



## **GUIDELINES - REGULATORY SANDBOX FOR ENVIRONMENTAL SERVICES**

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## **1 Introduction**

- 1.1 NEA encourages and welcomes interested parties to provide innovative technologies and solutions, so that our environmental services industry could continue to contribute towards achieving our Zero Waste Nation vision, a clean and liveable Singapore, as well as growing a vibrant and sustainable industry.
- 1.2 NEA currently accommodates experimentation of new technologies and solutions subject to current regulatory requirements. However, the environmental services landscape is fast evolving, with emerging and disruptive technologies and business models that have the potential to reshape economies and industries. In circumstances where it is less clear whether a new technology/solution complies with the legal and regulatory requirements, some companies may err on the side of caution and choose not to implement it. Promising innovations may be stifled and may result in missed opportunities. A responsive and forward-looking regulatory approach is necessary to enable promising innovations to develop and flourish. In this regard, the establishment of a regulatory sandbox, will create an environment for experimentation where regulations can be relaxed within parameters, to promote innovation in Singapore's environmental services industry. It also allows the regulator to assess the impact of the new technology/solution before deciding on the appropriate regulatory adjustments.
- 1.3 In view of the above, NEA is implementing a Regulatory Sandbox (the "Sandbox") to allow the industry to test new technologies and solutions in a safe and conducive space. While the risk of failure is an inherent characteristic of innovation, the sandbox can provide the necessary safeguards to contain the consequences of failure. At the same time, the Sandbox can provide an avenue for NEA to review its regulatory frameworks and to provide appropriate regulatory support.
- 1.4 Under the Environmental Services Industry Transformation Map (ES ITM) launched on 11 December 2017, the Sandbox has also been earmarked as one of the key enablers to transform the environmental services industry into a vibrant, sustainable and professional one, providing services and solutions to help achieve our Zero Waste Nation vision and a clean and liveable Singapore.

## **2 The Regulatory Sandbox Approach**

- 2.1 NEA is open to more experimentation in the environmental services industry, so that promising innovations can be tested in the market and have a chance for wider adoption in Singapore and abroad.
- 2.2 To achieve this objective, an interested party/parties (the "Applicant") can apply to enter the Sandbox to experiment with innovative technologies and solutions 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 environmental services system. NEA may also support experimentation of similar products and services that may run concurrently, as long as they meet the

objectives and the evaluation criteria as defined in sections 5 and 6 of this document respectively.

- 2.3 The Sandbox would be deployed and operated by the Applicant, with NEA providing the appropriate regulatory support by relaxing specific legal and regulatory requirements prescribed by NEA, which the Applicant would otherwise be subject to, for the duration of the Sandbox. Depending on the proposed technology/solution, the Applicant involved and the proposal made, NEA will determine the specific legal and regulatory requirements which it is prepared to relax for each case.
- 2.4 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.
- 2.5 NEA will not be providing any funding for proposals selected for the Sandbox.

### **3 Purpose of the Guidelines**

- 3.1 The guidelines set out the objective and principles of the Sandbox, and provide guidance to the Applicant on the application process and the information to be furnished to NEA.

### **4 Target Audience**

- 4.1 The guidelines will be of particular interest to entities that are looking to leverage existing or new technology in an innovative way to provide environmental services, 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 environmental services industry, premises owners, and companies partnering with or providing support to such businesses.

### **5 Objective and Principles of the Sandbox**

- 5.1 This section outlines the objective and principles of the Sandbox, and provides the rationale for deploying a Sandbox.
- 5.2 NEA aims to transform the environmental services industry into a vibrant, sustainable and professional one, providing services and solutions to help achieve our Zero Waste vision and a clean and liveable Singapore. To this end, the Sandbox allows NEA to provide the requisite support to:-
  - Encourage innovation in Singapore environmental services industry to enhance public well-being

- Allow trials of approved innovative technology/solutions that are not allowed under current regulatory framework
  - Allow companies through sandbox to experiment and develop scalable and replicable solutions in Singapore and overseas
  - Provide an avenue for NEA to review/adjust its existing regulatory, licensing and enforcement framework to facilitate application of new tech and solutions
- 5.3 The scope of the Sandbox will be on environmental services related technologies and solutions under the jurisdiction of NEA.
- 5.4 The Sandbox must have a well-defined space and duration for the proposed technology/solution to be launched, within which the consequences of failure can be contained.
- 5.5 NEA will determine the specific legal and regulatory requirements which it is prepared to relax for the Sandbox Projects, depending on the technology and/or solution to be experimented.
- 5.6 Given its purpose, the Sandbox may not be suitable under the following circumstances:
- (a) The proposed technology/solution is considered to be similar to those that are already being offered in Singapore, unless the Applicant can articulate the insights to be gained. For example, through showing that either (i) 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; or
- The Applicant has not done its due diligence to test and verify the viability and safety of the technology/solution, such as testing the technology/solution in a laboratory environment, and obtaining the necessary technical and safety certifications for the technology/solution used in the experimentation.
- 5.7 Proposals that are assessed upfront to have poorer emission standards than existing, public health and safety implications, and which do not present satisfactory measures to address these concerns will not be considered.
- 5.8 The Applicant should clearly understand the objective and principles of the Sandbox. It must be emphasised that the Sandbox is not intended and cannot be used as a means to circumvent legal and regulatory requirements.

## 6 Sandbox Evaluation Criteria

- 6.1 This section outlines the main evaluation criteria which will be used by NEA in the holistic evaluation and selection of the Sandbox Projects.

6.2 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 proposal should include new or emerging technologies or solutions, or demonstrate how existing technologies or solutions are deployed in an innovative way. For example, supporting documentation of research should show that few or no comparable offerings are available in the Singapore market.
- (b) **Benefit to stakeholders:** The proposal should show how the technology/solutions can benefit the environmental services industry (e.g. improve productivity) and/or the public.
- (c) **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.
- (d) **Defined boundary conditions:** The proposal should be as clearly defined as possible (e.g. by duration of experimentation; capacity such as estimated tonnage or estimated customer base, etc), for the Sandbox to be meaningfully executed, while sufficiently protecting the interests of stakeholders and maintaining the safety and soundness of the environmental services industry.
- (e) **Defined monitoring and evaluation procedure:** The Applicant should provide progress reports to NEA on the Sandbox Project, based on an agreed schedule.
- (f) **Risk assessment and mitigation:** Significant risks arising from the proposed technology/solution 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.
- (g) **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 when it can proceed to be deployed on a larger scale at the end of the Sandbox period. In particular, the conditions should ensure that affected parties are kept informed in the event that the Sandbox Project is discontinued. Where the Sandbox Project include substantial investments in fixed assets, the Applicant should also specify how these fixed assets will be handled/decommissioned if the Sandbox Project is discontinued.

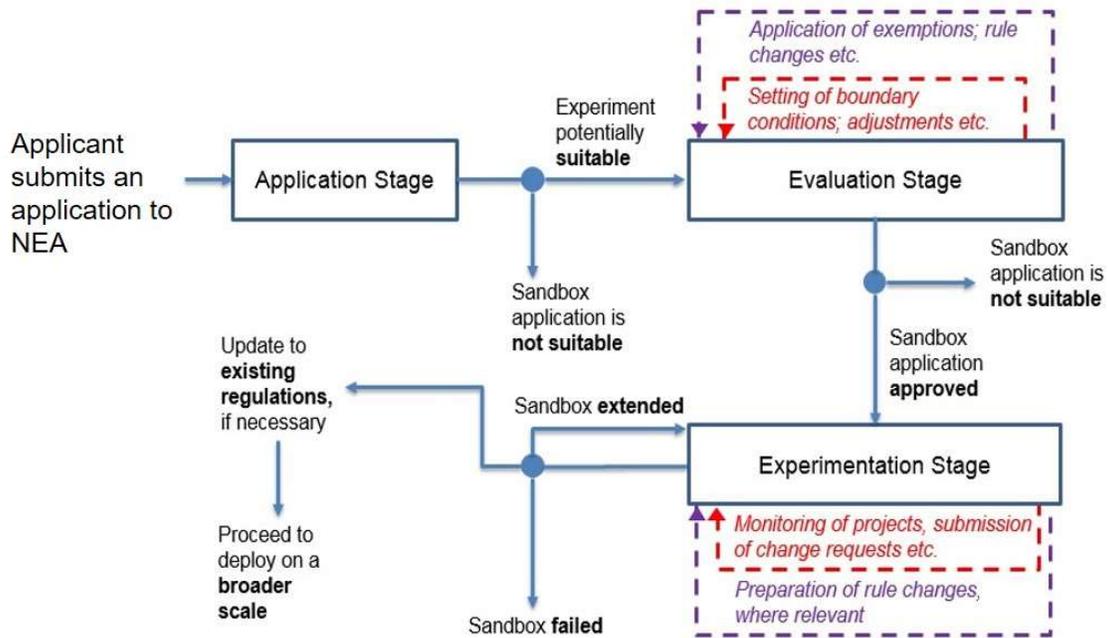
## 7 Application and Approval Process

7.1 The Applicant should ensure that the proposal fulfils the proposed objectives, principles and criteria as given at sections 5 and 6 before submitting the application

form, which is attached as **Annex A** of this document. Applications for Sandbox Projects should be sent to [sandbox@nea.gov.sg](mailto:sandbox@nea.gov.sg). Queries related to the Sandbox can also be sent to this account.

7.2 The following diagram depicts the application and approval process. NEA 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**



- (a) Prior to submitting an application, the Applicant can and should clarify any question regarding the Sandbox in writing, to NEA.
- (b) At the “Application Stage”, NEA will review the application and endeavour to inform the Applicant of its potential suitability for a Sandbox within **30 working days** after NEA receives a complete set of the necessary information for the assessment. The preliminary indication serves to help the Applicant with its business and resource planning.
- (c) 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, the Applicant is allowed to make adjustments to the application for resubmission (for example, refining the boundary conditions) after discussions with NEA. The Applicant will be informed in writing whether to proceed with the Sandbox.
- (d) The application may be rejected if it fails to meet the objectives 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 objectives,

principles and evaluation criteria of the Sandbox. NEA reserves the right to reject an application to the Sandbox at NEA's discretion.

- (e) Upon approval of the application, the Sandbox will enter the "Experimentation Stage", and Section 9 of this document shall apply. The Applicant shall notify its customers, if any, that the technology/solution is operating in a Sandbox and disclose the key risks associated with the technology/solution. 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 technology/solution under experimentation during the "Experimentation Stage", the Applicant should apply to NEA 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 technology/solution while NEA 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 NEA's website.

7.3 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) involve entirely new technologies/solutions 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.

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

## 8 Regulatory Changes

8.1 NEA can allow proposals for new technologies and solutions to be experimented within the Sandbox with relaxed regulations. The Acts that come under NEA's purview include, but are not limited to:

- The Environmental Public Health Act (EPHA) and its relevant regulations
- The Environmental Protection and Management Act (EPMA) and its relevant regulations
- Code of Practice on Environmental Health
- Code of Practice for Pollution Control

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

## 9 Extending or Exiting the Sandbox

- 9.1 At the end of the Sandbox period, the legal and regulatory requirements relaxed by NEA will expire, and the Applicant must exit from the Sandbox unless otherwise notified by NEA.
- 9.2 In the event that the Applicant requires an extension of the Sandbox period, the Applicant should apply to NEA as early as possible, with at least **1 month** before the expiration of the Sandbox period. Nonetheless, the Applicant is encouraged to consult NEA 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 technology/solution 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 6.2 of this document, are upheld unless otherwise notified. NEA will review the application and approval will be granted on a case-by-case basis. NEA's decision on the application for extension is final.
- 9.3 Upon exiting the Sandbox, the Applicant can proceed to deploy the technology/solution under experimentation on a broader scale, provided that:
- (a) both NEA and the Applicant are satisfied that the Sandbox has achieved its intended test outcomes;
  - (b) the regulatory treatment for the technology/solution for broader deployment is determined; and
  - (c) the Applicant can fully comply with the relevant legal and regulatory requirements.
- 9.4 The Sandbox will be discontinued ahead of schedule when:
- (a) NEA 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 technology/solution under experimentation, or if there are any severe unintended consequences, where the risks posed to consumers or the environmental services sector outweigh the benefits of the technology/solution under experimentation, and the Applicant acknowledges that the flaw cannot be resolved within the duration of the Sandbox;
  - (c) NEA 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 NEA of its decision to exit the Sandbox at its own discretion.

9.5 The Applicant shall ensure that any existing obligation to its customers of the technology/solution under experimentation must be fully fulfilled or addressed – i.e. affected stakeholders 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

### Applicant's Information

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

<b>Organisation</b>	
<b>Address</b>	
<b>Telephone</b>	
<b>Country of Incorporation</b>	

<b>Name of Authorised Representative</b>	
<b>Designation</b>	
<b>Email</b>	
<b>Telephone</b>	
<b>Signature</b>	
<b>Date</b>	

Note:

1. Please note that the regulatory sandbox is meant to enable experimentation of innovative environmental services technology/solutions that are regulated by NEA.
2. Before submitting an application, you may write to [Sandbox@nea.gov.sg](mailto:Sandbox@nea.gov.sg) to seek specific clarifications.
3. Please refer to **Section A** for the application details required, and submit the completed application using the template in **Section B**.
4. The completeness and clarity of the information provided in the application will determine the time taken for NEA to review your sandbox application.

## **Section A: Details Required for the Sandbox Application**

1. Please provide full details of your organisation, covering the following areas:
  - a. Profile of the organisation, including the organisation structure, past achievements and business profile with ACRA<sup>1</sup> and/or other regulatory bodies of business entities;
  - b. Profile of key personnel, including relevant domain knowledge and experience; and
  - c. Financial standing, including any funding raised and/or to be raised;

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

2. Please provide full details of the proposed technology/solution to be experimented in the sandbox, covering the following areas:
  - a. Problem statements that the proposed technology/solution aims to address;
  - b. Benefits of the proposed technology/solution, including productivity improvement, in particular, those that may not exist today;
  - c. Business model(s), including the target customers and specific use cases. For each use case, provide an end-to-end illustration on how the proposed technology/solution will be used by the target customers;
  - d. Technical architecture and solution, detailing the specific technology and innovative ways in which the technology will be applied;
  - e. Comparison with existing offerings (including in Singapore) that are similar to the proposed technology/solution, focusing on the problem statements, benefits, technology and business model; and
  - f. The readiness of the prototype development, including an estimated timeframe on the readiness to provide an end-to-end demonstration of the proposed technology/solution to NEA.
3. Please provide full details of the applicable legal/regulatory requirements and the relaxation that you are seeking in order to deliver the proposed technology/solution in the sandbox:
  - a. State all the regulatory status (e.g. licensing, registration, notification, approval, recognition) currently required; and
  - b. State the specific legal and regulatory requirements that you are seeking NEA to relax for the duration of the sandbox, how these should be relaxed and why so.

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<sup>1</sup> Accounting and Corporate Regulatory Authority.

4. Please provide full details of the proposed sandbox design, covering the following areas:
- a. Describe the experiments to be conducted in the sandbox, including specific testing of the application of technology in the proposed technology/solution;
  - b. For each experiment described in 4(a), provide the indicator(s) and corresponding value(s) that would be used to monitor and assess the progress of the experiment. Pls also propose a schedule for the reporting of these;
  - c. State and justify the sandbox boundaries, including:
    - i. Start and end date of the sandbox;
    - ii. Limit on the capacity of the proposed technology/solution (e.g. tonnage, number of customers etc) involved; and
    - iii. Quantification of the maximum loss and impact, including any potential knock-on effects;
  - d. Based on 4(c), describe the controls to be put in place so as to monitor and manage risk and failure in the sandbox as well as safeguards to address environmental, public health and safety concerns;
  - e. Describe the exit and transition plan for customers/stakeholders in the sandbox as well as the resolution plans and how the business would be run off, in the event that the proposed technology/solution has to be discontinued; and
  - f. Communications plan to inform customers/stakeholders and members of the public (if applicable), on the following:
    - 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 technology/solution can proceed to be deployed on a broader scale;
    - channels for handling customers/stakeholders or public queries, feedback or complaints.

## **Section B: Application Template**

Please attach supporting document/information, if any.

1. Please provide full details of your organisation, addressing item 1a to 1c in Section A of the Application Form.

2. Please provide full details of the proposed technology/solution to be experimented in the sandbox, addressing item 2a to 2f in Section A of the Application Form.

3. Please provide full details of the applicable legal/regulatory requirements and the relaxation that you are seeking in order to deliver the proposed technology/solution in the sandbox, addressing item 3a to 3b in Section A of the Application Form.

4. Please provide full details of the proposed sandbox design, addressing item 4a to 4f in Section A of the Application Form.

## **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 NEA.
- Based on its research, the solution is able to address an existing gap in the environmental services industry, 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 technology/solution.
- 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 NEA.

### **Existing Approach**

- The firm submits a licence application to NEA 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 environmental services companies, NEA 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 NEA encourages environmental services 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 NEA Review Officer, it submits the proposal and supporting information to NEA
- NEA 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, NEA will inform the Applicant on whether the proposal is potentially suitable for a Sandbox within 30 working days.
- NEA continues with the evaluation and clarification process with the firm. Assuming that NEA is satisfied with the proposal, the firm would be informed in writing to proceed with the Sandbox.

<b>Evaluation Criteria</b>	<b>Assessment (illustrative and non-exhaustive)</b>
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 vision towards a Zero Waste nation and a clean and liveable Singapore. It also better utilises land-resources given its small footprint as compared to similar technology/solution in the market.
Does the proposed solution address an issue or bring benefits to the stakeholders?	
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 conceptualisation 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.