicitly associated with the governing party if they referenced specific policy choices, such as privatization. No implicit association was made if the tweet focused on management or business activities of the organization, such as Hydro One applying to increase their customer rates.	Ontarian's In The Dark About Long-Term Costs Of *Fair Hydro Plan* #onpoli NDP Energy Critic @Peter_Tabuns ~ *Privatized Hydro One* is Out of Control #onpoli #KeepHydroPublic
Non-governing party	Non-governing party associated tweets made explicit reference to either a non-governing provincial party, politician from a non-governing provincial party, or referenced the political opposition.	*Ontario PCs* Call for an End to Secret Hydro Deal-making #onpoli Here's a better idea from *@OntarioNDP*: "Return Hydro One to public ownership & control, ensuring it serves the public interest" #onpoli
Other	Other actors or organizations associated tweets included public institutions (e.g., Hydro One, Toronto Hydro, or the Independent Electricity System Operator), non-provincial political actors (e.g., federal parties or politicians, non-Ontario provincial parties or politicians), energy technologies (e.g., nuclear generation, solar generation, renewables), and major energy projects (e.g., Energy East pipeline, the oil-sands). Tweets were categorized as referencing other actors or organizations if they did not also reference (explicitly or implicitly) the governing party or the non-governing party.	Blaming *Energy East's* demise on *Ottawa* 'dishonest' #cdnpoli #bcpoli #abpoli #onpoli *Hydro One's* unreliable connections to Michigan are costing Ontario ratepayers millions in foregone revenue #onpoli

The framing codes were specifically related to energy issues and were associated with a specific actor coded in the tweet. Codes were determined based on the tweet text and embedded media. Links to written content were assessed based on the title and subtitle of the content, rather than a detailed reading. Identifying positive, negative, neutral, or having an unclear framing is based on the interpretation by the coder. The language used in many tweets was fairly unambiguous and included either positive or negative language. Examples of positive and negative language are included in the descriptions below. In some cases, users employ sarcasm in their tweets, but even in these cases interpreting positive and negative framings was quite straight-forward.

Energy issue framing codes	***Description***	***Examples (note: links have been removed) [underlined italics indicated framing example]***
Positive	Positive framing suggests that an actor was described positively in relation to an energy issue. Positive framing for one actor was often combined with negative framing for another actor. A common tweet construction with positive framing included a non-governing party political actor responding to a negatively framed governing party policy or action. Examples of language that indicated positive framing include “cut hydro rate”, “lower bills”, “saying no to”, “demand accountability”, “smart”.	An @OntarioPCParty government *will lower hydro bills* by an additional 12%. That’s change that works for families. #peoplesguarantee #onpoli If the cost of energy-saving upgrades is out of reach, Ontario’s new Affordability Fund *is here for you* #onpoli
Negative	Negative framing suggests that an actor was described negatively in relation to an energy issue. Examples of language that indicated negative framing include “disaster”, “failed”, “haunts”, “higher bills”, “inflated”, “let down”, “scandal”, “unfair”, “waste”.	Look at the *mistakes* these people r making Electricity-Whre do u even start? *Complete morons* @JustinTrudeau @Kathleen_Wynne #onpoli #cdnpoli @pdrobertson Look how their *reckless approach* to energy has *hurt people & hurt Ontario's future* - there is a pattern here. #onpoli
Negative economic	Negative economic framing was a prominent subset of negative framing. This coding was associated with tweets that mentioned increased energy costs, increased debt based on energy choices, loss of jobs due to energy issues, or wasteful spending in relation to energy.	*$5.5 million to sell* us on hydro privatization. Couldn't that money have been better spent? #keephydropublic #onpoli Ontario Liberal Know-how at Work: Less electricity use but *higher bills* for Ontarians #onpoli
Neutral	Neutral tweets discussed energy issues but did not include positive or negative framing. Many of the tweets coded with neutral framings made an announcement or stated a fact without additional comment.	RT @robertbenzie: .@GlennThibeault will release Ontario's "long-term energy plan" on Oct. 26. #onpoli OEB meeting about the Centre Wellington Hydro rate application on Sept. 21 #HaveYourSay #onpoli

Unrelated/ unclear	A small number of tweets were not assigned a framing code. These included tweets that were unrelated to energy issues, or tweets that were determined to be unclear. The unrelated tweets used a keyword associated with the data collection process but did not discuss energy issues. The tweets that were determined to be unclear generally included links to outside media that were no longer active. Without the full context of the embedded media conclusive coding was not possible.	Terrific rally in Hamilton Mountain tonight for Esther Pauls. I really love Esther's energy and enthusiasm. She would make a great MPP! #onpoli RT @coopge: Ontarios Green Energy Act. In all it's glory. #onpoli https://t.co/DlpZ8azPlC **[dead link]**

Appendix B: Topics of interest during high activity days

Date	*Number of tweets*	*Topics of interest*	*Percent of daily tweets*
October 17, 2017	456	*Auditor General of Ontario special report on the Fair Hydro Plan released*	87%
October 26, 2017	292	*Ontario Long-term Energy Plan released*	84%
October 18, 2017	255	*Auditor General of Ontario special report on the Fair Hydro Plan released the previous day*	71%
October 27, 2017	206	*Ontario Long-term Energy Plan released the previous day*	83%
November 25, 2017	188	*Promotion of the Progressive Conservative Party's "People's Guarantee"*	53%
		Hydro One proposal for prepaid electricity meters	11%
		Tweet about political rally [unrelated to energy issues]	11%
November 22, 2017	174	*Empower Ontario's Engineers to Obtain Opportunity: An Analysis of Ontario's Clean Electricity Exports – report by the Ontario Society of Professional Engineers*	60%
		Retweet of political advocacy organization criticizing governing Liberal Party's Fair Hydro Plan	11%
November 24, 2017	144	*Hydro One proposal for prepaid electricity meters*	86%
October 19, 2017	139	*Auditor General of Ontario special report on the Fair Hydro Plan released two days prior*	82%
		Newspaper article describing lost manufacturing jobs linked to electricity costs	11%
November 23, 2017	135	*Hydro One proposal for prepaid electricity meters*	56%
		General criticism of governing Liberal Party's energy policies	33%
December 5, 2017	132	*OEB Report: Report on an Investigation into Goreway Station Partnership*	38%
		Retweet of political advocacy organization criticizing "unfair hydro bills"	19%
		Promotion of the Progressive Conservative Party's "People's Guarantee"	15%
September 26, 2017	130	*Criticism of governing Liberal Party spending $5.5M on advertisements promoting the Fair Hydro Plan*	65%
		Reaction to governing Liberal Party awarding new feed-in-tariff contracts for renewable generation	23%