A Responsible Data Sharing Framework for the Mini Grid Sector

Status: Final
Version: 0.3
Last update: 24 August 2023

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Published: February 2026

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About Open Data Services

We partner with governments, multilaterals, charities, academics, social innovators, and other purpose driven entities who share our vision of using data to deliver lasting impact in communities worldwide.

Over the past decade, Open Data Services has helped over 50 organisations build impactful data initiatives. In recent years, we've worked with:

- 360Giving
- Open Ownership
- World Bank
- African Development Bank
- Foreign, Commonwealth and Development Office, UK
- United Nations Development Programme (UNDP)
- World Health Organization
- International Organization for Migration
- Mozilla Foundation

We bring extensive experience in data initiative design, including developing tools and guidance that's practical, user-centred and designed to help users take action.

Introduction

Mini grids will be key to improving access to clean energy in remote and underserved communities over the next decade. Planning, financing and operationalising mini grids at scale will require improved coordination, collaboration and learning across the sector, which in turn requires timely, trusted and accessible information.

The mini grid sector produces significant quantities of data, much of it collected automatically. But the sector, and a wider set of stakeholders, are not seeing the full value of this resource due to a lack of consistency in how data is collected and key information is calculated. This is further hindered as data is not routinely and consistently shared with decision-makers and stakeholders across the ecosystem.

This report provides a model and a set of tools for producing and sharing data across the mini grid sector so that policy-makers, funders and regulators have the right information to inform their decisions and so that operators and industry bodies can learn from and improve operational practices. These are as follows:

- The **Responsible Data Sharing Framework** (RDSF) provides a set of principles that can inform and guide the sharing of data amongst relevant organisations. These principles ensure that data is shared responsibly, in a spirit of collaboration and coordination, and that trust is built and maintained.

- A **Data Sharing Arrangement** is a specific instantiation of the RDSF, tailored to the regulatory, policy and sectoral context in which it occurs.

- A **Data Sharing Agreement** (DSA) is the formal mechanism by which an Arrangement is agreed and against which implementation can be monitored. A DSA clarifies who will be sharing and have access to data, specifies the purpose for which data is shared, and includes an inventory of data that the DSA applies to. A template and brief guidance for a DSA is provided in Appendix 1.

- The **Standard Mini Grid KPIs** (KPIs) provide a baseline of key information about mini grid projects, together with definitions and derivation methods. The KPIs can form the basis of a data inventory when specifying a DSA. An abbreviated list of the KPIs is provided in Appendix 2 (removed for publication).

Landscape analysis of the data supply, demand and flows around the mini grids sector has informed the development of this framework. This is detailed in Appendix 3 (removed for publication), including a set of user stories and requirements that were derived from the analysis.

Why do we need a Responsible Data Sharing Framework?

Solar mini grids are small-scale power grids that can operate independently of the national grid and provide uninterrupted electricity to off-grid or underserved communities. It is estimated that nearly 750 million people have no access to electricity: mini grids represent a legitimate solution to bridge a sizable portion of this gap.

A variety of factors including equipment costs, economies of scale, financing modalities and sectoral experience have combined to scale the mini grid ecosystem thus far, but rapid growth and acceleration is needed to get to the goal of 500 million mini grid connected people by 2030. At current rates, this will not be met.

The use of data is essential to supporting the growth, scale and efficiency of the mini grid sector. Data is not in short supply: the mini grid sector has an abundance that is generated, stored, processed and output. This includes data associated with the electricity generation and consumption; the calculations of performance metrics; data on community impacts.

But at present data is not being used to its full potential. The sharing and subsequent use of this data is undertaken through a range of differing practices. There is a growing risk that stakeholders may end up in data silos, duplicating effort and losing opportunities for best practice. In this context, inconsistencies and inefficiencies can linger, leading to data being potentially unprotected, undervalued and under used. Without a coherent and cohesive approach there is a risk that the shared ambitions for mini grids will struggle to be reached.

Data needs to be shared so that it can be used. Data on mini grids exists in different parts of the ecosystem, and is collected and controlled by various parties. That is not a design flaw, but a strength: the key is to now find harmony and alignment in the various practices, and encourage convergence rather than divergence. Data on mini grids can be understood as a **shared resource** from which stakeholders can gather information, insights and intelligence. Missing out on this opportunity may have negative impacts and lead to a loss of confidence in the sector and its constituent parts.

Key principles for a Responsible Data Sharing Framework

This framework is based on three overarching principles:

The appropriate sharing of data on mini grids requires consent

Data in the mini grids sector and ecosystem is controlled and processed by various parties. Their interaction via an increasing number of data touch points can present risks in terms of clarity around confidentiality and commercial-sensitivity, for example. To ensure that appropriate data sharing is observed, parties can:

- align in terms of intended purpose;
- detail the roles and responsibilities of each party;
- communicate this shared understanding

Using consent as the basis for the framework will build trust between the parties to a data sharing agreement and help ensure delivery of data to the relevant place at the right time.

The efficient sharing of data on mini grids requires *coordination*

Data in the mini grids sector ranges in the degree of standardisation and harmonisation. This is particularly evident at the level of computed and generated data about the performance of mini grids, meaning an increasing effort is required to produce, use and understand such data. To reduce inefficiencies, parties can:

- agree on common methodologies to compute and process mini grid data;
- establish and document standards for metrics and indicators;
- maintain and review any shared understanding

Embedding coordination in the framework helps to foster coordination over the standards, benchmarks and best practice agreements that underpin data sharing. In turn, convergence in practice can lead to more effective use and analysis of mini grid data.

The effective sharing of mini grid data requires *collaboration*

A vision for mini grid data is needed to unite stakeholders and catalyse the required actions. Collaboration is required to make the best use of mini grid data, the full value of which requires turning data produced and controlled by individual organisations into a shared resource. To make this effective, parties should:

- build capacity for all parties to participate;
- invest in mechanisms to derive insights;
- design for longevity;

This framework codifies collaboration in the agreements and arrangements that support data sharing. This can be the foundation for continued partnership and equitable relations between stakeholders.

Taken together, **consent, coordination** and **collaboration** represent principles that can push mini grid stakeholders to share data in appropriate, efficient and effective ways. Using a common framework to negotiate and arrange data sharing agreements is an important tool to achieve that, and to scale the mini grid economies.

Who is this Framework for?

This framework applies to those who are **responsible for producing, processing or using data** in the mini grid sector.

A non-exhaustive list of relevant stakeholders includes:

- **Mini grid developers** - entities that directly install, maintain and manage mini grids
- **Equipment suppliers** - companies that supply equipment and materials to mini grid developers
- **Platform services** - organisations that support mini grid projects with administrative and analytical platforms
- **Analysts** - those supplying insights and services to the mini grid sector;
- **Financiers** - organisations that provide funding stimulus to mini grid projects and programmes
- **Energy regulators** - agencies that ensure compliance
- **Interest groups and Industry bodies** - nonprofit organisations driving an equitable transition to renewable energy
- **Software providers** - entities that offer solutions to specific points in the mini grids ecosystem
- **Non-governmental organisation NGOs** - entities working towards promoting and supporting the development and deployment of mini-grids as a means to increase access to reliable and affordable electricity in underserved communities, along with wider impacts and outcomes.

This list can be made more comprehensive or targeted by assessing the roles that an organisation plays with regard to data on mini grids. In general, an organisation should be involved in the framework if it is:

- Responsible for the handling and safeguarding of the data of customers to a mini grid site;
- Responsible for ensuring and managing that a mini grid site has data flows in place to fulfil its operations;

- Responsible for the provision of data services that integrate between mini grid developments and third party services;
- Responsible for developing monitoring performance metrics for a mini grid project or programme;
- Responsible for using data on mini grids to undertake analysis and gather insights.

All these roles combine in the collection, storage and processing of data. To effectively share and use this, it is important that the framework is applied when these partnerships form.

What about local communities and customers?

The framework is not designed to be directly used by these recipients of mini grid electricity.

However communities are indirectly served by the framework, which aims to protect the privacy and security of community members' data, ensuring their rights are respected when data is collected and utilised. All parties to the framework are expected to guard against risks of handling personally identifiable data.

Using this Framework

This document provides guidance and suggestions for those wanting to share and use data related to mini grids. It situates the various outputs, checklists and resources in relation to key facets of ensuring data is shared in an appropriate, efficient and effective manner.

Context: the data sharing arrangement

When using this framework, stakeholders will often be in a particular context already. This could be a countrywide investment in mini grids, for example, or a sector specific research action.

This context can inform a data sharing **arrangement**, whereby the various agreements and policies are instantiated to satisfy the conditions of a particular mini grid project, programme or specific deployment.

A data sharing arrangement is an important concept for stakeholders to recognise. The diverse nature of mini grid developments means that many such arrangements are possible, via country or regional programmes, thematic drives or donor-led initiatives. This framework does not seek to rationalise or reduce any of these interventions, but provides a mechanism to ensure data sharing and use is consistently and confidently enacted.

With a data sharing arrangement identified, partners can then use the tools and resources that follow to form the relevant agreements and policies that guide and secure their working together.

Appendix 1. Tools for implementing a data sharing framework

Data Sharing Agreements (DSA)

A DSA is a contract that defines the purpose for which data is shared between organisations and the terms under which it is processed and used. DSAs facilitate data sharing within agreed parameters that ensure compliance with relevant laws, regulations and ethical codes and satisfy the requirements, restrictions and needs of parties to it.

Elements of a Data Sharing Agreement

A DSA is composed of multiple elements that define:

- *why* data is shared;
- *who* is sharing and accessing data;
- *what* is shared
- *what* aggregation and analysis is performed;
- *when* and for how long data is shared;
- *how* the data is structured, formatted and communicated;
- *how* ethical and legal requirements will be met.

DSAs are complex and technical documents that will always require tailoring to the relevant legal and organisational environment. The elements or tools below are therefore intended to highlight the key areas that must be addressed.

Element	What it represents	Component
Purpose	Why	Statement of purpose Use cases and user stories
Scope	What	Geographic scope Sectoral scope Contextual scope (project; programme) Functional scope Time (contractual monitoring and validation; ongoing MEL)
Parties	Who	Senders Recipients Third-parties Contact points
Data governance policies	How	Retention Personal data and anonymisation Processing Verification and audit Tiers of access x roles Dispute policy
Data inventory	What (details)	Data sets (fields; KPIs; concepts; transparent methods) Data formats (in; out) Data access methods
Data impact assessment	How	

Defining the Purpose

Output: A Statement of Purpose in a DSA clarifies to all parties why data is being collected and limits subsequent data processing and sharing to that purpose alone.

This is particularly helpful in the context of mini grid data if commercially-sensitive information is required for a particular social purpose but where wider usage would limit agreement or support.

Checklist / Template

- ☐ The statement of purpose clarifies why data is being shared
- ☐ The statement of purpose is permissive enough to meet the use cases and user stories identified in project design
- ☐ The statement of purpose is restrictive enough to exclude harmful or unexpected usage of the data

Supporting tools: A set of user needs, user stories and stakeholder research may help to refine the purpose.

- ☐ User needs and user stories are understood well enough to define a Statement of Purpose for the data sharing agreement
- ☐ Concerns of stakeholders are understood well enough to mitigate through a Statement of Purpose and other parts of a DSA

Parties and roles

Output: A list of named parties to the DSA, their roles in the DSA, and descriptions of those roles.

This may be particularly relevant in the mini grid context where data is processed and passed through broker platforms.

Checklist / Template

- ☐ All senders of data are specified
- ☐ All brokers of data are specified (eg Energy Service Companies (ESCOs))
- ☐ All direct recipients of data are specified
- ☐ All third-party recipients of data are specified
- ☐ All roles of the parties are defined (including any sub-roles) and these definitions cover the rights and responsibilities associated with the DSA
- ☐ Contact points are specified for each party

Defining what data is shared

Output

A Statement of Scope defines what data is to be shared under a DSA. It allows all parties to be clear what they are committing to, and to plan and resource data-sharing on this basis. A statement of scope may include an inventory of data to be shared and criteria that define which data is in scope.

This may be particularly useful in the context of mini grid data where developers and data brokers operate in multiple markets and participate in a variety of programmes and funding facilities.

Checklist / Template

- ☐ Any geographic criteria are defined, i.e. “Mini grid projects in rural Nigeria”
- ☐ Any sectoral or institutional criteria are defined, i.e. “Mini grid projects overseen by the The Nigerian Rural Electrification Agency (REA)”
- ☐ Any contextual scope is defined, i.e. “Mini grid projects funded through [example programme]”
- ☐ Any time-based conditions are defined, i.e. “Data will be shared for 5 years after project initiation”
- ☐ The data to be shared is defined at a high-level, i.e.”Developers will provide project-level smart meter data and derived KPIs”
- ☐ The mechanisms by which data is to be shared is described at a high-level, i.e. “Developers will be provide data through the data broker,
- ☐ A Data Inventory provides sufficient detail to ensure consistent implementation and convergence with agreed quality and technical standards

Populating a data inventory

Output:

An inventory of datasets to be shared with a DSA that provides sufficient detail to ensure consistent implementation and convergence with agreed quality and technical standards.

An inventory should include a list of datasets to be shared and, for each dataset, details of data fields (including definitions or derivation methods), technical formatting requirements, and practical details of how data will be shared between parties. It may be useful to separately document derivative datasets produced as a result of collation or enhancement of shared datasets, particularly in contexts where there may be concerns about commercial confidentiality or the sharing of personal data.

The standard KPI set described in Appendix 2 (removed for publication) may be a useful starting point for defining the core data points and data sets that will be shared.

Dataset	Source and description	Field definitions	Data format	Submission mechanisms	Destination storage and processing
Name of dataset	Brief description of where the data comes from and its scope, coverage and topic	List of required fields, including any field format/type requirements and clear definitions for derived measures like KPIs, if not specified elsewhere	Format for submitting data, including any required standards, methodologies, templates and API specifications	How, where, when and how often the data is to be submitted	Where this data will be held after submission and brief details of any processing to be performed

Example Data Inventory template

Data governance policies

Data governance establishes the principles and standards for managing data among the parties to a data sharing agreement. Data governance covers a wide spectrum of data-related activities. Relative levels of emphasis will depend on context but the most important for mini grid data are listed below.

Data lifecycle

A **data lifecycle policy** establishes how long data will be held for as part of the DSA. A data lifecycle policy is necessary to ensure that full value can be extracted from data over the course of the agreement and that data is not retained or used beyond its terms.

This may be particularly important for mini grid data where the production of data is routine for specific time-bound purposes like staged project payments, but new norms are emerging around the long term use of data for broader purposes.

- ☐ The length and expiry date of the DSA, and any terms relating to renewal or review points
- ☐ Requirements on updates, timeliness and archiving
- ☐ Policies on default data retention and deletion periods

Verification and audit

Verification and audit are approaches used to ensure that the data is trusted and reflects the reality on the ground.

A range of techniques may be applied to increase trust in the data. These include technical approaches such as systems-level authorisation, data provenance records, automated checks and risk analysis methodologies and more involved methods such as human-in-the-loop red flag analysis, spot checks on data accuracy, and system- or supplier-specific audits. A DSA should establish the principle and a high-level description of verification and audit which parties agree to but it may be inappropriate to share the full details of methods and processes in order to protect the integrity of the audit system itself.

This may be particularly important for mini grid data because of how it may shape future decisions, for example any links to project performance and payments or to future investment planning.

- ☐ Any audit and verification mechanisms are specified at a high-level
- ☐ The responsibility for carrying out audit and verification is defined
- ☐ The processes and parties subject to audit and verification are specified

Role-based access policies

A role-based access policy sets out which parties have access to which data, under what circumstances.

Specifying differential access to data shared under the agreement may be particularly important for mini grid data where commercially sensitive or personal information is included.

Party/Role	Dataset	Access level or restrictions
A named party to the agreement and a role if applicable, e.g., Developer X - data supplier	The dataset to which the access level or restrictions apply, e.g. project-level smart meter KPIs. Any subsetting of the dataset should be specified, e.g. exclusion of precise geographic data for data protection reasons.	The level of access that applies, e.g. Full access to own project-level smart meter KPIs; no access to other developers' KPIs; restricted access to collated KPIs.

Personal data and anonymisation

Personal data is typically defined as data about natural persons who can be identified directly or indirectly. Data produced by or about mini grid projects may include personal information under this definition and a DSA will therefore help to set standards for ensuring compliance and reducing potential liability from uncontrolled use. All personal data should be identified as part of the scoping and design of the DSA. It may be possible to use anonymisation techniques to ensure that it is not necessary to share personal data to fulfil the purpose of the DSA; in this case, techniques and standards for anonymisation should be specified as a condition for sharing data.

- ☐ Any personal data and sensitive data has been identified
- ☐ A lawful basis for processing personal and sensitive data is documented
- ☐ Any anonymised data has been identified
- ☐ Standards for anonymising data are agreed
- ☐ A dispute policy is documented

Data security, processing and transfers

A DSA may need to set conditions on how and where data is stored or processed, and the security arrangements that surround this, in order to meet legal or organisational requirements. These requirements may relate to specific security standards or to the physical location of the data (data residency). Personal data may be subject to controls on transfers to different jurisdictions. It may be desirable to set limits on how, by who and for what purpose data can be processed within the scope of the agreement, for example by excluding methods that could lead to deanonymization of disaggregated data. The DSA should specify how parties will respond in the event of a security incident or if a breach of standards is detected.

- ☐ Any requirements around data sovereignty, data residency and data security have been identified and are satisfied by the DSA
- ☐ Any data transfers have been identified and are compatible with data sovereignty and data residency requirements
- ☐ Any restrictions on processing or analysing the data are recorded
- ☐ An incident response protocol is specified

Data impact assessments

Output

A Data Impact Assessment (DIA) is a process that evaluates the potential risks and effects of producing, sharing and processing data as part of a DSA and balances these against potential benefits. A DIA should ensure that parties to the DSA can meet their own ethical or responsibility standards and that data is shared in a responsible and informed manner. A data impact assessment should help identify and address privacy or ethical issues and assess potential social, economic or environmental impacts. If a DSA will lead to significant data-driven or algorithmic decision-making then the scope and impact of these should be included.

- ☐ The format of the DIA meets the standards of all parties to the DSA or parties are satisfied with conducting additional independent DIAs
- ☐ Potential risks, harms and benefits have been identified and assessed
- ☐ Data-driven or algorithmic decision-making processes have been identified and assessed
- ☐ Parties are satisfied that all relevant legal and ethical standards associated with potential risks, harms and decision-making will be met

Indicative timeline for a responsible data sharing framework

Milestones and an indicative timeline to implement an RDSF are shown in the table below.

Milestone	Start	Time to completion
Identify the need	At project inception	1 month
Parties commit to the Responsible Data Sharing Framework (RDSF) covering a standard set of KPIs	6-9 months before data will be shared	1-3 months
Final design of a Data Sharing Agreement to implement the RDSF	3-6 months before data will be shared	3-6 months
Sign a Data Sharing Agreement (DSA)	1-3 months before data will be shared	1 month
Implement the DSA	On signature of DSA (with some preparatory work likely during the design phase)	0-3 months
Data sharing begins and compliance is monitored on an ongoing basis	As stipulated in the DSA and dependent on implementation work	-

Activities that are required to reach milestones are shown in the table below, along with estimates on time for each activity.

Activities to reach milestone	Time required (activities may run in parallel)
Milestone: Identify the need	
Explore suitability of an RDSF to project requirements and available resources	1-2 months
Identify parties, build understanding of standard KPIs and agree to explore the use of the RDSF	1-2 months
Milestone: Commit to the Responsible Data Sharing Framework (RDSF)	
Set a timeline for implementing a RDSG	1 month
Secure agreement from parties to proceed	2-5 months
Milestone: Final design of a Data Sharing Agreement (DSA) to implement the RDSF	
Identify and assess the data, beginning with the standard KPI set	2-3 months
Define data to be shared	2-3 months
Define data governance	2-3 months
Define any governance around the RDSF	2-3 months
Draft a Data Sharing Agreement	3-4 months
Milestone: Sign a DSA	
Perform any legal and organisational checks	1-2 months
Milestone: Implement the DSA	
Technical implementation	1-3 months
Implement governance structures	1-3 months
Milestone: Data sharing begins	
Monitor and evaluate implementation of the DSA	As required for the length of the DSA
Structured close down	As required at the end of the DSA