

Blueprint on how to conduct feasibility studies on off-grid and edge-of-grid power systems

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Executive Summary

This blueprint provides a step-by-step guideline on how to conduct feasibility studies for off-grid and edge-of-grid power systems. By following the process, one should be able to conduct an effective feasibility assessment for a photovoltaic based off-grid or edge-of-grid power system.

All feasibility studies are different; every project develops in a unique context that consists of different locations, stakeholders, site conditions, aims, constraints, and opportunities. In this blueprint, clear and concise definitions of what a feasibility study is and when and why they should be undertaken in the context of Off-Grid and Edge-of-Grid power systems, provide a solid foundation from which a study can be undertaken.

The blueprint breaks a feasibility study down into the following four stages:

1. Determining the nature and extent of the feasibility study.
2. Gathering information and data.
3. Modelling and analysis.
4. Assessment and recommendations.

Each stage is then split into the following three key project areas that are used to discuss and guide each stage of a feasibility study:

1. Organisational.
2. Financial.
3. Technical.

The purpose of the first stage of a feasibility study is to gain an understanding of the project context and to clearly define the nature and extent of the feasibility study that best suits this context. This involves identifying and engaging with all key project stakeholders to:

- Identify the target audience.
- Identify the project aims and drivers and their relative priority.
- Determine the commitment of and involvement from each stakeholder.
- Assess stakeholder capacity.
- Determine the agreed project assessment criteria.

This second stage focuses on gathering, sorting, and collating the available information and data, which are used in the assessment and modelling work carried out in Stage three. An effective feasibility study

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requires a considerable amount of information and data to be gathered from a wide range of sources. A key source of information and data will be the project stakeholders, and the gathering process will therefore directly follow on and at times overlap with the stakeholder engagement work of Stage one.

Stage three builds on the first two stages by modelling a range of potential solutions, with the results analysed, summarised, and presented in a meaningful way to help inform decision making. The core outcomes that are required for each element of this stage are:

1. Organisational:
 - a. A workable governance structure for the system for its full project lifecycle.
 - b. An understanding of the legal and regulatory framework for system deployment and operation.
 - c. A general market awareness and understanding of local supply chains for these systems.
2. Technical:
 - a. A system design, or range of suitable designs that match the requirements of the project. Underscoring this design will be technical modelling of the power system.
 - b. An understanding of the target site(s) and the resultant impacts this may have on the procurement, installation, and long-term operation of the system.
3. Financial:
 - a. A model that accurately reflects financial aspects of the project. The detail and complexity of the model should reflect the agreed nature and extent of the feasibility study (i.e., scoping study vs. detailed feasibility) as determined in stage one. Additionally, a key focus is the optimisation of each of these outcomes. As noted previously, the organisational, technical, and financial elements are highly interdependent. Changes to any one of these elements will likely impact other elements. Optimisation therefore will require an iterative feedback process between these three elements to determine the most balanced outcome.

The objective of the fourth and final stage of the blueprint is to bring together all the analysis and understanding of the organisational, technical, and financial aspects of the project, make an assessment as to the whether the project is “feasible”, and provide stakeholders with clear recommendations and guidance on how to proceed. The blueprint provides a general structure for this assessment, some underlying principles to support the assessment, and a range of assessment criteria to be applied against the key project elements.

By following the process outlined in the blueprint, a project manager will be able complete an effective feasibility assessment for a photovoltaic based off-grid or edge-of-grid power system. After conducting a feasibility study of this nature, stakeholders will have a very clear understanding of whether an Off-Grid or Edge-of-Grid PV is feasible, what such a system looks like, the steps required to proceed with a system installation, and how much it is likely to cost.