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# **CEER Paper on Regulatory Sandboxes in Incentive Regulation**

**Distribution Systems Working Group**

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## INFORMATION PAGE

### Abstract

This document (C21-DS-74-04) presents CEER's views on regulatory sandboxes and other regulatory tools to support innovation. The document addresses the reasons why National Regulatory Authorities (NRAs) should promote innovation and remove barriers that can obstruct power system transformation. The document discusses the relationship between regulatory sandboxes and incentive regulation for grid operators (DSOs and TSOs) and provides a toolkit for NRAs that is suitable for supporting innovation in different conditions.

### Target audience

National Regulatory Authorities, energy suppliers, network operators, gas/electricity industry, Member States' public institutions, research institutes, academics, and other interested parties.

### Keywords

Incentive regulation, innovation, power system, regulatory sandboxes and experiments, pilot projects, pilot regulation.

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## Related documents

### CEER Documents:

- [CEER Approach to More Dynamic Regulation](#), 8 April 2021, C21-RBM-28-04.
- [Conclusions Paper on Incentives Schemes for Regulating Distribution System Operators \(DSOs\), including for innovation](#), 19 February 2018, Ref: C17-DS-37-05.

### External Documents

- ISGAN (International Smart Grid Action Network), Regulatory Sandbox 2.0 Project, Policy Messages to the Clean Energy Ministerial, May 2021, [www.iea-isgan.org/wp-content/uploads/2021/06/Policy-Messages-from-the-ISGANRegulatory-Sandbox-2.0-Project.pdf](http://www.iea-isgan.org/wp-content/uploads/2021/06/Policy-Messages-from-the-ISGANRegulatory-Sandbox-2.0-Project.pdf)
- ISGAN (International Smart Grid Action Network), Innovative Regulatory Approaches with Focus on Experimental Sandboxes 2.0, Casebook: Austria, Belgium, Canada, Denmark, France, Israel, Italy, Norway, Sweden, and the United Kingdom, October 2021, [www.iea-isgan.org/wp-content/uploads/2021/10/Regulatory-Sandbox-2.0\\_For-Publication.pdf](http://www.iea-isgan.org/wp-content/uploads/2021/10/Regulatory-Sandbox-2.0_For-Publication.pdf)
- Council of the European Union, “Council Conclusions on Regulatory sandboxes and experimentation clauses as tools for an innovation-friendly, a future-proof and resilient regulatory framework that masters disruptive challenges in the digital age”, 16 November 2020, <https://data.consilium.europa.eu/doc/document/ST-13026-2020-INIT/en/pdf>;
- QUEST and Pollution Probe, “[Enter the Sandbox. Developing Innovation Sandboxes for the Energy Sector](#)”, 2020.
- The UK Financial Conduct Authority, “[Regulatory Sandboxes](#)”, Nov. 2015, PUB REF: 005147

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## EXECUTIVE SUMMARY

### Background

Regulatory sandboxes, as well as other tools that regulators use to foster and support innovation, are part of Dynamic Regulation, one of the pillars of CEER's 2019-2021 strategy<sup>1</sup> and a key part of the second regulatory dimension of CEER's 2022-2025 strategy<sup>2</sup>. Regulatory sandboxes are part of the energy national regulatory authority's (NRA's) toolkit to facilitate innovation without compromising the efficacy of incentives for efficient operation or the role of the distribution system operator (DSO) as a neutral market facilitator

### Objectives and contents of the document

The objectives of this paper are to provide clarity and a framework for the different tools (including sandboxes) that NRAs can use to facilitate innovation in the context of incentive regulation for grid operators. This paper also examines the use of "derogations" provided by NRAs as these are a closely related concept to regulatory sandboxes, with similar purposes.

The content of the document is as follows:

- The reasons why NRAs should facilitate innovation, among which the most important is the digitalisation of energy services, which provides significant opportunities for innovative business models;
- The characteristics that can differentiate regulatory sandboxes or experiments, as well as the common pillars of all the regulatory tools to support innovation;
- the relationship between regulatory sandboxes (and other similar tools) with incentive regulation of grid operators: regulators can move towards a more proactive stance to facilitate innovation and in turn results of projects that benefit from a regulatory sandbox can inform NRAs when designing incentive regulation; and
- The institutional issues of regulatory sandboxes, among which coordination and cooperation with other public institutions, research bodies, and research and development and demonstration (R&D&D) funding agencies is of paramount importance.

### A brief summary of the conclusions

In the conclusions section, a toolkit with four complementary tools (regulatory sandboxes, pilot projects, regulatory experiments, and pilot regulations) for implementing Dynamic Regulation is provided, together with a few recommendations for NRAs on the following topics:

- NRAs should engage at least in removing barriers to innovation, as a first preliminary step;
- NRAs could use the toolkit, selecting the best-suited tool, or combination of tools, according to specific cases;

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<sup>1</sup> Found at <https://www.ceer.eu/1740>

<sup>2</sup> Found at <https://www.ceer.eu/2050>

- When approaching the toolkit, NRAs should take into account the different regulatory treatment between regulated grid activities and competitive market activities, including funding;
- When supporting innovation, NRAs must avoid the foreclosure of competition in wholesale, retail, and adjacent markets; and
- Improving the learning process among all involved parties, regulators included, and dissemination of knowledge are ultimately the goals of each regulatory tool for supporting innovation.

## 1 Introduction

Regulatory sandboxes, as well as other tools that regulators use to foster and support innovation, are attracting more and more attention from European NRAs and stakeholders. In a paper<sup>3</sup> published by CEER in 2021 regulatory sandboxes were identified as one of the tools of Dynamic Regulation,<sup>4</sup> which is one of the pillars of CEER's 2019-2021 "3D" strategy.

The focus of this paper is to understand how some NRAs have implemented regulatory sandboxes (and closely related tools like regulatory experiments, pilot projects, and pilot regulations) within or outside incentive regulation for grid operators, and what best practices may be derived from their experiences. Regulatory sandboxes are part of the NRA's toolkit to facilitate innovation without compromising the effectiveness of incentives for efficient operation or the role of the DSO as a neutral market facilitator.

The objectives of this paper are to provide clarity and a framework for the different tools (including sandboxes) that NRAs can use to facilitate innovation in the context of incentive regulation for grid operators. This paper also examines the use of "derogations" provided by NRAs as these are a closely related concept to regulatory sandboxes, with similar purposes.

A questionnaire on regulatory sandboxes was circulated to provide NRAs' insight on experiences with regulatory sandboxes. The answers have been used in this paper in describing how regulatory sandboxes – or closely related concepts – have thus far been implemented in Europe and which best practices may be derived from the experiences with this tool.

While the tools described in this paper may help NRAs in utilising innovation to deliver the energy transition, NRAs must avoid the foreclosure of competition in wholesale, retail, and adjacent markets when supporting innovation.

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<sup>3</sup> CEER RBM WG, "CEER Approach to More Dynamic Regulation", 8 April 2021. [www.ceer.eu/documents/104400/-/70634abd-e526-a517-0a77-4f058ef668b9](http://www.ceer.eu/documents/104400/-/70634abd-e526-a517-0a77-4f058ef668b9)

<sup>4</sup> See also the section of the CEER website dedicated to Dynamic Regulation: [www.ceer.eu/dynamic-regulation](http://www.ceer.eu/dynamic-regulation).

## 2 Why NRAs should facilitate innovation

It is common knowledge that the energy sector is standing at the edge of a system transformation and that innovation will have a central role in remaking our energy landscape: the transition to a radically changed energy system based on renewable energy, energy efficiency, decarbonisation and decentralisation requires more flexible regulatory approaches. In this context, the “typical” regulatory goals of increasing economic efficiency, greater effectiveness, and better quality of service will only be reached by not discouraging innovation<sup>5</sup>.

Moreover, the digitalisation of energy services provides significant opportunities for new business models that rely on network infrastructure (including metering). Grid operators are, therefore, “enablers” of innovation and this role should be recognised by regulators, together with the role of neutral market facilitators.

In the face of the energy system transformation, NRAs can have two different “innovation” needs: firstly, to build “temporary spaces” where solutions for technical, economic, and regulatory challenges relating to the energy transition can be tested and demonstrated at a small scale; regulatory sandboxes and pilot projects respond to this first need. Secondly, when innovative practices have been tested and proven to be successful, a larger scale roll-out is desired and NRAs must ensure that regulation is not a barrier to this step.

An example of a barrier can be the methodologies NRAs use for setting allowed revenues that treat OPEX (operational expenditure) and CAPEX (capital expenditure) differently; typically applying a price cap or revenue cap on OPEX and recognizing CAPEX through a cost-plus methodology. This regulatory approach tends to favour CAPEX, thereby discouraging innovative operational solutions.

The development of new technologies will require an OPEX-CAPEX neutral incentive environment, whereby more efficient alternatives to CAPEX, such as flexibility procurement, can be incentivised. A pilot project mechanism can act as an incentive tool for new technologies that are not yet in use, but should not be used for technologies that are already in use. Output-based incentives are best suited for promoting the roll-out/diffusion of innovative technologies and solutions, although other approaches, which are rather based on cost efficiency or the network operator’s overall performance, may also help in pursuing the diffusion of innovative technologies and solutions.

In most CEER member countries, the existing national legal and regulatory frameworks already allow for the development of innovation, in particular through tariff/allowed revenues methodologies and flexibility products. NRAs also already rely on experimental regulatory tools to test and anticipate future evolutions such as regulatory sandboxes, pilot projects, or pilot regulations. According to the answers to the internal survey circulated for this paper, 15 CEER NRAs already have regulatory sandbox regimes or pilot projects in place; some others are in the process of setting these up.

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<sup>5</sup> See “CEER Incentive schemes for regulating DSOs, including for innovation”, 19 February 2018. [www.ceer.eu/documents/104400/-/-/1128ea3e-cadc-ed43-dcf7-6dd40f9e446b](http://www.ceer.eu/documents/104400/-/-/1128ea3e-cadc-ed43-dcf7-6dd40f9e446b)



### 3 Regulatory sandboxes and related concepts

Behind the term “regulatory sandboxes” there is a huge variety of concrete experiences. Our key insight from the experiences of NRAs and the growing academic literature is that there is no single version of a regulatory sandbox and that this diversity provides regulators with different tools for different contexts and tasks.

Nevertheless, as a starting point for this paper we can refer to some well-established and pioneering cases: in the financial sector, *“a regulatory sandbox is a ‘safe space’ in which businesses can test innovative products, services, business models and delivery mechanisms without immediately incurring all the normal regulatory consequences of engaging in the activity in question”*<sup>6</sup>.

In the energy sector, the co-existence of monopolies for network activities (both transmission and distribution, and in most cases, metering) and competition for market activities (generation, trading, and supply) implies that the two parts – i.e., grid operators and market players – have to cooperate with each other. As stated in a recent research report, *“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 (...). 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”*<sup>7</sup>.

#### 3.1 Characteristics of regulatory sandboxes/experiments

Evidence from our survey of NRAs reveals that more than half of the CEER Members have implemented the concept of “regulatory sandboxes” (or a related concept that may be considered to be closely related to it, as understood by NRAs). The survey reveals that the term “regulatory sandbox” is used to describe a wide variety of tools used by regulators to support innovation. Before attempting to provide a classification of these tools, it is useful to look at some different features and aspects of regulatory sandboxes (and closely related concepts) as they have been used in practice by NRAs:

- a) A distinction can be made between “network-side” and “market-side” players involved in sandboxes. In some schemes, only grid operators are involved; in others, retail suppliers, aggregators, and third parties (involved in the marketing and provision of energy services to consumers) are involved.
- b) It is important to distinguish between “policy-oriented” and “innovator-oriented” regulatory approaches. While “policy-oriented” experiments are in most cases launched by regulators to address specific goals, an “innovator-oriented” sandbox is

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<sup>6</sup> “UK Financial Conduct Authority, Regulatory Sandboxes”, Nov. 2015, PUB REF: 005147 [www.fca.org.uk/publication/research/regulatory-sandbox.pdf](http://www.fca.org.uk/publication/research/regulatory-sandbox.pdf)

<sup>7</sup> QUEST and Pollution Probe, “Enter the Sandbox. Developing Innovation Sandboxes for the Energy Sector”, 2020 <https://questcanada.org/wp-content/uploads/2020/07/Innovation-Sandboxes-Report-1-EN.pdf>. According to this inspiring study, conducted by a Canadian no-profit organisation, under the umbrella of “Innovation sandboxes” three main topics are covered: Innovation hubs; Enquiry services; Regulatory trials.

much more demand-led, responding to the near-term needs of innovators seeking to trial or bring a new product or service to market<sup>8</sup>.

- c) The third distinction relates to the scale of experiments: in most cases, they are locally-confined with small-scale parameters, but in a few cases, experiments may embrace a large portion of a network (and connected customers).
- d) The last substantive distinction refers to the process adopted by NRAs for the selection of sandboxes and experiments. In almost all cases we observed, there is a defined process by which applications are developed and assessed: we refer to these cases as “ex-post approval”. In this model, the regulator assesses each application against established criteria and makes individual decisions. In fewer cases, an “ex-ante regulatory framework” approach is utilised. In this model, each potential sandbox is not subject to assessment; rather, “pilot regulations” are established which allow for a specific novelty for a transitional period at the end of which, the original regulation is changed according to the results of the pilot.

### 3.2 Pillars of regulatory sandboxes/experiments

In the previous section, we identified characteristics that differentiate the tools available to NRAs when seeking to unleash innovation in enabling the energy system transition: a) network versus market; b) policy-orientated versus innovator-oriented; c) the scale of the experiment; and d) ex-post versus ex-ante design approach).

Despite these differences, there are “pillars” common to almost all schemes. Three main aspects are discernible in the regulatory sandboxes and experiments being enacted by NRAs:

Pillar 1 – time-limited: this is a feature of practically every regulatory tool supporting innovation, although the duration of sandboxes/experiments varies a lot from case to case.

Pillar 2 – an orientation to learning: a genuine openness to learning from the results of the experiment. This can take different forms amongst which dialogue with innovators, dissemination of results, and wider discussion with stakeholders are the most frequent. In a limited number of cases, sandboxes are accompanied by a “test plan” defined at the beginning and subject to formal evaluation during and at the end of the experiment.

Pillar 3 – derogations from regulation: this is the most difficult and sometimes controversial issue because when derogations are granted on a case-by-case basis, regulators must be conscious of the risk of discrimination and distortion of the “level playing field”, especially when not only grid operators are involved but also other market players<sup>9</sup>.

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<sup>8</sup> Among the respondents, two-thirds of the CEER Members have implemented demand-led sandboxes. The rest of the Members have implemented either policy-led sandboxes or both demand-led and policy-led sandboxes.

<sup>9</sup> See from the Council of the European Union, “Council Conclusions on Regulatory sandboxes and experimentation clauses as tools for an innovation-friendly, future-proof and resilient regulatory framework that masters disruptive challenges in the digital age”, 16 November 2020, <https://data.consilium.europa.eu/doc/document/ST-13026-2020-INIT/en/pdf>; in particular, see point 12 “...*underlines that regulatory sandboxes and experimentation clauses always need to respect and should foster the application of the principles of subsidiarity and of*

The above characteristics, distinctions, and pillars may prove to be useful in classifying the “regulatory toolkit” of Dynamic Regulation which is explored in the paper’s conclusion.

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*proportionality, as well as of the precautionary principle. A high level of protection of inter alia citizens, consumers, employees, health, climate and the environment, as well as legal certainty, financial stability, a level playing field and fair competition always need to be ensured and existing levels of protection need to be respected”.*

## **4 Regulatory sandboxes, experiments, and incentive regulation**

So far, this paper has explored regulatory sandboxes at a higher-conceptual level, but now we turn to the question of sandboxes and network innovation. How, for example, does the regulatory sandbox affect incentive regulation? Are there fundamental tensions between the goals of facilitating innovation and providing incentives for efficient network operation?

Incentive regulation encompasses regulatory methodologies that aim to reach regulatory goals by setting the allowed revenues of grid operators, to be recovered through network tariffs, in a way that is not directly related to their actual costs. Therefore, incentive regulation links grid operators' actual remuneration (above or below the allowed one) to their performance, either in cost efficiency or in reaching targets or outputs in specific areas of activity, such as quality of service and power losses. These incentives should be set in ways that deliver efficient long-term outcomes for consumers.

Traditionally, under incentive regulation, the promotion of innovation was viewed as a means to reach other regulatory goals, such as cost efficiency and quality of service.

However, as mentioned in chapter 2, in the current context of energy system transition and integration, regulatory methodologies should reflect the need for adaptive regulation and the DSO's role as an "enabler" of innovation. Regulatory sandboxes are part of an NRA's toolkit to facilitate innovation without compromising the effectiveness of incentives for efficient operation or the role of the DSO as a neutral market facilitator. This tool enables regulators to move towards a more proactive stance to facilitate innovation in ways that do not necessarily require additional allowed revenues or remuneration, securing the affordability of grid operations.

In turn, the input and results of projects that benefit from a regulatory sandbox can inform NRAs when designing incentive regulation and setting its parameters, for instance by identifying more appropriate outputs which were revealed through a regulatory sandbox experience. At the same time, some innovation tools may require some form(s) of financial incentives, such as the recognition of costs with pilot projects or regulatory experiments outside of the incentive regulatory scheme.

Based on a questionnaire that was circulated amongst CEER Members for this paper, almost half of the NRAs recognise that there is a relationship between tools such as regulatory sandboxes (or related concepts) and incentive regulation. In this context, a few NRAs stated that they use regulatory sandboxes to check if there are any regulatory barriers to innovation, while some NRAs use pilot projects before introducing new functionalities (for instance, smart grid requirements), or a combination of both.

Several NRAs also mentioned that when using these tools to facilitate innovation there is some form of financial incentive awarded to the DSO through the definition of allowed revenues. Examples included setting specific output-based innovation incentives or recognising pilot projects' costs. For example, in the case of Italy, the regulatory experiments related to DSOs are strictly interlinked with output-based regulation: derogations can be allowed and the penalty foreseen from ordinary regulation is temporarily suspended during the experiment, but if at the end of the experiments, the innovation does not prove to be successful, ordinary regulation is applied as if the DSO had not applied for the experiment.

## 5 Institutional perspectives

The survey revealed a diverse range of institutional considerations that NRAs (and other stakeholders) have considered in the development and enactment of regulatory sandboxes and experiments:

### 5.1 Institutions in charge of the regulatory sandbox

Across CEER Members, different institutions have established and run regulatory sandboxes. In Great Britain (GB) and Italy, regulators manage the regulatory sandboxes, whereas in the Netherlands and Germany it is the governments. In France and Spain, both the regulator and the government manage the regulatory sandbox. In some countries, such as Norway, funding agencies play a crucial role.

### 5.2 Source of legal powers

It might be necessary to give a new legal competence or competences to the regulator in order to create a sandbox. In France, the Energy and Climate Law of November 2019<sup>10</sup> enables the regulator to grant derogations from legal provisions within defined parameters. However, the introduction of a new legal competence for the regulator is not always a prerequisite. In GB and the Netherlands, for example, existing legal frameworks for regulators were sufficient for the scope of the regulatory sandboxes.

### 5.3 Jurisdictional competence

To the best of our knowledge, an institution can only grant derogations to regulatory provisions that fall within its defined parameters of competence. For example, in GB and France, regulators can grant a derogation to a rule only if the “ownership” of the rule resides with them. In both France and GB, as the regulator approves the industry rulebooks of the network operators, regulators can also provide derogations for time-limited trials.

### 5.4 Collaboration and coordination

Collaboration and knowledge exchange among a diverse group of stakeholders is essential for innovation to result in learning and subsequent change. In some countries, coordination is a prerequisite: in Spain and France, the NRAs must coordinate with the government; in GB, Ofgem engages with industry code bodies<sup>11</sup>.

However, coordination is not always an easy task. Across the countries that have implemented regulatory sandboxes/experiments, the issue most mentioned by NRAs is the complexity of coordinating with other organisations and institutions<sup>12</sup>.

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<sup>10</sup> See <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000039355955/>

<sup>11</sup> Industry codes underpin the electricity and gas wholesale and retail markets. Licensees are required to maintain, become party to, or comply with the industry codes in accordance with the conditions of their licence. Each code has a panel or committee that oversees the assessment of proposed changes to that code, supported by a code administrator/body. A general rule is that changes should only be made if they better facilitate that code’s ability to meet its objectives. For some proposed changes, the code’s panel will also make the final decision on whether implementation is appropriate, but this is not always the case. Certain modifications require consent from Ofgem.

<sup>12</sup> See also ISGAN (International Smart Grid Action Network), Regulatory Sandbox 2.0 Project, Policy Messages to the Clean Energy Ministerial, May 2021, <https://www.iea-isgan.org/wp-content/uploads/2021/06/Policy-Messages-from-the-ISGANRegulatory-Sandbox-2.0-Project.pdf>

With a diversity of stakeholders, there is the possibility that regulatory players reach different conclusions about the desirability and deliverability of a particular proposal. Despite these challenges, the DS WG identified good practices from across Europe and further afield that can foster coordination and collaboration:

- a) Collaborative design: in France, the regulator developed its framework after public consultations and published feedback on the implementation of the framework.
- b) Clear procedures: clearly defined scope, roles, obligations, and processes are critical for success. In Norway, procedures describe the different stages of the sandbox and the roles of the NRA, the government, research institutes and funding bodies.
- c) Permanent working groups: setting up permanent working groups (or knowledge exchanges) ensures that information is shared. In Germany, there are regular exchanges between the SINTEG<sup>13</sup> programme managers and standardisation committees. In Italy, ARERA has set up spaces for better dialogue with innovators.
- d) Collaborative trials. In GB, unregulated companies must partner with licensed companies to undertake a live trial. In Austria, consortia must include a research institute. In Italy, the power system research institute (RSE – *Ricerca sul Sistema Energetico*) cooperates with the regulator for the evaluation of pilot projects or pilot regulations. In Germany, the SINTEG programme encourages the participation of large consortia. In France, the regulator and the government draw on the expertise of network operators and local authorities.

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<sup>13</sup> Funded by the German Federal Ministry for Economic Affairs and Energy, [SINTEG](#) was a large-scale test for the energy supply of the future and the digitalisation of the energy sector. More than 300 companies, research institutions and municipalities worked together from 2016 to 2020 and formed five model regions (showcases) in which they developed and tested solutions for the energy supply of the future.

## 6 Conclusions

### 6.1 Towards a Dynamic Regulation Innovation Toolkit

Regardless of whether they fit into the “regulatory sandbox” description, we can say with certainty that there is a diverse range of dynamic tools available to NRAs seeking to unleash the potential of innovation to contribute to the energy system transition. Although the concept of regulatory sandboxes is becoming ubiquitous, spreading globally among regulated sectors and industries, we should be clear that a regulatory sandbox is but one form of dynamic tools available to NRAs to support innovation.<sup>14</sup>

Looking across the activities of Europe’s NRAs we typically observe different (and interacting) tools that could be broadly classified into four categories. The suitability of each depends on various factors including the policy issue at hand, who the participants are, where things are on the innovation policy journey (research and development, demonstration, deployment, or diffusion), and the scale/reach of the proposed activities.

The four tools of the Dynamic Regulation Innovation Toolkit are:

1. **Pilot project:** these are small-scale preliminary in-field trials conducted to evaluate the feasibility, benefits, costs, and risks of an innovative approach/functionality/technology. These pilots involve grid operators (DSOs and/or TSOs) and regulatory approval is necessary. Regulators sometimes contribute funding to pilots through a levy on network tariffs (extremely limited impact due to the small scale of the pilot), and in such a case require full transparency on results.
2. **Regulatory sandbox:** sandboxes are a general framework that innovators can apply to test their innovative products, services, and methodologies (including new business models) for a certain period of time; the regulator (sometimes in combination with other institutions) awards eligible applicants the ability to operate within such a framework following an assessment process. In most cases, the sandbox involves a specific derogation (waiver or exception) from standard regulations, subject to conditions imposed by the regulator. In some cases, the sandbox can include additional support such as bespoke guidance and comfort (about compliance and enforcement) that the innovator can rely on for the period of the trial. This tool allows innovators to trial their ideas while preventing severe risks for innovators, other market participants, and final customers; the regulator’s approval is intended to avoid discrimination or the foreclosure of competition.
3. **Regulatory experiments:** this term is used in a few jurisdictions and describes a “large-scale” and “policy-driven” sandbox in which derogations are awarded to grid operators (only) to test changes in regulation combined with new grid technology. Unlike demand-led innovations stemming from market players (as in “regular”

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<sup>14</sup> The upcoming CEER paper ““Dynamic NRAs to Boost Innovation” (Report on NRAs’ experiences and recommendations on Dynamic Regulation)” will look at dynamic tools more broadly.



sandboxes), these experiments are commissioned, coordinated, and overseen by the regulator (or another public institution).

4. **Pilot regulations:** these involve the establishment of an ex-ante regulatory framework that defines a transitional regime to cope with a novel issue impacting the power system. Pilot regulations are intended as learning initiatives to inform changes to the current regulatory framework. This tool, although still rare among NRAs, has the advantage of avoiding lengthy approval proceedings (that are inherent in all other regulatory innovation tools), and of limiting the risk of discrimination embedded in sandbox derogations, where market players may be treated differently according to the approval or not of their applications<sup>15</sup>.

These tools may operate on a stand-alone basis, but a more agile and dynamic approach will see NRAs and stakeholders utilising different approaches (sometimes sequentially) as pilot projects and discrete regulatory sandboxes to inform the development of regulatory experiments and pilot regulations. The following chart plots the different tools according to the users (grid or market participants) and the scale of the proposed innovation activity:

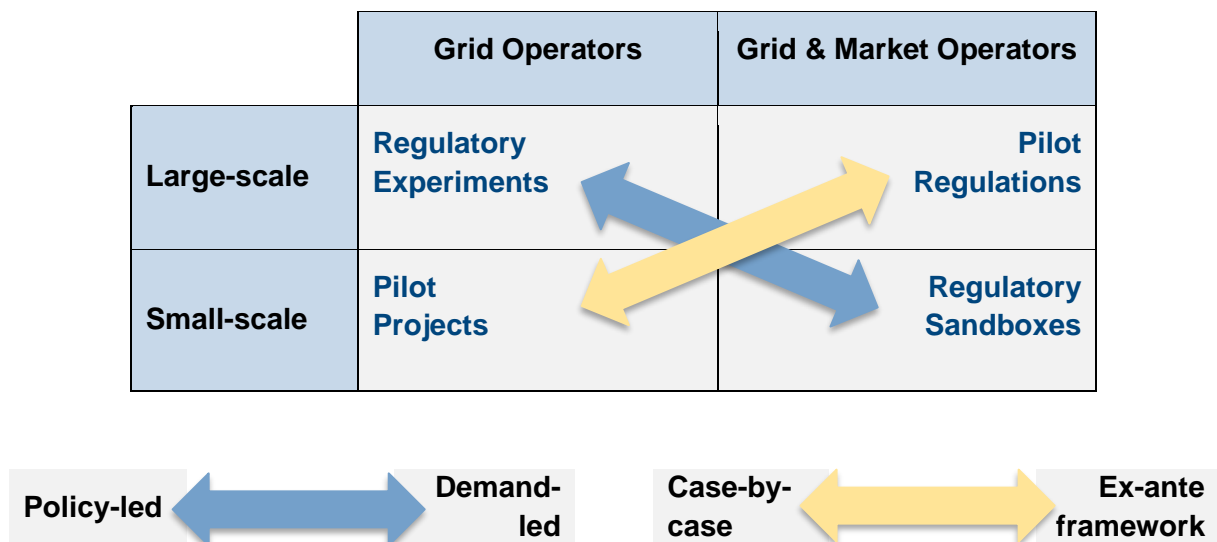


Figure 1 – Dynamic Regulation Innovation Toolkit

Finally, it should be noted that this typology (or (taxonomy) is not intended to be rigid and should not be seen as a “one size fits all” approach. Depending on the context of each country, the boundaries between these tools may overlap or be difficult to define. Moreover, certain situations will require a specific approach that may combine characteristics of several tools. As its name suggests, dynamic regulation implies the ability by NRAs to adopt an ever-evolving toolkit. However, we believe that suggesting a taxonomy provides some guidance to NRAs when deciding the most adequate dynamic regulation approach to apply in specific situations.

<sup>15</sup> See also ISGAN (International Smart Grid Action Network), Innovative Regulatory Approaches with Focus on Experimental Sandboxes 2.0, Casebook: Austria, Belgium, Canada, Denmark, France, Israel, Italy, Norway, Sweden and the United Kingdom, October 2021, [www.iea-isgan.org/wp-content/uploads/2021/10/Regulatory-Sandbox-2.0\\_For-Publication.pdf](http://www.iea-isgan.org/wp-content/uploads/2021/10/Regulatory-Sandbox-2.0_For-Publication.pdf).

## 6.2 What next for NRAs?

The topic of the regulatory support for innovation in the power system is still very open and only a few first recommendations for NRAs can be drawn so far.

Firstly, it is rather evident that power system transformation (decarbonisation, decentralisation, digitalisation) requires regulatory authorities to engage at least in removing barriers to innovation. Keeping in mind the ultimate objective of innovation, this would be the first preliminary step for NRAs to understand the real need for change. Each NRA could therefore consult the stakeholders to identify major barriers, but without compromising the regulatory principles of fair competition, customer protection, and efficiency.

Secondly, this paper has aimed to demonstrate that there is no “*one-size-fits-all*” solution for an NRA wishing to engage actively in supporting innovation: indeed, a broad toolkit is available for regulators and the NRA could select the best-suited tool, or combination of tools, according to each concrete case (i.e. according to targets, involved roles, the width of the experiment, funding and feasible derogations).

Thirdly, the distinction between regulated grid activities (transmission, dispatching, distribution and metering) and competitive market activities (generation, storage, retail supply and aggregation) is of paramount relevance when an NRA is approaching the toolkit. Particularly in regard to funding, NRAs should focus on regulated activities, in which their institutional remit can provide a legal basis for specific incentive regulation related to innovation on a large scale and/or for funding of pilot projects for a demonstration on a small scale. Cooperation with other public institutions, research institutes, and funding agencies is also relevant when considering a larger perimeter than regulated activities only.

Fourthly, regulatory sandboxes and other innovation-related tools are often characterised by regulatory derogations. When supporting innovation, NRAs must avoid the foreclosure of competition in wholesale, retail and adjacent markets: in this respect, derogations are possibly one of the most critical issues because the risk of discrimination has to be carefully avoided when designing the experiment or approving the application for a sandbox. Furthermore, requests for derogations have to be checked through close cooperation with competent authorities in case of juridical or institutional constraints that are beyond the legal powers of NRAs.

Lastly, but of great importance, all regulatory tools for supporting innovation should ultimately aim to allow learning of all involved parties, regulators included. A robust design of each experiment is therefore strongly recommended, including transparent criteria for evaluation of results and actions for dissemination of knowledge emerging from trials. When implementing regulatory sandboxes and other innovation-related tools or incentives, it should be emphasised that these approaches are not considered as an aim in themselves, and nor should they privilege certain technologies (in the long run) but rather they should support overall grid efficiency.

## Annex 1 – List of abbreviations

Term	Definition
CAPEX	Capital Expenditure
DS WG	Distribution System Working Group
DSO	Distribution System Operator
GB	Great Britain
GGP	Guidelines of Good Practice
NRAs	National Regulatory Authorities
OPEX	Operational Expenditure
R&D&D	Research, development and demonstration
RBM WG	Regulatory Benchmarking Working Group
TSO	Transmission System Operator

## **Annex 2 – About CEER**

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 39 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice, and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment-friendly, and harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

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More information is available at [www.ceer.eu](http://www.ceer.eu).