

# A Renewed Push on Solar-Powered Irrigation Would Accelerate India's Energy Transition

## *Lessons Learned Can Help States Overcome Hurdles to Deployment of Solar Irrigation Pumps*

### Introduction

India is the world's third-largest electricity market after the U.S. and China and also one of the fastest growing electricity markets. Under the Paris Climate Agreement India set ambitious targets to reduce its emission intensity and decarbonise its electricity sector through large-scale deployment of renewable energy.<sup>1</sup>

The Government of India's ambitious target to install 450 gigawatts (GW) of renewable energy capacity by 2030 has drawn enormous interest from global investors, developers and energy companies with the ability to deploy capital at an unprecedented scale. The majority of capacity additions have come in the form of utility-scale solar and wind projects on the back of favourable economics and ultra-low wholesale tariffs. However, similar momentum has yet to be seen in distributed solar energy capacity.

India's distributed solar capacity is lagging significantly behind its near-term target of 40GW by 2022. This is an important sub-target of the 100GW of solar capacity which is in turn part of the target to install 175GW of renewable energy capacity by 2022.

India's current total distributed solar capacity is 7.8GW. The Ministry of New and Renewable Energy (MNRE) reports on-grid rooftop solar capacity reached 4.3GW as of February 2021, while Bridge to India reports an additional 2.2GW of rooftop solar capacity as of December 2020, making the total rooftop solar capacity ~6.7GW.<sup>2</sup> Bridge to India also reports additional off-grid solar capacity of ~1.1GW as of December 2021.

**India's agricultural sector accounts for about 20% of electricity consumption.**

In agriculture, electricity plays a crucial role in meeting irrigation requirements. Power consumption by the agricultural sector in India grew at a compound average growth rate (CAGR) of 7.1% between FY2008/09 and FY2018/19. This is in line

<sup>1</sup> IEEFA. [India on track to meet majority of Paris goals](#). 3 December 2018.

<sup>2</sup> Bridge to India. [India Solar Compass Q42020](#).

with India's overall growth in electricity demand of roughly 6-7% over the last decade. As per FY2018/19 data, roughly 20% of India's electricity consumption was in the agricultural sector.<sup>3</sup>

Successful farming in India typically requires irrigation. However only 48% of the country's "net sown area" is irrigated while the rest is dependent on the vagaries of nature.

As per Ministry of Statistics and Programme Implementation (MoSPI) data from FY2017/18, 62% of the country's net irrigated land is watered either by relatively deep tube wells or other, shallower types of wells. Most of these wells are reliant on electric or diesel pumps.<sup>4</sup>

To support India's vast agricultural demand, power is provided to farmers at subsidised rates. The state power distribution companies (discoms) finance these subsidies either through state government budgetary support for subsidies or higher power tariffs for their commercial and industrial (C&I) customers and residential customers.

In a study from 2019, the Indian Statistical Institute estimated that Rs90,000 crore (US\$12bn) was directed towards subsidising power supplied to the agricultural sector in FY2015/16.<sup>5</sup>

Also, power at free or subsidised rates does not encourage efficient use of water, resulting in exploitation and depletion of extremely valuable groundwater resources.

Solar irrigation pumps have been identified as an extremely effective way of supporting expansion of distributed solar generation whilst supporting India's vast power demand in the agricultural sector. In IEEFA's view, solar irrigation pumps when implemented sustainably are a key instrument to tackle the growing challenges of the nexus between food, water and energy in India.

**Solar pumps help expand distributed solar generation while catering to agriculture's vast power demand.**

Additionally, we note that significant up-scaling of solar irrigation pump deployment would provide multiple benefits to India in terms of:

- reducing the need for heavily subsidised electricity to the agricultural sector, which would help to alleviate discom financial distress;
- aligning solar generation with irrigation time of use;

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<sup>3</sup> CEIC.

<sup>4</sup> MoSPI.

<sup>5</sup> Indian Statistical Institute. [Agriculture Subsidies](#). March 2019.