

ST4 - Social and Economic Value

Sub-task specific data collection

Alectra GridExchange Pilot Project: Ontario Municipal utility Alectra Utilities piloted a customer energy marketplace with its "GridExchange" platform. The Pilot was 3 months, and engaged 21 households in Ontario with distributed energy resources (DERs) including: solar panels, battery storage and/or electric vehicles (EVs) to trade on the platform. GridExchange is a blockchain based software platform that has been developed to enable energy exchange between consumers and the grid.

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Collection template (data extracted from literature reviews)				Data type	Answer	Was this factor particularly essential to the success of meeting your pilot's primary outcome? If so, please describe in what ways (in terms of experiential positives and negatives)
Scope/Context		Description/Question				
Contextual		What would be the business or value in the absence of the pilot or, single supplier trust model?	Free text	Participants would remain passive energy consumers and not prosumers; this lacks support/enforcement of regulations/policies for GED participation in energy markets. Instead they'd be a single supplier retail model where consumers would not benefit directly from a utility or energy retailer without the benefits of peer-to-peer energy trading achieved by the Grid Exchange project.	NA	
Assets/Participants						
Motives for participation		Ask participants to describe motivation to participate in this pilot - depending on format, could be free form interview question or structured multiple choice response in survey	Free text	Most participants were primarily motivated by climate change mitigation, seeking to take steps to address environmental concerns. Others were interested in technological advancement and a desire to be part of the grid. Some valued self-independence, having control over their own energy supply.	Yes, the success of the project in terms of active participation deeply relied on participants' motives and related attitudes.	
Participant demographics		Demographics of participants e.g. age, education, housing tenure, income, personal distributed energy resource (DER) ownership etc.	Free text	21 Residential customers from Vaughan, Markham, Richmond Hill, Barrie and Hamilton in Ontario Participated in this Participants ranged from mid 20's up to mid 60-70's 4 local merchants: Church & Dwight (Mississauga), Colson's (Great Tori Andorra Market), Ontario's Tuffies Hardware & Saw Knowledge, Ontario's Pizzaria (Woodbridge, Thornhill, Barrie, Hamilton, and Vaughan, Ontario)	NA	
Participant attitudes		Participant attitudes i.e. attitudes towards climate change, interest in renewable energy, public views etc.	Free text	Majority of participants were drawn to climate change initiatives. Most of the participants were interested in knowing that Greenhouse Gas Emissions with renewable energy sources. Participants were particularly interested in Nature Resources Canada and a partner given the job possibility or climate change.	Yes, the success of the project in terms of active participation deeply relied on participants' motives and related attitudes.	
Participant experience: autonomy/skylark		Ask participants to describe experience of consuming their own energy/charging energy - did they experience a sense of responsibility and autonomy?	Free text	Participants demonstrated willingness to change their behavior to help manage the grid, which demonstrates a sense of responsibility and autonomy. Participants valued being prosumers - had a sense of energy security.	NA	
Participant experience: community identity		Ask participants to describe if/how participating in this pilot affected their sense of community identity	Free text	Participants felt proud and believed they were making a difference, not only within their community but also in a broader sense. They saw this pilot as an opportunity to be a difference to others and themselves.	NA	
Participant experience: social relations		Ask participants to describe if/how participating in this pilot affected their social relations with other participants (both positive and negative)	Free text	From "Businesses Section on Green Grid Exchange Ltd. "The app has been their agent for us, we chat about it often to check how we can save, and then exchange experiences." "The neighbors were quite interested and wanted to be involved. Participants developed connections and shared experiences, particularly among those who were each other."	NA	
Participant experience: engagement		Ask participants to describe their experience of engaging with the project - which members of the household/participants were the most engaged? How often did they engage with the project/participate? How easy was it to view their data, see performance etc.	Free text	From Participants Acquisition Decision Matrix Project Report "The application was simple and not overwhelming. The consensus was that it was a very smooth experience." "Engagement varied among households, with some individuals showing more interest in technical aspects." "Younger users, both spouses were equally engaged, while others, one was more involved."	NA	
Participant experience: environmental awareness		Ask participants to describe if/how participating in this pilot affected their environmental awareness/concern of environmental responsibility	Free text	Participants in the pilot enhanced participants' environmental awareness since they learn more about their energy consumption patterns and how to reduce them. Participants learned more information on energy saving measures, including a variety of environmental responsibility.	NA	
Participant experience: energy awareness		Ask participants to describe if/how participating in this pilot affected their awareness of energy consumption system, likelihood of future engagement with energy market, interest in energy services, did they consciously change their energy usage patterns?	Free text	Participants increased understanding with their energy usage. Some participants sold energy back to the grid, indicating active engagement in energy systems. Certain individuals sought to quantify the impact of energy-saving upgrades, suggesting a deeper interest in energy efficiency.	NA	
Participant experience: expectations		Initially, did participants to describe their expectations going into the pilot and whether these were met, alternative option - look at promotional material from pilot, hearing etc.	Free text	Participants expressed an increased control in their energy consumption, cost savings, and environmental benefits. Many expected to learn about energy patterns, but felt that their expectations were met, citing improved awareness, savings, and satisfaction with grid stability.	NA	
Participant satisfaction		Ask how satisfied with the pilot were these blocking factors for engagement (both for participants e.g. using app, or using data - did they want to opt in - would they participate on ActiveX Project Project? Large internal staff were required to only encourage participants and customers to continue to use more reward options." "No regrets."	Free text	All participants were happy with the product and platform, they enjoyed ability to profit of carbon and electricity had been exchanged on the app. From Participants Acquisition Decision Matrix Project Project: "Large internal staff were required to only encourage participants and customers to continue to use more reward options." "No regrets."	Yes, it was very important to make the participants feel comfortable and satisfied with the technology they were using (on the GridExchange App)	
Structure						
Rules/User engagement						
User engagement: Design process		To what extent did participants play a role in the design of the pilot?	Free text	Participants did not play a significant role in designing the pilot but provided insights into its complexity and usability. Participants were not directly involved in designing the pilot. The design was based on agreements between participants and the technology provider. Feedback from regular interviews with participants sometimes influenced project design adjustments.	NA	
User engagement: Recruitment processes		Please describe the recruitment process for participants and how difficult/easy it was	Free text	Partnership with GED website to find residential customers with specific criteria like EVs and solar lanterns. It was challenging due to limited houses meeting criteria. Additional outreach was conducted, considering equity, diversity, and inclusion (EDI) strategies to ensure equitable participation.	NA	
User engagement: Participant preferences		To what extent could participants specify their preferences for energy trading/consumption? How flexible is the system participants had in expressing preferences	Free text	Participants were given the choice to opt into events manually or set automatic response for each event, adopted mobile app (Events created by the utility to coordinate energy in the grid).	NA	
User engagement: Market participation		What type of participation is required/expected from participants and how is this participation incentivized?	Free text	Participants could set preferences in the mobile app regarding their level of participation. These preferences were automated - participants did not need to manually intervene. Participants were incentivized with rewards.	NA	
User engagement: Frequency		How often were participants required/able to interact with the platform?	Free text	Participants were required to participate in events as they occurred, with frequency varying based on grid conditions and priorities. They could choose to opt in - essentially affecting their credibility score.	Yes, we wanted participants to be actively engaging with the platform and contributing to the grid.	
User engagement: Automation		To what extent were transactions/interactions between participants automated?	Free text	Implementation of choice: participants could switch to automate mode during the pilot, they appreciated having the ability to stop and switch options - giving them greater control.	NA	
User engagement: Interface		Please describe the interface participants used to interact with the platform	Free text	Mobile and web application "GridExchange", majority of users used the mobile app via the web app		
User engagement: Interface (images)		Please upload images of the interface that participants use to interact with the platform.	Image		NA	
User engagement: Strategies		Describe any strategies deployed in order to encourage participant engagement with the platform. This could be elements of gamification, comparisons with other strategies, nudges etc.	Free text	Customer engagement was increased by gamifying the energy market using concept of GoldCredits and participants medals. The incentive was that we set a very low threshold to earn GoldCredits. Instead gamification of payment was engaged by participants. Credibility score was implemented. Encouraging delivery upon committed services as well as increasing participation.	Yes, participants were more engaging due to the gamification strategy.	
Value/Participants/communities						
Financial benefits		What, if any, financial benefits did participation bring for participants?	Free text	Monetary incentives for energy-saving contributions, receiving dollars based on event priority. Additionally, they earned CO2 credits to reduce their carbon footprint or be redeemed at partnering merchants.	NA	
Cost of electricity		How much did electricity cost per kWh under the pilot? (Ideally data is belowhand). Ideally collect for all participants (to identify distributional impacts) otherwise average across participants	Numeric	The price per kilowatt-hour (kWh) compensated per event ranged from \$0.15 to \$2.00. On average, participants received between \$0.75 and \$10 per hour. The pricing depended on how the bid of one user in wholesale market price.	NA	
Origin of energy		How much did users get participants given about the origin of the energy they were consuming?	Free text	Participants were not provided with detailed information, however they were aware of the type of event and action required from them, such as not charging EV's.	NA	
Benefit allocation		Are benefits distributed for individual persons or shared as part of a community?	Free text	Calculated for individual persons (households).	Yes, this seemed to be a key element in the project.	
Job creation		Were any new jobs created as a result of this project?	Free text	Activists had to new personnel, fully creating temporary positions. However, it's uncertain if these jobs directly led to permanent job creation. The Grid Exchange was said to "SCoP", generating jobs for their and.	No.	
Financial redistribution		Is there a redistributive element to the project (e.g. regulated social redistribution of wealth brought into the case without through non-market transactions)? If so please describe.	Free text	The project aimed to redistribute energy consumption by incentivizing participants to reduce load to the grid during peak hours. However, there isn't direct redistribution of wealth.	NA	
Local reinvestment		Has the project led to any local reinvestment? If so, please describe	Free text	The project did not lead to local reinvestment, but there is potential for job creation and further investment as the project progresses.	No.	
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ST4 - Social and Economic

Sub-task specific data collection

General comments

POWER.HOUSE HYBRID PILOT STUDY: Aimed to empower deployment across 10 residential homes in Markham to ir hybrid heating of natural gas and electric, micro combined controls.

Data collection template (data extracted from

Data

Scope: Context

Counterfactual

Assets: Participants

Motives for participation

Participant demographics

Participant attitudes

Participant experience: autonomy/autarky

Participant experience: community identity

Participant experience: social relations

Participant experience: engagement

Participant experience: environmental awareness

Participant experience: energy awareness

Participant experience: expectations

Participant satisfaction

Structure:

N.A.

Rules: User engagement

User engagement - Design process

User engagement - Recruitment processes

User engagement - Participant preferences

User engagement - Market participation

User engagement - Frequency

User engagement - Automation

User engagement - Interface

User engagement - Interface (images)

User engagement - Strategies

Value: Participants/communities

Financial benefits

Cost of electricity

Origin of energy

Benefit allocation

Job creation

Financial redistribution

Local level reinvestment

Add more data fields below

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c Value

er households in Markham to generate and store clean energy while initiating a move towards Net-Zero Energy
integrate a set of controllable electrical and thermal equipment into a Virtual Power Plant (VPP) platform. These
d heat and power (mCHP), and electric vehicle chargers — will enable customers to minimize greenhouse gas

m literature reviews)

Description/Question

What would be the 'business as usual' case in the absence of the pilot (e.g. single supplier retail model)?

Ask participants to describe motivation to participate in this pilot - depending on format, could be free form interview question or structured multiple choice response in survey

Demographics of participants e.g. age; education; housing tenure; income; personal distributed energy resource (DER) ownership etc.

Participant attitudes i.e. attitudes towards climate change; interest in renewable energy; political views etc.

Ask participants to describe experience of consuming their own energy/sharing energy - did they experience a sense of agency; independence etc.?

Ask participants to describe if/how participating in this pilot affected their sense of community identity

Ask participants to describe if/how participating in this pilot affected their social relations with other participants (both positive and negative)

Ask participants to describe their experience of engaging with the project - which members of the household (age/gender) were the most engaged; how often did they want to engage with the project/app/interface; how easy was it to view their data, set preferences etc.

Ask participants to describe if/how participating in this pilot affected their environmental awareness/sense of environmental responsibility

Ask participants to describe if/how participating in this pilot affected their awareness of energy use/energy system; likelihood of future engagement with energy market; interest in energy transition; did they consciously change their energy usage patterns?

Ideally: ask participants to describe their expectations going into the pilot and whether these were met; alternative option - look at promotional material from pilot, framing etc.

Are they satisfied with the pilot? Were there blocking factors for engagement (both for participants e.g. using app, and non-participants i.e. why they didn't participate, also attrition/drop-outs - why?)

To what extent did participants play a role in the design of the pilot?

Please describe the recruitment process for participants and how difficult/easy it was

*To what extent could participants specify their preferences for energy trading/consumption?
Please describe the options participants had for expressing preferences.*

What type of participation is required/expected from participants and how is this participation incentivised?

How often were participants required/able to interact with the platform?

To what extent were transactions/interactions between participants automated?

Please describe the interface participants used to interact with the platform

Please upload images of the interface that participants use to interact with the platform.

Describe any strategies deployed in order to encourage participant engagement with the platform. This could be elements of gamification; comparisons with other participants; nudges etc.

What, if any, financial benefits did participation bring for participants?

How much did electricity cost per kWh under the pilot? (ideally data before/after). Ideally collect for all participants (to identify distributional impacts) otherwise average across participants.

How much detail were participants given about the origin of the energy they were consuming?

Are benefits delivered for individual prosumers or shared as part of a community?

Were any new jobs created as a result of this project?

Is there a redistributive element to the project (e.g. regulated social redistribution of wealth designed into the case enforced through non-market structures)? If so please describe.

Has the project led to any local reinvestment? If so, please describe

[illegible]



Emission homes. Funded by Natural Resources Canada, the POWER.HOUSE Hybrid pilot project has now completed the 3 homes were retrofitted with a combination of smart electric and thermal technologies such as solar panels, battery storage, (GHG) emissions, have greater control over their energy costs, and enjoy increased comfort levels through automated

Data type	Answer

Free text	Less grid flexibility, centralized power plant, no home energy retrofits. The most common installation in Ontario homes comprises furnaces and air conditioners, with few having solar or renewable power generation.
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Free text	Mainly climate change mitigation, technological curiosity, and to have a sense of self-reliance.
Free text	10 homes selected based on readiness to adopt the technology installation, limited to Markham, Ontario. Mainly, homeowners, married or partnered, with varied ages ranging from mid-30s to 70s, while slightly more male participants. Affordability indicators suggested higher income levels
Free text	Participants expressed pride in showcasing their homes equipped with renewable energy technologies, such as solar panels, and being part of the pilot project. They viewed their homes as models for sustainability and took pride in being early adopters. This pride led to word-of-mouth conversations with family and friends, spreading awareness and promoting the adoption of renewable energy and sustainable practices.

Free text	Participants showed willingness to adjust behaviors to contribute to grid management. Sense of agency and independence was experienced, particularly among EV drivers.
Free text	Participants were curious and showed increased engagement and awareness during the study. Some participants wanted to learn more about the impact and contribution that they were making on the grid.
Free text	Participants shared their experiences with family and friends, leading to positive word-of-mouth conversations. However, there wasn't explicit mention of how participation affected social relations with other participants in the pilot.
Free text	Engagement varied among households, with some individuals showing more interest in technical aspects. In some cases, both spouses were equally engaged, while in others, one was more involved. They were not able to set preferences, the utility managed their use of energy, depending on the grid stability.
Free text	Increased participants' environmental awareness and sense of responsibility. Many were already conscious of their energy usage and wanted to reduce it.
Free text	They became more educated and informed about hybrid heating systems and air source heat pumps. May lead to future engagement with the energy market and interest in transitioning to more sustainable energy solutions.
Free text	Some individuals, particularly those with technical backgrounds, may have been more interested in understanding the technical aspects of the project and how everything was connected and functioning. Others may have anticipated greater insights and transparency. Limited information about whether these expectations were met.
Free text	Improved comfort and energy efficiency. From PHH Project Report: "The tankless water heater is significantly much more responsive than the large tank." "The heat pump is certainly doing a better job in cooling the house. It's not dry air anymore. It's a great tech."

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Free text	They had to have EV to participate - home able to be retrofitted/efficient
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<i>Free text</i>	Homeowners were selected based on a number of criteria including: -Requirement for them to own an electric vehicle -Size of home -Suitability of roof to host solar panels -Type of home heating and cooling system -Willingness of to share data and allow occasional site visits for monitoring and servicing the equipment
<i>Free text</i>	Participants had limited direct control over their energy consumption preferences. The project focused on optimizing electricity consumption to mitigate emissions during peak periods, primarily managed by the utility.
<i>Free text</i>	Participants are expected to allow access to their homes for system installation, commissioning, and maintenance. This includes accommodating technicians for the installation of new equipment and meters. Incentives for participation include the opportunity to receive free upgrades, reduced energy consumption, and potential improvements in home comfort. At the end of the project, participants are asked to complete a survey to provide feedback on their experience and system performance.
<i>Free text</i>	Participants had access to dashboards provided by vendors, allowing them to monitor energy consumption, system performance, and other relevant data. However, the level of engagement varied among participants
<i>Free text</i>	Yes digitally automated interactions - when GHG are low and the gas demand is high, electric heat pump is used.
<i>Free text</i>	Participants primarily interacted with a consumer dashboard provided by a vendor in the project.
<i>Image</i>	n/a
<i>Free text</i>	Participants got a brand new HVAC system installed. Additionally, the promise of reduced energy consumption and lower bills served as incentives for participation.

Free text	
Free text	

When editing in Excel: To start a new line of text or add spacing between lines or paragraphs of text in a worksheet cell, press:

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macOS: *CONTROL + OPTION + RETURN*

Was this **factor particularly essential** to the **success of meeting your pilot's primary outcome**? If so, please describe to what extent (in terms of experienced positives and negatives).

N/A

N/A

N/A

Yes, because this made the implementation of technology in the household's participants smoother.

N/A

N/A

N/A

N/A

N/A

Yes, because participants now are more educated about the use and contribution of these technologies into their daily life (ex: lowered energy bills)

N/A

N/A

N/A

N/A

N/A

N/A

N/A

Yes, because the utility was able to manage the grid and the energy use for each house.

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

[illegible]
