



GOVERNMENT OF INDIA  
MINISTRY OF NEW  
AND RENEWABLE ENERGY

# Approaches to Drive Distributed Solar Market in Asia

*Learning from India*

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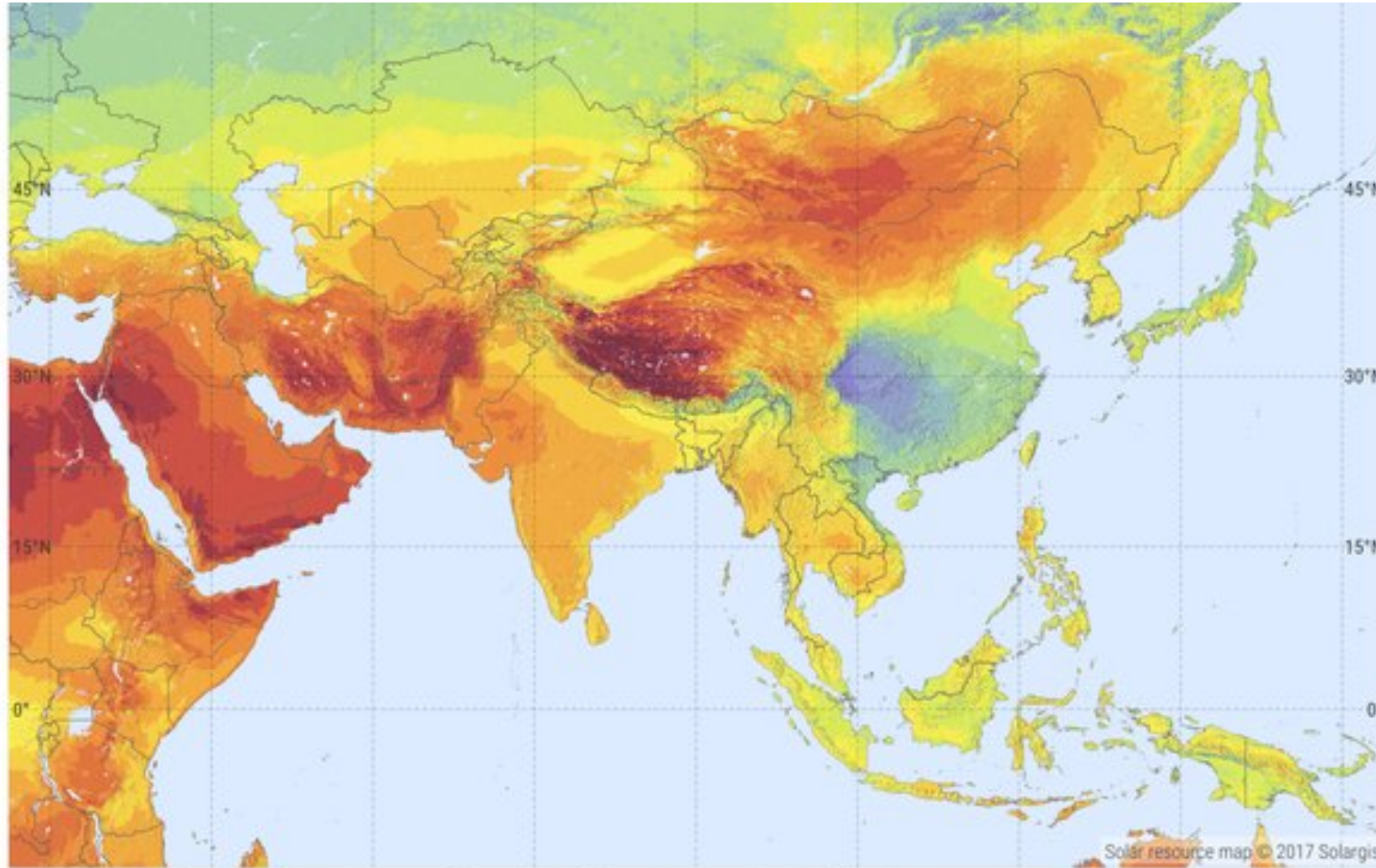
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# Asia is set to become global capital for solar power by 2050



**Solar the Most  
Common Distributed  
Energy Resource  
Available in Asia**



**Top-  
7/21**



# India National Solar Mission

**Target**  
**60 GW Utility Scale**

**40 GW Rooftop Solar**

**Achievement**  
**13 GW Utility Scale**

**2.3 GW Rooftop Solar**

**Slow  
growth of  
rooftop  
solar in  
India, story  
is same  
across Asia**



# Key Challenges Impacting Deployment of Distributed Solar

Fear of revenue loss leading to resistance from the Distribution Utilities

Net-metering offer incentives to only certain consumer class

Gaps in existing quality & safety standards

Policies/incentives not aligned with the market

Lack of knowledge and capacity amongst low income consumer groups

Value proposition changes with location and time

Impact on the demand curve- high evening peak

**These issues are not unique to India**

# Potential solutions

- Quantify real benefits of Distributed Solar/Rooftop Solar
- Distribute these benefits equitably among stakeholders- utilities and consumers
- Promote Distributed Solar where benefits are high  
- low-paying consumers, distribution network limitation, etc.
- Enhance the benefits of Distributed Solar
- Monitor and adjust schemes as market develops-  
benefits of Distributed Solar/Rooftop Solar will change over time



<https://www.adb.org/news/adb-help-develop-rooftop-solar-power-systems-sri-lanka>

# Alternate Compensation Model- “Value of Solar” analysis for Gujarat

**Value of Solar:** Determine what is the average benefit (and cost) of DPV exports to the power system



Energy



Generating Capacity



Transmission Capacity

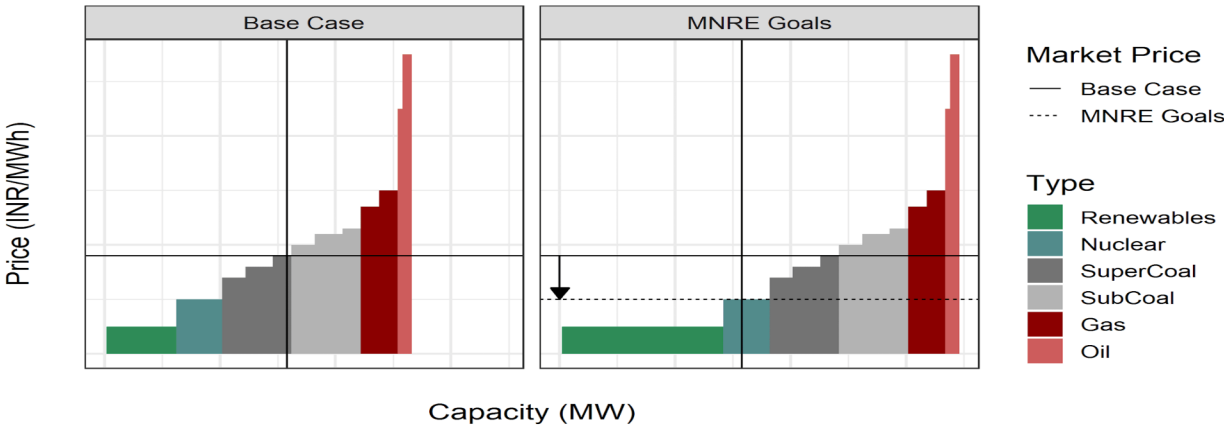


Environmental

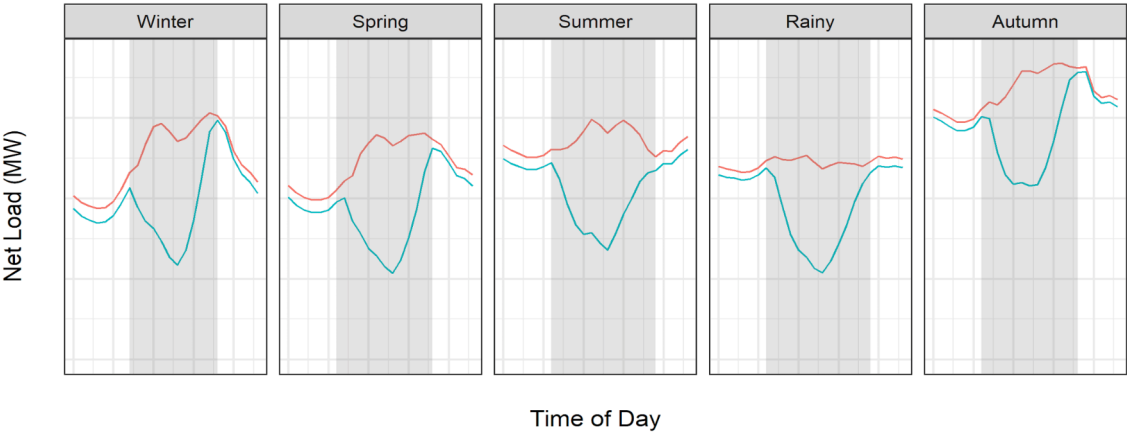
## Results for Gujarat

	Base Case (INR/MWh)	MNRE Goals (INR/MWh)
Energy	4,247	3,956
Generation Capacity	4,694	10
Transmission Capacity	4	5
Env and Health	4,2012-9,375	
Total Value	14,157-15,928	9,183- 10,954

### a. Reduced Energy Value with Increasing Solar deployment



### b. Reduced Capacity Value with Increasing Solar Deployment



### c.Value Changes with Location

### d. High Environmental Benefits

# RTS+ Storage- An Incremental Effort to Derive Higher Value

## Benefits of RTS+ Behind-the-Meter Storage

And many more...



### Many jurisdictions already familiar with storage

Primarily as backup resource with limited grid interaction



### As costs drop, storage spreads and capabilities improve

Storage will offer increased range of services for customers and utilities



### Comprehensive framework for storage can ensure systems work for customers and utilities

Compensation Mechanisms

Technical Configuration and Metering

Interconnection



# RTS+ Storage- Considerations for India

- Regulatory decisions can enable Indian DISCOMS and customers seize the opportunity
- Determining the desired role of DPV-plus-storage is an important first step.
- Customizing rules and requirements based on the characteristics of the DPV-plus-storage system is a key strategy to promote fairness.
- Current state net energy metering (NEM) policies do not incentivize storage deployment
- Tariff design is an important tool to align the interests of DPV-plus-storage customers with the broader power system in India
- Indian regulators can enable business model innovation for DPV-plus-storage systems.
- Existing DPV regulations in India can be used as foundation for designing DPV-plus-storage interconnection rules.



## AN OVERVIEW OF BEHIND-THE-METER SOLAR-PLUS-STORAGE PROGRAM DESIGN: WITH CONSIDERATIONS FOR INDIA

Owen Zinaman, Thomas Bowen, and Alexandra Aznar  
U.S. National Renewable Energy Laboratory

June 2020

<https://www.nrel.gov/docs/fy20osti/74131.pdf>

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**# It's time for Nature**

**Thank You**

