



# ENTER THE SANDBOX

## DEVELOPING INNOVATION SANDBOXES FOR THE ENERGY SECTOR

QUEST



POLLUTION PROBE  
CLEAN AIR. CLEAN WATER.

## ACKNOWLEDGEMENTS

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### About QUEST

QUEST is a national non-government organization that works to accelerate the adoption of efficient and integrated community-scale energy systems in Canada by informing, inspiring, and connecting decision-makers. QUEST undertakes research, communicates best practices, convenes government, utility, private-sector and community leaders, and works directly with local authorities to implement on-the-ground solutions. QUEST grounds all its activities in the “Smart Energy Community”– a concept that encapsulates the ideal end state of the organization’s work.



### About Pollution Probe

Pollution Probe is a national, not-for-profit, charitable organization which is improving the health and well-being of Canadians by advancing policy that achieves positive, tangible environmental change. It is a leader in building successful partnerships with industry and government to develop practical solutions for shared environmental challenges.



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# LIST OF ACRONYMS

ACM	<i>Autoriteit Consument &amp; Markt</i> (Authority for Consumers and Markets), the Dutch energy regulator
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator, the energy regulator for the National Electricity Market in Australia
ARERA	<i>L'Autorità di Regolazione per Energia Reti e Ambiente</i> , the Italian energy regulator
CEP	Community energy plan
COAG	Council of Australian Governments, an inter-governmental body in Australia that coordinates state and federal policies
CRE	<i>Commission de Régulation de l'Énergie</i> , the French energy regulator
DER	Distributed energy resource
E-Control	Austrian energy regulator
EMA	Energy Market Authority, the Singapore energy regulator
EV	Electrical Vehicle
FinTech	Financial technology sector
FFG	<i>Forschungsförderungsgesellschaft</i> , the Austrian Research Promotion Agency, the public body in charge of administering publicly funded research
GHG	Greenhouse gas
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
ISGAN	International Smart Grids Action Network (a working group of the IEA)



NEM	National Electricity Market is the Australian interconnected electricity system for Queensland, New South Wales (including the Australian Capital Territory), Victoria, South Australia, and Tasmania. Western Australia and the Northern Territory are not connected to the NEM.
OEB	Ontario Energy Board, the Ontario energy regulator
Ofgem	Office of Gas and Electricity Markets, the energy regulator for Great Britain (Northern Ireland has a separate energy regulator)
RSE	<i>Ricerca sul Sistema Energetico</i> , an Italian public energy research agency funded through levies on the electricity bills
RVO	<i>Rijksdienst voor ondernemend Nederland</i> , the Netherlands Enterprise Agency
SINTEG	"Smart energy showcases – Digital agenda for the energy transition," the German Innovation Sandbox initiative

## GLOSSARY OF TERMS

Enquiry Service	A tool of Innovation Sandboxes that employs collaborative tools or platforms that enable knowledge exchange and sharing of lessons learned between innovators, and general information about regulatory systems for conducting trials.
Innovation Sandbox	A policy tool that uses collaboration to create conditions for a safe and controlled space to test new energy products, services and business models in a real-world environment. The tools included in Innovation Sandbox are Enquiry Services, Innovation Hubs and Regulatory Trials.
Innovation Hubs	A tool of Innovation Sandboxes where collaboration among diverse stakeholders is encouraged.
Pilot project	A one-off project that usually receives public funding and is used to demonstrate whether a new technology works.
Prosumer	A consumer who also generates or provides control over their energy consumption (such as through solar PVs, batteries or demand response).
Regulatory Trial	A tool of Innovation Sandboxes that offers time-bound derogation or exemption to existing rules for specific trials (in some literature referred to as Regulatory Sandboxes).
Regulatory and Policy Learning	A tool of Innovation Sandboxes that takes lessons learned from the other tools — Innovation Hubs, Enquiry Services, and Regulatory Trials — and uses the results to inform longer-term policies and regulatory processes.

# EXECUTIVE SUMMARY

There is both a consensus that innovation is needed in the energy sector to achieve emissions reduction commitments<sup>1</sup> and that the current framework overseeing the energy landscape is not well equipped to cope with innovation in Canada and around the world. The challenge will be for the sector to be agile and flexible enough to integrate innovation and to allow new services, new entrants and new ways of meeting energy needs while at the same time not losing what is valuable from current energy policy and regulatory frameworks.

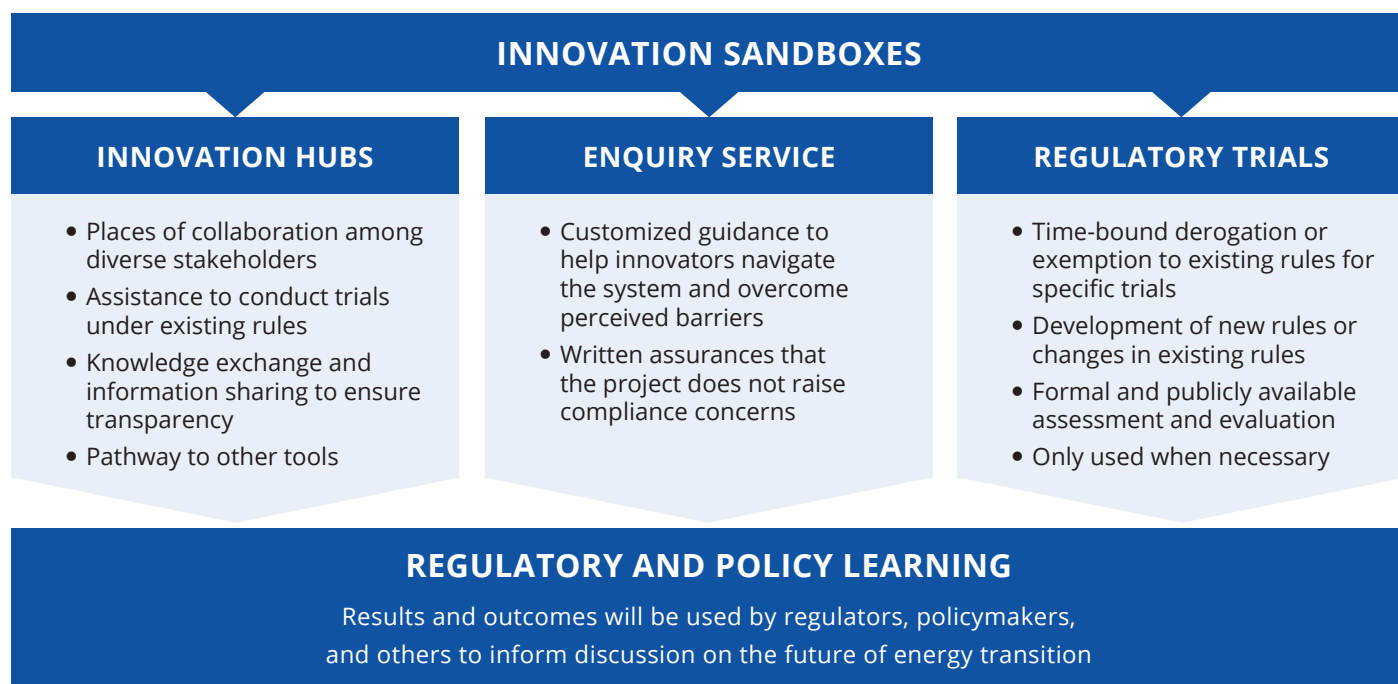
Originating in the FinTech sector, Innovation Sandboxes are policy tools that use collaboration to create conditions for safe and controlled methods to explore new energy products, services, and business models in a real-world environment. Innovation Sandboxes are about promoting innovation in a broad sense. Technological innovation, such as new technologies, is only one aspect of innovation.

Most of the focus of energy Innovation Sandboxes is on two other types of innovation: business model innovations and social or processual innovations. Energy Innovation Sandboxes provide the opportunity to change how processes, procedures, policies, rules or regulations are applied in a controlled manner, with the ultimate goal of creating durable and lasting systemic change to enable innovations that benefit the energy sector, consumers, and society. Many countries, primarily in Europe, have already developed Innovation Sandboxes for the energy sector, and others are in the process of developing them.<sup>2</sup>

This report prepared by QUEST and Pollution Probe aims to identify best practices and lessons learned to design and develop Innovation Sandboxes for the energy sector in Canada.

Innovation Sandboxes combine four tools that address regulatory, policy, and procedural barriers to innovation (see figure below). Jurisdictions can choose among the tools, selecting those that meet their specific needs and will help to achieve the desired outcomes.

## The four tools of Innovation Sandboxes



<sup>1</sup> International Energy Agency (July 2020). Clean Energy Innovation. Retrieved from: <https://www.iea.org/reports/clean-energy-innovation>

<sup>2</sup> Belgium, France, Germany, Italy, the Netherlands, Ontario (Canada), Singapore and the United Kingdom have set up energy Innovation Sandboxes. As of June 2020, Austria and Australia are developing them.

An Innovation Sandbox has five benefits. It:

1. Can help remove non-technological barriers to innovation
2. Values learning-by-doing to remove perceived barriers and create pragmatic and practical change
3. Protects consumers
4. Can flexibly work with different forms of energy
5. Promotes collaboration to identify problems and frame solutions.

There is more than one way to run an Innovation Sandbox. First, Innovation Sandboxes are **diverse in who is creating and implementing them**.

They can be developed by governments and regulators — in some cases both — to pursue specific policy outcomes. In one instance, the sandbox was initiated by utilities. Second, Innovation Sandboxes are **diverse in the energy sources** they consider: while the focus has tended to be on the electricity system, some include, or will be expanded to, natural gas. A few have also included transportation and electrical vehicles. Third, Innovation Sandboxes are **diverse in the policy tools** that are associated with them, such as funding, data sharing, and academic research. Finally, they are diverse in the **scope of regulatory trials**.

Based on preliminary assessments conducted in a few jurisdictions, as well as initial results from initiatives already in place, the report highlights six lessons learned for implementing successful Innovation Sandboxes:

#### ► Lesson 1: Prioritize ongoing learning

A key purpose of Innovation Sandboxes is to use what is learned from running them to inform future energy policy and regulatory discussions.

#### ► Lesson 2: Prioritize collaboration, transparency and knowledge sharing

Most Innovation Sandbox initiatives value collaboration and knowledge sharing among multiple traditional and non-traditional energy players. Collaborative mechanisms include co-design of the sandbox framework, transparency requirements, setting committees or working groups, and collaborative trials.

#### ► Lesson 3: Need for a culture of innovation and leadership

Innovation Sandboxes can be successfully designed and implemented only when there is clear leadership and a culture of innovation within the organization establishing the Innovation Sandbox, and impetus from policymakers.

#### ► Lesson 4: Regulators' roles will need to change to be part of the energy future

Regulators need to play a larger role in facilitating innovation and in working with new players in at least two ways:

- + *Developing enquiry services*, which is most crucial for new entrants. Dissociating regulatory activities from guidance activities requires that enquiry services come with some liability considerations.
- + *Engage new stakeholders, and in a different way*. Non-energy traditional players do not speak the regulator's language and feel overwhelmed by the regulatory "machine." Regulators need to rethink the way they engage stakeholders and to be innovative to make the system accessible to each actor. This can be done through one-on-one conversations, market-wide broadcasts and fact sheets, and by making information more easily accessible and legible to everyone. Regulators could even try more innovative engagement methods such as workshops, assemblies or online engagement.

#### ► Lesson 5: Need to promote real innovation that benefits and protects consumers

It is crucial that innovation contributes to the long-term benefit and protection of all consumers. Innovation can lead to territorial and social fragmentation and inequality as well as issues with consumers' privacy and use of personal data. When developing guidelines for Innovation Sandboxes the need to protect consumers needs to be clear. The focus should be on "real innovation" which benefits all, as opposed to cost-shifting between different groups. Successful sandboxes clearly set up criteria that define genuine innovation as well as put in place a sound post-experiment evaluation mechanism.

## ► Lesson 6: Objectives will dictate the design of Sandboxes

The objectives of the Innovation Sandbox will dictate the design. While this seems obvious, the differences between Innovation Sandboxes stem from both the structure of the particular energy market and the objectives the sandbox is to achieve.

The report concludes that Innovation Sandboxes are seen to be an effective tool for ensuring that the energy transition is as fast and effective as possible while protecting those parts of the current system that continue to provide value, and ensuring that durable long-term frameworks for innovation are created.

Canada can benefit from energy Innovation Sandboxes. But a key lesson learned is that there is no “one” type of Innovation Sandbox that will work for the diverse jurisdictions across the country. Developing energy Innovation Sandboxes in Canada means developing a specific sandbox framework that is tailored to each jurisdiction context, and that has been designed and developed by incorporating the inputs and feedback from diverse stakeholders representing the entire energy system, from energy users to new entrants, to utilities; from the regulators to the government. This requires the use of innovative and inclusive engagement processes.

# INTRODUCTION

## CHANGE IS HAPPENING IN CANADA'S ENERGY SYSTEMS

Change has been the one constant in Canada's energy system. We have, in many cases, managed to use those changes to our social and economic benefit by finding new and better ways of doing things and by creating new economic opportunities.

But the changes in the energy sector are currently happening at a much faster pace than ever before.

There are four interrelated reasons for the speed of this energy transition. First, government policies around the world are pushing for a lower-emissions energy system as part of climate change programs. Over 77 countries and 100 cities have declared their intention to be net-zero in emissions by 2050.<sup>3</sup> This is true in Canada at all of our levels of government. The federal government has said it will develop a plan to become net-zero by 2050<sup>4</sup>, which will clearly require a transition to a low-emissions energy system. Innovation will be needed to achieve these emissions reduction-commitments.<sup>5</sup>

Across Canada, over 200 communities, representing more than 50% of the population, have developed a Community Energy Plan (CEP) and more than 300 local governments in every province and territory (representing over 65% of the Canadian population) pledged to reduce their greenhouse gas (GHG) emissions by joining the Federation of Canadian Municipalities' Partners for Climate Protection program.<sup>6</sup> While the effectiveness of such low-zero commitments remains to be seen, it is clear that there is pressure to at least be seen to be acting.

<sup>3</sup> IISD (September 24, 2019). 77 Countries, 100+ Cities Commit to Net Zero Carbon Emissions by 2050 at Climate Summit. Retrieved from <https://sdg.iisd.org/news/77-countries-100-cities-commit-to-net-zero-carbon-emissions-by-2050-at-climate-summit>

<sup>4</sup> Government of Canada (December 20, 2019). Government of Canada releases emissions projections, showing progress towards climate target. Retrieved from: <https://www.canada.ca/en/environment-climate-change/news/2019/12/government-of-canada-releases-emissions-projections-showing-progress-towards-climate-target.html>

<sup>5</sup> International Energy Agency (July 2020). Clean Energy Innovation. Retrieved from: <https://www.iea.org/reports/clean-energy-innovation>

<sup>6</sup> The Partners for Climate Protection is a program run by FCM (<http://www.pcpub.fcm.ca/index.html>)

Second, the economics have flipped and now low-cost renewables are out-competing conventional fossil-fuel generation. In 2019, for example, more than half the renewable electricity capacity deployed globally provided electricity at rates lower than the cost of a new coal-fired power station. The cost declines have been impressive. As an example, between 2010 and 2019, the cost of solar PV declined by over 82%, and onshore wind by 40%.<sup>7</sup> In Canada, a recent report highlighted how renewable energy could provide the same services like natural gas plants at a competitive price.<sup>8</sup>

Third, consumers are now wanting more control over their energy system. While cost continues to be an important decision point, consumers also consider environmental impacts, their perceptions of energy companies, and the protection of their data and privacy, which is threatened by the digitalization of the electricity system. Households and companies are choosing to invest in low-emissions options.<sup>9</sup> Corporations are also responding to consumer sentiments, with over 177 companies pledging to become net zero by 2050, including BP and Microsoft.<sup>10</sup>

Finally, governments are likely to include developing low-emissions energy systems as key components of COVID-19 recovery packages. The European Union has proposed large investments in clean energy as part of its stimulus plan,<sup>11</sup> and other countries are likely to follow.

<sup>7</sup> International Renewable Energy Agency (June 2019). Renewable Power Generation Costs in 2019. Retrieved from: <https://irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>

<sup>8</sup> Jan Gorski and Binu Jeyakumar (2019). Reliable, affordable: The economic case for scaling up clean energy portfolios: A study comparing clean energy portfolios and natural gas for electricity generation. The Pembina Institute. Retrieved from: <https://www.pembina.org/pub/reliable-affordable-economic-case-scaling-clean-energy-portfolios>

<sup>9</sup> Deloitte (2019). Beyond the energy transition: When the demand-side is demanding change. Retrieved from: [http://images.content.deloitte.com.au/Web/DELOITTEAUSTRALIA/%7Be9dbf836-2492-49e8-9eca-204fee0676d3%7D\\_20191009-ene-inbound-beyond-energy-transition-report.pdf](http://images.content.deloitte.com.au/Web/DELOITTEAUSTRALIA/%7Be9dbf836-2492-49e8-9eca-204fee0676d3%7D_20191009-ene-inbound-beyond-energy-transition-report.pdf)

<sup>10</sup> IISD (December 17, 2019). 177 Companies Have Pledged to Reach Net-Zero Emissions by 2050. Retrieved from: <https://sdg.iisd.org/news/177-companies-have-pledged-to-reach-net-zero-emissions-by-2050>

<sup>11</sup> Jennifer Rankin (May 28, 2020). "EU pledges coronavirus recovery plan will not harm climate goals," Guardian. Retrieved from: <https://www.theguardian.com/environment/2020/may/28/eu-pledges-coronavirus-recovery-plan-will-not-harm-climate-goals>



These four factors are driving innovation in every energy sector — including electricity, natural gas, thermal and heating, and in transportation and unregulated fuels.

Yet a significant gap remains, between the pace needed to achieve energy transition and meet carbon reduction targets, on the one hand, and the current pace of innovation and transformation of energy systems on the other.

## **BARRIERS TO CHANGE**

The Generation Energy Council formed by Natural Resources Canada says that an energy transition is already happening. The energy transition is not the future, it is the present.

The International Energy Agency (IEA) says that all the key technologies to reach our targets are known today, but many are not commercially available yet.<sup>12</sup> As such, and while technological improvements, and lower costs, will continue to help drive the energy transition, for the most part, technology is not the barrier to faster innovation.<sup>13</sup> Rather, the barriers are twofold: 1) the way the energy sector itself is structured, organized and regulated, and 2) the need for innovation not in technology but in business models — finding new ways to provide value to consumers through activities such as providing new energy services, enabling new methods, and allowing non-conventional players to play a larger role.

The Council saw innovation, and the need to adopt new ideas, new models, and new technologies as crucial to accelerate and benefit from this transition. According to the Council, getting there will require new rules of the game and new markets.<sup>14</sup>

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<sup>12</sup> International Energy Agency (July 2020). Clean Energy Innovation. Retrieved from: <https://www.iea.org/reports/clean-energy-innovation>

<sup>13</sup> Pollution Probe and QUEST conducted a survey in 2019 of energy experts across Canada. The consensus opinion was that the technology already exists and is not a barrier. See Bruce Cameron, Richard Carlson and James Coons (March 2019). Canada's Energy Transformation - Evolution or Revolution? Pollution Probe and QUEST. Retrieved from: <https://www.pollutionprobe.org/canadas-energy-transformation>

<sup>14</sup> Generation Energy Council (June 2018). Canada's Energy Transition: Getting to Our Energy Future, Together. Generation Energy Council Report. Retrieved from: [https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/CouncilReport\\_june27\\_English\\_Web.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/CouncilReport_june27_English_Web.pdf)

From a survey on innovation of over 45 energy experts in governments, utilities, and regulatory bodies from every Canadian jurisdiction, conducted by Pollution Probe and QUEST, we heard a similar message. There was a strong consensus that the development of low-emission energy resources such as solar power, batteries, electric vehicles (EVs), and hydrogen — especially as they become cost-competitive — would provide significant benefits to all consumers. But Canada's energy regulators, policymakers, and utility leaders were almost unanimous in stating that the current energy policy, market, and regulatory frameworks were not flexible enough and did not easily adapt to managing the kinds of changes coming forward.

The energy regulatory and policy frameworks in Canada are particular to each jurisdiction, yet they are all well established and well understood by those involved. The framework is designed to minimize risk to both energy consumers and the utility. Risk minimization is important as energy is an essential commodity, and ensuring that everyone has access to a reliable energy supply at a fair price is crucial.

Existing energy regulatory and policy frameworks do not always work well with innovation, as we heard in our national survey. They have been established to govern a centralized and hierarchical organization of energy systems. Yet, some new technologies challenge this traditional structure and open up technical possibilities that didn't exist when the frameworks were drawn up decades ago. For example, the electricity distribution system was set up assuming that electricity goes one way — from the power plant to the consumer. The rise of distributed energy resources (DERs), such as solar, challenges that structure by creating “prosumers” who can both produce and consume energy on the same site. Storage — where electricity can flow both ways — further challenges existing frameworks. The complexity increases if we consider that EVs could be used as mobile storage. Siloed energy planning frameworks are also going to be challenged by greater integration between electricity, heating, and transportation with electrification, which is known as sector coupling.

These new technologies not only challenge the physical organization of energy systems, but raise issues around equity, such as ensuring that rates are kept reasonable, as well as entry of non-traditional players on the energy system. Similarly, the integration of digital technologies to monitor DERs creates both new opportunities to organize the grid and challenges around privacy.

There is also a consensus that the current framework overseeing the energy landscape is not agile enough to overcome barriers and not well equipped to cope with uncertainties and unintended consequences that come with changes.

If there is a consensus that innovation is needed, there is also a consensus that the current framework overseeing the energy landscape is not agile enough to overcome barriers and not well equipped to cope with uncertainties and unintended consequences that come with changes. It is not always clear what the best way is for new technology to be integrated into the energy system in a way that provides long-term benefits to everyone — especially the consumer.<sup>15</sup> As a result, we need to look into new frameworks and policy tools for achieving the innovation we need.

## WHAT SHOULD BE DONE TO ACCELERATE THE ENERGY TRANSITION?

Uncertainty about the types of changes and their consequences, and the complexity of managing energy systems, cannot be used as excuses to do nothing. Consumers will continue to adopt new technologies and the pressure to reduce emissions will grow, making the need to prepare for innovation urgent. To a certain extent this is already happening, with both regulated and unregulated energy companies looking into ways they can do things differently and better.

<sup>15</sup> Bruce Cameron, Richard Carlson and James Coons (March 2019). Canada's Energy Transformation - Evolution or Revolution? Pollution Probe and QUEST. Retrieved from: <https://www.pollutionprobe.org/canadas-energy-transformation>

The question then becomes, "What is the best way to integrate innovation into the existing energy policies, markets and regulations, and what needs to change to allow it?" This integration will happen at different levels:

- ✦ At the **system level** — with the integration of different types of energy (such as fossil fuels, renewable energy, and energy efficiency) and of different energy sectors (such as electricity, thermal, and transportation).
- ✦ At the **business model level** — with the integration of new business practices and new services into the energy sector (such as grid orchestration and valuing of DERs for commercial and residential users, of energy efficiency, companies supplying energy services in new ways and DER aggregators).
- ✦ At the **consumer level** — with the integration of new technologies and services that help energy consumers to meet their energy choices and needs while preserving privacy and ensuring equity and fairness.
- ✦ At the **regulatory level** — with the integration of innovation into the regulatory space while protecting all consumers.

In other words, the challenge will be to integrate innovation and allow new services, new entrants and new ways of meeting energy needs without losing what is valuable from the current energy policy and regulatory framework. On the regulatory side, examples of values to preserve are set by the Bonbright principles: rates should be designed fundamentally around principles of fairness, public acceptability and should promote economic efficiency. These principles are fundamental to the energy regulatory system in North America and they can continue to be relevant in the future, with necessary modifications.<sup>16</sup>

Since much of this innovation is likely to come from unregulated companies, energy policy and regulatory changes become even more important. They need to ensure that innovation will be introduced in a way that is balanced and fair for all stakeholders, and that will protect all consumers.

<sup>16</sup> Paul Sommerville, Richard Carlson and Petar Prazic (December 2016). Emerging Energy Trends: Regulatory Responses to Ontario's Energy Future. Mowat Centre, University of Toronto. Retrieved from: [https://munkschool.utoronto.ca/mowatcentre/wp-content/uploads/publications/141\\_emerging\\_energy\\_trends.pdf](https://munkschool.utoronto.ca/mowatcentre/wp-content/uploads/publications/141_emerging_energy_trends.pdf)

Innovation Sandboxes are new, cutting-edge policy tools that have been mobilized to foster innovation in the energy sector. Coming from the FinTech sector and often reduced to regulatory trials, Innovation Sandboxes combine four tools that address regulatory, policy, and procedural barriers to innovation.



**The challenge will be to integrate innovation and allow new services, new entrants and new ways of meeting energy needs without losing what is valuable from the current energy policy and regulatory framework.**



Pollution Probe and QUEST are undertaking a project examining how Innovation Sandboxes have worked in other jurisdictions. This research, informed through a literature review, jurisdiction scans and interviews with six of the nine international regulators that have developed or are developing sandboxes, identifying best practices and lessons learned to design and develop Innovation Sandboxes in Canada.

## WHAT ARE INNOVATION SANDBOXES?

Innovation Sandboxes are policy tools that use collaboration to create conditions for a safe and controlled space in which new energy products, services, and business models can be tested in a real-world environment. Innovation Sandboxes have become an increasingly common way of trialing innovation in energy systems. They provide the opportunity to change how processes, procedures, policies, rules or regulations are applied in a controlled manner, with the ultimate goal of creating durable and lasting systemic change to enable innovations that benefit the energy sector, consumers, and society.

This section presents the origin of sandboxes, their application in the energy sector, and their benefits.

### ORIGIN OF INNOVATION SANDBOXES

Starting in the 2010s, the rise of disruptive innovation in the financial technology space (FinTech) led to many countries looking into changing regulatory and institutional structures to create “safe spaces” for innovation. At the same time, in the aftermath of the 2008 financial crisis, financial regulators were also concerned with consumer protection and preventing the propagation of systemic disruption into the financial system. It is from these two considerations that financial regulators developed innovative policy tools for regulatory innovation in the FinTech sector.

It was quickly realized that not all, or even most, barriers to innovation were due to regulatory constraints. So while the framework for sandboxes is often reduced to the idea of regulatory trials, many jurisdictions have moved beyond a mere regulatory exemption-led trial approach to encompass mechanisms of collaboration, learning, and information sharing that address both regulatory and policy issues. For example, the first sandboxes in the FinTech sector included Innovation Hubs. Innovation Hubs provide a dedicated contact point for innovators to discuss potential projects with regulatory authorities and how they would or would not fit within the current regulatory framework. The goals of Innovation Hubs are dialogue and opening up the regulatory authority to those who do not generally deal with it.<sup>17</sup>

The UK Financial Conduct Authority started the first FinTech sandbox in 2016. Since the UK’s sandbox launch, over 50 countries have developed or announced they will develop a FinTech sandbox.<sup>18</sup>

<sup>17</sup> European Banking Authority (2018). FinTech: Regulatory sandboxes and innovation hubs. Retrieved from: <https://eba.europa.eu/sites/default/documents/files/documents/10180/2545547/154a7ccb-06de-4514-a1e3-0d063b5edb46/JC%202018%2074%20Joint%20Report%20on%20Regulatory%20Sandboxes%20and%20Innovation%20Hubs.pdf>

<sup>18</sup> Ross Buckley, Douglas Arner, Robin Veidt, and Dirk Zetzsche (2019). “Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond.” EBI Working Paper Series 2019, No. 53. Retrieved from: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3455872](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455872)



Following on from the success and interest of Innovation Sandboxes in the FinTech and other sectors, the idea of developing places for innovation spread to the energy sector. Innovation is seen as key to achieving a sustainable energy future. Innovation Sandboxes are considered an efficient policy tool to bring innovation to the sector quickly enough to meet our goals. Innovation Sandboxes foster a collaborative approach and generate learning that can be used to identify policies and other institutional solutions that enable innovators and investors while protecting consumers.<sup>19</sup>

The IEA's International Smart Grids Action Network (ISGAN) is supportive of Innovation Sandboxes as well, saying that the changes necessary to the energy transition could be accelerated through their use.<sup>20</sup>

European energy regulators said in a report on meeting future decarbonization goals that new assets and activities should be facilitated using a sandbox model at the EU level to ensure there is no risk to the wider energy market. Collaboration and information sharing among jurisdictions will help promote the lessons learned.<sup>21</sup>

The need to broaden the scope of the sandbox framework “beyond the regulatory” is particularly acute in their application in the energy sector. Given that each jurisdiction has its own unique barriers to innovation, we have found that each jurisdiction has its own version of a sandbox that combines different elements of Innovation Hubs, Enquiry Services and Regulatory Trials, not all of which focus exclusively on the regulated sectors.

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<sup>19</sup> World Economic Forum (May 2018). Accelerating Sustainable Energy Innovation. Retrieved from: [http://www3.weforum.org/docs/Accelerating\\_sustainable\\_energy\\_innovation\\_2018.pdf](http://www3.weforum.org/docs/Accelerating_sustainable_energy_innovation_2018.pdf)

<sup>20</sup> International Smart Grids Action Network (May 2019). Policy messages on Innovative Regulatory Approaches with Focus on Experimental Sandboxes to Enable Smart Grid Deployment. Retrieved from: <https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN-Policy-Messages-on-Sandboxes-to-the-Clean-Energy-Ministerial.pdf>

<sup>21</sup> Agency for the Cooperation of Energy Regulators and Council of European Energy Regulators (November 19, 2019). The Bridge Beyond 2025: Conclusions Paper. Retrieved from: [https://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/SD\\_The%20Bridge%20beyond%202025/The%20Bridge%20Beyond%202025\\_Conclusion%20Paper.pdf](https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/SD_The%20Bridge%20beyond%202025/The%20Bridge%20Beyond%202025_Conclusion%20Paper.pdf)

## DIFFERENCE BETWEEN INNOVATION SANDBOXES AND PILOT PROJECTS

Innovation Sandboxes differ from research and development (R&D) programs in that R&D is concerned with proving feasibility or technical demonstration. Innovation Sandboxes are not about proving feasibility, they examine integration and how the project would interact with the energy system.

Similarly, Innovation Sandboxes differ from a pilot project. A pilot project is a one-off project that usually receives public funding and is used to demonstrate whether a new technology works. The primary focus of pilot projects is technology and the assumption is that the market will adopt this technology on its own once the technology is proven to work. Policy and regulatory barriers are not addressed.

Innovation Sandboxes aim to change the system to enable innovation. Deploying Innovation Sandboxes is a process of learning and engagement that is primarily focused on innovative services and business models.

By helping innovators overcome perceived regulatory or procedural barriers, or by temporarily changing or adapting rules and regulations to enable experiments, Innovation Sandboxes generate new knowledge to both inform innovators and policymakers. Innovators gain knowledge of what they can or cannot do in the current system and policymakers better understand how things can be permanently changed in the system to facilitate innovation for the long-term, beyond a one-off pilot or demonstration project.

An Innovation Sandbox is a process that looks to create durable solutions and lasting change where innovation can be more widely disseminated and in a way to benefit all consumers.



## ENERGY INNOVATION SANDBOXES

Innovation Sandboxes are about promoting innovation in a broad sense. Technological innovation, such as new technologies, or an innovative method of deploying or integrating new or existing technologies, is only one aspect of innovation. Most of the focus of Innovation Sandboxes is on two other types of innovation: business model innovations and social or processual innovations.

Business model innovation describes a change in how an organization delivers value to customers and transforms its operating model through the development of new revenue streams or distribution channels. Social or processual innovation is concerned with how end-users interact with energy and the difference in routines.<sup>22</sup>

Innovation Sandboxes are implemented for creating long-term changes to the energy system to enable innovation that benefits all consumers. Innovation Sandboxes are a process of engagement and inquiry and collaborative discussion that leads to durable innovation, and a process that can use different tools, not just Innovation Hubs or Regulatory Trials. As such, no two Innovation Sandboxes are alike and different jurisdictions will use different tools to achieve the outcomes needed. The one constant is that all of them aim to foster change in energy systems through innovation.

Many countries, primarily in Europe, have already developed Innovation Sandboxes. These countries include Belgium, France, Germany, Italy, the Netherlands, Ontario (Canada), Singapore, and the United Kingdom (see [Appendix A](#)). Other countries are in the process of establishing Innovation Sandboxes, as of June 2020, including Austria and Australia (see [Appendix B](#)).

Innovation Sandboxes in the energy sector have been broadly developed to accelerate innovation in technologies, services, and business models; however, the reasons for encouraging innovation will vary depending on the jurisdiction (see

[Sidebar C](#) below). Generally jurisdictions have the following main objectives when implementing the Innovation Sandbox:

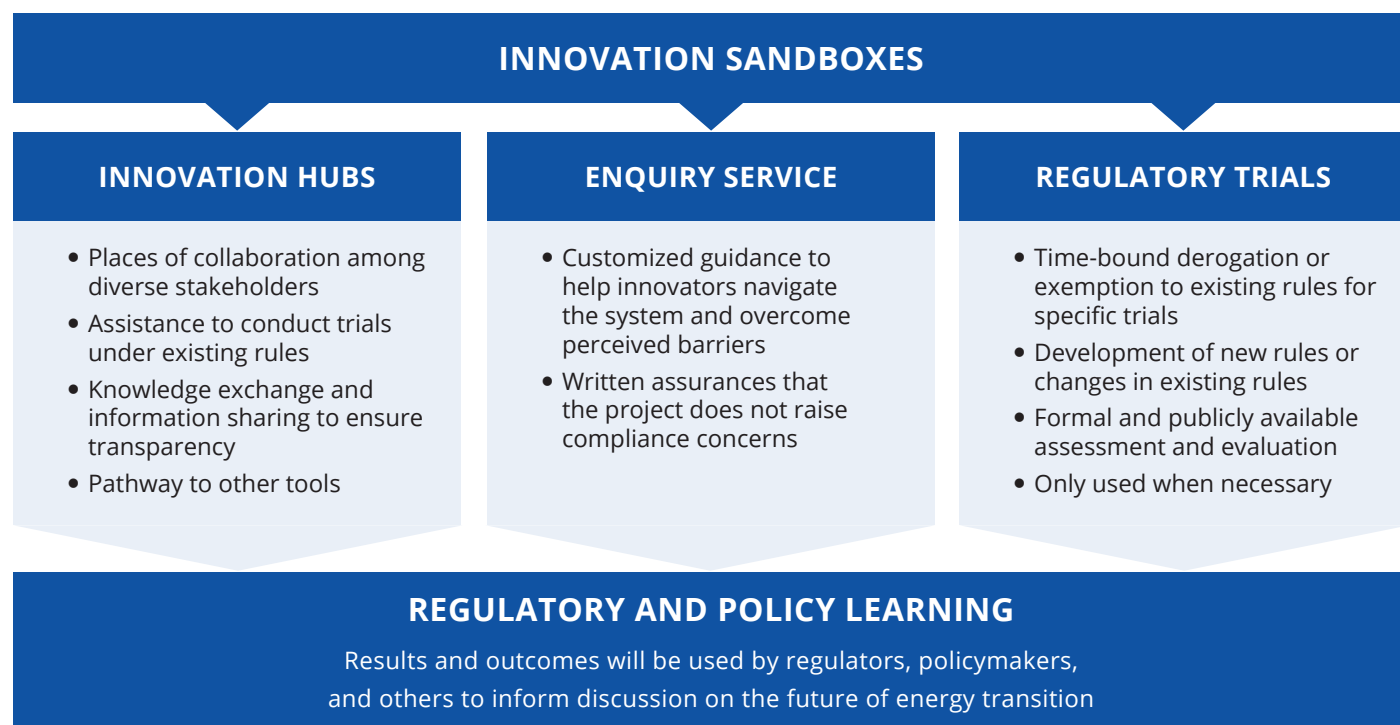
- ✦ Supporting market development and enhancing competition
- ✦ Enabling market entry by non-traditional players
- ✦ Promoting economic growth and job creation
- ✦ Protecting consumers benefits
- ✦ Enhancing grid functions
- ✦ Accelerating energy transition in the context of climate change.

[Sidebar B](#) contains more examples of projects implemented.

There are four tools employed in Innovation Sandboxes (see Figure 1 on the next page). Innovation Sandboxes do not need to contain all four elements. When developing an Innovation Sandbox, jurisdictions can choose among the tools, selecting those that meet their specific needs and will help to achieve the desired outcomes.

<sup>22</sup> F.R. Westley and J.W. McConnell. (2010). Making a Difference Strategies for Scaling Social Innovation for Greater Impact. The Innovation Journal: The Public Sector Innovation Journal, Vol. 15(2), article 2.

Figure 1: The four tools of Innovation Sandboxes



**Innovation Hubs** employ collaborative tools or platforms that enable knowledge exchange and sharing of lessons learned among innovators and other stakeholders, and general information about regulatory systems for conducting trials.

**Enquiry Services** provide innovators with more specific information relevant to their particular idea. In particular, innovators may have informal discussions with the Innovation Sandbox administrator and have ideas assessed. This may help to uncover situations where ideas may be permissible within existing regulations, in other words, if the regulatory barrier is more perceived than actual. Alternatively, an assessment may identify real regulatory barriers and if a Regulatory Trial is needed. It should be noted that this does not replace legal advice.

**Regulatory Trials** may be used in cases where an innovative idea faces a real regulatory barrier. Time-bound exemptions and derogations from regulations (such as licensing requirements, reporting requirements, etc.) may be applied to enable a trial under specific conditions. The length of exemptions and derogations varies, often case-by-case, and can last two years (as was the case in the UK) or up to 10 years (as is the case in the Netherlands), with possibilities for extension.

Ensuring customer protection underlies all approvals for experiments under regulatory trials, with potentially impacted customers and risk identified, and mitigation and exit strategies in place. Additionally, regulatory trials come with a series of criteria that determine who and how one is eligible to enter that experimental space. These criteria include the area of the systems that experiments will be deployed in, the geographical scope of the experiments, eligible participants, and monitoring and regular reporting requirements to sandbox administrators.

**Regulatory and Policy Learning** should be taken from all other elements — Innovation Hubs, Enquiry Services, and Regulatory Trials — and be used to inform longer-term policies and regulatory processes. Using real-world information would allow regulators, policymakers and other stakeholders to better prepare for the future of energy in their jurisdiction.

Each tool facilitates innovation differently, and it is not necessary for all tools to exist in an Innovation Sandbox. Different jurisdictions will choose different elements to meet their particular needs. Depending on the structure and context of the jurisdiction, Innovation Hubs may be more helpful to innovators than Regulatory Trials or vice versa.

The tools found in Innovation Sandboxes from different jurisdictions can be seen in Table 1 below. What is included should ultimately depend on what best addresses the needs of innovators.

**Table 1** – The combination of the four tools of Innovation Sandboxes in different jurisdictions

Innovation Sandbox Jurisdiction	Innovation Hubs	Enquiry Service	Regulatory Trials	Regulatory and Policy Learning
Australia*	☑	☑	☑	☑
Austria*	☑	☑	☑	☑
Belgium	☑			
France			☑	☑
Germany			☑	☑
Italy	☑		☑	☑
Netherlands			☑	☑
Ontario		☑	☑	
Singapore		☑	☑	
United Kingdom	☑	☑	☑	☑

\* *Innovation Sandboxes that are currently in development*



## EXAMPLES OF PROJECTS DEVELOPED USING INNOVATION SANDBOXES

There is a wide diversity in the kinds of projects that can occur under Innovation Sandboxes. Below are some examples from Germany, the UK, the Netherlands, and Italy where derogations using Regulatory Trials were needed to realize the projects.

### GERMANY

**C/SELLS** is a local energy market in the states of Baden-Württemberg, Bavaria and Hesse that uses solar energy and involves 30 million residents, 800,000 active prosumers, and 2,000 controllable facilities to increase flexibility in the electricity system.

Source: <http://www.csells.net>

**WINDNODE** is a project in five eastern German states that looks to combine renewable generation and flexibility through digital networking, and exploring different market and business models.

Source: <http://www.windnode.de>

### UNITED KINGDOM

**Chase Community Solar** project has fitted solar panels to council-owned homes and uses solar, storage and smart meters and devices to automate tariff selection, and lowering costs by automatically choosing when to export to the grid.

Source: <http://chasesolar.org.uk>

**OVO Energy** is testing a smart tariff that uses smart devices and smart heating to provide grid balancing services.

Source: <http://www.ovoenergy.com>

### NETHERLANDS

**Villa de Verademing**, an apartment complex in The Hague, has become energy neutral with the installation of heat pumps, solar hot water, solar PV, a wind turbine, storage and a smart grid system.

Source: <http://www.villadeverademing.nl>

**Amersfoort Duurzame Stad** uses blockchain and smart grid to organize energy trading among 820 households and a sports complex.

Source: <http://www.amersfoortduurzamestad.nl/eemstroom-energiecooperatie-amersfoort>

### ITALY

**Flexibility and demand response project** is a national trial lowering the threshold for generators to participate in the ancillary market from 10 MVA to 1 MW, and to allow renewable generation to participate, which previously wasn't allowed. Renewable generation under 1 MW is also allowed to participate in the ancillary market provided that it is aggregated.

Source: [https://www.iea-iscan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-iscan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)



## BENEFITS OF INNOVATION SANDBOXES

The increasing interest in energy Innovation Sandboxes can be explained by the multiple benefits of this policy tool compared with other tools. While intertwined with one other, we can distinguish the five following benefits.

### 1. Can help remove non-technological barriers to innovation

Innovation Sandboxes have been developed and implemented in many jurisdictions under the realization that policies focusing on technological innovations alone have not been sufficient to foster their diffusion and that new mechanisms were needed to create favourable conditions to the adoption of technological innovation.

Technological and digital innovations are entering energy systems that were not designed for them. They face multiple barriers to diffusion that are not related to their technological performance, such as regulatory, institutional, governance, cultural, or economic barriers. Once the feasibility of technological innovation has been proven, there needs to be policy tools that create the conditions to nurture and deploy that innovation.

Innovation Sandboxes enable innovators, utilities, and other stakeholders in the energy space to identify a range of non-technological barriers (from regulation and policy to procedures and culture) and to experiment with new business models and energy services to address them by temporarily testing new ways of doing things, including changing regulations. The intent is both to learn from these experiments to inform permanent changes, and to protect consumers.

### 2. Values learning-by-doing to remove perceived barriers and create pragmatic and practical change

Innovation Sandboxes are policy tools that value learning in two ways. Firstly, Innovation Sandboxes enable innovators to clarify what they can and cannot do in the existing system and to identify perceived versus actual barriers. As discussed below in section entitled [Lessons learned for successful Innovation Sandboxes](#), a key learning of energy sandboxes is that the perception of barriers is more of a deterrent to innovation than

actual barriers. An Innovation Sandbox can help dispel these perceived barriers transparently and collaboratively and can enable all the energy players to learn how to navigate the current system together.



**An Innovation Sandbox can help dispel these perceived barriers transparently and collaboratively and can enable all the energy players to learn how to navigate the current system together.**



Secondly, Innovation Sandboxes enable regulators and policymakers to inform the change, retirement, or adoption of regulation and policies by using lessons learned from real-world experiments. Regulatory trials are conducted in the real energy system, but in a controlled manner. The outcomes of these experiments can be used to provide evidence of what does or does not work to overcome identified barriers, and to inform decision-makers and regulators on needed changes in existing rules, regulations, or policies. Innovation Sandboxes thus act as a proof of concept for adopting new rules, regulations, policies, and processes.

### 3. Protects consumers

Because of their focus on learning through time-bound experiments, Innovation Sandboxes are policy tools that have the potential to protect consumers and mitigate risks. The major challenge when introducing new rules or policies to scale up innovation is to do so in a manner that does not create unintended and uncontrolled consequences that can harm consumers (with increases in energy rates) or the entire systems (privacy issues or reliability).

Regulatory trials provide that safe space for testing innovation, one that is controlled by being time-bound and limited in scope. By being time-bound, there is always an exit strategy in case of failure. In addition, the eligibility criteria could ensure that projects that could potentially lead to cost-shifting between customers are excluded.

The section below entitled [Diversity in the scope of regulatory trials](#) details these criteria further.

#### **4. Can flexibly work with different forms of energy**

Another benefit of Innovation Sandboxes is flexibility. They can be implemented in different sectors of the energy system such as in the electricity sector, the natural gas sector, the transportation sector, and/or in all sectors at the same time.

Innovation Sandboxes have been used in the transportation sector, especially around EVs, and have the potential to be used to test new types of fuel, such as renewable fuels.

The main focus of applying Innovation Sandboxes in electricity systems has been on the four following areas:

- 1. Development of distributed energy and community energy through DERs and smart grids**, and the involvement of prosumers, connected energy consumers, and community actors such as energy and housing cooperatives, building owners, and municipalities, among others.
- 2. Development of grid stabilization and orchestration systems** to integrate increasing renewable energy from large and distributed generation through digitization of the grid (e.g. experimentation of new consumer-centric applications), new energy services such as valuation of DERs through a user-centric application, or aggregation, and grid optimization.
- 3. Integration of new entrants and non-traditional energy players** such as community energy groups, innovators, digital companies, research organizations, and academia.
- 4. Rate structure and rate incentives** to encourage new low-emissions forms of energy supply through rate design, new market designs, or the more efficient use of energy.

#### **5. Promotes collaboration to identify problems and frame solutions.**

Based on our research, Innovation Sandboxes are spaces where policymakers from all levels of government, regulators, utilities, industry, innovators, small business, civil society, and energy consumers can collaborate to establish a shared and transparent framework to experiment with new services and business models.

Collaboration among these different groups will help ensure that innovation can benefit multiple groups. It will also allow for greater buy-in, and to help ensure that any policy changes and innovations can provide short and long-term benefits.



## DRIVERS FOR INNOVATION SANDBOXES IN THE ENERGY SECTOR

Jurisdictions have many reasons for developing Innovation Sandboxes.

Often the initiative under which the Innovation Sandbox falls is national in scope. For example, the “Smart Energy Showcases — Digital Agenda for the Energy Transition” programme (SINTEG) in Germany exists under the broader context of the “Digital Agenda.” The Digital Agenda aims to digitize Germany’s economy more broadly through a comprehensive suite of legal and regulatory reforms for the establishment of digital platforms. SINTEG is the energy component of the larger initiative.<sup>23</sup> Similarly Energie.Frei.Raum in Austria is just one of 12 flagship projects of the #Mission 2030 Austrian Climate and Energy Strategy to achieve greenhouse gas emissions targets. Other projects for #Mission 2030 include building energy infrastructure, green financing, and awareness-building campaigns.<sup>24</sup>

In comparison, Innovation Sandboxes can be components of regulatory reform. In Singapore, the Energy Market Authority (EMA) sandbox is part of the EMA’s broader efforts and mandate to promote innovation. The sandbox runs alongside other energy market and regulatory reforms, such as the recent electricity market liberalization<sup>25</sup> or demand response programming.<sup>26</sup>

In some cases, the objectives of Innovation Sandboxes change over time. The UK’s Innovation Link and regulatory trial initiatives were developed internally at Ofgem, the energy regulator, due to barriers observed in promoting new business models, particularly as non-traditional market players wished to enter the market and bundle typically separated services. Allowing these innovations was seen as benefiting consumers by giving them more choice.

Subsequently, the UK government committed to becoming net-zero by 2050, and Ofgem has developed a Decarbonisation Action Plan looking at areas where it can help meet the government’s objectives. Innovation is part of that. As Ofgem now sees “that decarbonizing at the lowest cost to consumers goes hand-in-hand with protecting consumers and enabling competition and innovation” as key, and that innovation will make achieving net zero at a low cost more likely, Innovation Link has become part of this new plan.<sup>27</sup>

Below we identify the varying objectives of Innovation Sandboxes that have been developed or are in the advanced stage of development.<sup>28</sup>

Photo by Vined on Pixabay

<sup>23</sup> German Federal Ministry for Economic Affairs and Energy (2017). White Paper Digital Platforms: Digital regulatory policy for growth, innovation, competition and participation. Retrieved from: [https://www.bmwi.de/Redaktion/EN/Publikationen/white-paper.pdf?\\_\\_blob=publicationFile&v=2](https://www.bmwi.de/Redaktion/EN/Publikationen/white-paper.pdf?__blob=publicationFile&v=2)

<sup>24</sup> FFG (2019). Energie.Frei.Raum. Retrieved from: <https://www.ffg.at/Energie.Frei.Raum>; Austrian Federal Ministry for Sustainability and Tourism & Austrian Federal Ministry for Transport, Innovation and Technology. (2018, September). #Mission 2030 - Austrian Climate and Energy Strategy. Retrieved from: <https://www.bmlrt.gv.at/service/publikationen/umwelt/mission-2030-austrian-climate-and-energy-strategy.html>

<sup>25</sup> Energy Market Authority of Singapore (n.d.). Liberalisation of Retail Electricity Market. Retrieved from: [https://www.ema.gov.sg/Electricity\\_Market\\_Liberalisation.aspx](https://www.ema.gov.sg/Electricity_Market_Liberalisation.aspx)

<sup>26</sup> Energy Market Authority of Singapore (n.d.). Demand Response Programme. Retrieved from: [https://www.ema.gov.sg/Demand\\_Response\\_Program.aspx](https://www.ema.gov.sg/Demand_Response_Program.aspx)

<sup>27</sup> Ofgem (February 2020). Ofgem Decarbonisation Programme Action Plan. Retrieved from: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

<sup>28</sup> Sources and further discussions of these Innovation Sandboxes are available in [Appendix A](#) and [Appendix B](#)



Table 2 – Stated objectives of Innovation Sandboxes

Innovation Sandbox Jurisdiction	Stated Objective(s)	Focus
Australia*	“The introduction of a regulatory sandbox toolkit aims to make it easier for businesses to develop and trial innovative energy technologies and business models. Innovation in the energy sector can lead to better services and lower costs for consumers. It is important that the regulatory framework supports emerging technologies and business models that have the potential to deliver these benefits to consumers.” <sup>29</sup>	Business model transformation and economic development
Austria*	The Sandbox intends to support the main goals of the national climate and energy strategy #mission2030 and the National Energy and Climate Plan (NECP) for the period 2021-2030. <sup>30</sup>	Reducing GHG emissions
Belgium	“To facilitate the development of new energy services by market parties to drive the power system towards consumer centricity.” <sup>31</sup>	Business model transformation
France	<p>To advance the national energy policy as defined in the article L101.1 of the Energy Act (modified in 2015):</p> <ul style="list-style-type: none"> <li>+ Building a competitive economy conducive to job creation, especially through green growth.</li> <li>+ Securing energy supply and reducing dependence on energy importation.</li> <li>+ Maintaining competitive and attractive energy prices compared to international prices.</li> <li>+ Preserving human health and the environment including fighting the impact of greenhouse gases.</li> <li>+ Protecting social and territorial cohesion by ensuring the right to energy access for all households without excessive costs irrespective of their resources.</li> <li>+ Combatting energy poverty.</li> <li>+ Contributing to the implementation of an EU of energy, based on supply security and building a decarbonized and competitive economy.<sup>32</sup></li> </ul>	Reducing GHG emissions and business model transformation

<sup>29</sup> Australia Energy Market Commission (2019). Recommended Revisions to Energy Laws. Retrieved from: [https://www.aemc.gov.au/sites/default/files/documents/regulatory\\_sandboxes\\_-\\_draft\\_rules\\_for\\_consultation\\_-\\_epr0079.pdf](https://www.aemc.gov.au/sites/default/files/documents/regulatory_sandboxes_-_draft_rules_for_consultation_-_epr0079.pdf)

<sup>30</sup> FRESCH (May 22, 2020). Freiraum für Regulatorisches Experimentieren Schaffen Projektendbericht Mai 2020. Retrieved from: <https://www.bmlrt.gv.at/umwelt/energiewende/Energie.Frei.Raum--Experimentierraume-im-Energiebereich.html>

<sup>31</sup> For more information see the IO.Energy webpage: <https://www.ioenergy.eu>

<sup>32</sup> Government of France (August 17, 2015). LOI n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte - Article 1. Retrieved from: <https://www.legifrance.gouv.fr>

Germany	<p>The objectives of SINTEG are to develop and demonstrate scalable solutions for meeting the technical, economic and regulatory challenges of the energy transition through five showcases. The program focuses on enabling secure, efficient and mass market-enabled processes, and developing innovative technologies and market mechanisms for creating flexible and smart grids and markets to:</p> <ul style="list-style-type: none"> <li>+ Guarantee the secure and efficient grid operation at high levels of renewables.</li> <li>+ Harness the potential for greater efficiency and flexibility (in terms of markets and grids).</li> <li>+ Ensure that all players of the smart energy system work together in an efficient and secure manner.</li> <li>+ Make more efficient use of existing grid structures</li> <li>+ Reduce the need for grid expansion at the level of distribution grids.</li> </ul> <p>The results from these real-world projects will provide evidence to inform future development of the legal framework.<sup>33</sup></p>	Business model transformation and economic development
Italy	<p>ARERA supports innovation to improve the energy systems and customer experience.<sup>34</sup> Much of the push for innovation comes from the extremely rapid uptake in wind and solar generation over the past decade and the introduction of smart meters, and the need to ensure better regulatory, policy and market integration.<sup>35</sup></p>	Energy systems optimization and customer benefits
Netherlands	<p>To stimulate more renewable energy at the local level and more involvement of consumers in meeting their energy needs through:</p> <ul style="list-style-type: none"> <li>+ <b>New generation sources:</b> Increase renewable energy generation and CHP at the local level.</li> <li>+ <b>New services and business-models:</b> More efficient use of the existing energy infrastructure (enhancing integration and sector coupling).</li> <li>+ <b>New practices:</b> Increase involvement of energy consumers with their own energy supply.<sup>36</sup></li> </ul>	Business model transformation and economic development
Ontario	<p>The sandbox is to promote the development of “energy-related projects that show clear potential for benefit to consumers – whether in the form of long-term economic efficiencies, cost performance improvement, service enhancements or other ways”.<sup>37</sup></p>	Energy systems optimization and customer benefits

<sup>33</sup> Federal Ministry for Economic Affairs and Energy (February 2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future, p. 7. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf)

<sup>34</sup> ARERA (2019). “Sostenere l’innovazione con sperimentazioni e ricerche.” Quadro strategico 2019-2021. Retrieved from: [https://www.arera.it/it/quadrostrategico/1921\\_OS4.htm](https://www.arera.it/it/quadrostrategico/1921_OS4.htm)

<sup>35</sup> Interview with ARERA.

<sup>36</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

<sup>37</sup> Ontario Energy Board (2019). What is the OEB Innovation Sandbox? Retrieved from: [https://www.oeb.ca/\\_html/sandbox/index.php#popup1](https://www.oeb.ca/_html/sandbox/index.php#popup1)

Singapore	<ul style="list-style-type: none"> <li>✚ Allow industry to test new products and services while providing consumer/market safeguards</li> <li>✚ Provide an avenue for the Energy Market Authority to review existing regulations.</li> </ul>	Business model transformation and economic development
United Kingdom	To support innovation and experimentation, particularly in the retail market, to create low carbon products and services that will directly benefit consumers. <sup>38</sup>	Energy systems optimization and customer benefits

*\*Components of planned Innovation Sandboxes that are currently in development.*

<sup>38</sup> Ofgem (February 2020). Ofgem Decarbonisation Programme Action Plan. Retrieved from: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

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# THERE IS MORE THAN ONE WAY TO RUN AN INNOVATION SANDBOX

The previous section described the commonalities of Innovation Sandboxes in the energy sector. This section focuses on the variations of implementation. Indeed, there is no “one” Innovation Sandbox. Development and implementation are unique and based on local conditions. We can no more copy an Innovation Sandbox than we can copy any other policy, but we can learn from how others have created and applied them.

## DIVERSITY IN WHO IS CREATING AND IMPLEMENTING A SANDBOX

Innovation Sandboxes are not necessarily the prerogative of energy regulators. As explained above in the section entitled [What are Innovation Sandboxes?](#), they are foremost a policy tool that is used by governments and regulators, to pursue specific policy outcomes (see [Table 3](#)).

Innovation Sandboxes generally include Regulatory Trials, where regulators provide derogations and exemptions for specific circumstances. Regulators are empowered to provide such derogations and exemptions either because:

- ✚ The legislation already existed and the regulator mobilized this power to create sandboxes. This was the case in Italy, the UK, Singapore, the Netherlands, and Ontario. In all these cases, the government explicitly or implicitly supported the regulator’s initiative to establish a sandbox.
- ✚ The legislator adopted a new piece of legislation that enables the regulator to create a sandbox. This is the case in Austria, Germany, and Australia. Or in the case of France, where the regulator proposed that the government introduce a sandbox in the new *Energy Act*.

In a few cases only, the sandbox is administered and implemented solely by the regulator, such as in Italy and the UK. In Australia, two regulators

may be involved. For example, the Australian Energy Regulator (AER) will be in charge of the innovation enquiry services and granting specific exemption and waivers, while the Australian Energy Market Commission (AEMC) will be in charge of temporarily changing existing rules or introducing a new rule of limited application to allow a trial to go ahead.

In some cases, there is a strong involvement of the executive power in the oversight and implementation of the sandbox. In the Netherlands, the sandbox is administered by the Ministry of Economic Affairs and Climate Policy with advice and monitoring from the regulator. In France, the sandbox initiative introduces the possibility that once a project is approved by the regulator, the ministry in charge of energy, and in some instances, the ministry in charge of consumption, can oppose part or all the derogation within two months. In Austria, the government commissioned FFG (*Forschungsförderungsgesellschaft*, the Austrian Research Promotion Agency, the public body in charge of administering publicly funded research) to administer the sandbox. FFG will look at whether or not projects qualify for sandbox and E-Control, the regulator, will look at regulatory issues and provide an exemption for selected projects. In Germany, the federal government adopted the SINTEG Ordinance with fixed-term “experimental options” that can only apply to five showcases regions.

In only one instance, the Belgium initiative, the sandbox was initiated by a consortium of system operators with the help of an innovator service company. The focus of this utility-led initiative is to develop new energy services with viable business cases, and there is no focus on regulation or policy changes.

Table 3 – Who initiates and administers sandboxes<sup>39</sup>

Country	Initiated by	Initiation	Administration
Australia <sup>40</sup> (under development)	Government	The Council of Australian Governments (COAG) energy ministers tasked the Australian Energy Market Commission (AEMC) to develop an Innovation Sandbox. Innovation Sandboxes were recommended in the government's Independent Review into the Future Security of the National Electricity Market (Finkel Review). The required legislative changes are still going through the relevant parliaments.	The Innovation Sandbox will be spread between two regulators. The Australian Energy Regulator (AER) will be in charge of the innovation enquiry services and regulatory trials. The Australian Energy Market Commission (AEMC) will be in charge of temporarily changing existing rules or temporarily introducing a new rule of limited application to allow a trial to go ahead.
Austria (under development)	Government	A project of the <i>Bundesministeriums für Klimaschutz, Umwelt, Mobilität, Innovation und Technologie</i> (Ministry of Climate Protection, Environment, Mobility, Innovation and Technology) and administered by FFG ( <i>Forschungsförderungsgesellschaft</i> , the Austrian Research Promotion Agency). The project came from #mission2030, the Austrian climate and energy strategy, where research innovation was one of the pillars.	FFG is the administrator of the project under the direction of the Government. E-Control, the regulator, is part of discussions and will be more involved during implementation. In implementation, FFG will look at whether projects qualify for the sandbox or not, while E-Control will look at the regulatory issues and provide exemptions as required.
Belgium	Other	A consortium of Belgium transmission and distribution system operators (Elia, Fluvius, Ores, Resa, Sibelga) with the help of Co.Station, an entrepreneur/innovator service company.	Administered by Co.Station on behalf of the consortium's members.

<sup>39</sup> Sources and further discussions of these Innovation Sandboxes are available in [Appendix A](#) and [Appendix B](#).

<sup>40</sup> For Australia, the sandbox only applies to the National Electricity Market, and not to the other electricity markets.

France	Government	<p>The regulator proposed that the government introduce a sandbox mechanism. The French government adopted the Energy and Climate Act on November 8, 2019. Article 61 of the new act introduces the possibility to use sandboxes (« <i>bac à sable réglementaire</i> »). The article authorizes the regulator — Commission de Régulation de l'Énergie (CRE) — to set derogations to the conditions of use, access, and connection to the electricity and natural grid, to enable the implementation of innovative projects.</p>	<p>The CRE will be in charge of launching and managing the intakes and selecting projects. Once a project is approved by the CRE, the energy ministry, and in some instances, the ministry in charge of consumption and can oppose the derogation within two months.</p>
Germany	Government	<p>The sandbox is part of a larger program entitled “Smart energy showcase – digital agenda for the energy transition” that aims to address technical, economic, and legal barriers in the energy sector. On the energy side, public funding is provided to five regions, known as “showcase regions,” to develop various innovative projects with reduced economic risk for proponents. The regions were pre-selected through a competition before the program launch.</p>	<p><i>Project Management Jülich</i> (PtJ, a federal agency) is in charge of managing project funding and support for the programme. Funding is provided by the Federal Ministry for Economic Affairs and Energy (BMWi).</p>
Italy	Government	<p>In 2009, the Dutch government enabled the development of 12 smart grid pilot projects, which were developed by large distribution system operators. The Sandbox leveraged a specific article of the Electricity Act (1998) that authorizes derogation for experiments under specified conditions for a particular target group of homeowners associations (HOAs) and cooperatives.</p>	<p>The Ministry of Economic Affairs and Climate Policy supervises the initiative and exemptions have to be granted by two agencies: the Netherlands Enterprise Agency (<i>Rijksdienst voor ondernemend Nederland</i>, RVO) and the Authority for Consumers and Markets (ACM, <i>Autoriteit Consument &amp; Markt</i>).</p>

Ontario (Canada)	Regulator	The idea for a sandbox was developed by the Advisory Committee on Innovation to the Ontario Energy Board (OEB), the energy regulator.	The OEB administers the sandbox and provides exemptions.
Singapore	Regulator	The Energy Market Authority started the sandbox program, as it has the ability to create regulations and apply exemptions to codes of practice, market rules and gas and electricity licensing conditions.	The Energy Market Authority administers the sandbox.
United Kingdom	Regulator	Innovation Link was developed internally at the Office of Gas and Electricity Markets (Ofgem, the energy regulator for Great Britain <sup>41</sup> ) and supported by internal leadership.	Ofgem administers the sandbox and provides exemptions.

<sup>41</sup> Ofgem regulates the energy networks in Great Britain. Northern Ireland has its own energy regulator and is part of the All-Island Grid with the Republic of Ireland. As such, Innovation Link only applies to Great Britain.



## DIVERSITY OF ENERGY SOURCES

While the focus of energy Innovation Sandboxes has tended to be on the electricity system, they can be applied to different systems.

Only Belgium's and Germany's initiatives did not include the natural gas sector and focused solely on electricity. In the case of the UK, Singapore, and Ontario, the scope of application of Innovation Sandboxes includes both the electricity and natural gas systems. While not included up to now, ARERA, the Italian regulator, is looking into including the natural gas system into upcoming thematic projects, with the injection of low-carbon gases such as hydrogen being of interest.<sup>42</sup> ARERA has also had projects related to EVs and transportation.

Australia is planning to include natural gas in its sandbox, and there is much interest in hydrogen. In the Netherlands, the regulator is planning to extend the second iteration of sandboxes to the natural gas sector — the first iteration only included small-scale combined heat and power projects. Similarly, in France, the scope of eligible projects includes natural gas and electricity networks.

However, electricity tends to dominate the list of projects. From interviews, we have heard that responses to broad calls for projects that are open to any energy source tend to involve electricity only.

## DIVERSITY IN ADDITIONAL TOOLS

In addition to the combination of the four tools of Innovation Sandboxes identified in the section entitled [Energy Innovation Sandboxes](#), Innovation Sandboxes may be combined with a range of other policy and regulatory tools. Some of the most common ones include:

**+ Partnerships with academia:** Academic partnerships can help identify policy and regulatory barriers, and existing and emerging trends in the energy system that need to be addressed. The Italian regulator works closely with RSE (*Ricerca sul Sistema Energetico*), a

public energy research agency funded through levies on the electricity bills. RSE helps identify emerging issues in the country's energy market, as well as to determine critical parameters and indicators to select projects. Austria commissioned FFG to identify barriers and scope the areas of exemption of the sandbox. FFG will be in charge of administering the sandbox and the agency expects proposals to include research institutions. Finally, in Germany, universities have been involved in the five selected showcases to help document learnings.

**+ Funding:** In Germany, the SINTEG program provides funding to the five selected showcases eligible for regulatory exemptions. In Austria, FFG intends to co-fund selected projects in partnership with industry. In the UK, funding is not provided as part of the sandbox, but other innovation funding is available through Ofgem to network operators, such as the Network Innovation Allowance (available to all licensed parties), or the Network Innovation Competition (GBP 90 million a year).<sup>43</sup> The majority of the sandboxes in the UK received public funding of some form. In Singapore, separate R&D grants can be awarded to projects by the regulator.

**+ Data sharing:** To provide more support, EMA, the Singaporean regulator, is also prepared to supply applicants with needed energy data (including market/consumer data, with the necessary confidentiality conditions) that can be used to test and refine proposed innovations.

## DIVERSITY IN THE SCOPE OF REGULATORY TRIALS

In most cases, Innovation Sandboxes initiatives are associated with a regulatory trial component that uses exemptions or derogations from current regulatory requirements, codes or standards.

Generally, for a project to enter a regulatory trial, they have to be “genuinely innovative.” Applicants need to explain how the product, service or business model to be trialled is not widely being used in the existing energy systems. Additionally, genuinely innovative projects should not just shift costs to consumers through gaming market administration and rules. They also have to comply with existing rules protecting consumers.

<sup>42</sup>ARERA (February 12, 2020). Reti di trasporto e distribuzione del gas naturale: progetti pilota di ottimizzazione della gestione e utilizzi innovativi. Linee di intervento. Retrieved from: <https://www.arera.it/it/docs/20/039-20.htm>

<sup>43</sup>Energy Systems Catapult (December 2017). A Guide to Funding: Connecting Innovation. Retrieved from: <https://es.catapult.org.uk/wp-content/uploads/2017/12/ESC-EIC-A-guide-to-Funding.pdf>

Other requirements that have been included in some regulatory trials include:

- ✚ The scalability of a product, service or business model for others to adopt or deploy
- ✚ How a product, service, or business model compares to alternatives of a similar nature.

**Genuinely innovative projects should not just shift costs to consumers through gaming market administration and rules.**

There are five different ways to structure the scope of regulatory trials.

### 1. Open

Open regulatory trials are technology — and application — neutral and are used in the UK, Ontario, and Singapore. France and Australia are planning to adopt the same approach. In open trials, a high-level only definition of “innovation” is provided, usually including technologies, services, and business models that are not currently offered in the market. Proponents are allowed to submit any potential project they are interested in pursuing as long as it is “innovative.” Common elements among all open regulatory trials were: clear parameters for trials, regulatory barrier(s), customer and/or system benefits, and plans for risk mitigation and end-of-trial reporting requirements.

### 2. Thematic

Thematic regulatory trials aim to resolve one or several high-level challenges that are identified before the launch of the sandbox. Applicants can then propose projects to address the challenge. By focusing on specific areas of the energy sector or usages/applications, this approach is meant to address the system’s priorities and needs. Austria intends to adopt this approach, with a focus on network tariffs, for the first round of sandbox projects.

ARERA in Italy conducts thematic trials. ARERA works with stakeholders and outside researchers to identify the scope of the problem and assessment process. For each initiative, ARERA will then either undertake pilot projects or “regulatory experiments,” which involves temporary changes to national regulation and which any licensed market participant can take advantage of. One advantage of regulatory experiments is that any market participant licensed by ARERA can undertake trials, which levels the playing field as anyone can participate.<sup>44</sup>

### 3. Trial-specific

These regulatory trials establish strict criteria and requirements regarding the type of trials that are allowed to enter the sandbox space. This is the case of the Netherlands, where only specific players could enter the sandbox and for projects complying with specific criteria (see [Sidebar D](#) below).

### 4. Pre-selected

In this type of regulatory trial, the exemptions are selected in advance, and then proponents propose projects. This is the case in Germany where regulatory exemptions were selected in advance and then regional consortia proposed projects that they could undertake given the exemptions offered.<sup>45</sup>

### 5. Hybrid

In the case of Singapore, EMA developed a hybrid approach in 2019 with the creation of two streams: open and thematic. EMA started with the open approach, but as a result of the lessons learned by the regulator in the first two years of the sandbox also introduced a thematic process. EMA said that thematic sandboxes could better meet EMA’s priorities and needs. While the UK is continuing with open calls for its regulatory trials, Ofgem has indicated that it may consider thematic calls in the future if required.

<sup>44</sup> ARERA (2010). Determina n. 4/10, Approvazione dell’elenco degli esperti per la commissione di cui all’articolo 3 della deliberazione 25 marzo 2010 ARG/elt 39/10. Retrieved from: <https://www.arera.it/it/docs/10/004-10dtrf.htm>

<sup>45</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook, pp 32-33. Retrieved from: [https://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)



## ELIGIBILITY CRITERIA FOR REGULATORY EXEMPTIONS IN THE NETHERLANDS' SANDBOX

**Eligible participants:** Homeowner associations and energy cooperatives (these associations must be entirely controlled by their members).

**Eligible experiments:**

- ✚ Grid related project involving up to 500 users. In this case, the grid is owned by the project and has only one connection to the public grid; or
- ✚ Grid related project up to 10,000 users and 5 MW generating capacity, usually in cooperation with the grid operator. The grid operator remains the owner of the grid. These experiments are concerned with balancing the electricity grid through peak shaving, and dynamic electricity tariffs.



# LESSONS LEARNED FOR SUCCESSFUL INNOVATION SANDBOXES

Given that Innovation Sandboxes are relatively new policy tools, a formal evaluation has yet to be undertaken at an international level. However, preliminary assessments conducted in a few jurisdictions, as well as initial lessons learned from initiatives already in place, offer valuable insights on how to design and implement efficient and fair Innovation Sandboxes.

## LESSON 1: PRIORITIZE ONGOING LEARNING

A key purpose of Innovation Sandboxes is to use what is learned from running them to inform future energy policy and regulatory discussions.

The opportunity to learn-by-doing has been identified as an essential benefit of sandbox initiatives in the jurisdictions we analyzed. As a regulator explained in an interview, sandboxes are not about granting exemption to trials that won't inform regulatory changes, but to address a problem where there is no identified solution or answer. The experiment is a way to get more information on what to do.<sup>46</sup>

In the UK, Ofgem intends to make better use of learnings gained from projects and its Innovation Link services and to provide insights and feedback to ministry policymakers to inform new policies on community energy, storage, and EVs. Helping the policy community understand the real-world barriers can make future energy sector reform more practical and relevant to all players.<sup>47</sup> In France, the CRE explains that “the experiment allows to test the viability of a sustained evolution of the legal framework.”<sup>48</sup>

<sup>46</sup> Anonymous interview, June 2020.

<sup>47</sup> Interview with Ofgem, June 3, 2020.

<sup>48</sup> Authors' translation. In French: “L'expérimentation permet de tester la viabilité d'une évolution pérenne du cadre juridique.” CRE (2020). Deliberation No 2020-125. Retrieved from: <https://www.cre.fr/Documents/Deliberations/Decision/mise-en-oeuvre-du-dispositif-d-experimentation-reglementaire-prevu-par-la-loi-relative-a-l-energie-et-au-climat>

In Austria and Australia, the learning aspect is also a key driver behind the development of Innovation Sandbox initiatives. Austria is particularly interested in findings informing future policies and regulations on community energy and tariffs for renewable energy.<sup>49</sup> This can be crucial as the barriers may not be regulatory, and it is challenging for policymakers and others to know what is needed. For example, in Ontario, four of the five applications were related to requirements that the regulator could not provide relief from.<sup>50</sup> This information can be used by others as they consider more wide-ranging energy sector reforms.

The outcomes from the sandbox can be used to inform other policy areas as well. In Germany, the outcomes from the SINTEG program are expected to help inform policies around employment and skills training as well as on IT security.<sup>51</sup>

## LESSON 2: PRIORITIZE COLLABORATION, TRANSPARENCY AND KNOWLEDGE SHARING

Successful innovation requires collaboration and knowledge-sharing among a wide variety of stakeholders, and it is through this that the learning comes about.

Most Innovation Sandbox initiatives value collaboration and knowledge sharing among multiple traditional and non-traditional energy players. Each jurisdiction has put in place different mechanisms to foster a collaborative approach through:

- + design of the sandbox frameworks
- + transparency requirements
- + committees or working groups
- + collaborative trials.

<sup>49</sup> Interview with FFG, June 8, 2020.

<sup>50</sup> OEB (July 2019). Sandbox Reporting. Retrieved from: [https://www.oeb.ca/\\_html/sandbox/reporting.php](https://www.oeb.ca/_html/sandbox/reporting.php)

<sup>51</sup> Federal Ministry for Economic Affairs and Energy (2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf)

## Co-Design of sandbox frameworks

In many cases, Innovation Sandboxes are designed using a more traditional regulatory consultation model, which does not prioritize collaboration and knowledge sharing. This has been the case in France, the UK, Ontario, and Singapore.

In other cases, stakeholders were extensively consulted and included in the co-creation of the Sandbox framework. As an example, the Austrian government tasked the FFG, an independent public agency that manages funds for publicly funded research, to set up the Innovation Sandbox. FFG conducted research to help map out the barriers and gaps of the current energy system in relation to those topics and to identify priorities. Through a series of workshops that brought diverse stakeholders together – including government, regulators, industry, and innovators – FFG developed a consensual list of areas where derogations are needed to move forward innovation.

“  
Encouraging collaboration from a diversity of stakeholders in the development of the Innovation Sandbox ensures that the final form benefits everyone, and does not favour incumbent interests or those that have the experience in navigating regulatory proceedings.  
”

## Transparency requirements

Because of their focus on collaboration and knowledge exchange, some Innovation Sandboxes come with specific criteria on transparency and information disclosures to ensure that knowledge is shared and circulated among energy stakeholders. Fully transparent selection and outcomes reporting requirements will enable all stakeholders to benefit from the Innovation Sandbox, not just those who have the resources to apply.

<sup>52</sup> FRESCH (May 22, 2020). Freiraum für Regulatorisches Experimentieren Schaffen Projektendbericht Mai 2020. Retrieved from: <https://www.bmlrt.gv.at/umwelt/energiewende/Energie.Frei.Raum--Experimentierraeume-im-Energiebereich.html>

## SIDEBAR E

### AREAS IDENTIFIED THAT COULD BENEFIT FROM INNOVATION SANDBOXES IN AUSTRIA

An Austrian research report identifies that the following areas can be created or enabled through regulatory experiments:

- ✦ Alternative proximity criteria for renewable energy communities
- ✦ Increasing the gas network limits for allowing more renewable gases
- ✦ Dynamic electricity network charges
- ✦ Direct feed-in of renewable gases into the gas grid
- ✦ Differentiation of supplier status (e.g. Energy Communities)
- ✦ Integration of profit-oriented service providers in energy communities
- ✦ Standardization / harmonization of power network communication and control infrastructure
- ✦ Exemptions from regulated network charges in case of network-supporting behaviour
- ✦ Exemption from network charges e.g. on batteries and power-to-heat
- ✦ Central platforms for power grid measurement data
- ✦ Mainstreaming accreditability of smart technologies as network costs
- ✦ Means of integrating local energy communities in the electricity system
- ✦ Alternative benchmarking parameters for assessing network operator efficiency
- ✦ Real-time status of the power grid (“traffic light system”)
- ✦ Participation in the electricity balancing market for smart technologies and renewables.<sup>52</sup>

Photo by shilmar on Pixabay

In Italy, project outcomes are made fully public to enable external evaluation and dissemination of best practices. In France, the Sandbox requires experimenters to share their information with consumers and the CRE for public reporting and assessment purposes. While much of the current information in the UK is commercially sensitive and is not public, Ofgem is planning to ensure that more public documents and clarifications on perceived versus actual regulatory barriers for certain topics will be made more public.

### Ongoing working groups and committees

Collaboration and knowledge sharing needs to be included throughout the entire life of the Innovation Sandbox. One way to do that is to have standing committees or working groups.

In Germany, SINTEG partners with standardization committees and regularly shares information. In the UK and Italy, Ofgem and ARERA have created spaces to facilitate the dialogue between innovators and the regulator. Austria is also planning to set up a working group involving the diverse stakeholders of the energy system to inform the exemption process and regulatory learning and identify emerging issues to be considered by the Sandbox.

### Collaborative trials

Ensuring that the regulatory trials are truly collaborative ensure that knowledge is shared to benefit all.

Many regulatory trials encourage collaboration. In Ontario and the UK, non-regulated companies are encouraged to partner with regulated (or

licensed) companies. It is expected in Austria that research institutes, including universities, will be part of consortia proposing trials, while ARERA in Italy partners with RSE, a public energy research agency, in many areas. Germany encouraged large consortia in SINTEG. In the five selected showcase regions more than 300 companies, research institutions, municipalities, districts, and federal states have been working together.<sup>53</sup>

<sup>53</sup> Federal Ministry for Economic Affairs and Energy (2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf), page 6

Lack of collaboration can be detrimental, as was seen in the Netherlands. There, the first generation of the sandbox had no collaboration mechanism, which in part explains the low number of applications. Also, there is no support for potential applicants. Homeowners and energy associations, those who were able to apply, had limited resources and it was challenging for them to meet all the criteria, such as to demonstrate the necessary organizational, financial, and technical expertise to fulfil all required goals of an experiment.<sup>54</sup>

## LESSON 3: NEED FOR A CULTURE OF INNOVATION AND LEADERSHIP

Innovation Sandboxes can be successfully designed and implemented only when there is clear leadership and a culture of innovation within the organization establishing the Innovation Sandbox, and impetus from policymakers.

In some cases, the leadership can be expected from the regulator, while in others the leadership is expected to come from elsewhere. For ARERA in Italy “pushing” regulated companies to use innovation to improve services is seen as a regulator’s job.<sup>55</sup> The CRE, the French regulator, played a crucial role in having the legislative power include a sandbox in the new *Energy Act* so that it could advance innovation. Executive support for innovation was also one of the reasons for the establishment of the sandbox at Ofgem. In comparison, in Austria innovation is not seen to be the purview of the regulator, and FFG was put in charge of developing the Sandbox.

But this support is not just internal to the regulator, or the organization establishing the sandbox. Government support is also crucial. As such, sandboxes highlight the interdependence between policies and regulation. As one regulator we interviewed explained, there is not a clear distinction between regulation and government. To develop and implement a sandbox both need to be onboard and support the initiative.

<sup>54</sup> I. Lammers and L. Diestelmeie (2017). Experimenting with Law and Governance for Decentralized Electricity Systems: Adjusting Regulation to Reality? Sustainability, February 2017. Vol. 9, 212. Retrieved from: <https://www.mdpi.com/2071-1050/9/2/212>

<sup>55</sup> Interview with ARERA, June 2020.



## LESSON 4: REGULATORS' ROLES WILL NEED TO CHANGE TO BE PART OF THE ENERGY FUTURE

A key learning from jurisdictions that have implemented open sandboxes is that key regulatory barriers that innovators are facing are more perceived than actual.

For instance, during the first two windows of application in the UK (2017 and 2018), most of the 67 applications didn't require an exemption or derogation. Instead, Ofgem helped applicants navigate what they needed to do thanks to the Innovation Link service. As Ofgem explains, "it is not always clear to innovators what they can and can't do. Innovators commonly need advice, not a sandbox."<sup>56</sup> In Australia, the feedback from the majority of stakeholders was that help in navigating the regulatory framework, especially for new entrants, was key.<sup>57</sup>



**Regulators' roles will need to change, and regulators will need to play a larger role in facilitating innovation and in working with new players.**



This need means that regulators' roles will need to change, and regulators will need to play a larger role in facilitating innovation and in working with new players. Regulators will no longer be able to be unengaged observers of the energy system, responding to issues as they arise. Rather, with Innovation Sandboxes they will be called upon to become brokers to help innovators navigate the system, and to be facilitators of innovation that will benefit consumers in at least two ways:

<sup>56</sup> Ofgem (2018). Insights from Running the Regulatory Sandbox. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2018/10/insights\\_from\\_running\\_the\\_regulatory\\_sandbox.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/10/insights_from_running_the_regulatory_sandbox.pdf)

<sup>57</sup> Australian Energy Market Commission (March 7, 2019). Interim Advice Regulatory sandbox arrangements, p. 9. Retrieved from: <https://www.aemc.gov.au/sites/default/files/2019-03/Interim%20Advice%20-%20REGULATORY%20SANDBOXES%20-%20for%20publication.pdf>

## Developing enquiry services

The need for regulatory advice is most crucial for new entrants. According to Ofgem, new entrants are not so much interested in running trials but rather in starting work in the system. These new entrants look to Ofgem to review their business idea and confirm whether or not it faces regulatory hurdles. If a company can get assurance from Ofgem that it faces no regulatory hurdles, this will reassure investors and make access to capital easier.<sup>58</sup> The OEB noted similar developments and said that most companies that approached them about the sandbox were interested in information and guidance.<sup>59</sup>

Therefore, the Enquiry Service tool of Innovation Sandboxes plays a key function in expanding the role of regulators to provide guidance and advice. This service could include not just inform discussion, but also written assurance, subject to the necessary legal disclaimers, that a proposed project is not constrained through regulation. Public assurance, such as an examination of a type of activity, could also be made to enable new entrants to learn from past projects. Building on the Ofgem experience, Australia plans to include an enquiry service in its sandbox, and the Australian Energy Regulator will coordinate feedback among regional and federal market entities, and provide guidance on regulatory issues to proponents of innovative trials, technologies and business models. This guidance could be letters confirming that there are no regulatory issues with a specific project or more general regulatory publications.<sup>60</sup>

However, traditionally regulators have avoided providing guidance to a stakeholder without in-depth and formal regulatory hearings. In some cases, regulators are even tightly constrained in any communication with outside parties, and cannot comment on any proposals. These constraints have been put in place to ensure that the regulator remains an independent third-party and treats all parties equally.

<sup>58</sup> Interview with Ofgem.

<sup>59</sup> OEB (July 2019). Sandbox Reporting. Retrieved from: [https://www.oeb.ca/\\_html/sandbox/reporting.php](https://www.oeb.ca/_html/sandbox/reporting.php)

<sup>60</sup> Australian Energy Market Commission (March 7, 2019). Interim Advice Regulatory sandbox arrangements, p. 9. Retrieved from: <https://www.aemc.gov.au/sites/default/files/2019-03/Interim%20Advice%20-%20REGULATORY%20SANDBOXES%20-%20for%20publication.pdf>

As a result, providing guidance to companies before any formal regulatory hearing, and to provide such assurances to innovators, will require a change in the way regulators generally operate at the moment. Dissociating regulatory activities from guidance activities is crucial and requires that enquiry services come with some liability considerations. Innovation Link in Ofgem identified itself as a separate part of Ofgem. While it coordinates feedback from throughout the organization, the advice it gives has no legal authority. In addition, promoting transparency and making guidance publicly available to all actors can also mitigate the risk of discrimination and preserve third-party independence. It is important to note that it could be difficult for any enquiry service to be able to provide feedback on *all* areas of the energy sector where innovation could be hindered.

### Engage new stakeholders, and differently

The current regulatory landscape is complex and not well understood by new and small entrants — unlike large and established utilities that know the legal and regulatory framework by heart. As a regulator mentioned, smaller players do not speak the regulator's language and feel overwhelmed by the regulatory "machine." Non-conventional energy players and small energy system participants are not always able to give the regulator the information it needs. We need to ensure that the regulatory system does not only help the incumbents such as large utilities or generators. It is essential that the Enquiry Service tool of a sandbox also helps non-energy traditional players and introduces a more level-playing field.

In the jurisdictions reviewed, the conclusion was reached that regulators need to rethink the way they engage stakeholders and challenge their traditional approaches of disseminating discussion papers and conducting technical consultations. They need to be innovative to make the system accessible to each actor and ensure all voices are represented around the table. This can be done through one-on-one conversations, market-wide broadcasts, and fact sheets, engaging the public to inform them of the benefit of innovation, and by making information more easily accessible and legible to everyone. Regulators could even try

more innovative engagement methods such as workshops, assemblies, or online engagement.

AER, the Australian regulator, is currently considering how to conduct a non-traditional engagement process to make the electricity system accessible to new entrants.



**We need to ensure that the regulatory system does not only help the incumbents such as large utilities or generators. It is essential that the Enquiry Service tool of a sandbox also helps non-energy traditional players and introduces a more level-playing field.**

In addition, the UK and Ontario experiences also highlight how important it is for energy regulators to consider other policy and regulatory players when developing trials. Ofgem realized that when the agency is not able to provide the exemptions needed for a regulatory trial, "it is usually because of a complex mix of requirements including industry norms, systems, charging arrangements, codes, and licences."<sup>61</sup> This is more than just a regulatory barrier at one level. Industry needs also to develop its trials around norms and standards and potentially associated with regulatory trials. In the case of Ontario, four applications related to regulatory requirements for which the OEB did not have the authority to provide relief, and exemptions from other regulators or legislated policies would have been required. This highlights the importance of involving other regulatory bodies when developing sandboxes.

### LESSON 5: NEED TO PROMOTE REAL INNOVATION THAT BENEFITS AND PROTECTS CONSUMERS

The energy system is set up to provide services to consumers. As such, innovation must contribute to the long-term benefit and protection of all consumers, not just innovation for innovation's sake.

<sup>61</sup> Ofgem (2018). Insights from Running the Regulatory Sandbox. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2018/10/insights\\_from\\_running\\_the\\_regulatory\\_sandbox.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/10/insights_from_running_the_regulatory_sandbox.pdf)



Because of their mandate, in some cases, energy consumer associations can be ambivalent about innovation. While they recognize that innovation can reduce energy costs and increase energy choices for some consumers, at the same time innovation can lead to territorial and social fragmentation and inequity. The challenge of innovating in the energy sector is ensuring that the price of innovation does not fall on the backs of vulnerable consumers.

Innovation Sandboxes can be efficient policy tools to test and introduce innovation in a controlled way. When developing guidelines for Innovation Sandboxes the need to protect consumers needs to be clear. As well, the focus should be on “real innovation” which benefits all, as opposed to cost-shifting between different groups. This point has been raised in the Netherlands<sup>62</sup> as well as in Ontario.<sup>63</sup> Other regulators have also mentioned the importance of ensuring that innovation is in the collective interest and not in the interest of the sole experimenters. This is why it is crucial for successful sandboxes to clearly set up criteria that define genuine innovation and protect consumers, as well as to put in place sound post-experiment evaluation mechanisms. For example, in France, the CRE requires applicants to propose indicators that will allow the CRE to assess whether the temporary exemption granted to an experiment could lead to a permanent legislative or regulatory evolution that advances the collective interest.<sup>64</sup> It is also important for poverty reduction institutions and groups and energy consumer associations to be part of the design of the Innovation Sandboxes.

Another major concern raised by innovations, especially as they advance the digitalization of the energy system, is consumers’ privacy and use of personal data. To address consumers’ concerns, the French regulator, the CRE, and the Commission Nationale de l’Informatique et des Libertés (CNIL, a national independent administrative authority in charge of protecting citizen’s privacy when it relates to internet and digital technologies) are discussing the possibility of developing a specific sandbox targeted at the use of personal data.

<sup>62</sup> Interview, ACM, June 2, 2020.

<sup>63</sup> OEB (July 2019). Sandbox Reporting. Retrieved from: <https://www.oeb.ca/html/sandbox/reporting.php>

<sup>64</sup> CRE (2020), Deliberation N° 2020-125. Retrieved from: <https://www.cre.fr/Documents/Deliberations/Decision/mise-en-oeuvre-du-dispositif-d-experimentation-reglementaire-prevu-par-la-loi-relative-a-l-energie-et-au-climat>

## LESSON 6: OBJECTIVES WILL DICTATE SANDBOX DESIGN

The objectives of the Innovation Sandbox will dictate its design. While this seems obvious, the differences between Innovation Sandboxes stem from both the structure of the particular energy market and the objectives the sandbox is to achieve.

As an example, in those jurisdictions where innovation for customer benefit was the main priority, open or thematic calls for projects were most common. While in other jurisdictions where a particular policy objective was key, such as reducing emissions, the calls for projects tended to be more predefined, such as in the case of the Netherlands and Germany.

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At times, a too restrictive format can be challenging. In the Netherlands, strict criteria limited participation, and while 80 projects were eligible under the program, only 18 were eventually approved. The Netherlands plans to open up the criteria in the future to ensure that more projects are implemented.<sup>65</sup>

At the same time, a call for projects that is too open may be administratively hard to deal with, especially in the beginning when staff are still learning how to manage applications. In addition, they may not get applications from areas of interest, such as from natural gas in the UK, or to address emerging challenges and system priorities. In this case, a more hybrid approach,

<sup>65</sup> RVO (2020). “Experimenten Elektriciteitswet En Gaswet”. Retrieved from: <https://www.rvo.nl/subsidie-en-financieringswijzer/experimenten-elektriciteitswet-en-gaswet>

as in Singapore where there have been both open and thematic calls for projects starting in 2019, could be useful. The UK has indicated that it may consider thematic calls in the future, in addition to its open call for proposals.

## SIDEBAR F

### KEY INSIGHTS FROM THE UK EXPERIENCE

- ✚ **Insight 1** It is not always clear to innovators what they can and cannot do. Innovators commonly need advice, not a sandbox.
- ✚ **Insight 2** When a proposition isn't possible today it is usually because of a complex mix of requirements including industry norms, systems, charging arrangements, and/or codes and licences. More than just regulatory barriers.
- ✚ **Insight 3** Innovators are focused on launching businesses, not trials.
- ✚ **Insight 4** Start-ups want to signal low regulatory risk to investors. Many used sandbox applications as evidence that there were no regulatory barriers.
- ✚ **Insight 5** Innovators have to operate within existing structures.
- ✚ **Insight 6** Innovation is happening across the sector, with local electricity supply featuring strongly.<sup>66</sup>

Photo by Ugur Akdemir on Unsplash

<sup>66</sup> Ofgem (2018). Insights from Running the Regulatory Sandbox. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2018/10/insights\\_from\\_running\\_the\\_regulatory\\_sandbox.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/10/insights_from_running_the_regulatory_sandbox.pdf)

## CONCLUSION: WHAT IS RELEVANT TO CANADA AND WHAT WE PROPOSE TO DO

Canada requires multi-faceted solutions to arrive at a low-emissions energy system and economy quickly, effectively, and fairly.

At the same time, every aspect of the energy sector is changing, and the previous heavily centralized system is moving to a more decentralized system. Consumers are also demanding more control and choice over the energy they use. In addition, communities, including Indigenous communities, are leading clean energy initiatives all over the country and need to be central to energy system planning from the very beginning of the process.



The energy system in Canada has two needs when it comes to innovation: first, to ensure that the regulatory and policy frameworks can adapt quickly enough to allow traditional and non-traditional energy players to develop innovation, and second, to ensure that all consumers are protected and society as a whole benefit from innovation. Yet, it is not easy to reconcile both of these needs when solutions and answers to existing and emerging problems are unknown. Dealing with uncertainty, and preserving the balance between these two needs, requires creating structures that inform long-lasting policies and regulatory changes through collaboration, learning, and experimentation.

The jurisdictional scan conducted demonstrates that Innovation Sandboxes are an effective tool for ensuring that the energy transition is as fast and effective as possible, while protecting those parts of the current system that continue to provide value, and ensuring that durable long-term frameworks for innovation are created. They address non-technological barriers to innovation through a continuous process of learning-by-doing that is inclusive of all stakeholders involved in the energy system. The different tools embedded in Innovation Sandboxes enable institutional change fostering innovation by facilitating knowledge exchange, informing public policy and improving decision-making.

At the same time, the research demonstrates that only well-designed Innovation Sandboxes can be efficient tools to accelerate innovation and there is no “one” type of Innovation Sandbox. A sandbox design cannot be replicated from one jurisdiction to another because it needs to be tailored to the energy context of each jurisdiction, and the outcomes the collaborators wish to achieve. Well-designed Innovation Sandboxes require great leadership as well as sound mechanisms of engagement and collaboration to define shared objectives and principles, and determine criteria for trials.

As a result, the development of Innovation Sandboxes in Canada’s provinces and territories implies developing a specific sandbox framework, tailored to each jurisdiction, and a sound engagement process involving key local, provincial/territorial, and federal stakeholders.

## OUR PROJECT

The next step of this project is to create foundational frameworks that can inform the implementation of Innovations Sandboxes in the energy sector for participating provinces and territories — and the energy stakeholders in these jurisdictions. The foundational frameworks could be used by provincial, territorial, and federal policymakers, regulators, and other stakeholders thereby leading to more effective policies, regulations, and programs to accelerate the transition to a low-emissions future efficiently and fairly using a multi-sectoral, collaborative process.

This report is the first component of this project, and it intends to provide the context for energy Innovation Sandboxes and how they have been developed around the world.

Subsequent reports will look at Innovation Sandboxes in other sectors of the Canadian economy and the methods and approaches for potentially developing energy Innovation Sandboxes in Canada. This project is not just about creating the theoretical background for Innovation Sandboxes. In phase II of the project a series of workshops will be delivered in three Canadian jurisdictions, to develop an Innovation Sandbox framework tailored to each jurisdiction that considers the multiple perspectives of each stakeholder group.

# APPENDIX A: JURISDICTIONS WITH INNOVATION SANDBOXES

## BELGIUM: I.O. ENERGY ECOSYSTEM

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	None, as it is a private initiative led by system operators. <sup>1</sup>
	<b>Stated objectives</b>	<ul style="list-style-type: none"> <li>+ “To facilitate the development of new energy services by market parties to drive the power system towards consumer centricity.”<sup>2</sup></li> <li>+ To contribute to the EU’s 80% GHG reduction target and to the objective of making consumers active and central players in the energy markets.</li> </ul>
	<b>Type(s) of barriers addressed</b>	<ul style="list-style-type: none"> <li>+ Lack of business models to connect energy infrastructures and smart/digital technologies to high-value services.</li> <li>+ Lack of interactions and collaboration amongst various energy and technological players.</li> </ul>
	<b>Types of policy tool</b>	No policy tools included in the initiative, only ideation workshops and coaching to develop new services.
	<b>Consultation process and stakeholder engagement</b>	Only organisations that became members of the initiative were allowed to attend ideation workshops to select eight cases to move forward on.
	<b>Area/system of application</b>	Focused on new energy services at the interface of electricity infrastructure at the distribution system level with digital/smart technologies.
	<b>Eligible participants</b>	Only open to members of the initiative.
	<b>Eligible initiatives</b>	Unclear
	<b>Timeframe</b>	The initiative was launched in early 2019 and is ongoing.
	<b>Public funding or financial incentives</b>	Unclear

<sup>1</sup> All information in this section has been retrieved from the project website: <https://www.ioenergy.eu>

<sup>2</sup> IO.Energy webpage (April 2020). Retrieved from: <https://www.ioenergy.eu>

<b>Implement- ation</b>	<b>Authority in charge of the implementation</b>	A consortium of Belgium transmission and distribution system operators (Elia, Fluvius, Ores, Resa, Sibelga) with the help of Co.Station, an entrepreneur/innovator service company.
	<b>Application process</b>	<p><b>Principles:</b> Development of new energy services and associated digital tools and market design elements in an iterative and progressive approach through the following steps:</p> <p>✚ <b>Ideation:</b> In Spring 2019, five ideation workshops were facilitated for all members of the consortium. The purpose of the workshops was to validate use case problem statements and consumers' interest for their ideas and to define the scope of a use-case to test a minimum viable product in a sandbox. Seven use-cases were selected (eight were initially planned).</p> <p>✚ <b>Sandbox:</b> In Fall 2019 and Winter 2020, the selected use-cases developed a minimum viable product (MVP) to test the technical feasibility and market traction.</p> <p>✚ <b>Demonstration and industrialization:</b> Upcoming.<sup>3</sup></p>
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Seven use-cases were selected, and none have been implemented yet as they are still in the development phase.
	<b>Types of projects implemented</b>	<p>Mainly development of apps or platforms for:</p> <p>✚ The integration of digital technologies with DERs with focus on user-centric services.</p> <p>✚ Grid orchestration and valorization of DERs for commercial and residential users.</p> <p>Examples: software and platform development to help prosumers optimize energy consumption and production through forecasting; apps to help consumers identify consumer green electricity on the grid so they know the best time to use electrical appliances or charge an electric vehicle; valorization of energy efficiency in commercial buildings on the energy market by collecting energy information; valorization of households' consumption flexibility on the balancing pool; energy efficiency; creation of micro-grids to optimize energy consumption and production among connected buildings.</p>
	<b>Lessons learned</b>	Too early. But it is interesting to note that only seven cases were selected instead of eight as mentioned initially.
	<b>Next steps</b>	Development of the demonstration and industrialisation stages for the seven selected use-cases.

<sup>3</sup> IO.Energy webpage (April 2020). Retrieved from: <https://www.ioenergy.eu>

## FRANCE: BAC À SABLE RÉGLEMENTAIRE

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	<p>Article 61 of the Energy and Climate Act adopted on November 8, 2019 introduces the possibility of using Innovation Sandboxes (« <i>bac à sable réglementaire</i> »). The article gave the <i>Commission de Régulation de l'Énergie</i> (CRE, the energy regulator) the power to create derogations to the conditions of use, access, and connection to the electricity and natural grid, as well as natural gas storage, with the aim of enabling the implementation of innovative projects.</p> <p>The introduction of the sandbox was introduced in the Act under the proposition of the CRE.</p>
	<b>Stated objectives</b>	<p>To advance the national energy policy as defined in the article L101.1 of the Energy Act (modified in 2015):</p> <ul style="list-style-type: none"> <li>+ Building a competitive economy conducive to job creation, especially through green growth.</li> <li>+ Securing energy supply and reducing dependence on energy importation.</li> <li>+ Maintaining competitive and attractive energy prices compared to international prices. Preserving human health and the environment including fighting the impact of greenhouse gases.</li> <li>+ Protecting social and territorial cohesion by ensuring the right to energy access for all households without excessive costs irrespective of their resources.</li> <li>+ Combatting energy poverty.</li> <li>+ Contributing to the implementation of a EU of energy, based on supply security and building a decarbonized and competitive economy.<sup>4</sup></li> </ul>
	<b>Type(s) of barriers addressed</b>	Regulatory and legislative.
	<b>Types of policy tool</b>	Temporary and delineated regulatory derogation for specific projects for a period of 4 years (with possibility to be renewed).
	<b>Consultation process and stakeholder engagement</b>	The CRE conducted a public consultation to get feedback on its proposed Sandbox framework.

<sup>4</sup> Government of France (August 17, 2015). LOI n° 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte - Article 1. Retrieved from: <https://www.legifrance.gouv.fr>



Design, scope, and criteria	Area/system of application	Projects related to the use, access, and connection to the electricity and natural grid. For each project, the <i>Commission de Régulation de l'Énergie</i> (CRE) is in charge of determining the scope of the experimentation based on the characteristics of the project, including the number of participants, the geographical area, or maximum generated revenues ( <i>chiffre d'affaires</i> ).
	Eligible participants	Unclear. It seems any entity can participate (eg., private sector, local governments, utilities). It is only mentioned that in some cases, transmission and distribution utilities and the authorities in charge of overseeing distribution systems can be associated with the experimentations.
	Eligible initiatives	<p>Eligible initiatives should comply with all the following criteria:</p> <ul style="list-style-type: none"> <li>✚ To contribute to the energy policy objectives set in the article L. 100-1 of the Energy Act.</li> <li>✚ To present an innovative dimension, for example testing technologies or services for which upcoming development would require a derogation to current regulation.</li> <li>✚ To face a clearly identified regulatory or legislative barrier.</li> <li>✚ To present a potential for deployment, especially in the case the experimentation meets expected goals.</li> <li>✚ To present a benefit for the community/society in the case the solution is eventually deployed.</li> </ul>
	Timeframe	The Innovation Sandbox was launched in June 2020. Applicants have three months to submit their project, and the exemptions will be set for four years, with ability to renew.
	Public funding or financial incentives	No
Implementation	Authority in charge of the implementation	<i>Commission de Régulation de l'Énergie</i> (CRE), the national regulator for the electricity and natural gas markets.
	Application process	<p>CRE will regularly hold application windows. The first window runs from June 15 to September 15, 2020. The CRE will first conduct a preliminary scan before undertaking a more thorough review within three months that will lead to selecting successful projects.</p> <p>Once a project is approved, the ministry in charge of energy, and in some instances, the ministry in charge of consumption, can oppose the derogation within two months.</p> <p>Experimenters have to agree to share their information with consumers and the CRE for public reporting and assessment purposes.</p>

<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Still taking applications for the first intake.
	<b>Types of projects implemented</b>	Still taking applications for the first intake.
	<b>Lessons learned</b>	Still taking applications for the first intake.
	<b>Next steps</b>	<p>The CRE is planning to assess and reevaluate the framework based on the results of the first intake.</p> <p>The CRE is in discussion with the <i>Commission Nationale de l'Informatique et des Libertés</i> (CNIL), an independent administrative authority in charge of protecting citizens' privacy when it relates to internet and digital technologies, to develop a specific sandbox on use of data and address consumers' concerns.</p>

## GERMANY: SMART ENERGY SHOWCASES — DIGITAL AGENDA FOR THE ENERGY TRANSITION (SINTEG, SCHAUFENSTER INTELLIGENTE ENERGIE — DIGITALE AGENDA FÜR DIE EENERGIEWENDE)

Areas	Areas to be explored	Description
<b>Design, scope, and criteria</b>	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	<p>The sandbox is part of a larger program, “Smart energy showcase – digital agenda for the energy transition,” that aims to address technical, economic, and legal barriers in the energy sector. On the energy side, public funding is provided to five regions, known as “showcase regions”, to develop various innovative projects — technologies, processes, and business models — with reduced economic risk for proponents. The regions were pre-selected through a competition prior to the program launch.<sup>5</sup></p>
	<b>Stated objectives</b>	<p>The aim of SINTEG is to create a “real-world laboratory” for the digitization of the energy transition by allowing innovation to more quickly move from idea to business practice.</p> <p>The objectives of SINTEG are to develop and demonstrate scalable solutions for meeting the technical, economic, and regulatory challenges of the energy transition through the five showcases. The program focuses on enabling secure, efficient, and mass market-enabled processes, and for developing innovative technologies and market mechanisms for creating flexible and smart grids and markets to:</p> <ul style="list-style-type: none"> <li>✚ Guarantee the secure and efficient grid operation at high levels of renewables.</li> </ul>

<sup>5</sup> Information in this section has been retrieved from the project website: <https://www.sinteg.de/en/programme>

**Design,  
scope, and  
criteria**

<b>Stated objectives</b>	<ul style="list-style-type: none"> <li>✚ Harness the potential for greater efficiency and flexibility (in terms of markets and grids).</li> <li>✚ Ensure that all players of the smart energy system work together in an efficient and secure manner.</li> <li>✚ Make more efficient use of existing grid structures.</li> <li>✚ Reduce the need for grid expansion at the level of distribution grids.</li> </ul> <p>The results from these real-world projects will provide evidence to inform future development of the legal framework.<sup>6</sup></p>
<b>Type(s) of barriers addressed</b>	Technical, economic, and regulatory challenges.
<b>Types of policy tool</b>	Subsidies/reimbursement of eligible activities and an ordinance that provides exemption/derogation from the <i>Electricity Act</i> for the five selected showcases.
<b>Consultation process and stakeholder engagement</b>	German states ( <i>Länder</i> ), individually or as a consortium, and industry, research institutions, and local governments and districts were given the opportunity to submit comments until February 28, 2017. SINTEG partners participate in relevant committees and regularly exchange information on activities with the respective interest groups. <sup>7</sup>
<b>Area/system of application</b>	Five showcase regions, which vary from part of one state to a consortium of six states. The focus for all are flexible and smart grids and markets (digitization).
<b>Eligible participants</b>	Consortium for each showcase region includes partners from more than 300 companies, research institutions, municipalities, local districts, federal states.
<b>Eligible initiatives</b>	<p>Initiatives will focus on digitisation of the energy sector through five regional showcases tailored to the specific context of each showcase region:</p> <ol style="list-style-type: none"> <li>1. C/sells - solar integration.</li> <li>2. Designnetz - decentralised energy.</li> <li>3. enera - regional ancillary services for grid stability.</li> <li>4. NEW 4.0 - 70% renewable sources.</li> <li>5. WindNODE - combining renewable energy and electricity, heat and mobility sectors.</li> </ol>
<b>Timeframe</b>	2016-2020: The regions were selected in late 2016 and early 2017, and the project will run for four years.

<sup>6</sup> Federal Ministry for Economic Affairs and Energy (February 2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf)

<sup>7</sup> Federal Ministry for Economic Affairs and Energy (February 2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future, p. 18. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf)

<b>Implement- tation</b>	<b>Public funding or financial incentives</b>	€200 million public-sector funding.
	<b>Authority in charge of the implementation</b>	<i>Project Management Jülich</i> (PtJ, a federal agency) is in charge of managing project funding and support for the programme. Funding is provided by the Federal Ministry for Economic Affairs and Energy (BMWi).
	<b>Application process</b>	PtJ dealt with applications and selected final projects.
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Many projects have been implemented in each showcase region (e.g. 29 projects in the Designetz showcase region); <sup>8</sup> however, a total number is not available.
	<b>Types of projects implemented</b>	<p>Generally projects involve the use of information and communications technologies (ICT) to integrate various aspects of energy systems. Specific programs include:</p> <ul style="list-style-type: none"> <li>+ C/sells: Coupling of generation (solar PV), grids, and consumption, through smart meters/sensors, into cells controlled through automation.</li> <li>+ Designnetz: Use of smart grid technology to balance decentralized electricity production from wind and solar and develop flexible prosumer systems.</li> <li>+ enera: Deployment of smart meters and transformers for automated grid balancing of wind and solar power production, large consumers, and storage units.</li> <li>+ NEW 4.0: Use of smart networks for overcoming grid bottlenecks to export and use of existing wind power capacity and potential.</li> <li>+ WindeNODE: Development of an ICT platform to connect electricity (wind generation and storage), heat (storage) and mobility (electric vehicle) sectors.</li> </ul>
	<b>Lessons learned</b>	The SINTEG Ordinance was adopted after showcase regions (and consortia) were selected. That uncertainty about the specifics of the final ordinance led to reduced participation from non-traditional actors. <sup>9</sup>
	<b>Next steps</b>	Proven experience from the “SINTEG real-world laboratory” will be used for the further development of the energy regulatory and policy framework. For this purpose there is an exchange of ideas with and between the showcases based on the use of new technologies, processes and business models.” <sup>10</sup>

<sup>8</sup> Designetz. (n.d.). Designetz webpage. Retrieved from: <https://www.designetz.de/blaupause-und-bausteine>

<sup>9</sup> International Smart Grid Action Network (ISGAN). (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes - Casebook. Retrieved from: [http://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf#page=28](http://www.iea-isan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf#page=28)

<sup>10</sup> Federal Ministry for Economic Affairs and Energy (February 2018). SINTEG – Smart energy showcases: A programme for funding showcase regions for the energy supply of the future, p. 18. Retrieved from: [https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG\\_broschuere\\_2018\\_EN\\_bf\\_web.pdf](https://www.sinteg.de/fileadmin/media/Publikationen/SINTEG_broschuere_2018_EN_bf_web.pdf)



## ITALY: PILOT PROJECTS AND REGULATORY EXPERIMENTATION

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	The Regulatory Authority for Energy, Networks and the Environment ( <i>L'Autorità di Regolazione per Energia Reti e Ambiente</i> , ARERA) has authority under the regulatory act to establish innovation programs, and to derogate from its own regulatory codes and policies, and there is an innovation levy charged on customers that can be used. <sup>11</sup>
	<b>Stated objectives</b>	ARERA supports innovation to improve the energy systems and customer experience. <sup>12</sup> Much of the push for innovation comes from the extremely rapid uptake in wind and solar generation over the past decade and the introduction of smart meters, and the need to ensure better regulatory, policy and market integration. <sup>13</sup>
	<b>Type(s) of barriers addressed</b>	Regulatory and financial barriers.
	<b>Types of policy tool</b>	Funding and derogation from regulatory constraints. Regulated distribution and transmission network operators are able to introduce innovation themselves and potentially be compensated through performance-based regulation if they achieve their objectives. As an example, Enel Distribution introduced smart meters without incentives.
	<b>Consultation process and stakeholder engagement</b>	ARERA works with <i>Ricerca sul Sistema Energetico</i> (RSE), a research institute funded through levies on the electricity bill, to identify scope of problem and assessment process. Other researchers, such as at universities, are included where appropriate. ARERA also appoints experts to provide advice on and approve selection of projects. <sup>14</sup>
	<b>Area/system of application</b>	ARERA has two different streams for innovation.  The first stream is “Regulatory pilot projects for local problems”. This stream includes limited derogations of regulations and funding of pilot projects in areas of interest. ARERA decides on areas of interest for pilot products and then issues a call for proposals around regulatory barriers and funding. <sup>15</sup>

<sup>11</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

<sup>12</sup> ARERA (2019). “Sostenere l'innovazione con sperimentazioni e ricerca.” Quadro strategico 2019-2021. Retrieved from: [https://www.arera.it/it/quadrostrategico/1921\\_OS4.htm](https://www.arera.it/it/quadrostrategico/1921_OS4.htm)

<sup>13</sup> Interview with ARERA.

<sup>14</sup> Interview with ARERA and ARERA (2010). Determina n. 4/10, Approvazione dell'elenco degli esperti per la commissione di cui all'articolo 3 della deliberazione 25 marzo 2010 ARG/elt 39/10. Retrieved from: <https://www.arera.it/it/docs/10/004-10dtrf.htm>

<sup>15</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

<b>Design, scope, and criteria</b>	<b>Area/system of application</b>	<p>The second stream is “System-level regulatory experiments of innovation”. This stream is focused on system-level problems. For this stream, ARERA makes temporary regulatory changes for a set period of time to accommodate innovation, and then allows any licensed participant in Italy to launch a temporary project. Following the time period, ARERA then evaluates how the regulatory change impacted the sector and decides whether or not to make the change permanent.</p> <p>While ARERA is shifting to more of these system-level innovation programs in electricity, there is a consultation looking at pilot projects for natural gas.</p>
	<b>Eligible participants</b>	Market players licensed by ARERA: including distribution and transmission network operators, generators, aggregators and suppliers (residential and for EV charging). Electricity only in the past but plans to include natural gas in the future. <sup>16</sup>
	<b>Eligible initiatives</b>	ARERA has calls for applications for innovative programs in predefined areas that could benefit from a regulatory sandbox and funding.
	<b>Timeframe</b>	Generally 2-4 years, but varies.
	<b>Public funding or financial incentives</b>	Rate-based funding for innovation.
<b>Implementation</b>	<b>Authority in charge of the implementation</b>	ARERA
	<b>Application process</b>	<p>When identifying potential initiatives, ARERA commissions research to identify problems, indicators and barriers. From this research a demonstration program is designed, and there is a competitive process where potential demonstration projects bid on running a pilot project. The bids are evaluated by an external expert committee.</p> <p>Following the project, a public lessons-learned document is prepared for consideration by ARERA.<sup>17</sup></p>
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Five calls since 2010, total number of projects unknown but over 15.

<sup>16</sup> ARERA (February 12, 2020). Reti di trasporto e distribuzione del gas naturale: progetti pilota di ottimizzazione della gestione e utilizzi innovativi, Consultazione 11 febbraio 2020 39/2020/R/gas. Retrieved from: <https://www.arera.it/it/docs/20/039-20.htm>

<sup>17</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-iscgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-iscgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

<b>Outcomes and lessons learned</b>	<b>Types of projects implemented</b>	<p>Since 2010 there have been five competitive calls for pilot projects on the following themes.</p> <p>First phase: Regulatory pilot projects for local problems Smart electricity grids (2012-2015)</p> <ul style="list-style-type: none"> <li>+ EV charging (2012-2015).</li> <li>+ Energy Storage and dynamic thermal rating of high voltage lines (2012-2015).</li> </ul> <p>Second phase: System-level regulatory experiments</p> <ul style="list-style-type: none"> <li>+ Open protocols for smart devices in homes (2018-2020).</li> <li>+ Flexibility services and demand (2018-2020).</li> </ul> <p>While the five themes have all been based on electricity, it is planned that gas will be included in the future.</p>
	<b>Lessons learned</b>	<p>In the first phase, ARERA selected a number of projects from those proposed. In the second phase, more system-level problems were identified and that required working with the system and market operators.</p>

**Table A1: Projects and regulatory derogation in Italy<sup>18</sup>**

**Regulatory pilot projects for local problems**

Initiative	Derogation requested	Size and number of projects	Public investment	Major players
Smart (electricity) grids	Extra remuneration on higher risk capital	7 projects were successful	EUR15 million	Distribution utilities
Energy Storage and Dynamic Thermal Rating	Derogation to EU unbundling rules to allow the TSO to own and operate the storage systems	3 energy storage sites were developed, all operated by Terna	EUR155 million	Terna, transmission system operators
EV charging	A specific EV charging tariff without a fixed element	4 projects carried out, and 500 charging stations installed	EUR2 million	Charging providers

<sup>18</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

## System-level regulatory experiment

Initiative	Derogation requested	Size and number of projects	Public investment	Major players
Interoperability of in-home smart devices	No derogation, but future expectation that derogation on meter communications may be needed	1 nation-wide trial, around 100 customers	None	Distribution utilities and smart home appliance manufacturers
Flexibility and demand response	Minimum threshold for participation in the ancillary market was reduced to 1 MW, and aggregation of small-scale renewable energy systems was allowed	94 MW (number of projects unknown)	Under evaluation	Developers, balancing system providers, transmission system operator

## THE NETHERLANDS: EXPERIMENTATION DECREE FOR DECENTRALIZED RENEWABLE ELECTRICITY GENERATION (*BESLUIT EXPERIMENTEN DECENTRALE DUURZAME ELEKTRICITEITSOPWEKKING*)

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	<p>In 2009, the Dutch government enabled the development of 12 smart grid pilot projects by large distribution system operators.</p> <p>The Sandbox initiative was developed as a follow-on tool to continue promoting smart grid through other tools with the aim of enabling local renewable energy projects and empowering local stakeholders.</p> <p>The Sandbox leveraged a specific article of the <i>Electricity Act</i> (1998) that authorizes derogation for experiments under specified conditions for a particular target group of homeowners associations (HOAs) and cooperatives.</p>
	<b>Stated objectives</b>	<p>To stimulate more renewable energy at the local level and more involvement of consumers in meeting their energy needs through:</p> <ul style="list-style-type: none"> <li>➤ <b>New generation sources:</b> Increase renewable energy generation and CHP at the local level.</li> <li>➤ <b>New services and business-models:</b> More efficient use of the existing energy infrastructure (enhancing integration and sector coupling).</li> <li>➤ <b>New practices:</b> Increase involvement of energy consumers with their own energy supply.<sup>19</sup></li> </ul>

<sup>19</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)



Design, scope, and criteria	<b>Type(s) of barriers addressed</b>	Removing regulatory requirements to enable eligible players to carry out the functions of the distribution grid operator. <sup>20</sup>
	<b>Types of policy tool</b>	Exemption/Derogation from the <i>Electricity Act</i> : to carry out the functions and tasks of the distribution system operator (DSO) for defined projects up to 10 years. Derogation on a project by project basis.
	<b>Consultation process and stakeholder engagement</b>	The Sandbox was an outcome of the consultation process to review the <i>Electricity Act</i> . There is a specific article in this Act to create derogation for experiments under specified conditions for a particular target group of homeowners associations (HOAs) and cooperatives.
	<b>Area/system of application</b>	Electricity system: Limited to allowing specific non-regulated entities to fulfill the functions and tasks of a distribution system operator for defined geographical areas.
	<b>Eligible participants</b>	Associations, meaning HOAs and energy cooperatives. These associations must be entirely controlled by their members, which means that DSOs and energy suppliers are not allowed to exercise any control (Decree Article 7). Members decide on the organisation, progress and distribution of costs of a project (Decree Article 7(1)). <sup>21</sup>
	<b>Eligible initiatives</b>	<p>Projects should advance community energy and DERs, including local electricity supply, community projects, smart electricity grid, integrated approach/sector coupling, storage, new flexibility services for grid stability for residential customers. Projects should also fall under one of these two main types of experiments:</p> <ul style="list-style-type: none"> <li>✚ Grid project involving up to 500 users. In this case, the grid is owned by the project and has only one connection to the public grid</li> <li>✚ Larger experiments up to 10,000 users and 5 MW generating capacity, usually in cooperation with the grid operator. The grid operator remains the owner of the grid. These experiments are concerned with balancing the electricity grid through peak shaving and dynamic electricity tariffs.</li> </ul>
	<b>Timeframe</b>	Derogation up to 10 years.
	<b>Public funding or financial incentives</b>	None

<sup>20</sup> I. Lammers and L. Diestelmeie (February 2017). "Experimenting with Law and Governance for Decentralized Electricity Systems: Adjusting Regulation to Reality?," Sustainability, Vol. 9, 212. Retrieved from: <https://www.mdpi.com/2071-1050/9/2/212>

<sup>21</sup> I. Lammers and L. Diestelmeie (February 2017). "Experimenting with Law and Governance for Decentralized Electricity Systems: Adjusting Regulation to Reality?," Sustainability, Vol. 9, 212. Retrieved from: <https://www.mdpi.com/2071-1050/9/2/212>

Implementation	Authority in charge of the implementation	The Ministry of Economic Affairs and Climate Policy is in charge of supervising the initiative and exemptions have to be granted by two agencies: the Netherlands Enterprise Agency ( <i>Rijksdienst voor ondernemend Nederland</i> , RVO) and the Authority for Consumers and Markets (ACM, <i>Autoriteit Consument &amp; Markt</i> ).
	Application process	Admission period: 2015-2018
Outcomes and lessons learned	Numbers of project implemented	In theory, up to 10 projects of both types could have been approved each year, for a total of 80 projects. In practice, only 18 projects have been approved during the admission phase (between 2015 and 2018).
	Types of projects implemented	<ul style="list-style-type: none"> <li>+ Grid orchestration and smart grid (energy management via ICT, peer-to-peer trading).</li> <li>+ Solar PV, battery.</li> <li>+ Energy efficiency and heating generation: Heat pump and CHP.</li> </ul>
	Lessons learned	<p>According to some researchers the application process to get an exemption was complicated due to narrow eligibility criteria and the lack of eligible participants' experience and knowledge. As a result, the attractiveness of the initiative was limited which explains why there were only 18 applications — while in theory the initiative could have accepted up to 80 projects (10 per year for each category). Four major issues have been identified:</p> <ul style="list-style-type: none"> <li>+ <b>Lack of collaborative mechanisms:</b> DSOs and energy suppliers are not required to be included in the project design. In addition, there is no support to increase learning processes, articulate expectations, and foster networking processes.</li> <li>+ <b>Mismatch between experimenters' capacities and expectations:</b> Associations have limited resources and it has been challenging to meet all the criteria, i.e. to demonstrate the necessary organisational, financial, and technical expertise to fulfil all required goals of an experiment — that is to ensure reliability, safety, consumer, and environmental protection, and comply with the technical standards that apply to DSOs.</li> <li>+ <b>No financial support:</b> the Associations have to finance the entire project and rely on their own capacities to secure grants, or find partners with knowledge or capital.</li> <li>+ <b>Restrictive eligibility of actors:</b> Only associations are eligible to apply for projects, meaning that not only are DSOs left out but also actors from outside the electricity sector (developers, real estate), and newly-emerging actors (such as technology providers).<sup>22</sup></li> </ul>

<sup>22</sup> I. Lammers and L. Diestelmeie (February 2017). "Experimenting with Law and Governance for Decentralized Electricity Systems: Adjusting Regulation to Reality?" *Sustainability*, Vol. 9, 212. Retrieved from: <https://www.mdpi.com/2071-1050/9/2/212>

<b>Outcomes and lessons learned</b>	<b>Next steps</b>	The experiments were evaluated in early 2020. Learnings from the project experiences were used to draft a follow-up executive order. The new order may broaden the size and scope of eligible projects, and eligible actors. <sup>23</sup>
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**Table A2: Overview of eight successful applications<sup>24</sup>**

Name	Location	Applicant	Technology
Zwijssen Veghel	Veghel	Owners' association	PV, CHP, smart devices, and dynamic tariffs
Endona	Heeten and Raalte	Energy cooperative	PV, CHP with biodigester, peer-to-peer trading, and smart devices
Greenparq	Reeuwijk	Owners' association	PV panels on common buildings, CHP, and peer-to-peer trading
Schoonschip	Amsterdam	Owners' association	Developed in partnership with a research institute. PV panels, heat pumps, solar thermal, batteries, peer-to-peer trading and energy management software
Noordstraat 11 Tilburg	Tilburg	Owners' association	PV, solar thermal, and energy management software
Villa de Verademing	The Hague	Energy cooperative	PV panels, heat pumps, solar thermal, batteries, peer-to-peer trading, and energy management software
Aardehuizen	Olst	Owners' association	PV, collective batteries, peer-to-peer trading, energy management software, and dynamic tariffs
Kringloopgemeenschap	Bodegraven and Reeuwijk	Energy cooperative	Wind turbine, PV, and dynamic electricity tariffs.

<sup>23</sup> RVO (2020). "Experimenten Elektriciteitswet En Gaswet." Retrieved from: <https://www.rvo.nl/subsidie-en-financieringswijzer/experimenten-elektriciteitswet-en-gaswet>

<sup>24</sup> I. Lammers and L. Diestelmeie (February 2017). "Experimenting with Law and Governance for Decentralized Electricity Systems: Adjusting Regulation to Reality?" Sustainability, Vol. 9, 212. Retrieved from: <https://www.mdpi.com/2071-1050/9/2/212>

## ONTARIO: INNOVATION SANDBOX

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	The Ontario Energy Board, the regulator, has authority under the Act to derogate from its own regulatory codes to allow innovation. The idea for a sandbox was developed by the Advisory Committee on Innovation to the OEB. <sup>25</sup>
	<b>Stated objectives</b>	The sandbox is to promote the development of “energy-related projects that show clear potential for benefit to consumers – whether in the form of long-term economic efficiencies, cost performance improvement, service enhancements or other ways”. <sup>26</sup>
	<b>Type(s) of barriers addressed</b>	Regulatory barriers
	<b>Types of policy tool</b>	The OEB can exempt regulated entities from requirements under OEB Codes, Rules, licences or Orders. The OEB is also authorized to exempt participants from statutory requirements where the OEB has a mandate to enforce.
	<b>Consultation process and stakeholder engagement</b>	The Innovation team at the OEB is willing to meet with parties interested in developing new and innovative projects to advise on potential regulatory concerns.
	<b>Area/system of application</b>	Electricity and gas in Ontario.
	<b>Eligible participants</b>	Regulated and unregulated businesses can apply, but unregulated applicants are encouraged to partner with a regulated company.
	<b>Eligible initiatives</b>	Two streams of projects. Stream 1 are projects that have an articulated regulatory barrier; stream 2 projects just require assistance and clarifications. Projects must demonstrate five conditions: 1. Consumer benefit and protection: eg., long-term economic efficiencies, improvement in cost performance, enhancements to service or other forms. 2. Relevance: Must relate to gas or electricity. 3. Innovation: The project must involve testing a new product, service or business model for gas or electricity that is not widely in use in Ontario and can be scaled. 4. Readiness: Project must be ready to be trialed. 5. True regulatory barrier (Stream 1): There must be a clear regulatory barrier. <sup>27</sup>

<sup>25</sup> Advisory Committee on Innovation (November 2018). Report to the Chair of the OEB. Retrieved from: <https://www.oeb.ca/sites/default/files/Report-of-the-Advisory-Committee-on-Innovation-20181122.pdf>

<sup>26</sup> Ontario Energy Board (2019). What is the OEB Innovation Sandbox? Retrieved from: [https://www.oeb.ca/\\_html/sandbox/index.php#popup1](https://www.oeb.ca/_html/sandbox/index.php#popup1)

<sup>27</sup> Ontario Energy Board (2019). What are the five eligibility criteria for the Innovation Sandbox? Retrieved from: [https://www.oeb.ca/\\_html/sandbox/process.php](https://www.oeb.ca/_html/sandbox/process.php)



<b>Design, scope, and criteria</b>	<b>Eligible initiatives</b>	What is not supported includes: 1. Technical demonstration or feasibility trials. 2. Projects that would lead to cost-shifting among consumers. 3. Requests to change utility revenue requirements. 4. Requests to permanently change regulation. <sup>28</sup>
	<b>Timeframe</b>	None specified
	<b>Public funding or financial incentives</b>	None
<b>Implementation</b>	<b>Authority in charge of the implementation</b>	The OEB administers the sandbox and provides exemptions.
	<b>Application process</b>	Potential applicants complete an application form and then meet with the OEB Innovation team to gather further information.
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	As of July 2019: None. <sup>29</sup>
	<b>Types of projects implemented</b>	None
	<b>Lessons learned</b>	<p>In the first six months of the Sandbox (January-June 2019), 20 applicants approached the OEB for discussions; five formal applications were received. Of those five, four concerned barriers that the OEB had no jurisdiction over, and one did not have a regulatory barrier.<sup>30</sup></p> <p>Most applicants required only information and guidance around whether their project or idea was already possible under the current regulatory framework.</p>

<sup>28</sup> Ontario Energy Board (2019). FAQs. Retrieved from: [https://www.oeb.ca/\\_html/sandbox/faq.php](https://www.oeb.ca/_html/sandbox/faq.php)

<sup>29</sup> The OEB has indicated that updated reporting on the Sandbox will be released in late 2020.

<sup>30</sup> Ontario Energy Board (July 2019). Sandbox Reporting. Retrieved from: [https://www.oeb.ca/\\_html/sandbox/reporting.php](https://www.oeb.ca/_html/sandbox/reporting.php)

## SINGAPORE: REGULATORY SANDBOX FOR ENERGY SECTOR INNOVATIONS

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	<p>The <i>Energy Market Authority of Singapore Act</i>, the <i>Electricity Act</i>, and the <i>Gas Act</i> provide the Energy Market Authority, the regulator, with powers to create regulations and apply exemptions to:</p> <ul style="list-style-type: none"> <li>✚ Codes of Practice (e.g. metering codes or codes of conduct).</li> <li>✚ Electricity Market Rules.</li> <li>✚ Licensing Conditions of Electricity and Gas licenses.<sup>31</sup></li> </ul>
	<b>Stated objectives</b>	<ol style="list-style-type: none"> <li>1. Allow industry to test new products and services while providing consumer/market safeguards.</li> <li>2. Provide avenue to review existing regulations.</li> </ol>
	<b>Type(s) of barriers addressed</b>	Regulatory
	<b>Types of policy tool</b>	A case-by-case relaxation of specific legal and regulatory requirements for projects.
	<b>Consultation process and stakeholder engagement</b>	It's mentioned that consultation went into the original framework in 2017 before it was launched, but no additional information was found.
	<b>Area/system of application</b>	The Energy Market Authority (EMA), the Singapore energy regulator, has jurisdiction over the electricity and gas sectors.
	<b>Eligible participants</b>	The target participants include, but are not limited to, technology firms, as well as stakeholders and licensees in the electricity and gas sectors.
	<b>Eligible initiatives</b>	There are two sandboxes: the generic sandbox and the thematic sandbox. In the generic sandbox, potential participants are allowed to propose projects that relate to EMA's mandate. For the thematic sandbox, the EMA provides high-level questions that applicants are expected to address.
	<b>Timeframe</b>	The generic sandbox has been open for applications since 2017, and timeframe is open. The thematic sandbox was created in 2019 following a review of the initiative.
	<b>Public funding or financial incentives</b>	None included. However, separate R&D grants are available for companies and research institutes. <sup>32</sup>

<sup>31</sup> Information in this section has been retrieved on the project website: <https://www.ema.gov.sg/Sandbox.aspx>

<sup>32</sup> Energy Market Authority of Singapore (n.d.). Research Innovation, Enterprise and Deployment website. Retrieved from: [https://www.ema.gov.sg/Industry\\_Energy\\_Research\\_and\\_Development.aspx](https://www.ema.gov.sg/Industry_Energy_Research_and_Development.aspx)

<b>Implement- ation</b>	<b>Authority in charge of the implementation</b>	The Energy Market Authority of Singapore.
	<b>Application process</b>	<p>In the generic sandbox, general applications are welcome, as long as they relate to the electricity and gas sectors under the jurisdiction of EMA.</p> <p>They are evaluated based on the following criteria:</p> <ul style="list-style-type: none"> <li>+ Genuine innovation.</li> <li>+ Benefit to consumers and/or electricity and gas sectors.</li> <li>+ Need for sandbox (cannot be deployed under current framework).</li> <li>+ Ready for testing (assets / resources, test scenarios/ outcomes).</li> <li>+ Boundaries (duration, customer target segment/base).</li> <li>+ Monitoring and evaluation procedure.</li> <li>+ Risk assessment and mitigation.</li> <li>+ Exit and/or transition conditions.</li> </ul> <p>For the thematic sandbox, EMA creates scoped themes (challenge or problem statements) to indicate the system's priority and needs. Currently:</p> <ul style="list-style-type: none"> <li>+ Challenge 1: How might we overcome billing system and settlement constraints when consumers install different generation technologies (or lease them from different entities)?</li> <li>+ Challenge 2: How might we help consumers with embedded generation to reduce their required grid capacity?</li> </ul>
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Information not provided.
	<b>Types of projects implemented</b>	One example is the use of energy storage for residential peak load shifting, a project proposed by a transmission company.
	<b>Lessons learned</b>	From 2017-2019, the main two lessons learned were a need to better indicate EMA's priorities and needs through the Sandbox, and create more holistic support for Sandbox projects, which resulted in the addition of the thematic sandbox. To provide more support, EMA is also prepared to supply applicants with energy data (such as market/consumer data, with the usual confidentiality conditions) to test and refine proposed projects.

## THE UNITED KINGDOM: INNOVATION LINK

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	Innovation Link was developed internally at the Office of Gas and Electricity Markets (Ofgem, the energy regulator for Great Britain) <sup>33</sup> and supported by internal leadership.
	<b>Stated objectives</b>	To support innovation and experimentation, particularly in the retail market, to create low carbon products and services that will directly benefit consumers. <sup>34</sup>
	<b>Type(s) of barriers addressed</b>	Regulatory barriers to network operators and for suppliers.
	<b>Types of policy tool</b>	Innovation Link works with innovators to explain the regulatory system and how their project may or may not be affected by it. Innovation Link also provides internal, private clarifications as to whether a proposed project faces regulatory barriers. In addition, their sandbox allows for temporary derogations from various regulations and regulatory codes, such as the Balancing and Settlement Codes (BSC), the Distribution Connection and Use of System Agreement (DCUSA) and the Retail Energy Code (REC).
	<b>Consultation process and stakeholder engagement</b>	Innovation Link is the office at Ofgem that deals with all innovation funding and sandboxes. They are available for innovators to come to them and discuss a project at any stage for advice, even before it is sandbox-ready, and about what barriers exist, if any. <sup>35</sup> What was found earlier is that innovators want to launch business, not run trials. And many startups are more interested in clarity on regulation, and what is permissible, rather than running trials. <sup>36</sup>
	<b>Area/system of application</b>	Anywhere on the regulated electricity and gas system, where a generation, distribution, or supply license holder operates.
	<b>Eligible participants</b>	The sandbox is for innovators who already (or intend to) operate in the regulated energy market. This means that an innovator either has to hold a generation, distribution, or supply license or work for a license holder. <sup>37</sup>

<sup>33</sup> Ofgem regulates the energy networks in Great Britain (England, Scotland and Wales). Northern Ireland has its own energy regulator and is part of the All-Island Grid with the Republic of Ireland. Innovation Link does not apply to Northern Ireland.

<sup>34</sup> Ofgem (February 2020). Ofgem Decarbonisation Programme Action Plan. Retrieved from: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

<sup>35</sup> Ofgem (nd). Innovation Link. Retrieved from: <https://www.ofgem.gov.uk/about-us/how-we-engage/innovation-link>

<sup>36</sup> Ofgem (February 2020). Innovation Sandbox Services - Overview. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2020/02/sandbox\\_service\\_overview.pdf](https://www.ofgem.gov.uk/system/files/docs/2020/02/sandbox_service_overview.pdf)

<sup>37</sup> Ofgem (February 2020). Innovation Sandbox Services - Overview. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2020/02/sandbox\\_service\\_overview.pdf](https://www.ofgem.gov.uk/system/files/docs/2020/02/sandbox_service_overview.pdf)



<b>Design, scope, and criteria</b>	<b>Eligible initiatives</b>	Innovation Link at Ofgem decides on initiatives. The criteria: 1. The proposal is genuinely “innovative”. 2. The innovation will deliver consumer benefits and consumers will be protected during the trial. 3. A regulatory barrier inhibits innovation. 4. The proposal can be trialled. The innovator has a well-developed plan to trial the innovation. The plan will include clear objectives and success criteria.
	<b>Timeframe</b>	Initially 24 months was planned, although flexibility was provided. In future, the timeframe will be up to the applicant.
	<b>Public funding or financial incentives</b>	Funding not provided as part of the sandbox, but other innovation funding is available through Ofgem to network operators, such as the Network Innovation Allowance, available to all licensed parties. The Network Innovation Competition awarding GBP90 million a year is available, and is being redeveloped as part of the new price controls for gas and electricity transmission and distribution networks (RIIO 2). <sup>38</sup> Majority of sandboxes received funding of some form.
<b>Implementation</b>	<b>Authority in charge of the implementation</b>	Ofgem administers the sandbox and provides exemptions.
	<b>Application process</b>	Applications will be open indefinitely for the third window of the sandbox. Interested applicants approach Innovation Link at Ofgem. Previously Ofgem held “windows” for application. One window was held in 2017 and one in 2018. <sup>39</sup>
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	In the first two windows in 2017 and 2018 there were 67 applications; seven were eventually successful. Most unsuccessful applications didn’t require a sandbox and Ofgem helped them navigate what they instead needed through Innovation Link. The third window is expected to be open by fall 2020.
	<b>Types of projects implemented</b>	Examples include peer-to-peer energy trading; demand response with smart storage heaters; and residential solar and storage to provide grid support.
	<b>Lessons learned</b>	<p>Insight 1: It is not always clear to innovators what they can and can’t do. Innovators commonly need advice, not a sandbox.</p> <p>Insight 2: When a proposition isn’t possible today it is usually because of a complex mix of requirements including industry norms, systems, charging arrangements, codes and licences. More than just regulatory barriers.</p> <p>Insight 3: Innovators are focused on launching businesses, not trials.</p>

<sup>38</sup> Energy Systems Catapult (December 2017). A Guide to Funding: Connecting Innovation. Retrieved from: <https://es.catapult.org.uk/wp-content/uploads/2017/12/ESC-EIC-A-guide-to-Funding.pdf>

<sup>39</sup> Ofgem (February 2020). Ofgem Decarbonisation Programme Action Plan. Retrieved from: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

## Outcomes and lessons learned

### Lessons learned

Insight 4: Start-ups want to signal low regulatory risk to investors. Many used Sandbox application as evidence that there were no regulatory barriers.

Insight 5: Innovators have to operate within existing structures.

Insight 6: Innovation is happening across the sector, with local electricity supply featuring strongly.<sup>40</sup>

### Next steps

Sandbox trials from windows 1 and 2 are ongoing. Ofgem recently launched its new Sandbox initiative, based on learnings from the previous projects.

# APPENDIX B: JURISDICTIONS WITH INNOVATION SANDBOXES UNDER DEVELOPMENT

## AUSTRALIA: REGULATORY SANDBOX ARRANGEMENTS TO SUPPORT PROOF-OF-CONCEPT TRIALS

Areas	Areas to be explored	Description
Design, scope, and criteria	Key legislations or initiatives leveraged to develop the Sandboxes	The Council of Australian Governments (COAG) Energy Council tasked the Australian Energy Market Commission (AEMC) with developing an Innovation Sandbox. <sup>41</sup> Innovation Sandboxes were recommended in the government's Independent Review into the Future Security of the National Electricity Market (Finkel Review). <sup>42</sup> The required legislative changes are still going through the parliaments. Legislation before parliaments amending the energy laws — the <i>National Electricity Rules</i> (NER), the <i>National Energy Retail Rules</i> (NERR), and the <i>National Gas Rules</i> (NGR) — in order to introduce the Innovation Sandbox. <sup>43</sup>

<sup>40</sup> Ofgem (2018). Insights from Running the Regulatory Sandbox. Retrieved from: [https://www.ofgem.gov.uk/system/files/docs/2018/10/insights\\_from\\_running\\_the\\_regulatory\\_sandbox.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/10/insights_from_running_the_regulatory_sandbox.pdf)

<sup>41</sup> Note that the sandbox is only being developed for the National Electricity Market (NEM) area, which encompasses the eastern states of Australia. Western Australia and the Northern Territory operate their own electricity systems and this initiative does not apply to them. Information in this section has been retrieved on the project website: <https://www.aemc.gov.au/market-reviews-advice/regulatory-sandboxes>

<sup>42</sup> Alan Finkel, et al (June 9, 2017). Independent Review into the Future Security of the National Electricity Market. Retrieved from: <https://www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market>

<sup>43</sup> Australian Energy Market Commission (March 26, 2020). Final report Regulatory Sandboxes rule drafting advice. Retrieved from: [https://www.aemc.gov.au/sites/default/files/documents/regulatory\\_sandboxes.pdf](https://www.aemc.gov.au/sites/default/files/documents/regulatory_sandboxes.pdf)

**Design,  
scope, and  
criteria**

<b>Stated objectives</b>	<p>“The introduction of a regulatory sandbox toolkit aims to make it easier for businesses to develop and trial innovative energy technologies and business models. Innovation in the energy sector can lead to better services and lower costs for consumers. It is important that the regulatory framework supports emerging technologies and business models that have the potential to deliver these benefits to consumers.” The draft rules include a requirement that applicants state how a trial meets national electricity, electricity retail, or natural gas objectives.<sup>44</sup></p>
<b>Type(s) of barriers addressed</b>	Regulatory and informational.
<b>Types of policy tool</b>	<p>The recommended toolkit includes three new tools designed to be used sequentially:</p> <ul style="list-style-type: none"> <li>✚ An innovation enquiry service to provide guidance and feedback that can help facilitate trials that are feasible under current laws and rules. The innovation enquiry service can be operated within the existing regulatory framework. The Australian Energy Regulator (AER) will be responsible for its implementation.</li> <li>✚ A new regulatory waiver power (regulatory trial) for the AER that can provide temporary exemption for trials from regulatory obligations arising out of the existing rules or from the registration requirements in the laws .</li> <li>✚ A new AEMC trial rule change process that can temporarily change existing rules or temporarily introduce a new rule of limited application to allow a trial to go ahead.</li> </ul>
<b>Consultation process and stakeholder engagement</b>	<p>Public consultation: A consultation paper was released in December 2018 to understand the need for a sandbox, “with most stakeholders supporting the development of regulatory sandbox arrangements”. A call for written comments on an information sheet released January 16, 2020 was open until February 20, 2020, and received 15 submissions.</p>
<b>Area/system of application</b>	Electricity and gas markets in Australia.
<b>Eligible participants</b>	Still under development.
<b>Eligible initiatives</b>	<p>Still under development, but the broad eligibility requirements are expected that projects:</p> <ul style="list-style-type: none"> <li>✚ Be genuinely innovative.</li> <li>✚ Have the potential to lead to better services and outcomes for consumers.</li> <li>✚ Be unable to be conducted without a trial waiver.</li> <li>✚ Be appropriately limited in time, scope and scale.</li> </ul>

<sup>44</sup> Australia Energy Market Commission (2019). Recommended Revisions to Energy Laws. Retrieved from: [https://www.aemc.gov.au/sites/default/files/documents/regulatory\\_sandboxes\\_-\\_draft\\_rules\\_for\\_consultation\\_-\\_epr0079.pdf](https://www.aemc.gov.au/sites/default/files/documents/regulatory_sandboxes_-_draft_rules_for_consultation_-_epr0079.pdf)

<b>Design, scope, and criteria</b>	<b>Eligible initiatives</b>	<ul style="list-style-type: none"> <li>+ Maintain adequate consumer protections.</li> <li>+ Meet any other requirements specified in the trial projects guidelines.</li> </ul>
	<b>Timeframe</b>	Consultations for the sandbox development started in December of 2018 with the publication of a consultation paper. Legislation expected to be passed in late 2020. It is planned that the enquiry services start in early 2021, with regulatory trials in late 2021.
	<b>Public funding or financial incentives</b>	There will not be public funding or incentives for trials, although funding is available through other sources.
<b>Implementation</b>	<b>Authority in charge of the implementation</b>	The Innovation Sandbox will be spread between two regulators. The Australian Energy Regulator (AER) will be in charge of the innovation enquiry services and regulatory trials. The Australian Energy Market Commission (AEMC) will be in charge of temporarily changing existing rules or temporarily introducing a new rule of limited application to allow a trial to go ahead.
	<b>Application process</b>	Guidelines have not yet been produced; however there is a recommendation for an 'innovation enquiry service' to provide guidance and feedback that can help facilitate trials that are feasible under current laws and rules.
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Sandbox not yet implemented.
	<b>Types of projects implemented</b>	Sandbox not yet implemented.
	<b>Lessons learned</b>	Sandbox not yet implemented.
	<b>Next steps</b>	Amendments are going through legislatures, and expected to be passed by the end of 2020. AER will introduce rules on regulatory trials, which should be completed by the end of 2021. Enquiry service is expected to be operational earlier, in early 2021.



## AUSTRIA: ENERGIE.FREI.RAUM

Areas	Areas to be explored	Description
Design, scope, and criteria	<b>Key legislations or initiatives leveraged to develop the Sandboxes</b>	A project of the <i>Bundesministeriums für Klimaschutz, Umwelt, Mobilität, Innovation und Technologie</i> (Ministry of Climate Protection, Environment, Mobility, Innovation and Technology) and administered by FFG ( <i>Forschungsförderungsgesellschaft</i> , the Austrian Research Promotion Agency). The project came from #mission2030, the Austrian climate and energy strategy, where research innovation was one of the pillars. <sup>45</sup>
	<b>Stated objectives</b>	The Sandbox intends to support the main goals of the national climate and energy strategy #mission2030 and the National Energy and Climate Plan (NECP) for the period 2021-2030. <sup>46</sup> It will do this by breaking down barriers between testing and implementation so that projects can be developed and run live and with real customers.
	<b>Type(s) of barriers addressed</b>	Still under development, and currently focused on identifying areas for a sandbox. <sup>47</sup> Initial barriers that will be addressed through the sandbox will be network tariffs. <sup>48</sup>
	<b>Types of policy tool</b>	Following workshops and research designing a three-pillar system — helping innovators, regulatory sandbox, and using results to inform regulatory policy.
	<b>Consultation process and stakeholder engagement</b>	The sandbox is still at an early stage. FFG brought all relevant stakeholders together in workshops and other venues to survey the needs and potential for regulatory projects. An expert advisory group in partnership with FFG will help in project selection.
	<b>Area/system of application</b>	The initiative is to support early-stage renewable energy systems, storage and energy efficiency projects. The focus areas will be: <ul style="list-style-type: none"> <li>+ Grid stabilization.</li> <li>+ EVs and distribution networks.</li> <li>+ Local energy communities and peer-to-peer energy trading.</li> <li>+ Integration of storage.<sup>49</sup></li> </ul>
	<b>Eligible participants</b>	Generally consortiums with small, medium and large companies (potentially including OMV, Verbund or APG, but not necessarily) and universities and technical colleges, and public or private research institutions. <sup>50</sup>

<sup>45</sup> FFG (2019). Energie.Frei.Raum. Retrieved from: <https://www.ffg.at/Energie.Frei.Raum>

<sup>46</sup> FRESCH (May 22, 2020). Freiraum für Regulatorisches Experimentieren Schaffen Projektendbericht Mai 2020. Retrieved from: <https://www.bmlrt.gv.at/umwelt/energiewende/Energie.Frei.Raum--Experimentierraume-im-Energiebereich.html>

<sup>47</sup> IEA International Smart Grid Action Network (May 2019). Innovative Regulatory Approaches with Focus on Experimental Sandboxes Casebook. Retrieved from: [https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN\\_Casebook-on-Regulatory-Sandbox-A2-1.pdf](https://www.iea-isgan.org/wp-content/uploads/2019/05/ISGAN_Casebook-on-Regulatory-Sandbox-A2-1.pdf)

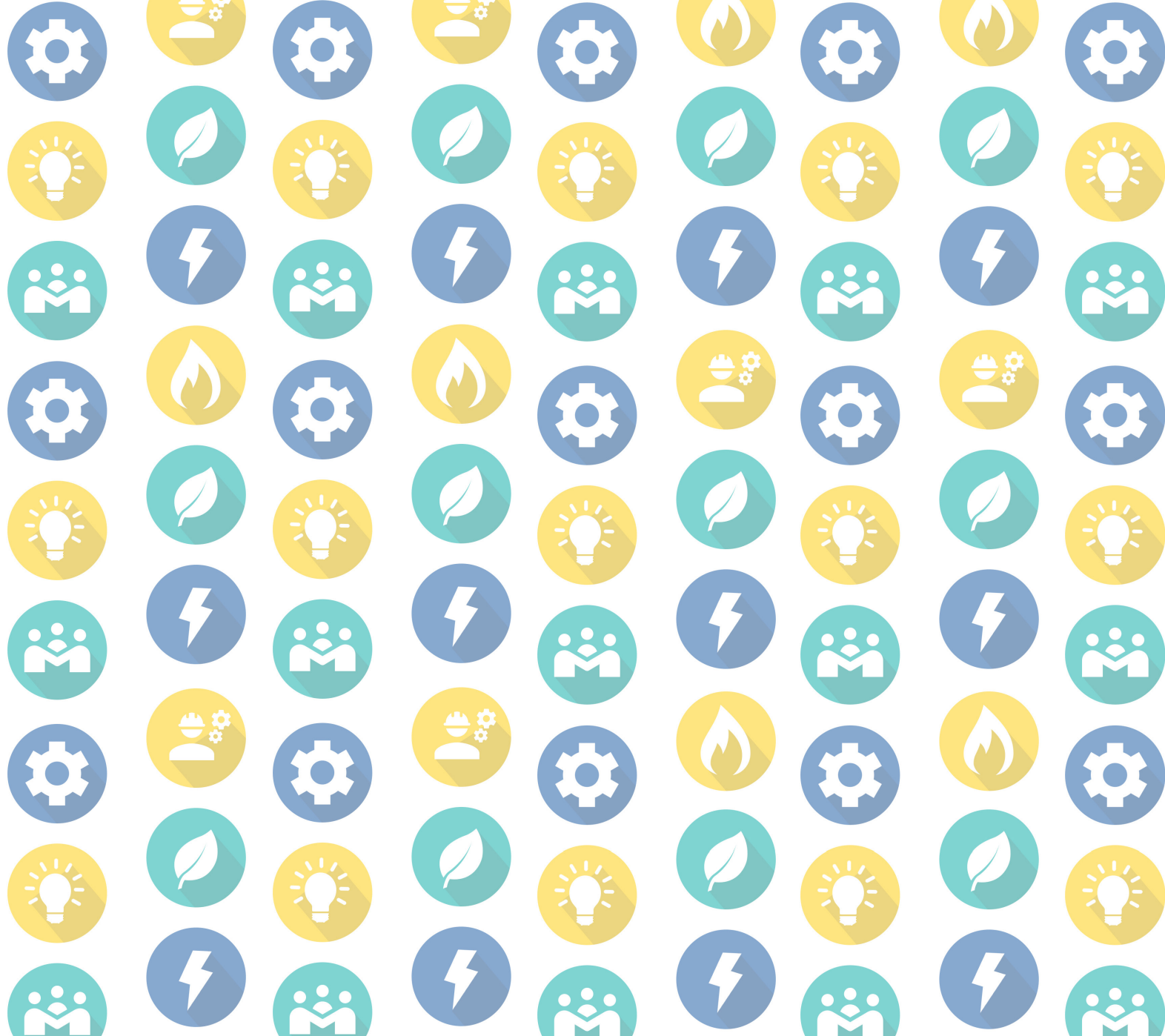
<sup>48</sup> Interview with FFG.

<sup>49</sup> BMLRT (2019). Start des Förderprogramms Energie.Frei.Raum des BMK. Retrieved from: <https://www.bmlrt.gv.at/umwelt/energiewende/foerderprogramm-energie.frei.raum-der-mission2030.html>

<sup>50</sup> FFG (2019). Energie.Frei.Raum. Retrieved from: <https://www.ffg.at/Energie.Frei.Raum>

<b>Design, scope, and criteria</b>	<b>Eligible initiatives</b>	The first call under the initiative in 2019 was for R&D services to help map out the barriers and gaps of the current energy system in relation to those topics, to develop research questions to guide the future tenders for projects, and to identify priorities and potential. The first regulatory barrier to be addressed will be network tariffs.
	<b>Timeframe</b>	2019-2025. The sandbox is expected to be started in 2021.
	<b>Public funding or financial incentives</b>	EUR 5 million for up to 2025. For the first phase, EUR 120,000 has been dedicated. Co-funding of projects with FFG contributing around 20-50% of costs is expected.
<b>Implementation</b>	<b>Authority in charge of the implementation</b>	FFG ( <i>Forschungsförderungsgesellschaft</i> , the Austrian Research Promotion Agency) is the administrator of the project under direction of the Government. FFG is in charge of all publicly funded research in Austria. E-Control, the regulator, is part of discussions and will be more involved during implementation. In implementation, FFG will look at whether projects qualify for the sandbox or not, while E-Control will look at the regulatory issues and provide exemptions as required.
	<b>Application process</b>	Open tender for specific services. Application process for future projects is not known, but projects will be selected by FFG with the assistance of an expert advisory group.
<b>Outcomes and lessons learned</b>	<b>Numbers of project implemented</b>	Legislation is expected to be passed by late 2020, with the first call for projects in early 2021.
	<b>Types of projects implemented</b>	None
	<b>Lessons learned</b>	It's still in early stages so final results are not known. But collaboration and stakeholder buy-in through FFG has been seen as valuable. <sup>51</sup>

<sup>51</sup> Interview with FFG.



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