Summary of the Virtual Workshop Series:
Accelerating Smart Grid Adoption Across Canada

About This Document

This is a summary of the activities and outputs of the Virtual Workshop Series ***"Accelerating Smart Grid Adoption Across Canada"*** organized by MaRS Discovery District (MaRS) in the Fall of 2020. The information presented in this summary is general in nature, and provides only high-level outputs and sample discussion points captured during the workshop sessions. For more detailed information on the Virtual Workshop Series, or other work MaRS is doing in smart grid, please visit our webpage and/or contact Alexandre Parrott-Mautner (aparrottmautner@marsdd.com).

Executive Summary

The adoption of smart grid technology is essential as Canada tackles issues of climate change and rapid urbanization, and attempts to spur economic recovery post-COVID-19. That is why MaRS is working to support the growth and diversity of Canada's smart energy community, by raising awareness, providing support, and connecting like-minded organizations pushing the cutting-edge of smart grid innovation.

Throughout October and November 2020, MaRS convened a group of leaders representing diverse system perspectives in the Canadian smart-energy community to participate in a virtual workshop series. These workshops were designed to foster collaboration and extract new ideas to accelerate the adoption of smart grid technologies. This three-part online series utilized the report Industry Perspective: Understanding Barriers to Smart Grid Adoption as a foundation for activities and discussion. In each of the three workshops, participants collaborated to align on and prioritize the top barriers to smart grid adoption, and explore solutions to these challenges.

Industry Perspective Report

In October 2020, MaRS published the report *Industry Perspective: Understanding Barriers to Smart Grid Adoption*. This report was based on primary research conducted with energy sector stakeholders across Canada in Spring 2020. The document outlines 22 unique barriers being faced by the Canadian electricity ecosystem in attempting to adopt and deploy smart grid technologies. These barriers are grouped into eight themes as outlined in *Table 1*. For additional context and details on each barrier, please download the report here.

Table 1: Barriers identified in the Industry Perspective report organized by theme, number, and name.

Theme 1.0: Business Models 1.1 Traditional Business Models 1.2 Communicating Value 1.3 Funding	**Theme 4.0: Energy Sector Culture** 4.1 Risk Aversion 4.2 Traditional Mindset & Utility Culture 4.3 Partnership & Collaboration 4.4 People Capacity	**Theme 7.0: Regulation** 7.1 Regulatory Leadership 7.2 Regulatory Market Gap
Theme 2.0: Customer Awareness & Understanding 2.1 Customer Perception 2.2 Education & Awareness	**Theme 5.0: Market Structure** 5.1 Traditional Market Economics 5.2 Regional Markets 5.3 Scaling Projects	**Theme 8.0: Technology Integration** 8.1 Development & Implementation 8.2 Technology Integration 8.3 Rates of Technology Adoption
Theme 3.0: Digitalization & Data 3.1 Transition to Digital 3.2 Privacy and Security 3.3. Interoperability and Connectivity	**Theme 6.0: Policy** 6.1 Policy Environment in Canada 6.2 Pathways to Innovation	

Virtual Workshop Series

Throughout October and November 2020, MaRS held a three-part virtual workshop series, convening smart grid stakeholders across Canada to prioritize barriers to smart grid adoption and explore solutions to those challenges. A high-level overview of the workshops is illustrated in *Figure 1*. Over 30 participants representing associations, government, regulators, solution providers, system operators and utilities participated in these online sessions. These participants represented organizations based in Alberta, British Columbia, Newfoundland and Labrador, Ontario, Québec, and Saskatchewan, as well as those that operate at a national and global scale.

Limitations

MaRS recognizes that the majority of participants present in the workshop sessions were predominately from Alberta and Ontario, thereby representing open market organizations. In addition, MaRS acknowledges an underrepresentation of perspectives from fully vertically-integrated utilities as well as customers. This consideration should be kept in mind as the outputs and discussions of each session is reviewed.

Figure 1: High-level overview of the Virtual Workshop Series.

Session 1 – October 27th 2020

Overview

In this first workshop, participants were split into four multi-stakeholder, multi-jurisdictional breakout groups to review the 22 barriers to smart grid adoption as highlighted in the *Industry Perspective* report. Working in these diverse teams, participants individually identified the barriers that are most important to overcome in their organization and jurisdiction, and collectively narrowed down their combined list to 3-4 top barriers which resonated with the entire group. These top barriers were then shared back in a plenary discussion with all participants present.

Output

A total of nine barriers were identified as priority areas to continue discussing in follow-on workshop sessions (*Table 2*). Notably, barriers 1.1 Traditional Business Models and 7.1 Regulatory Leadership were prioritized as top barriers by three of the four breakout groups. For the remaining seven prioritized barriers, only one group selected each barrier as a top priority.

Table 2: Top nine barriers prioritized from Session 1, organized by theme, number, and name.

Theme	Business Models			Customer Awareness	Market Structure	Policy		Regulation	
Number	1.1	1.2	1.3	2.2	5.2	6.1	6.2	7.1	7.2
Name	Traditional Business Models	Communicating Value	Funding	Education & Awareness	Regional Markets	Policy Environment in Canada	Pathways to Innovation	Regulatory Leadership	Regulatory Market Gap

Discussion Highlights

Participants remarked that the barriers under the theme Regulation were a significant point of discussion in many of their groups. They collectively agreed that the pace of regulatory change is often behind the technological advancement of smart grid solutions coming to market. In addition, participants acknowledged that while regulatory sandboxes are a useful framework, they are only seen as truly beneficial if a transition plan from pilot to scale is enacted by the regulator. Participants also expressed that regulatory change requires alignment of many stakeholders including regulators, policymakers, and government, and that unclear communication of the impact and value of any change can hinder regulatory advancements.

Stakeholder Education and Awareness (barrier 2.2) and Communicating Value (barrier 1.2) were highlighted as interconnected barriers. Participants agreed that when testing innovative technologies, all parties must understand and accept that pilots and projects can fail, and that the appetite for this risk must be increased to spur more rapid grid advancement. Some solution providers present noted that establishing trust with utilities is particularly vital to allow for technology adoption and partnerships. In particular, they expressed that utilities can sometimes be viewed as protective over their data, and that this can inhibit collaborative efforts with solution providers who require data access to ensure interoperability of their technologies. Participants recommended that finding a way for data-holders to communicate challenges without sacrificing privacy and security of their data could enable an easier pathway to adoption and scale.

Session 2 – November 3rd 2020

Overview

In the second workshop of the series, participants worked in three breakout groups to further prioritize the top nine barriers selected during Session 1. Participants utilized the Impact-Difficulty Matrix (*Figure 2*) in order to sort the barriers according to:

- The impact of solving the barrier on the Canadian energy ecosystem (y-axis)
- The difficulty of addressing the barrier in practice (x-axis)

As a group, participants were instructed to align on the placement of barriers in the quadrant labelled "Big Bets". This section of the matrix reflected barriers that were highly impactful, yet highly difficult to address, therefore necessitating collaboration across jurisdictions and stakeholder types. Once the group came to consensus on their 3-4 "Big Bets" barriers, participants re-convened in plenary to share their results and discuss their rationale for selection.

Unlike in the first session, participants for Session 2 were divided into groups based on their stakeholder type:

- **Group 1** – Customers & Ventures
- **Group 2** – Utilities & Regulators
- **Group 3** – Associations, Government, & System Operators

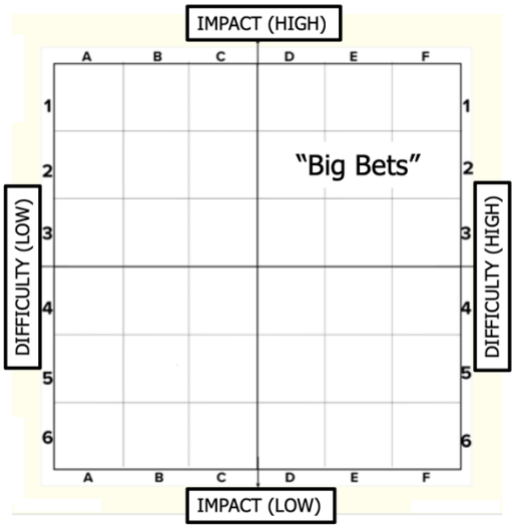

Figure 2: The Impact-Difficulty Matrix.

Output

Across all three breakout groups, a total of four barriers were prioritized as "Big Bets" during the facilitated activity (*Table 3*). Importantly, participants remarked on the significant overlap between barriers 7.1 Regulatory Leadership and 7.2 Regulatory Market Gap, agreeing in plenary that these two barriers should be amalgamated into one barrier for continued work in Session 3.

Table 3: Barriers discussed for prioritization during Session 2 as organized by theme, number, and name as well as the breakout group number which prioritized the barrier as a "Big Bet". The orange outline indicates two barriers amalgamated into one barrier.

Theme	Business Models			Customer Awareness	Market Structure	Policy		Regulation	
Number	1.1	1.2	1.3	2.2	5.2	6.1	6.2	7.1	7.2
Name	Traditional Business Models	Communicating Value	Funding	Education & Awareness	Regional Markets	Policy Environment in Canada	Pathways to Innovation	Regulatory Leadership	Regulatory Market Gap
Group	1, 2, 3	3	2, 3	2		1, 2		1, 3	2

Discussion Highlights

An overwhelming point of conversation throughout Session 2 was the interconnectedness of the barriers – in particular the overlap between barriers 7.1 Regulatory Leadership and 7.2 Regulatory Market Gap. In rationalizing the amalgamation of these two barriers, participants noted that without changes to regulatory modification, regulators cannot provide avenues for innovators in the market. In addition, some participants rallied behind the idea of a "bottom up" approach to smart grid regulation - one in which provincial and territorial alignment informs the federal policy direction. Other participants linked barrier 6.1 Policy Environment in Canada closely with the regulatory barriers, noting that the regulatory environment as a whole is highly driven by both federal and regional policy objectives.

The interconnectedness between barriers 1.1 Traditional Business Models and 1.3 Funding was also discussed. Participants remarked that funding structures are often tied to the success and outputs of pilot projects, and that more flexibility is needed in business models in order to allow for financing innovative technology testing and adoption. One participant remarked that "*without funding, nothing moves*" while others echoed that in order for a solution to be adopted, the customer needs to be reassured that it will be profitable, or at least, reduce costs. When discussing barrier 1.2 Communicating Value participants unanimously agreed that educating other stakeholders is a constant challenge, due to the unique needs of each member of the value chain. Solution providers in particular noted that the burden of communicating the technological value of their solutions is difficult without knowing the particular jurisdictional or regional requirements of the grid.

Session 3 – November 24th 2020

Overview

In the final workshop, participants reconvened to ideate and explore solutions to the four prioritized barriers from Session 2. Prior to the workshop, the prioritized barriers were reframed into "How Might We" statements (*Table 4*), which are used as a challenge framing technique to help generate creative brainstorming. Working in four multi-stakeholder, multi-jurisdictional breakout groups, participants focused on addressing a single How Might We statement. First, participants individually ideated a solution to their pre-assigned statement. Participants then co-designed one solution to their group's statement using their collective ideas. Afterwards, these solutions were shared back in a plenary discussion in order to allow for input and feedback from all participants.

Table 4: Four barriers prioritized from Session 2 with their associated How Might We statements.

Barrier	How Might We Statement
1.1 Traditional Business Models	**How Might We**: Enable flexibility in electricity sector business models so that utilities can adapt their businesses to changing markets, customers and new technologies, with the goal of providing service to customers at the same or lower cost?
1.3 Funding	**How Might We:** Make funding easier to access and more flexible to achieve greater technology adoption and scale?
6.1 Policy Environment in Canada	**How Might We:** Align on common political objectives and direction for the electricity sector across provinces and territories?
7.0 Regulation	**How Might We:** Help regulators, system operators and market administrators enable technology adoption, new business models and create value in markets by adapting to, and enabling, change and experimentation in electricity markets?

Output

A total of four solutions were developed, each of which aligns with one How Might We statement. The solution statements presented in *Table 5* reflect a high-level description of each solution, while more minute details (e.g., jurisdictional applicability, timeline for implementation, etc.) are not reflected in this document. Solution development is understood as an iterative process. Work on addressing these barriers only began in Session 3,

and therefore the solution descriptions represent the first step in a longer process of addressing these barriers to smart grid adoption.

Table 5: The four proposed solutions to address each prioritized barrier.

Barrier	Solution
1.1 Traditional Business Models	An Innovation Challenge (i.e. competition) with funding coming from the energy ecosystem (e.g. utilities, solution providers, government, etc.) with the goal of continuously demonstrating new business models to meet the needs of consumers at the same or lower cost.
1.3 Funding	Creation of: 1. Technology Insurance – an optional risk mitigation type solution (i.e. insurance), which can be built into funding streams to minimize the risk of the loss of technological value (e.g. due to changes to market) over the life of project. This insurance can be tailored so that what one is being insured against is aligned to the type of risk for a given smart grid project and/or; 2. Market Insurance – identification of key market prices that enable investment and drive insurance products with timelines around premiums (e.g. price of energy, volatility index, etc.), thereby creating a derivative market for energy sector players to mitigate risk of new investments in asset or solutions which are no longer recognized for their full value due to market change over time.
6.1 Policy Environment in Canada	A pan-Canadian coalition with a mandate to develop a national strategy focused on establishing regional collaboration zones. The coalition should include representation from across the energy sector including: venture capital firms, Indigenous groups, investors, and Provincial, Territorial, and Federal governments. The mandate should include incentive mechanisms (e.g. tax deductions, financial investments, etc.) for all stakeholders in order to encourage collaboration.
7.0 Regulation	Creation of a prescribed rule change process which ensures that multi-stakeholder considerations are addressed at frequent and regular intervals. Stakeholders will be able to shape the design and regulation of a market through submitting rule change requests that must be addressed by the regulator in a prescribed timeline/procedure.

Discussion Highlights

At the top of the plenary discussion, one participant highlighted that stakeholders must understand the agile approach undertaken to develop any type of solution, and that continued iterative experimentation is necessary following the work undertaken during this Virtual Workshop Series. Others echoed this sentiment and added that the solutions developed here were a first-pass attempt at addressing a complex and multi-dimensional barrier to smart grid adoption, and that perspectives from other stakeholders, and notably other jurisdictions across Canada, must be included in further development.

Upon presentation for the solution associated with barrier 1.1 Traditional Business Models, participants in plenary commented that a regulator would need to play a central role in developing an Innovation Challenge. One participant recommended that a way to de-risk financial strain on the regulator would be to funnel some of the funding dedicated to running this competition through the regulator so they could test out new business models with reduced liability. Overwhelmingly participants agreed that there is a necessity to start experimenting with

new business models, and that upfront financial capital is required in order to trial new models in a temporary way.

Participants mentioned that the two solutions presented to address barrier 1.3 Funding are complimentary, and together act as a long-term mechanism to de-risk access to capital. In particular, the technology insurance focused solution can improve flexibility of funding by removing risk from the funder – a hurdle which was noted as one that often disincentivizes investment in more innovative projects. One participant remarked that while the market insurance solution is simple on paper, it may be difficult to implement due to the risk averse nature of the actuarial community and the necessity for robust education on the value of technical smart grid solutions.

Many participants agreed that any solution to barrier 6.1 Policy Environment in Canada would need to be driven by provincial and territorial participation. In addition, in order for any mandate to resonate across the country, it must include more diverse voices, such as representatives from venture capital firms and Indigenous groups. The use of regional collaboration zones, and sharing of data gathered in these groups, was noted as a particularly important component for the success of this solution.

Multi-sectoral, multi-jurisdictional collaboration was also a theme present in the discussion around the solution to barrier 7.0 Regulation. Participants commented that this solution is modelled off the Australian Energy Market Commission rule change process, and would require legislation changes to enable this in Canada. While the solution presented resonated with many participants, some were quick to note that it was developed only in the context of implementation in Alberta and Ontario (due to the representation in the participant group), and so the feasibility or applicability of this idea is unknown in other jurisdictions.

Next Steps and Acknowledgements

In 2021, MaRS will seek to reconvene the Canadian smart grid community to validate and refine the solutions created in the workshops. To express interest in engaging in this work, please contact Alexandre Parrott-Mautner (aparrottmautner@marsdd.com). For more general information on MaRS' work in the cleantech and energy sector, please contact Aisha Bukhari (abukhari@marsdd.com).

MaRS would like to thank all 30 participants for dedicating their time, expertise, and enthusiasm to the Virtual Workshop Series.