



Smart Energy, Sustainable Future

**FRAMEWORK FOR A
REGULATORY SANDBOX FOR THE ENERGY SECTOR
IN SINGAPORE**

FINAL DETERMINATION PAPER

23 October 2017

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FRAMEWORK FOR A REGULATORY SANDBOX FOR THE ENERGY SECTOR IN SINGAPORE

FINAL DETERMINATION PAPER

1 Executive Summary

- 1.1 On 29 June 2017, the Energy Market Authority (“EMA”) issued a consultation paper on the proposed guidelines (the “Framework”) for a regulatory sandbox (the “Sandbox”) for the energy sector. The Sandbox is intended to allow the industry to test new products and services in a safe and conducive space, while providing the necessary safeguards to protect consumers and the energy market. At the same time, the Sandbox would provide an avenue for EMA to review existing regulations and adjust them as appropriate to support innovation.
- 1.2 The consultation paper set out the objective and principles of the Sandbox, as well as the application process for interested parties (the “Applicant”). The Applicant will be responsible for deploying and operating its products/services in the Sandbox upon approval, with EMA providing the appropriate regulatory support to facilitate experimentation.
- 1.3 The consultation paper closed on 27 July 2017, and a total of 20 responses were received. EMA would like to thank all respondents for their contributions.
- 1.4 EMA has carefully considered the feedback received, and has incorporated them where appropriate in this determination paper.

2 Feedback from the Public Consultation Paper

2.1 Recap of the Consultation Paper

2.1.1 In the consultation paper, EMA sought views on the Framework, which covered the following areas: (i) the proposed process for applying, evaluating and conducting the Sandbox; (ii) the proposed criteria for approving projects under the Sandbox; and (iii) the proposed changes to existing regulations and rules to address current regulatory barriers to innovation.

2.2 Summary of Feedback received

2.2.1 The consultation paper closed on 27 July 2017 and 20 parties provided responses to the consultation paper (see Table 1). The feedback received were positive and supportive of EMA's efforts to introduce a Sandbox for the energy sector. The respondents' feedback and EMA's corresponding responses are detailed in **Appendix 1**.

Table 1: List of Respondents to EMA's Consultation Paper

Respondents
1. Dr Victor Wong (provided independent feedback)
2. EDF Lab Singapore
3. Energy Market Company Pte Ltd
4. ExxonMobil Asia Pacific Pte Ltd
5. Gas Supply Pte Ltd & Pavilion Gas Pte Ltd (provided a joint response)
6. GreenSync Holdings Pte Ltd
7. Keppel Energy Pte Ltd
8. LYS Energy Group
9. Mr Ng Soo Yong (provided independent feedback)
10. PacificLight Power Pte Ltd
11. PUB, Singapore's National Water Agency
12. Red Dot Power Pte Ltd
13. Sembcorp Industries Ltd
14. Singapore LNG Corporation Pte Ltd
15. SP Group
16. Sun Electric Pte Ltd
17. Sunseap Group
18. Tuas Power Ltd
19. Tuaspring Pte Ltd
20. YTL PowerSeraya Pte Ltd

3 Introduction

- 3.1 EMA encourages and welcomes interested parties to provide innovative energy solutions and services that will contribute to a reliable and secure energy supply, effective market competition, and a dynamic and sustainable energy sector in Singapore.
- 3.2 The energy landscape is fast evolving, with emerging energy technologies and business models that have the potential to reshape economies and industries. A responsive and forward-looking regulatory approach will help promising energy innovations to develop and flourish. In this regard, the establishment of a regulatory sandbox can create an environment where regulations can be relaxed within parameters, to promote innovation in Singapore's energy sector. It also allows the regulator to assess the impact of new products and services before deciding on the appropriate regulatory treatment.
- 3.3 The concept of regulatory sandboxes is gaining momentum in sectors such as the Financial Technology (FinTech) sector. For example, in building a Smart Financial Centre in Singapore, the Monetary Authority of Singapore (MAS) is supporting FinTech experiments so that promising technologies can be tested in the market. While still nascent, there is growing interest in the concept in the energy sector as well. The Office of Gas and Electricity Markets (OFGEM), for example, launched in February 2017 a call for interest in a regulatory sandbox to trial innovative energy business propositions in the United Kingdom (UK), and to allow OFGEM to adapt its regulatory framework to future developments in UK's energy sector.
- 3.4 EMA currently reviews its regulations on a case-by-case basis to accommodate experimentation of new technologies and business solutions. To formalise the approach, EMA is implementing a Sandbox to allow the industry to test new products and services in a safe and conducive space. While the Sandbox cannot remove all risks, as failure is an inherent characteristic of innovation, the environment can provide the necessary safeguards to contain the consequences of failure on consumers and the energy market. At the same time, the Sandbox can provide an avenue for EMA to review its regulatory frameworks and to provide appropriate regulatory support.
- 3.5 This final determination paper will cover the following areas: (i) the process for applying, evaluating and conducting the Sandbox; and (ii) the criteria for approving projects under the Sandbox.

4 The Regulatory Sandbox Approach

- 4.1 EMA would like to encourage more experimentation in the electricity and gas sectors so that promising innovations can be tested in the market and have a chance for wider adoption in Singapore and abroad.
- 4.2 To achieve this objective, an interested party/parties can apply to adopt a Sandbox to experiment with innovative products and services within a well-defined space and duration. The Sandbox shall include appropriate safeguards to contain the consequences of failure and maintain the overall safety and soundness of the electricity/gas system. EMA may also support the sandboxing of similar products and services that could run concurrently, as long as they meet the objectives and the evaluation criteria as delineated in sections 7 and 8 of this paper respectively.
- 4.3 The Sandbox would be deployed and operated by the Applicant, with EMA providing the appropriate regulatory support by relaxing specific legal and regulatory requirements prescribed by EMA, which the Applicant would otherwise be subject to, for the duration of the Sandbox. Depending on the proposed product/service, the Applicant involved and the proposal made to EMA, EMA will determine the specific legal and regulatory requirements which it is prepared to relax for each case.
- 4.4 Upon the completion or expiry of the Sandbox, the Applicant must fully comply with the prevailing and relevant legal and regulatory requirements for its continued operations.
- 4.5 EMA will not be providing any funding for proposals selected for the Sandbox (the "Sandbox Project"). There will also not be any charges levied on the Sandbox Project associated with the running of the Sandbox (e.g. application fee/trial fee). EMA however, reserves the right to recover the relevant costs for the operation of the sandbox from the participants.

5 Purpose of the Framework

- 5.1 The Framework sets out the objective and principles of the Sandbox, and provides guidance to the Applicant on the application process and the information to be furnished to EMA.

6 Target Audience

- 6.1 The Framework will be of particular interest to entities that are looking to leverage on existing or new technology in an innovative way to provide products and services in the electricity and gas sectors, or to improve business and operational procedures. The target participants include, but are not limited to, technology firms, as well as stakeholders and licensees in the electricity and gas sectors.

7 Objective and Principles of the Sandbox

- 7.1 This section outlines the objective and principles of the Sandbox, and provides the rationale for deploying a Sandbox.

- 7.2 EMA aims to develop an energy landscape that is forward-looking, dynamic and vibrant. To this end, the Sandbox can help to support innovation and risk-taking that could bring benefits to the market and consumers. The Sandbox would also complement ongoing Energy Research and Development (R&D) initiatives, such as by providing a platform for R&D projects to be tested on a broader scale in Singapore.
- 7.3 The scope of the Sandbox will be on products and services related to the electricity and gas sectors under the jurisdiction of EMA.
- 7.4 The Sandbox must have a well-defined space and duration for the proposed product/service to be launched, within which the consequences of failure can be contained.
- 7.5 EMA will determine the specific legal and regulatory requirements which it is prepared to relax for Sandbox Projects, depending on the product and/or service to be experimented.
- 7.6 Given its purpose, the Sandbox may not be suitable under the following circumstances:
- (a) The proposed concept is considered to be similar to those that are already being offered in Singapore, unless the applicant can articulate the insights to be gained. E.g. through showing that either (i) how a different technology or product/service is being applied, or (ii) how the same technology or product/service is being applied differently;
 - (b) The proposed concept can already be implemented under the current legal and regulatory framework;
 - (c) The Applicant has not done its due diligence to test and verify the viability and safety of the product/service, such as testing the technology or product/service in a laboratory environment, and obtaining the necessary technical and safety certifications for the technology or product/service used in the experimentation;
or
 - (d) The Applicant can reasonably and effectively experiment with the product/service in a laboratory or test environment, such as in an ongoing R&D test-bed.
- 7.7 Notwithstanding the above, proposals that are assessed upfront to have the risk of compromising electricity/gas system security or adversely affect the competitiveness of the electricity/gas market will not be considered.

8 Sandbox Evaluation Criteria

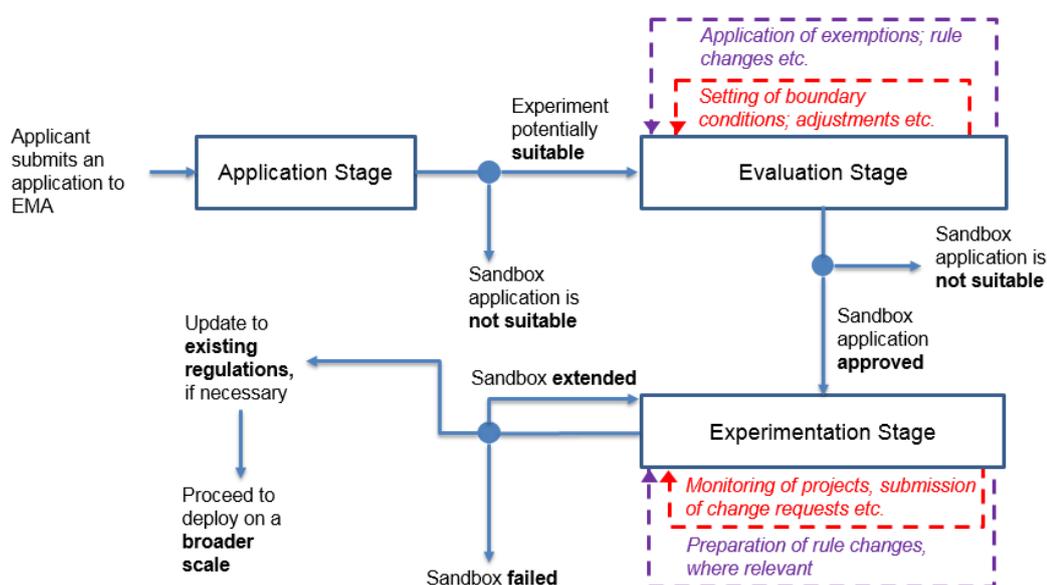
- 8.1 This section outlines the main evaluation criteria which will be used by EMA in the holistic evaluation and selection of the Sandbox Projects.
- 8.2 The application should contain the necessary supporting information (**Annex A**) to depict how the Sandbox evaluation criteria listed below can be fulfilled:

- (a) **Genuine innovation:** The submitted proposal should show that the product/service includes new or emerging technologies or products/services, or uses existing technologies or products/services in an innovative way. For example, secondary research should show that few or no comparable offerings are available in the Singapore market.
- (b) **Benefit to consumers and/or the energy sector:** The submitted proposal should show how the product/service can benefit the consumer and/or the gas and electricity sectors.
- (c) **Need for Sandbox:** The proposal should show that the project cannot be deployed under current regulatory framework. For projects that require relaxing of regulatory requirements, the proposal should identify the limiting clauses and include alternative safeguards that can be put in place by the Applicant to address potential system, market or consumer concerns.
- (d) **Ready for testing:** The proposal should show that the Applicant has secured or intends to secure relevant assets and resources for experimentation and has clearly defined test scenarios and outcomes.
- (e) **Defined boundary conditions:** The proposal should be as clearly defined as possible (e.g. by duration of experimentation; customer target segment or estimated customer base), for the Sandbox to be meaningfully executed while sufficiently protecting the interests of consumers and maintaining the safety and soundness of the electricity and gas sectors.
- (f) **Defined monitoring and evaluation procedure:** The Applicant should report to EMA on the test progress based on an agreed schedule.
- (g) **Risk assessment and mitigation:** Significant risks arising from the proposed technology/product/service should be foreseen, assessed and mitigated. For instance, by providing evidence of preliminary testing, and by identifying risks and proposing mitigating measures for such risks.
- (h) **Defined exit and/or transition conditions:** The proposal should clearly define acceptable exit and transition conditions, should the Sandbox Project be discontinued due to certain reasons (e.g. inability to meet objectives of project; safety lapses etc.), be extended (e.g. additional time required to rectify faults), or can proceed to deployment on a larger scale at the end of the Sandbox period. In particular, the conditions should ensure that affected consumers are kept whole in the event that the Sandbox Project is discontinued. Should the Sandbox Project include substantial investment in fixed assets, the Applicant should also specify how these fixed assets would be handled/decommissioned if the Sandbox Project is discontinued.

9 Application and Approval Process

- 9.1 The Applicant should ensure that the proposal fulfils the proposed objectives, principles and criteria as given at sections 7 and 8 before submitting the application form, which is attached as **Annex A** of this consultation paper. Applications for sandbox projects should be sent to sandbox@ema.gov.sg. Queries related to the Sandbox can also be sent to this account.
- 9.2 The following diagram depicts the application and approval process. EMA will communicate with the Applicant in the course of evaluating the Sandbox application, and will continue to do so during experimentation:

Figure 1: Application and approval process



- Prior to submitting an application, the Applicant can and should clarify any question regarding the Sandbox by writing in to EMA.
- At the “Application Stage”, EMA will review the application and endeavour to inform the Applicant of its potential suitability for a Sandbox within **30 working days** after EMA receives a complete set of information necessary for the assessment. The preliminary indication serves to help the Applicant with its business and resource planning.
- At the “Evaluation Stage”, the time required to assess the proposal is dependent on its complexity and the specific legal and regulatory requirements involved. Due to the exploratory nature of the Sandbox approach, the Applicant is allowed to make adjustments to the application for resubmission (for example, refining the boundary conditions) after discussing with EMA. The Applicant would be informed in writing whether to proceed with the Sandbox.

- (d) The Applicant will be informed of the reasons if the application is rejected. The reasons for rejection could include failure to meet the objective and principles of the Sandbox, or any of the evaluation criteria. The Applicant may re-apply for the Sandbox when it is ready to meet the objective, principles and evaluation criteria of the Sandbox.
- (e) Upon approval of the application, the Sandbox will enter the “Experimentation Stage”, and Section 11 of this document shall apply. The Applicant shall notify its customers, if any, that the product/service is operating in a Sandbox and disclose the key risks associated with the product/service. The Applicant is also required to obtain the customers’ acknowledgement that they have read and understood these risks.
- (f) In the event that the Applicant intends to make material changes to the product/service under experimentation during the “Experimentation Stage”, the Applicant should apply to EMA at least **1 month** in advance and provide details of the changes with reasons (the “change requests”). The Applicant can continue experimenting with the existing product/service while EMA reviews the change requests and informs the Applicant of its decision.
- (g) For the purpose of transparency and provision of information to customers, relevant information of all approved Sandbox applications such as the name of the Applicant, the start and expiry dates of the Sandbox experimentation and a broad description of the Sandbox will be published on EMA’s website.

9.3 The proposals may have different processes depending on whether they are (i) covered under existing frameworks but do not meet certain rule requirements, or (ii) entirely new technologies/products/services that are not covered under existing regulatory requirements. The processing time for (ii) will take longer, as more time is required to customise the test boundaries and conditions for the Sandbox.

9.4 To illustrate the application and approval process, **Annex B** provides a case study on how a proposal that meets EMA’s expectations is processed, which will allow for a Sandbox to be implemented.

10 Regulatory Changes

10.1 EMA can allow proposals for new products and services to be experimented within the Sandbox with relaxed regulations. Such regulations include, but are not limited to:

- (a) Codes of Practices - Under the Electricity and Gas Acts, EMA has the powers to exempt stakeholders from the relevant provisions in the codes of practices, such as those related to metering codes and codes of conduct.
- (b) Electricity Market Rules - EMA may work together with the Energy Market Company Ltd (EMC) – the administrator of the Electricity Market Rules – to modify the existing Electricity Market Rules, if necessary.

- (c) Licensing Conditions for Electricity and Gas licensees – Under the Electricity and Gas Acts, EMA may, with the approval of the Minister, provide exceptions from licensing requirements. EMA will continue to look at ways to facilitate the relaxation of such conditions related to the Sandbox.

10.2 Following a successful Sandbox, EMA may deem that certain regulations can be permanently amended or relaxed. EMA will consult the industry accordingly for such regulatory changes.

11 Extending or Exiting the Sandbox

11.1 At the end of the Sandbox period, the legal and regulatory requirements relaxed by EMA will expire, and the Applicant must exit from the Sandbox unless otherwise notified by EMA.

11.2 In the event that the Applicant requires an extension of the Sandbox period, the Applicant should apply to EMA as early as possible, with at least **1 month** before the expiration of the Sandbox period. Nonetheless, the Applicant is encouraged to consult EMA as early as practicable on the possibility of any extension. The Applicant is to provide reasons to support the application for extension (for example, if additional time is needed to make changes to the product/service under experimentation to rectify flaws, or if the Applicant requires more time in order to fully comply with the relevant legal and regulatory requirements). It should also assume that the deadlines that were earlier committed to, such as those stated in section 8.2 of this document, are upheld unless otherwise notified. EMA will review the application and approval will be granted on a case-by-case basis. EMA's decision on the application for extension is final.

11.3 Upon exiting, the Applicant can proceed to deploy the product/service under experimentation on a broader scale, provided that:

- (a) both EMA and the Applicant are satisfied that the Sandbox has achieved its intended test outcomes;
- (b) the regulatory treatment for the product/service for broader deployment is determined; and
- (c) the Applicant can fully comply with the relevant legal and regulatory requirements.

11.4 The Sandbox will be discontinued ahead of schedule when:

- (a) EMA is not satisfied that the Sandbox can achieve its intended purpose, based on the latest test scenarios, expected outcomes and/or schedule mutually agreed with the Applicant;

- (b) a substantial flaw has been discovered in the product/service under experimentation, or if there are any severe unintended consequences, where the risks posed to consumers or the electricity/gas system outweigh the benefits of the product/service under experimentation, and the Applicant acknowledges that the flaw cannot be resolved within the duration of the Sandbox;
- (c) EMA terminates the Sandbox due to reasons such as the Applicant breaching any condition imposed for the duration of the Sandbox; or
- (d) the Applicant has informed EMA of its decision to exit the Sandbox at its own discretion.

11.5 The Applicant shall ensure that any existing obligation to its customers of the product/service under experimentation must be fully fulfilled or addressed – i.e. affected consumers are kept whole – and that any fixed assets, if deployed, are properly handled/decommissioned upon exiting or discontinuing the Sandbox. The Applicant shall also ensure that it has not entered into any relevant obligations that would extend beyond the intended expiry of the Sandbox period.

Annex A: Application Template

1. Applicant's Information

[Note: For applications involving more than 1 entity, please include the details of the lead entity and all involved entities.]

Organisation	
Address	
Telephone	
Country of Incorporation	

Name of Authorised Representative	
Designation	
Email	
Telephone	
Signature	
Date	

2. Overview

S/N	Description	Response
1	Provide a brief description of the organisation and its core businesses.	
2	Provide a brief description of the product/service contemplated in the proposal.	
3	Does the Applicant currently have the relevant licence(s) to deploy the product/service in the energy sector? Please provide the details.	
4	Does the Applicant require EMA to relax any specific legal and regulatory requirements prescribed by EMA, for the duration of the Sandbox? If so, please identify the limiting regulations and provide details on how they should be relaxed, including alternative safeguards that can be put in place by the Applicant to address potential system, market or consumer concerns.	

3. Details of the proposal to support the Sandbox evaluation criteria

Criteria	Requirements	Supporting Information or Attachments
Para 8.2a and 8.2b	Details of the product/service, including a comparison of the key features against similar or competing technologies.	
	Details of the innovative ways the technology is utilised in the proposed product/service, including a comparison with existing or alternative products, services or processes of similar nature.	
	Benefits of the proposed product/service, such as improvements in security, sustainability, cost efficiency, operational efficiency, or new market segment. Provide quantifiable estimations where applicable.	
Para 8.2c	Assessment on the suitability and readiness of the proposed product/service for the Singapore market, including comparisons against similar markets globally.	
	Details of the business strategy and plan, including the roadmap to deploy the proposed product/service in Singapore on a broader scale.	
	Financial standing of the Applicant, including any capital raised.	

	Relevant technical and business domain knowledge and experience of the Applicant.	
Para 8.2d, 8.2e and 8.2f	Test scenarios aimed at removing the uncertainty which could be arising from regulatory, technology or business, and could not be reasonably or effectively simulated in a test environment.	
	Appropriate targets which allow EMA and the Applicant to assess whether the test outcomes have been achieved.	
	Boundary conditions for the Sandbox, such as: <ul style="list-style-type: none"> • Start and end date of the Sandbox, and the justification for the duration; • Target customer type; • Limit on the number of customers involved; and/or • Expected quantum of electricity sales. 	
	Processes and controls to ensure that the boundary conditions are not breached.	
	Monitoring and evaluation procedure, including a proposed reporting schedule, to report on test progress.	
Para 8.2g and 8.2h	Quantification of the maximum loss and impact that the proposal could potentially create, including any potential knock-on effects.	

	Channels for handling customer or public queries, feedback or complaints.	
	Monitoring plan to ensure the prompt notification of any breach to EMA, for example breach of the Sandbox test scenarios, boundary conditions or safeguards.	
	Risk mitigation plan to minimise the impact of failure on customers, and electricity and/or gas ecosystems.	
	<p>Exit and Transition plan for customers, in the event that the proposed product/service has to be discontinued, or can proceed to be deployed on a broader scale after exiting from the Sandbox.</p> <p>The Exit and Transition plan is to include steps to ensure that any existing obligation to its customers of the product/service under experimentation must be fully fulfilled or addressed – i.e. affected consumers are kept whole – and that any fixed assets, if deployed, are properly handled and/or decommissioned before exiting or discontinuing the Sandbox.</p>	
	Communications plan to inform customers and members of the public (if applicable), including:	

	<ul style="list-style-type: none">• the duration, boundary conditions and associated risk disclosure for participating in the Sandbox;• advance notification of the termination or extension of the Sandbox, or when the proposed product/service can proceed to be deployed on a broader scale.	
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Annex B: An Example of a Sandbox Application

Scenario

- A firm has developed an innovative proposed solution, using a combination of existing and new technology, for an activity regulated by EMA.
- Based on its research, the solution is able to address an existing gap in the electricity sector, and the firm intends to deploy the solution in Singapore.
- The firm has performed rigorous due diligence on the solution, such as by obtaining the necessary internationally-recognised technical and safety certifications for the product/service.
- However, the firm is uncertain if all major foreseeable risk scenarios have been effectively addressed given that there was no precedent to guide the testing.
- In addition, the firm is still at the early growth stage, and is unable to fully comply with existing legal and regulatory requirements. It is looking for certain exemptions to be granted by EMA.

Existing Approach

- The firm submits a licence application to EMA and indicates the specific exemptions required.
- Given the novelty of the solution and that the firm does not have a track record comparable with established energy companies, EMA is likely to take a longer time to understand and clarify the potential risks.
- Meanwhile, the waiting time adds on to the uncertainty of the situation.
- With the existing approach, the scenario could potentially develop into the situations whereby promising innovations were being stifled and the doors to potential opportunities were being closed.

Sandbox Approach

- The firm learns that EMA encourages energy innovations through the adoption of a Sandbox, and prepares the proposal in accordance to the Framework.
- As the firm does not have a contact point with any EMA Review Officer, it submits the proposal and supporting information to EMA

- EMA receives the proposal and assesses it against the Sandbox evaluation criteria, including the specific legal and regulatory requirements to be relaxed for the duration of the Sandbox.
- To facilitate the firm with its business and resource planning, EMA will inform the Applicant on whether the proposal is potentially suitable for a Sandbox within 30 working days.
- EMA continues with the evaluation and clarification process with the firm. Assuming that EMA is satisfied with the proposal, the firm would be informed in writing to proceed with the Sandbox.

Evaluation Criteria	Assessment (illustrative and non-exhaustive)
Is the proposed solution innovative?	Yes, the proposed solution is the first-of-its-kind in Singapore in the region. The deployment of the solution would support Singapore's climate change commitments given that it helps to better manage carbon emissions, and better utilize land-resources given its small footprint as compared to similar products/services in the market.
Does the proposed solution address an issue or bring benefits to consumers and/or the energy sector?	
Is the solution covered under the current regulatory framework?	Currently, the deployment of the solution is not allowed as it does not fall within the regulatory framework, but could be tested under the Sandbox framework to see whether doing so may be more cost-efficient. The Sandbox could also allow EMA to assess if there is a need to adapt our policies to accommodate the deployment of such technologies when they become commercially viable.
Has the Applicant secured the relevant assets for experimentation, and have the Sandbox test outcomes been clearly defined?	The necessary technical and safety certifications have been obtained from internationally-recognised certification bodies.

Are the boundary conditions clearly defined?	Technical experts were also involved from the conceptualization phase to provide safety advice to this initiative.
Have the major foreseeable risks been assessed and mitigated?	
Is there a defined monitoring and evaluation procedure?	The Applicant has included a monitoring and evaluation plan in its proposal.
Has the exit and/or transition strategy been defined in the event that the solution is discontinued?	The Applicant has included decommissioning and removal plans in its proposal.