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# State of the Global Mini-Grids Market Report 2024



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Energy  
Access



- 15:05 – 15:10 - Opening remarks by Damilola Ogunbiyi, CEO and Special Representative of the UN Secretary-General for Sustainable Energy for All, and Co-Chair of UN-Energy SEforALL (recording)
- 15:10 – 15:20 - Background and objectives, general trends, enabling environment, and business model trends - Irene Calve Saborit, Principal Specialist, Energy Access, SEforALL
- 15:20 – 15:35 - Key trends: Financing trends, technology trends, economic trends, impacts, outlook, recommendations - Elena Adamopoulou, Technical Director at Economic Consulting Associates (ECA)
- 15:35 – 15:45 - Report acknowledgement and initial response - Steven Hunt, Senior Energy Innovation Advisor, Foreign, Commonwealth and Development Office
- 15:45 – 16:15 - Panel discussion: Importance of data collection and standardization for accelerating delivery
  - Moderator: Irene Calve Saborit, Principal Specialist, Energy Access, SEforALL.
  - Steven Hunt, Senior Energy Innovation Advisor, Foreign, Commonwealth and Development Office
  - Benjamin Curnier, Principal Green Mini-Grids Officer, Sustainable Energy Fund for Africa, AfDB
  - Amon Mwadime, Director - Research, Data & Standards, Africa Minigrid Developers Association (AMDA)
  - Tatia Lemondzhava, Energy Specialist, ESMAP, World Bank
- 16:15 – 16:30 - Q&A



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# Table of contents

Background and objectives

---

General mini-grid market trends

---

Enabling environment trends

---

Business model trends

---

Financing trends

---

Technology trends

---

Economic trends

---

Impact

---

Recommendations

---

Panel discussion

---

Q&A



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# Background & context



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## Overview of the report's context and approach

Electricity access has improved massively over the past decade, yet current trends are insufficient to reach SDG 7. Current projections suggest that, under existing policies, approximately 660 million people will still lack access to electricity by 2030.

- 1 This report stands as a valuable contribution to the sector, with data from:
  - 796 mini-grid projects
  - 14 developers across 16 countries
  - 33 funding bodies
- 2 The scope of work encompasses a comprehensive global analysis of the mini-grids market between 2014 and 2023, with a particular emphasis on Sub-Saharan Africa, Asia, and island nations.
- 3 The report provides a comprehensive overview of the latest trends in the mini-grid sector, but also proposes a forward-looking strategy for its sustainable expansion.
- 4 Together with stakeholder interviews, the following databases were analysed in order to understand key trends in the mini-grid market:
  - The Mini-Grid Funders (MGF) database
  - The Mini-Grid Asset (MGA) database.



Mini-grids have emerged as a pivotal solution in the efforts to bridge the global electricity access gap.

### ELECTRICITY ACCESS

Electricity access increased from 84% in 2010 to 91% in 2021



### ROLE OF MINI-GRIDS

21,500 mini-grids providing electricity to 48 million people today



### UNELECTRIFIED POPULATION IN 2030

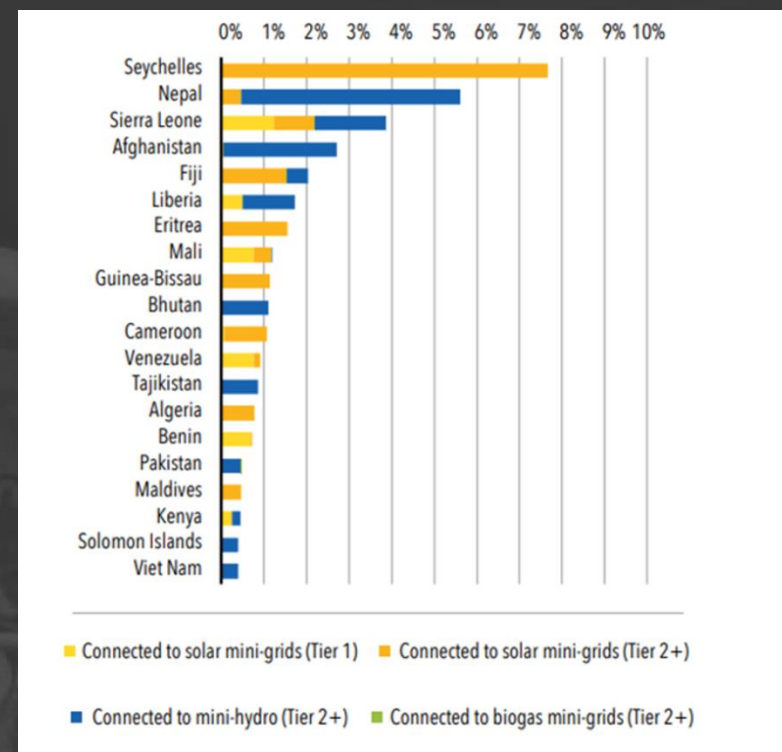
660 million people projected to remain without access if no additional measures are taken to speed up the current annual rate of growth in access



The current role of mini-grids

## Mini-grid access continues to expand, driven by the support of policymakers, private investors and consumers

Of the top 20 countries with extensive access to mini-grid electricity, nearly half are located in sub-Saharan Africa. Seychelles and Nepal are providing mini-grid electricity to over 5 percent of their populations.



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# General mini-grid market trends



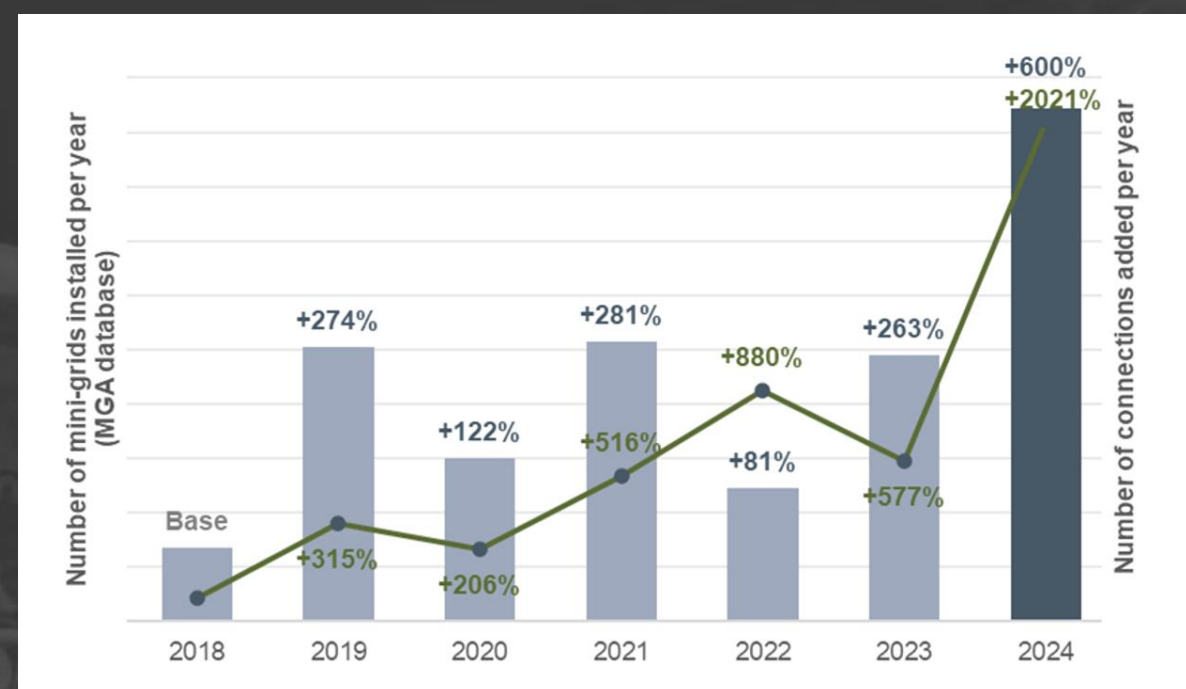
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Over the past decade, there has been a consistent and notable upward trend in the number of mini-grid installations globally.

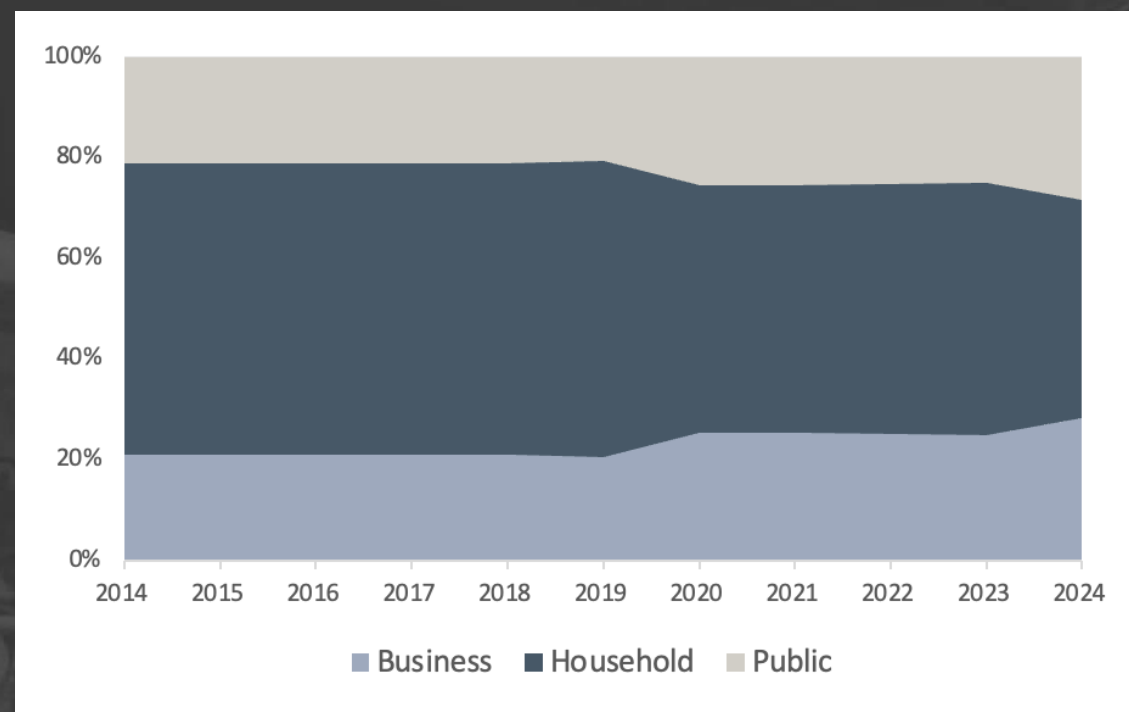
- Mini-grid installations increased by over 13 times since 2014
- Despite the COVID-19 pandemic, the number of connections in SSA doubled between 2019 and 2021
- The trend is expected to continue



Mini-grids installed and connections added, 2018–2024, and growth with respect to the base year (2018)

## Mini-grid companies are increasingly considering a shift from anchor loads towards a diversified, sustainable customer base.

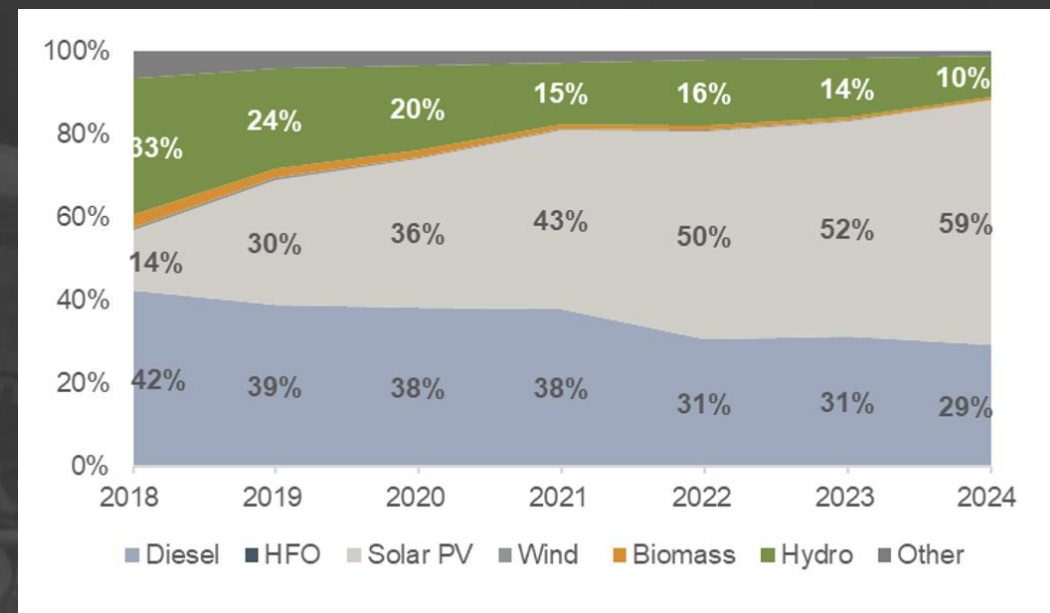
Public institutions and businesses combined, which make up approximately 17% of total connections, are responsible for over 50% of total energy consumption.



Share of total mini-grid power consumption by consumer type, 2014–2024

**Between 2014 and 2024 the cumulative share of diesel in the total installed capacity of mini-grids has decreased dramatically, falling from 42 percent in 2018 to 29 percent in 2024.**

The cumulative share of solar PV systems in mini-grids has seen a remarkable increase, growing from 14 percent in 2018 to 59 percent in 2024



Cumulative share of installed capacity by fuel type, 2018 - 2024

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# Enabling environment trends



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## Continuous improvement has been observed on mini-grid policy and regulatory frameworks

- 1 Integrated energy planning is gaining traction, recognizing that the three electrification modes coexist in silos in specific areas
- 2 Regulatory processes are increasingly being tailored for different mini-grid scales
- 3 Mini-grid regulations are enabling portfolio applications and extending the duration of permits
- 4 The sector is pushing towards standardization of regulatory approaches
- 5 Greater focus on collaboration between regulators, donor coordination, and involvement of the local communities
- 6 The sector is seeing continued efforts to streamline and digitalize application processes for licenses and permits
- 7 The risk of grid extension is progressively being tackled by mini-grid regulations.
- 8 Increased focus on interconnected mini-grids



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# Business model trends



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- 1 Increased focus on scalability**

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- 2 PUE has been established as a fundamental aspect of mini-grid development:**
  - Moving beyond the traditional anchor model, developers are increasingly providing appliances to customers
  - The intended impact of PUE has been expanded to encompass social development, beyond economic empowerment

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- 3 Mesh grids are increasingly being considered as an effective solution to electrifying areas with low population densities**

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- 4 To optimize costs and leverage synergies, mini-grid companies are forming partnerships and operating within a vertically integrated value chain**



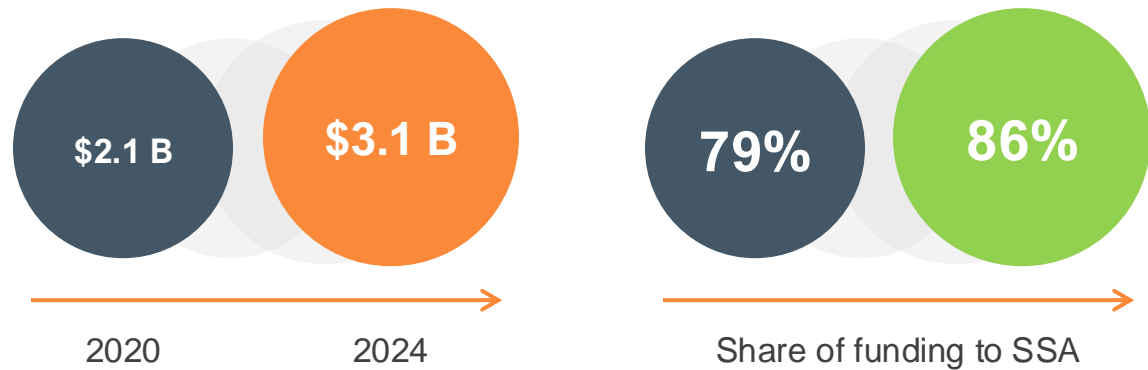
# Financing trends

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# Funding for the mini-grid sector remains substantial, but the **financing gap is still large**

▶ Since 2020, funders have committed more funding to the sector

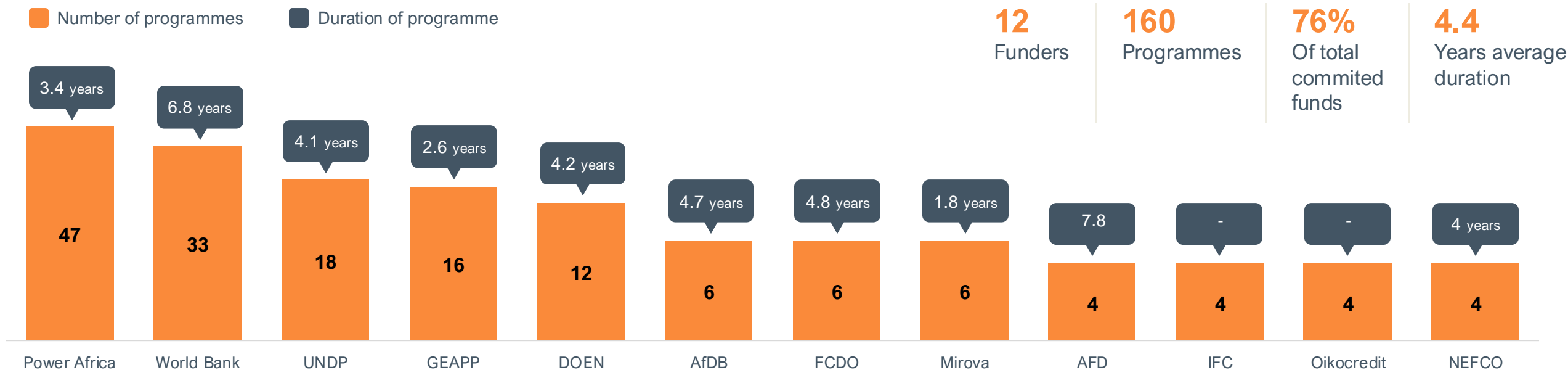


\*\* There's a large gap >\$100 billion to electricity 490 million people served at least cost by 217,000 mini-grids






# Funders have ambitiously been pursuing mini-grid development at scale






# Disbursement of funds has remained just below 60%


► Several factors affect disbursement rates




Market readiness



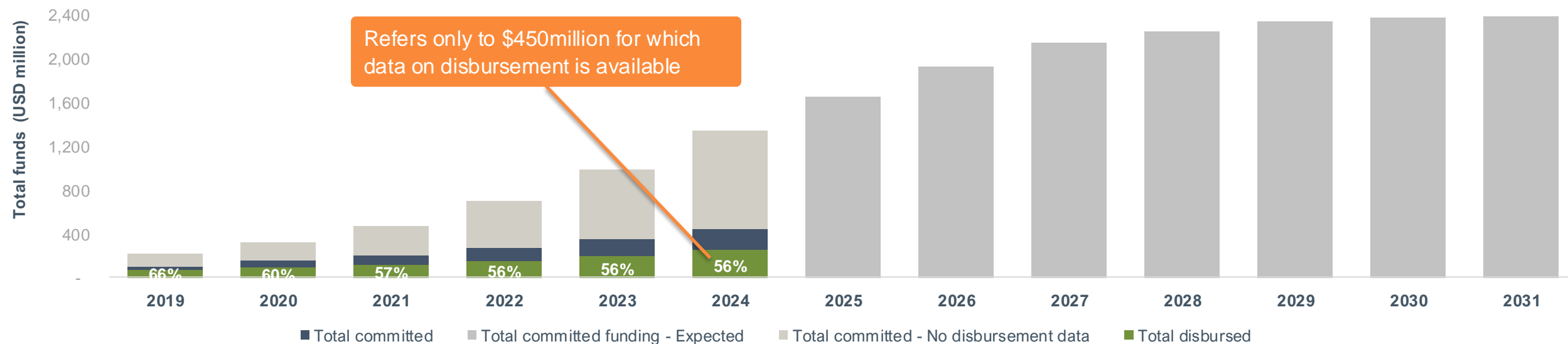
RBF financing



First-of-their-kind programmes



Regulatory environment

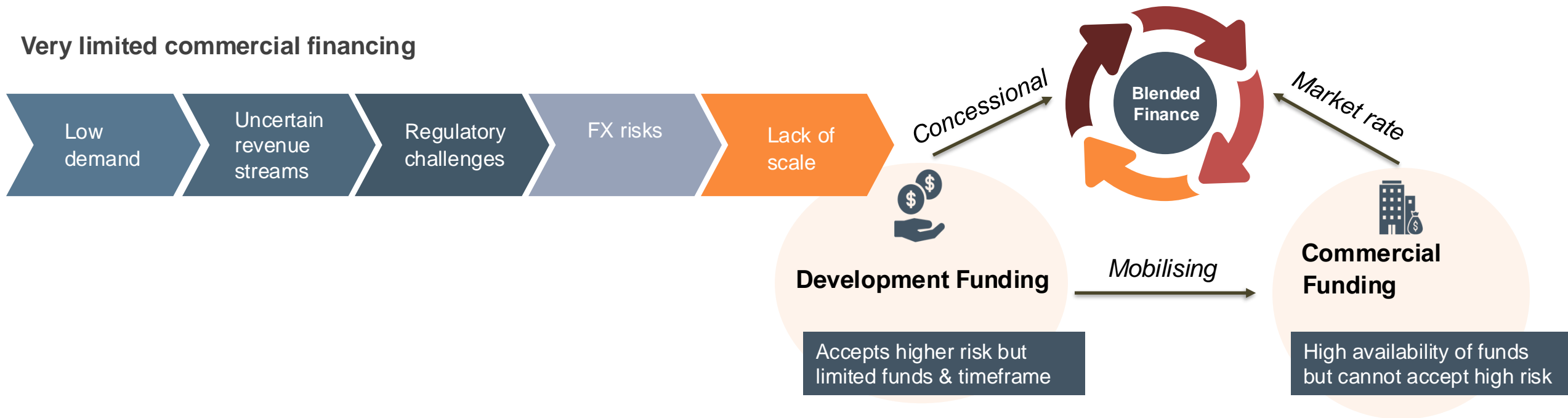


<sup>1</sup> The data presented here are represent funding flows from the MGF group

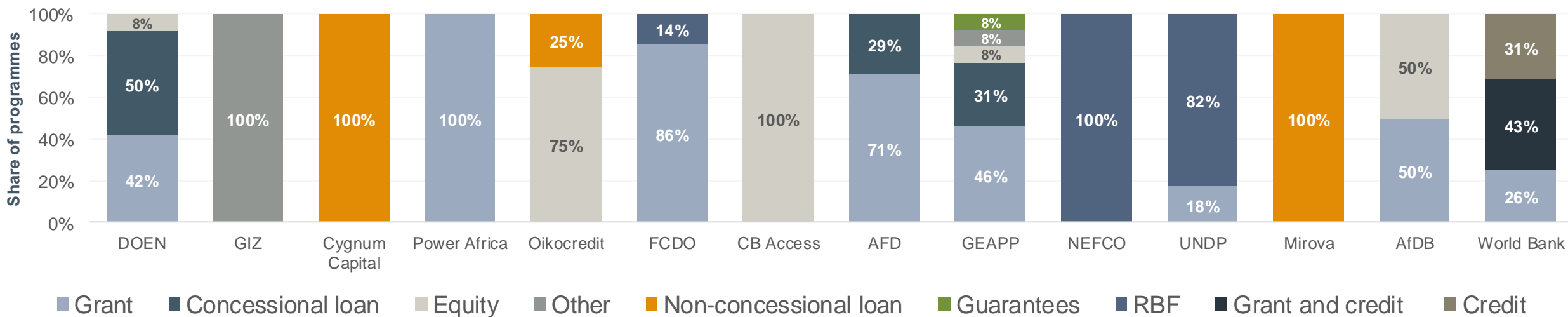
<sup>2</sup> The analysis takes into consideration the duration of the funding programmes

# Blended finance has been critical for mobilising private capital

## Very limited commercial financing



## Funding instruments used per funder (share of programmes)



# There is an effort to improve **financing viability**

## 01 Innovative financing mechanisms

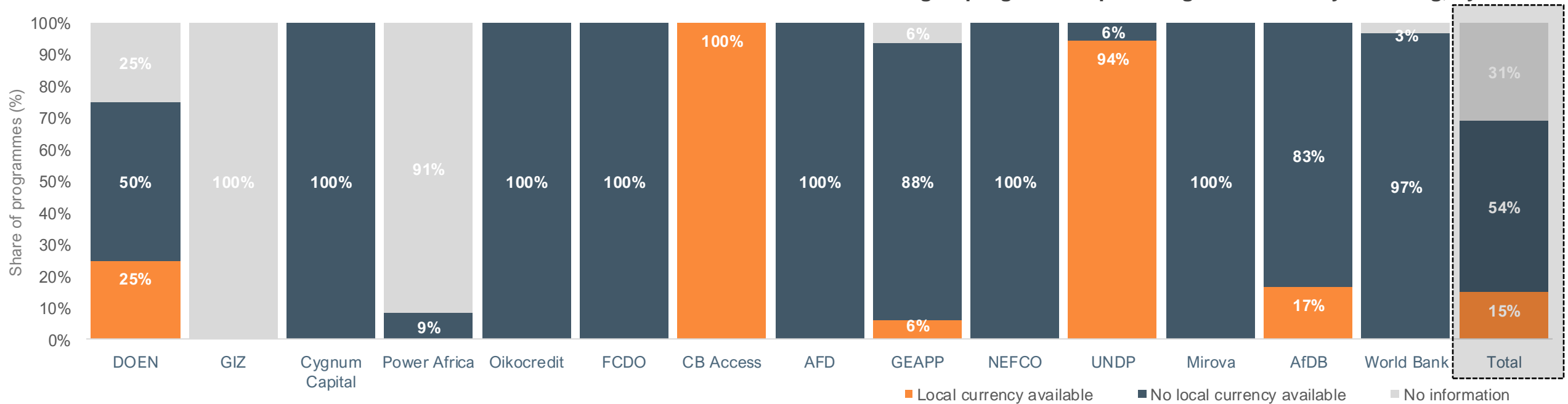
- ✓ Distributed Renewable Energy Credits (D-RECs) and Peace Renewable Energy Credits (P-RECs) provide additional funding streams

## 02 Aggregation of projects

- ✓ Allows for economies of scale
- ✓ Enhances economic feasibility

## 03 Local currency financing is limited and hedging is expensive

\*\* Share of mini-grid programmes providing local currency financing, by funder



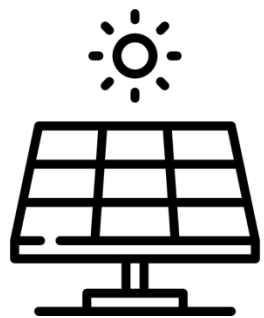


# Technology trends

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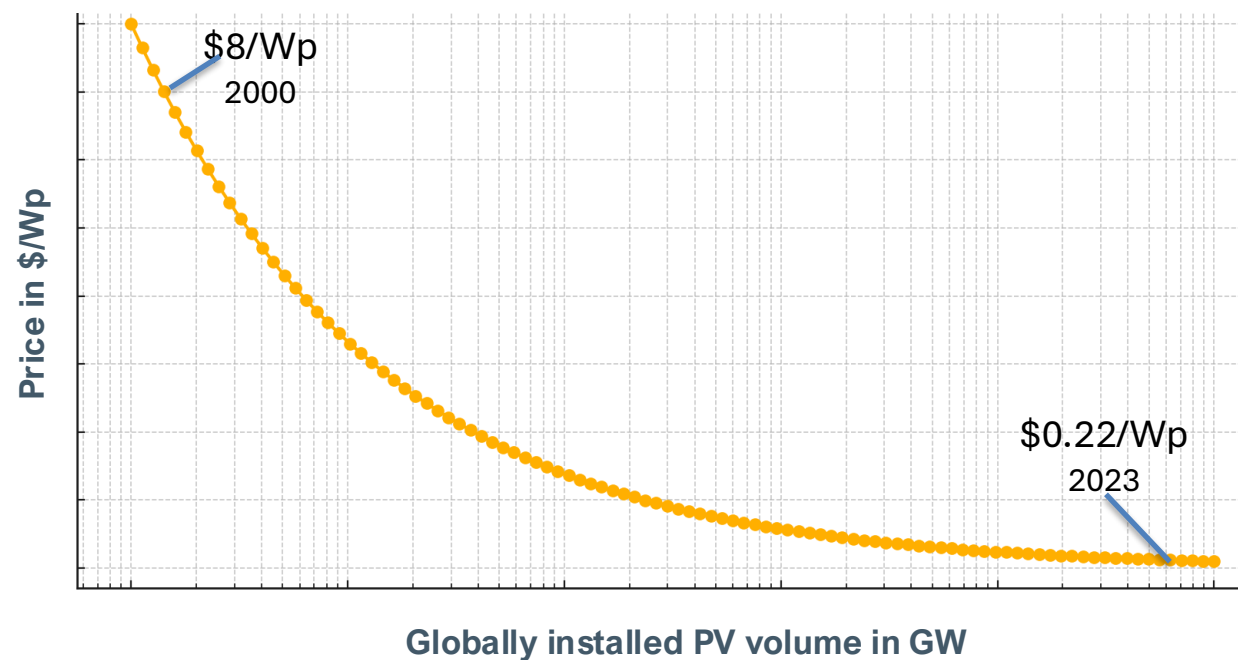
# Declining technology costs are a crucial driver in the sector's development



**PV module prices  
have declined by**

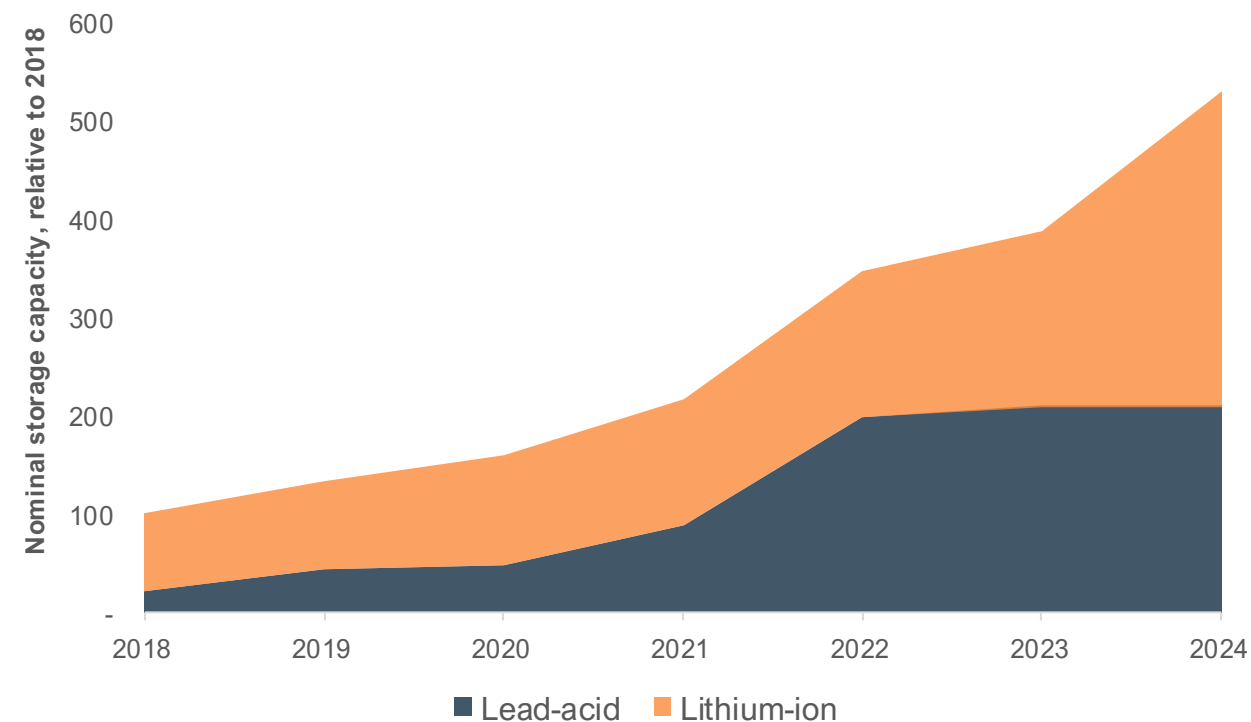
**97%**  
Since 2000

- ✓ Reduction driven by demand
- ✓ Despite COVID-19 and the Ukraine war prices continue to decline



**Lithium-ion batteries are gaining popularity**

- ✓ Prices have fallen by 90% since 2010
- ✓ They have longer lifetimes, higher efficiency and lower maintenance needs in comparison to lead-acid batteries





# Robust software solutions and digitalisation present a great opportunity for cost reductions in the mini-grid value chain

## GIS tools streamline site selection

- ✓ Identify anchor loads
- ✓ Reduce accessibility-related risks
- ✓ Reduces time and cost

## Planning tools streamline the design process

- ✓ Load profile optimisation
- ✓ System design
- ✓ Financial modelling



## Digitalisation streamlines the procurement process

- ✓ Aggregation platforms can lower the cost of equipment
- ✓ Time and cost savings for developers

## Remote monitoring helps optimise operations

- ✓ Sites managed remotely significantly reduce O&M costs
- ✓ Supports more accurate system design
- ✓ Allows for tracking and analysing consumption data

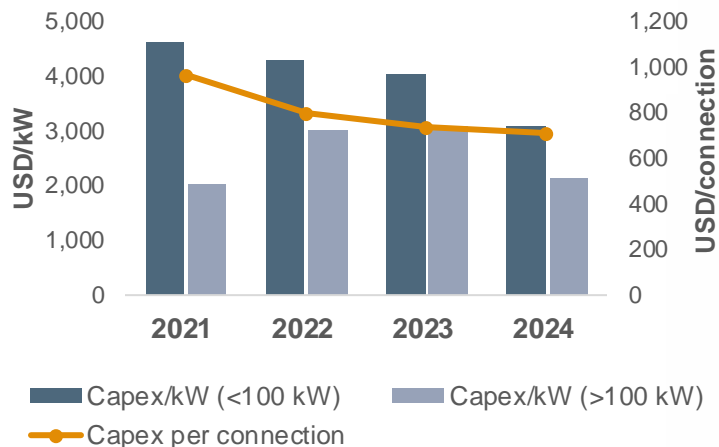


# Economic trends

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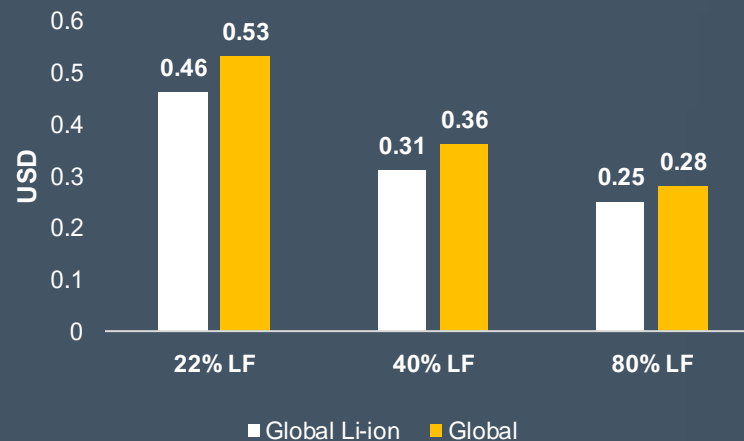
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# Mini-grid economics trends



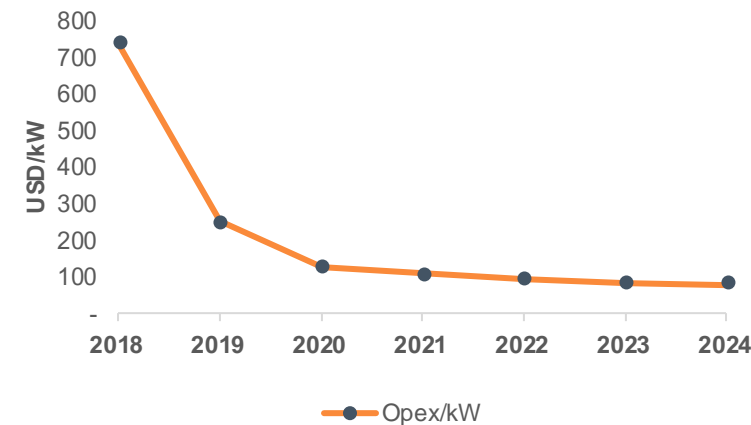
## Capex costs are affected by several factors...

- ✓ Advances in technology, procurement efficiencies, and operation scaling have resulted in significant capex reduction
- ✓ Capex for smaller mini-grids is 50% more than for larger sites
- ✓ Cost of materials is increasing
- ✓ Market saturation



## LCOE has fallen because of...

- ✓ Industry-wide efficiency gains and cost optimisation
- ✓ Advances in technology
- ✓ Economies of scale
- ✓ Remote monitoring



## Opex has also been declining...

- ✓ Industry-wide efficiency gains and cost optimisation
- ✓ Advances in technology
- ✓ Economies of scale
- ✓ Remote monitoring



# Impact

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# Effort to capture impact beyond number of connections

## Relevant SDGs for mini-grids

SUSTAINABLE DEVELOPMENT GOALS



**Most methodologies focus on economic, social, and environmental impact and are linked to SDGs**

- ✓ Eg, SDG 1 (no poverty), SDG 3 (good health), and SDG 16 (climate action)



**No standardised approach**

- ✓ Makes comparison difficult
- ✓ Measuring carbon emissions displaced important for accessing climate financing
- ✓ Eg, mini-grid emissions tool by SEforALL



# Recommendations

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# Recommendations



**Public Sector**

- ✓ Clarity about distribution network expansion plans
- ✓ Integrated energy planning
- ✓ Cost-recovery tariffs
- ✓ Champions for mini-grid development



**Donors/Investors**

- ✓ Standardisation in reporting requirements
- ✓ Making grants easier to access
- ✓ Extending the duration of donor programmes
- ✓ Support PUE efforts



**Private Sector**

- ✓ Seeking economies of scale
- ✓ Establishing a strong business case, with a clear path to profitability

## Shared responsibilities

- ✓ Enhance efficiency and collaboration
- ✓ Reduce sector fragmentation
- ✓ Improve data collection efforts
- ✓ Adopt a long-term perspective



# Report acknowledgement and initial response - Steven Hunt, Senior Energy Innovation Advisor, Foreign, Commonwealth and Development Office



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## Panel discussion - Importance of data collection and standardization for accelerating delivery

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# Q&A



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<https://minigrids.org/global-market-report-2024/>

<https://www.seforall.org/publications/state-of-the-global-mini-grids-market-report-2024>



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**This Mini-Grids Partnership Report was produced with funding from UK aid from the UK government via the Transforming Energy Access platform.**



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**The end!**

**Thank you for attending the  
launch of the State of the  
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