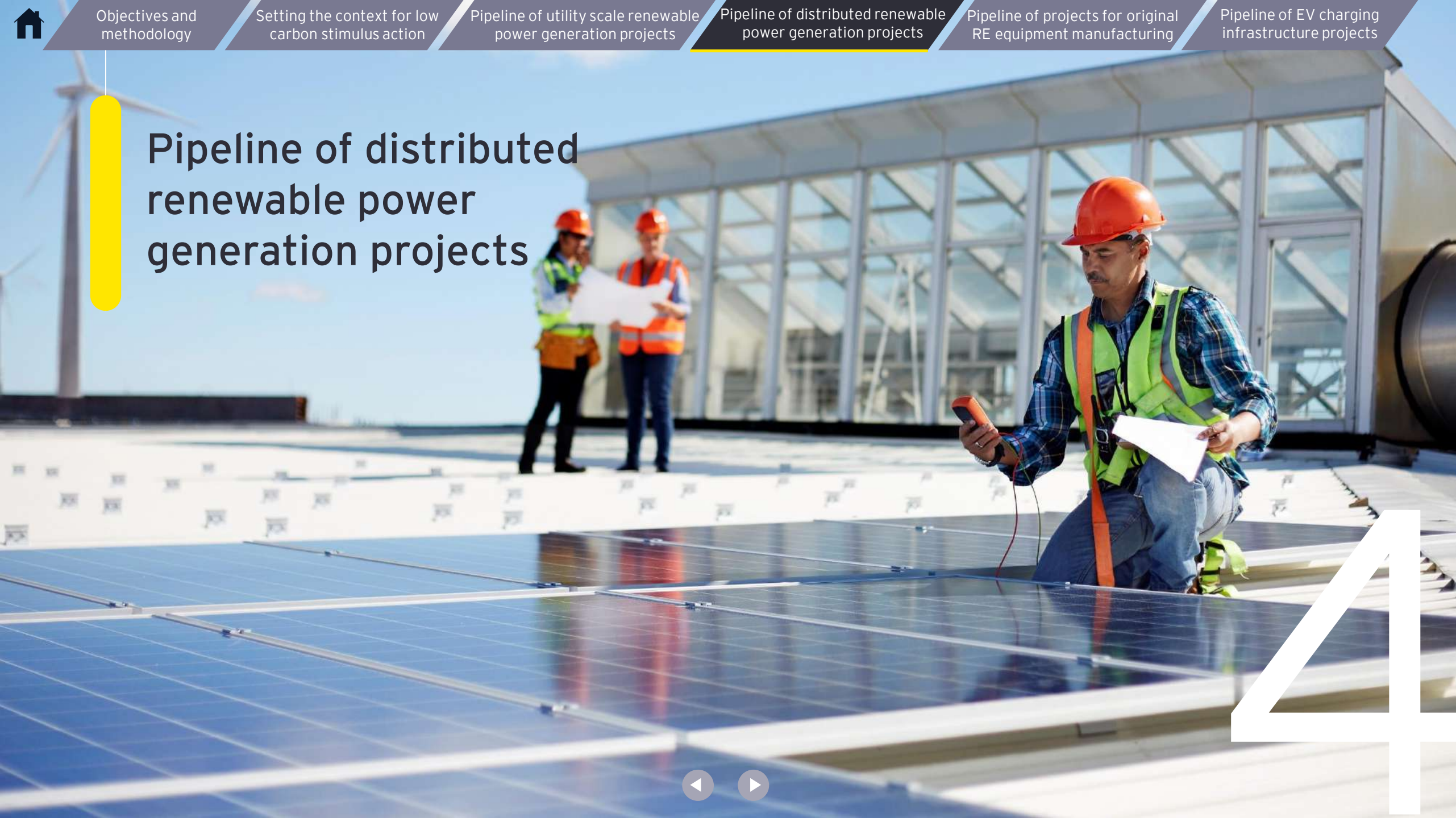
Pipeline of distributed renewable power generation projects



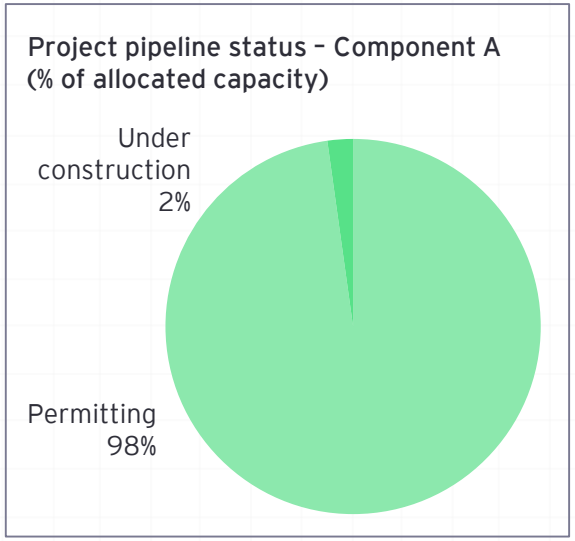
Grid Connected Solar Rooftop Program - 18 GW of distributed rooftop solar deployment announced for residential, institutional and other commercial sectors

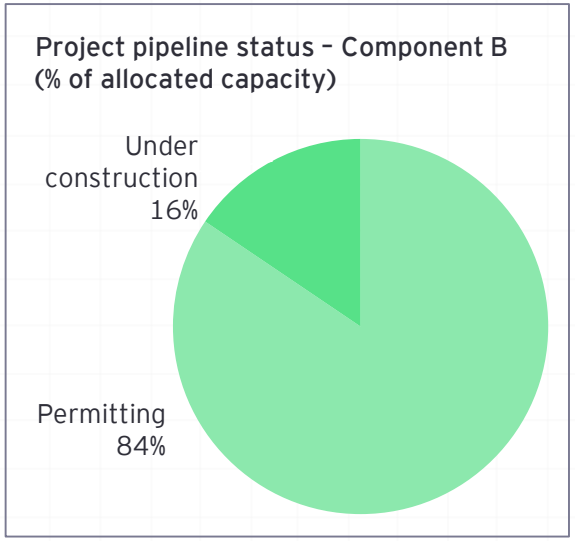
Introduction

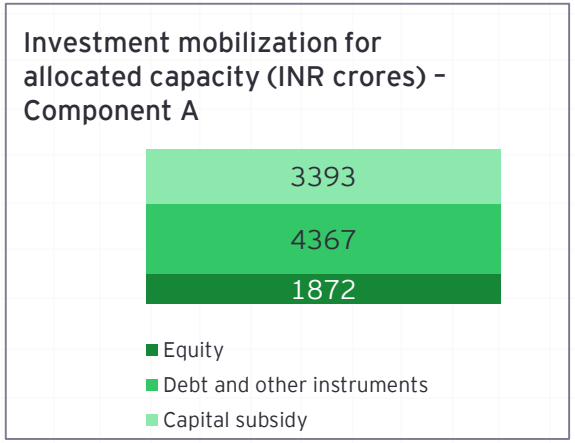
The Ministry of New and Renewable Energy (MNRE), Government of India, notified the operational guidelines for implementation of Grid Connected Solar Rooftop Program - Phase 2 in August 2019. The Component-A of this program aims to deploy 4 GW of Rooftop Solar PV (RTPV) systems in the Residential Sector with Central Financial Assistance (CFA) in the form of capital subsidy (up to 40%). At the same time, Component-B aims to incentivize state DISCOMs for achievements above baseline, up to 18 GW of total capacity addition in any sector.

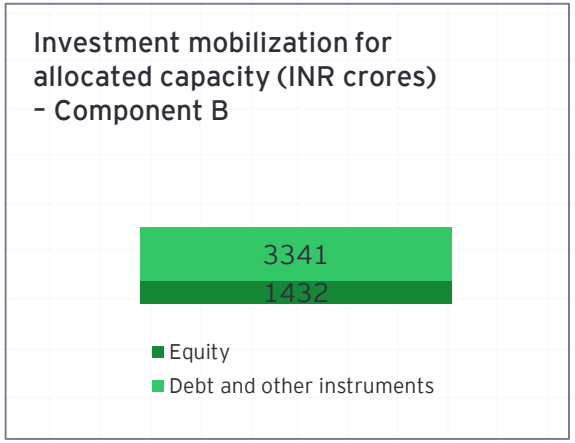
Shovel ready projects for implementation

~2,500 MW capacity of RTPV capacity is currently allocated by MNRE to various state nodal agencies (mostly DISCOMs) for implementation under component A. A majority of these projects are still under development with nodal agencies deliberating the right business models for maximum participation from all stakeholders, especially end users and investors. Another ~1.1 GW capacity of rooftop solar projects are allocated and developed under component B with about 600 MW being developed for the residential sector and the remaining 400 MW projects in other sectors. CAPEX model of development dominates in this project pipeline under both components. However, Renewable Energy Service Company (RESCO) model of development leveraging private sector investments is increasingly tested for faster adoption. A variety of other innovative business models such as rent a roof/lease model, community model, utility model, through a Special Purpose Vehicle (SPV) having share of Utility, plug-in Rooftop Solar (RTS) model and others are also being explored.









Source: EY analysis based on MNRE SPIN portal

Investment mobilization

In the prevailing conditions, we can expect the MNRE program to spill over until 2025 to achieve the overall target of 18 GW. This is because the state nodal agencies for implementation would gradually test innovative business models and streamline the process for solicitation of market participants, tariff discovery and capacity allocation, PPA execution, construction and commissioning, monitoring and evaluation. For the allocated capacity already under development, a total of INR 11,134 crores (US$ ~1.6 billion) of capital investment will be mobilized in 2021–22 (excluding the subsidy). Further, another INR ~69,400 crores (US$ ~9.7 billion) is expected to be mobilized for building the remaining capacity announced under the MNRE program. Both public and private sector players are expected to raise funds to meet this massive capital expenditure. The Government of India through MNRE will provide capital subsidies to the tune of ~INR 5,800 crores (US$ ~0.8 billion) under component A.

Capital Investment - Equity

~INR 24 thousand crores

For 18 GW of rooftop solar PV projects announced by MNRE

Capital Investment - Debt

~INR 56 thousand crores

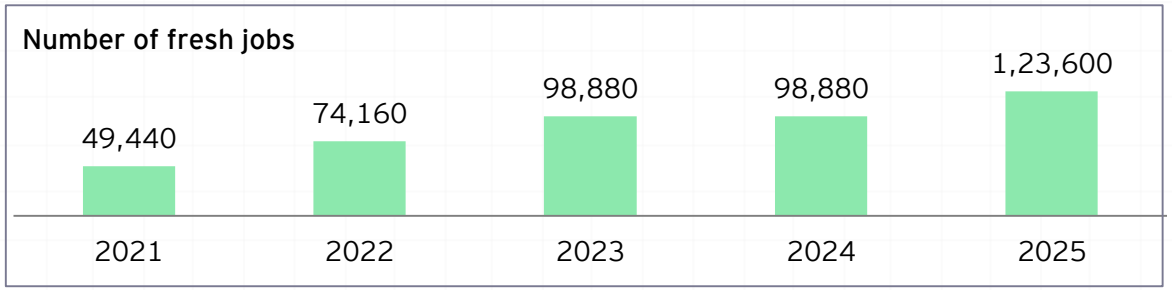
For 18 GW of rooftop solar PV projects announced by MNRE

Item	2021	2022	2023	2024	2025	Total
Annual Installed Capacity (GW)	2	3	4	4	5	**18**
Equity mobilization (INR crores)	2,686	4,029	5,372	5,372	6,715	**24,175**
Debt mobilization (INR crores)	6,268	9,402	12,535	12,535	15,669	**56,409**
Capital subsidy (INR crores)	1,214	2,312	2,312	0	0	**5,839**

Source: EY analysis based on MNRE SPIN portal

Socio economic benefits

Over 4.5 lakh fresh jobs will be created in building 18 GW capacity of grid connected rooftop solar PV systems announced under the program. For the allocated capacity already under development, about ~90,000 jobs will be created in 2021–22. These jobs will emerge in both public and private sectors along the value chain of project development, construction and commissioning, operations and maintenance of rooftop solar PV systems all across the country.



Source: EY analysis based on MNRE SPIN portal

Environmental benefits

Over ~622 million tonnes of CO2e emissions are expected to be avoided over the operating lifetime of 18 GW capacity of grid connected rooftop solar projects commissioned under the program.

Fresh jobs created

~4.37 lakh jobs

For 18 GW of rooftop solar PV projects by 2025

Avoided emissions (cumulative over project lifetime)

~622 million tonnes CO_2e

For 18 GW of rooftop solar PV projects announced by MNRE

Stimulus action to fast track implementation of rooftop solar project pipeline

1 Boost demand for rooftop solar deployment in the institutional sectors, especially rural health centres and schools

As per the Parliamentary Standing Committee's latest assessment, only 56.45% schools have adequate electricity access. Rural Health Statistics (2019) indicates that 26.3% of the rural sub-centres and 4.8% of rural Primary Health Centers (PHCs) do not have access to electricity supply, which is not only imperative for the functioning of healthcare facilities but also a vital determinant of essential healthcare services delivery.

Rural health centers and schools are largely vulnerable to irregular power supply and frequent interruptions adversely impacting the delivery of essential healthcare and education in rural communities. Despite having diesel generators for power backup, their operations are restricted due to inadequacy of funds for diesel. Sometimes in remote locations, the supply of diesel is interrupted during monsoons or bad weather. As per the World Health Organization (WHO), unreliable electricity access leads to vaccine spoilage, interruptions in the use of essential medical and diagnostic devices, and lack of even the most basic lighting and communications for maternal delivery and emergency procedures. The quality of energy access in healthcare and education facilities may have crosscutting impacts, for example, retention of health workers, improved enrolment / attendance of students and teachers in government schools who often live right alongside these facilities.

Experience from Chhattisgarh, Odisha (Kalahandi) and Karnataka (Karuna trust) have shown that health centres with rooftop solar systems provide 24-hour healthcare services treating a greater number of patients. Regular access to electricity has also enabled them to have reliable supply of water, safe refrigeration for vaccines, and powered theatre equipment, fans, and baby warmers.

There are ~1.5 lakh health centres (viz. sub-centres, primary health centres and community health centres) across the country with potential for ~564 MW of rooftop solar deployment. Similarly, there are approx. 6,82,000 rural primary schools managed by government with potential for ~2 GW of rooftop solar deployment.

Stimulus options:

- Dedicated capacity allocation for rooftop solar deployment in rural schools (2 GW) and health centres (500 MW) with generation based incentives
- Extend low cost credit line for financing rooftop solar projects in the institutional sectors
- Set up institutional mechanism at central and state levels for demand aggregation and investment related actions under OPEX mode in both health and education sectors

Stimulus benefits - (Cumulative over Solar PV system operating lifetime)

Item	Value
Direct savings in electricity costs of health centres	INR 5,875 crores (US$ ~0.8 billion)
Direct savings in electricity costs of rural government elementary schools	INR 21,284 crores (US$ ~3 billion)
Fresh jobs created in rural communities	61,800 fresh jobs
Avoided CO_2 emissions	86 million tons of CO_2e
Total capital investment toward rooftop Solar PV systems in health centres and rural government elementary schools	INR 11,200 crores

Source: EY analysis

Other cross cutting benefits:

- 6 hours of daily reliable electricity for powering health centres and school infrastructure
- Conducive learning environment (e.g. thermal comfort, drinking water, clean toilets etc.) for students and teachers
- Improved enrolment, attendance of students and teachers in Government schools, retention of health workers
- Infrastructure for evening classes and computer aided learning when integrated with cost effective battery back up solutions
- Reduced vaccine spoilage and interruptions in the use of essential medical and diagnostic devices

2 Promote net metering in all categories of consumers up to 1 MW of sanctioned load

The Ministry of Power, Government of India recently notified the Electricity (Rights of Consumers) Rules, 2020. The section 11 of these rules outlines the right of 'Consumer as prosumer' in order to promote investments toward decentralized renewable energy systems for self consumption. The rule 11 (4) states that the 'regulations on Grid Interactive Roof top Solar PV system and its related matters shall provide for net metering for loads up to ten kW and for gross metering for loads above ten kW'. The Ministry of Power has further issued a draft amendment to the Electricity (Rights of Consumers) Rules, 2020 dated 9th April 2021, which allows net metering for rooftop solar systems of loads up to 500 kW or up to the sanctioned load, whichever is lower and net billing (gross metering) or net feed-in for above 500 kW. This amendment is much appreciated and perceived as a quintessential policy enabler for the emerging 'PROSUMER' driven markets for RTPV systems. The government should gradually allow net metering for all consumer categories up to 1 MW.

It is needless to say that such policies limiting the consumer's right to avail net metering create artificial market barriers in the process of realizing the full potential for investments and employment generation in the power sector's transition toward clean energy. The energy landscape is changing rapidly driven by 3Ds - decarbonization, decentralization and digitization. Electricity generation is rapidly becoming more decentralized and closer to the end consumer. RTPV generation will naturally grow to contribute substantially more than utility scale systems, which are constrained by land availability, evacuation infrastructure and their suboptimal utilization. This transition will materialize through the following "tipping points" felt across all functions and by all stakeholders. Understanding the when, what, and how of the tipping points creates opportunities for electric utilities and other stakeholders.

- The levelized cost of round the clock electricity from decentralized solar PV power generation integrated with battery storage will reach parity with the full retail price of grid-supplied electricity before 2025.
- The cost of transporting and distributing electricity exceeds the cost of generating and storing it locally before 2040.