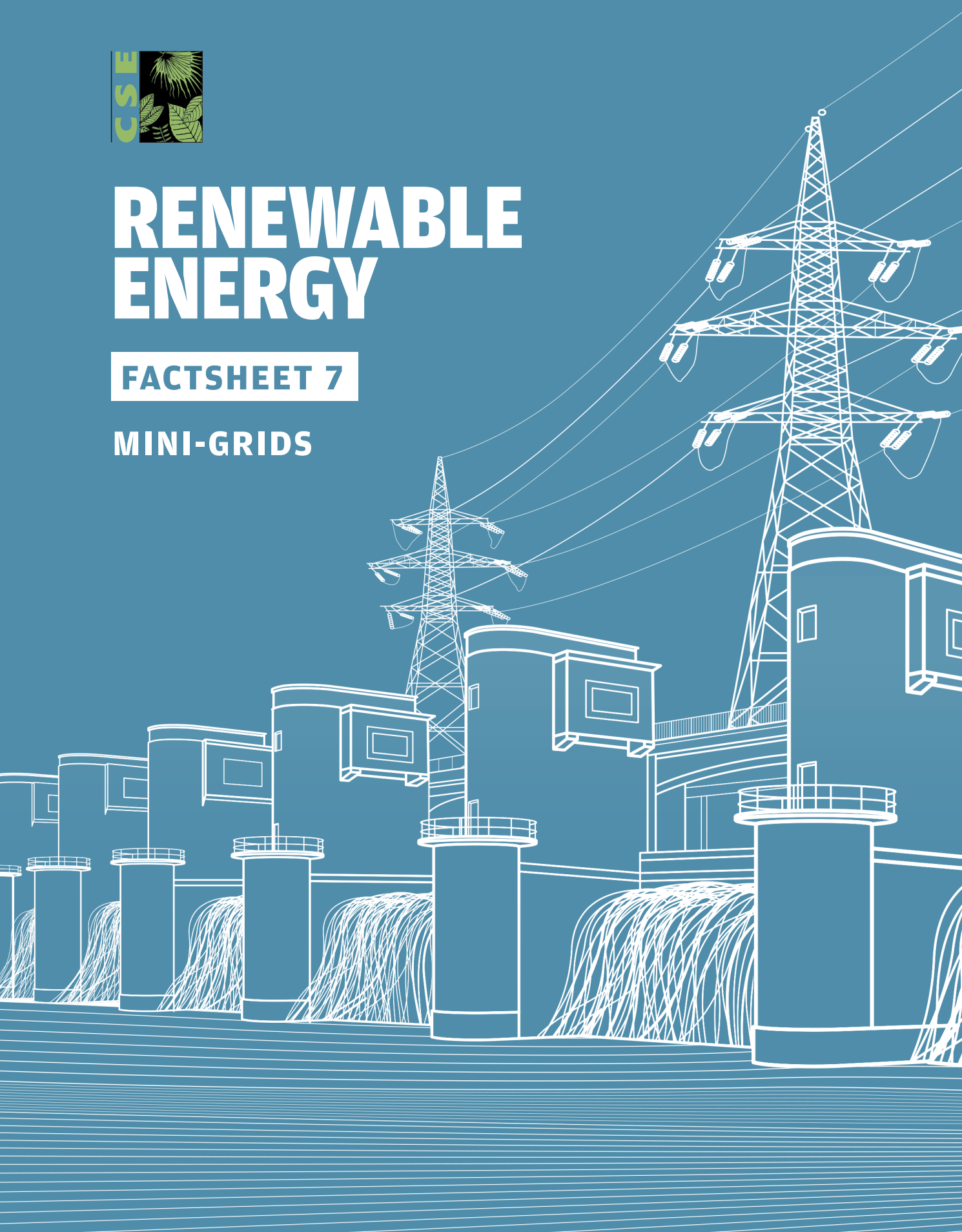
RENEWABLE ENERGY

FACTSHEET 7

MINI-GRIDS



MINI-GRIDS

Mini-grids might have lost out momentarily to grid electrification, but their significance cannot be discounted. They are essential for ensuring round-the-clock energy access and last-mile connectivity

A. WHERE DO WE STAND TODAY

A 1 A mini-grid refers to decentralised electricity generation systems with capacities above 10 kW to a few MW, serving residential, commercial, institutional and small industrial loads. As opposed to this, micro-grids are systems with capacities less than 10 kW.

A 2 Currently, it is diesel that is the source of this decentralised energy – a fuel that is polluting, but convenient. The question is, if the fuel for decentralised energy source can shift to solar, biomass or wind. This can then become the key source for last-mile connectivity, reaching households that still do not have access to electricity; or, and most critically, can become the supply for cooking energy needs of households. It will then displace all the dirty fuels which are today used, and can be a win-win proposition for the world's energy-insecure poor.

A 3 There was an interest in setting up mini-grids till policy moved to all-India grid-connectivity. Micro / mini-grids were promoted by the Ministry of New and Renewable Energy (MNRE) as a component of the 'Off-grid and Decentralised Applications Programme', implemented under the National Solar Mission with a provision of Central financial assistance. In 2016, the Indian government came up with a **Draft National Policy on Mini and Micro-grids** with a target of deploying at least 10,000 renewable energy-based micro / mini-grids with a minimum capacity of 500 MW in the next five years in under-served and un-served locations of the country. But this policy has not been finalised yet.

A 4 The draft policy encouraged states to use the enlisted guidelines to prepare their own policies. Uttar Pradesh[1], following this, has framed its own mini-grid policy, while states like Odisha[2] and Bihar[3] have included the component of mini-grid in their wider renewable energy policies (*see Table 1*).

Table 1: State mini-grid policies and their features

States	Salient feature of mini-grid policy
Uttar Pradesh (Uttar Pradesh Mini-grid Policy, 2016)	• To ensure power supply to 20 million households of the state for minimum need (daily three hours in the morning and five hours in the evening – with a total of at least eight hours) • To create a conducive environment for stimulating private sector participation through 30 per cent subsidy. Developers to establish projects on Build Own Operate & Maintain (BOOM) basis and guarantee 10 years of Operation and Management (O&M) services. • To enhance skills and create employment opportunities at the local level. • To promote establishment of local manufacturing facilities and socio-economic development of backward areas.
Odisha (A component under Odisha Renewable Energy Policy, 2016)	• The Odisha Electricity Regulatory Commission notified the Mini-grid Renewable Energy Generation and Supply Regulations in June 2019. • Two models for business operations are discussed – one each for where the grid pre-exists and the grid is non-existent.
Bihar (A component under Policy of Promotion of Bihar New and Renewable Energy Sources, 2017)	• Promotion of mini-grids as a solution to provide 24x7 reliable energy to all by FY18-19. • State government targets to achieve deployment of 100 MW of RE capacity equivalent through mini-grids. • Projects to be constructed on the BOOM model. • The government to facilitate the development of mechanisms to streamline project aspects such as single window clearance etc.

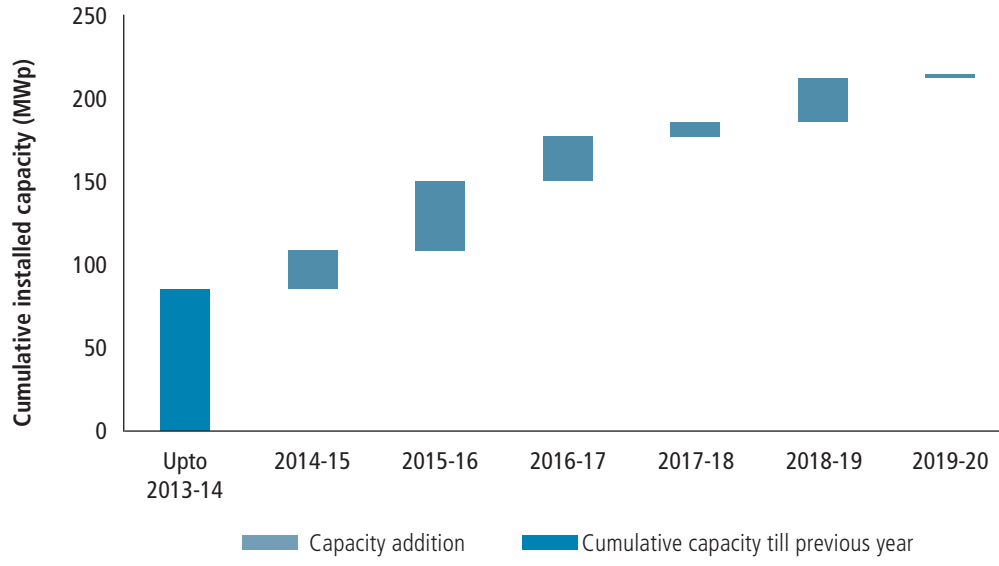
A 5 Grid-electrification has reduced interest in mini-grids: By 2017, the government's focus had shifted to providing access to electricity to all households by extending the grid. The Pradhan Mantri Sahaj Bijli Har Ghar Yojana – also known as the 'Saubhagya' scheme – aims that 99.99 per cent of households are electrified in India till date. According to it, as of now only some 18,734 households remain to be electrified out of 26,303,084 households in the country[4]. This is no mean achievement as the grid has been extended to reach across the country.

A 6 However, the definition of 'electrified households' remains problematic. Till recently, 'electrification' meant that there was more than just a single wire in the village connected to the grid. The new definition says a village can be called 'electrified' if at least 10 per cent of the households are connected.

A 7 There is also a lack of data to show if this electrification has led to electricity reaching households, if it is reliable, and if it continues to be supplied given that distribution companies are mostly cash-strapped and households are often unable to pay. In such a situation, mini-grids, which can generate and supply energy close to the households, could well be the answer.

A 8 So, how much has been installed till date: As per the MNRE, 214 MW capacity equivalent of off-grid power plants – which include micro / mini-grids (*see Graph 1*) – and almost 10 million-plus off-grid solar-based systems (including solar lamps, pumps, etc) had been deployed in India by March 2020.

Graph 1: Cumulative installation of off-grid RE power plants



Source: MNRE

B. RELEVANCE OF MINI-GRIDS

B 1 In a report on micro-grids in India – *Myths, Misunderstandings, and the Need for Proper Accounting* – Rahul Tongia of Brookings India establishes that assuming capital costs (capex) of Rs 12,000 / kW and a 10-year life, it would cost between Rs 4 / kWh to Rs 6 / kWh (with battery storage for cloudy days). This competes well with diesel power, finds Tongia.[5]

B 2 The 2019 report on *Rural Electrification in India – Customer Behaviour and Demand*[6], published by Smart Power India, a subsidiary of The Rockefeller Foundation and the Initiative for Sustainable Energy Policy (ISEP), had found households mixing and matching both grid and off-grid energy sources for their needs. The study, based on data collected from 10,000 households and 2,000 rural enterprises in Bihar, Uttar Pradesh, Odisha and Rajasthan, found that 16 per cent of the households and 40 per cent of the enterprises used non-grid sources – diesel generators, but also solar home systems. It also

found that one in two grid-users faced a power cut at least eight hours daily. Besides the inconvenience, an undependable electricity supply forced customers to bear additional expenses on power back-ups.

B 3 Centre for Science and Environment (CSE), in its study of solar-biomass hybrid-based mini-grid model at Chanpatia village in Pashchim Champaran district in Bihar, found that the system is effectively handling the load during power outages as well as ensuring the customers stable and uninterrupted supply. Customers were observed to have a higher willingness to pay to the mini-grid-based energy suppliers for their service steadfastness, operational efficiency and tailored solutions, despite the power being costlier than that from grid-based supply. Small commercial customers are gradually shifting now from diesel generators to mini-grid connections.

B 4 Some private sector firms – including TP Renewable Micro-grid, a joint venture of Tata Power, The Rockefeller Foundation and Husk Power Systems – are installing mini-grids to provide quality energy in rural areas. TP Renewable Micro-grid is all set to install around 10,000 micro-grids.

B 5 The CEA acknowledges the importance of mini-grids in meeting the target of 175 GW of RE by 2022[7]. The potential of mini-grids in India has been estimated at about 4 GW in the villages which have an inadequate power supply.

B 6 Mini-grids will be essential in ensuring round-the-clock energy access and last-mile connectivity in the country. Hence, it is important to streamline the process of development of micro and mini-grids through a robust mechanism. A revised national policy on mini and micro-grids should be put forward to achieve the target of 450 GW of RE. Falling RE prices give opportunities for businesses to use different technologies to develop implementation models for profitable dealing.

But the key will be to develop mini-grid systems and policies that integrate with the grid, so that the surplus power generated can be exported out; and in times of need also imported into the system for supply. The modern mini-grid must be as easy to install as the local distributor for other supplies – it should provide the last-mile-connectivity and through its services, support the growth of local economies and livelihoods.

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