



Strategies to overcome the implementation and financial challenges of PM-KUSUM Components A&C

18 Jan 2023

Project consortium

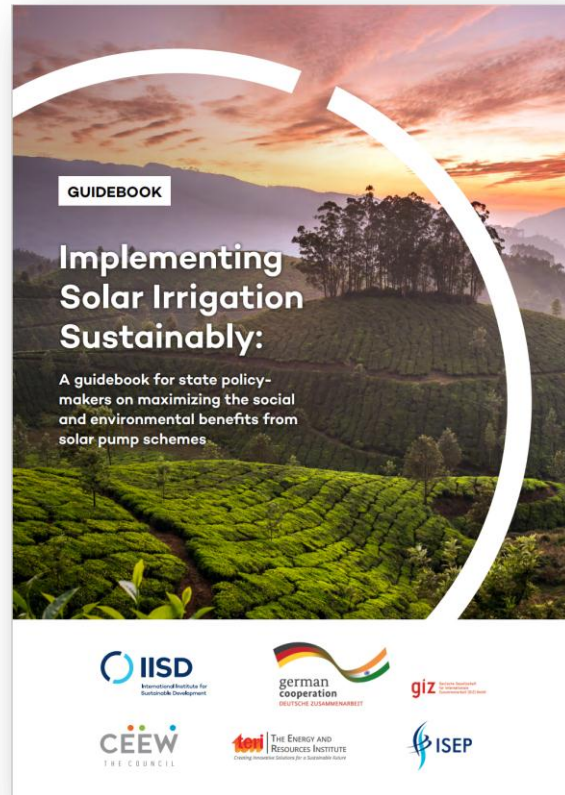


Guidebook on PM-KUSUM

Phase- I

Solar pumps

PM-KUSUM
Components
B & C(IPS)



Solar feeders

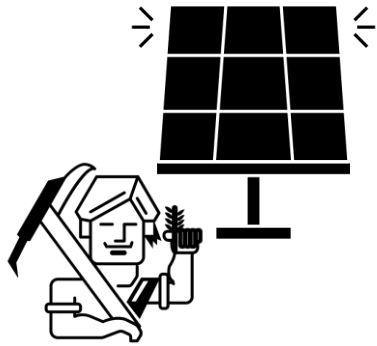
PM-KUSUM
Components
A & C (FLS)

Phase- II

Under development

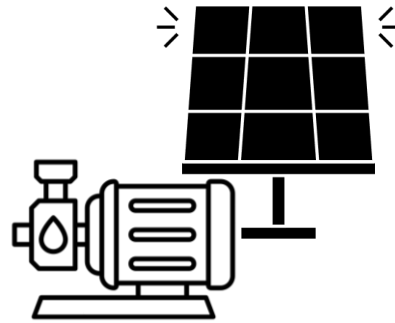
PM-KUSUM scheme

Three components are designed with different objectives



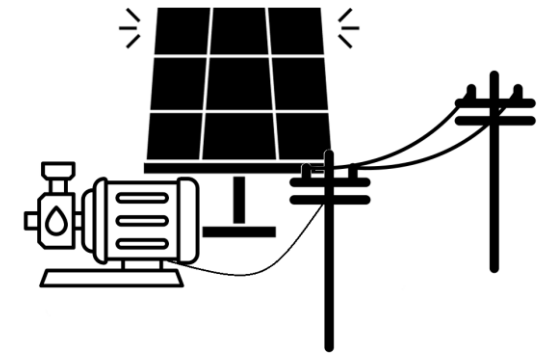
Component A

Setting up 0.5-2 MW solar plants on barren and uncultivable lands of farmers, allowing an additional income



Component B

Off-grid solar pumps for farmers using diesel pump or do not have access to irrigation

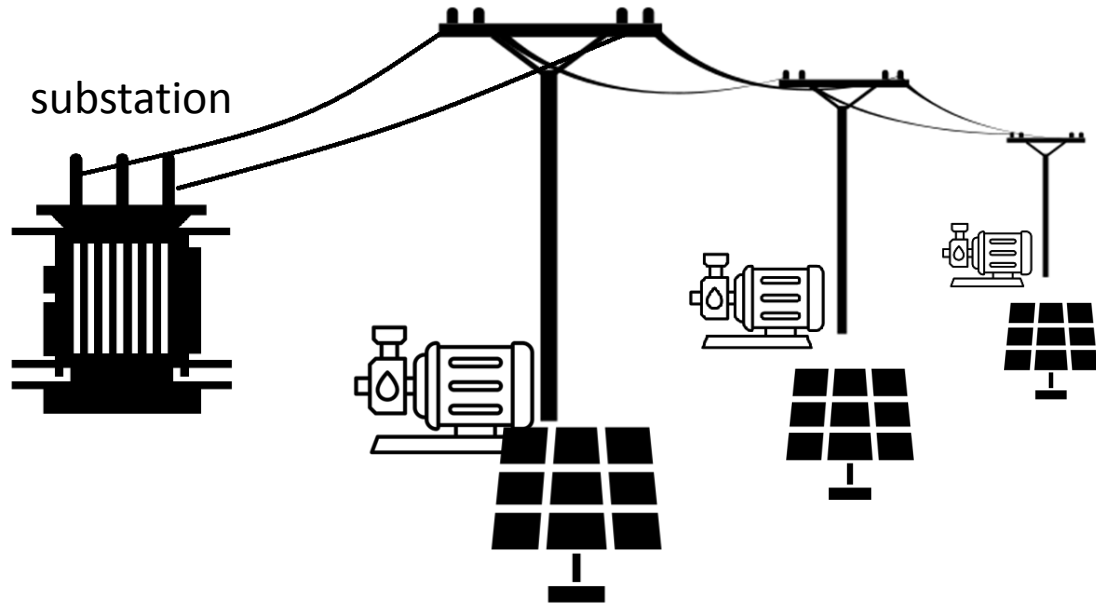


Component C

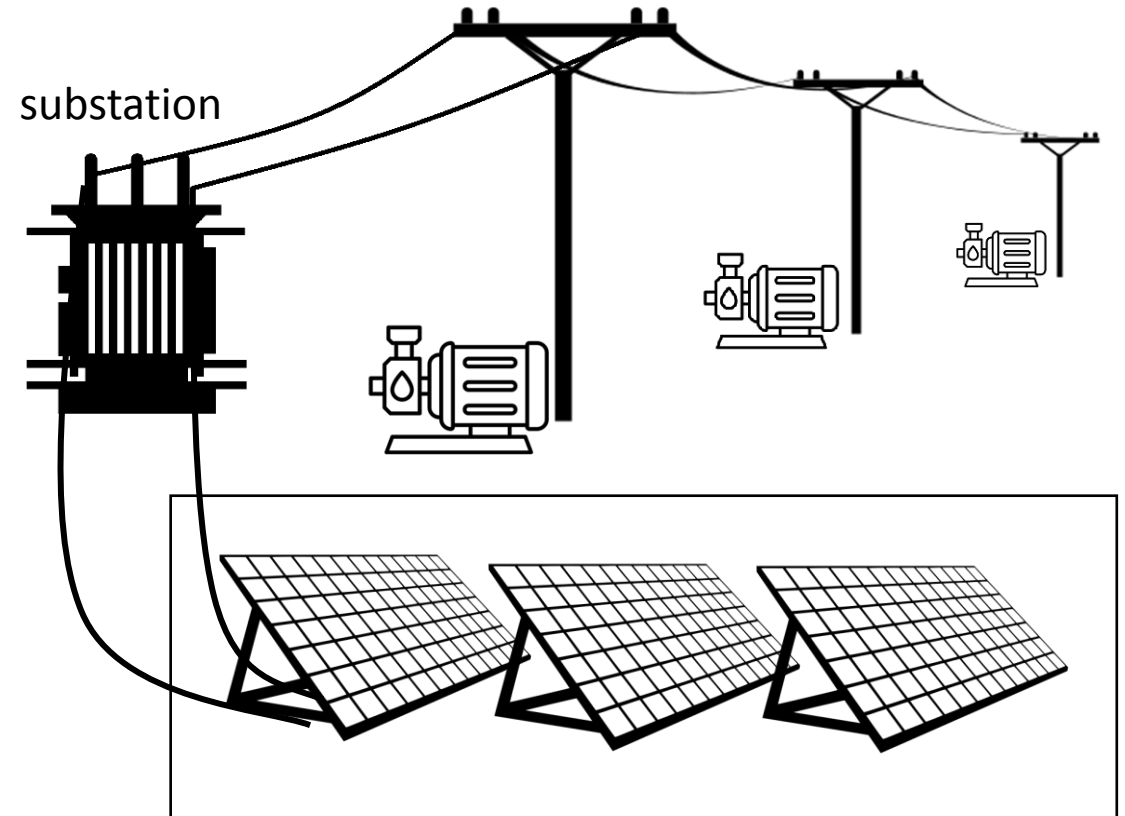
Solarization of grid-connected pumps for assured day-time power and to reduce subsidy

Component-C

Individual pump solarization

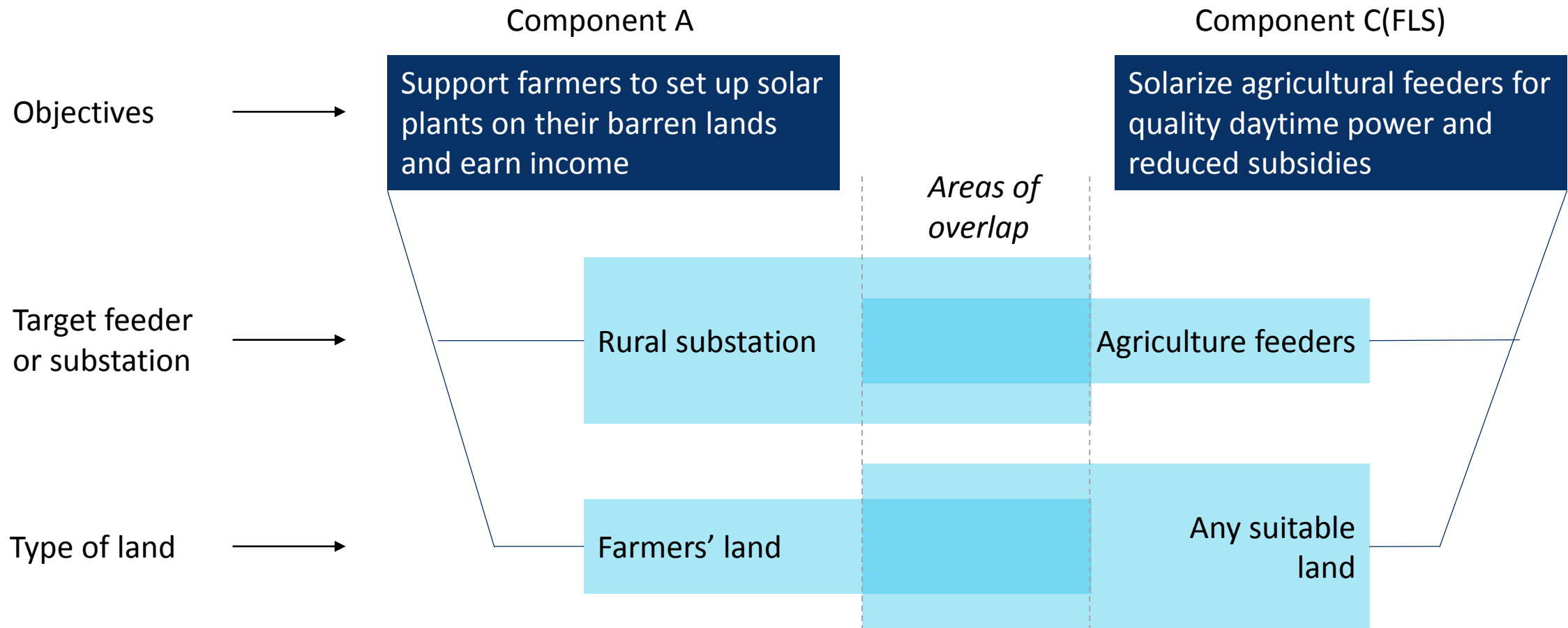


Feeder-level solarization



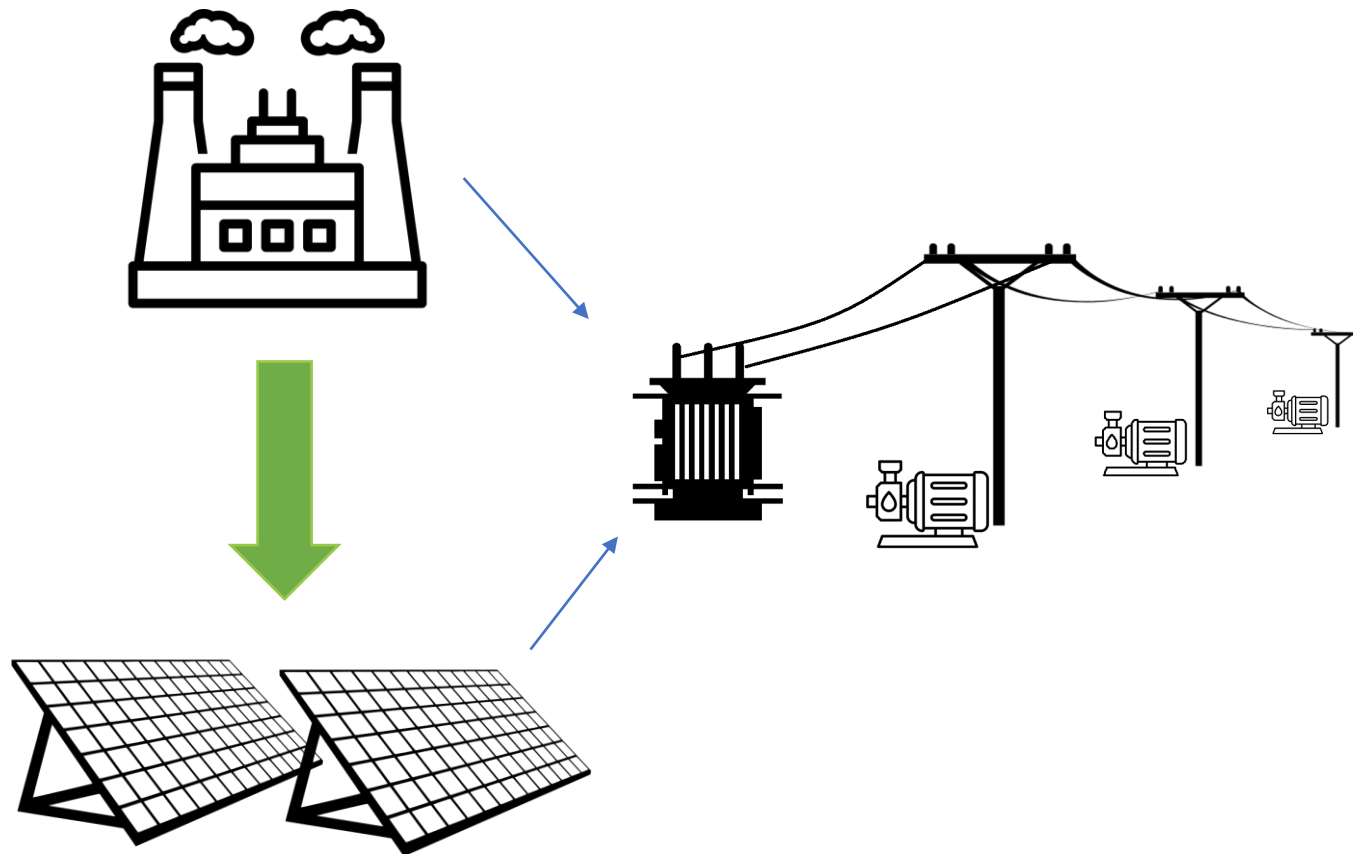
Component-A vs Component-C (FLS)

The objectives are different, but the results may overlap



Impact of Component-A or Component-C(FLS)

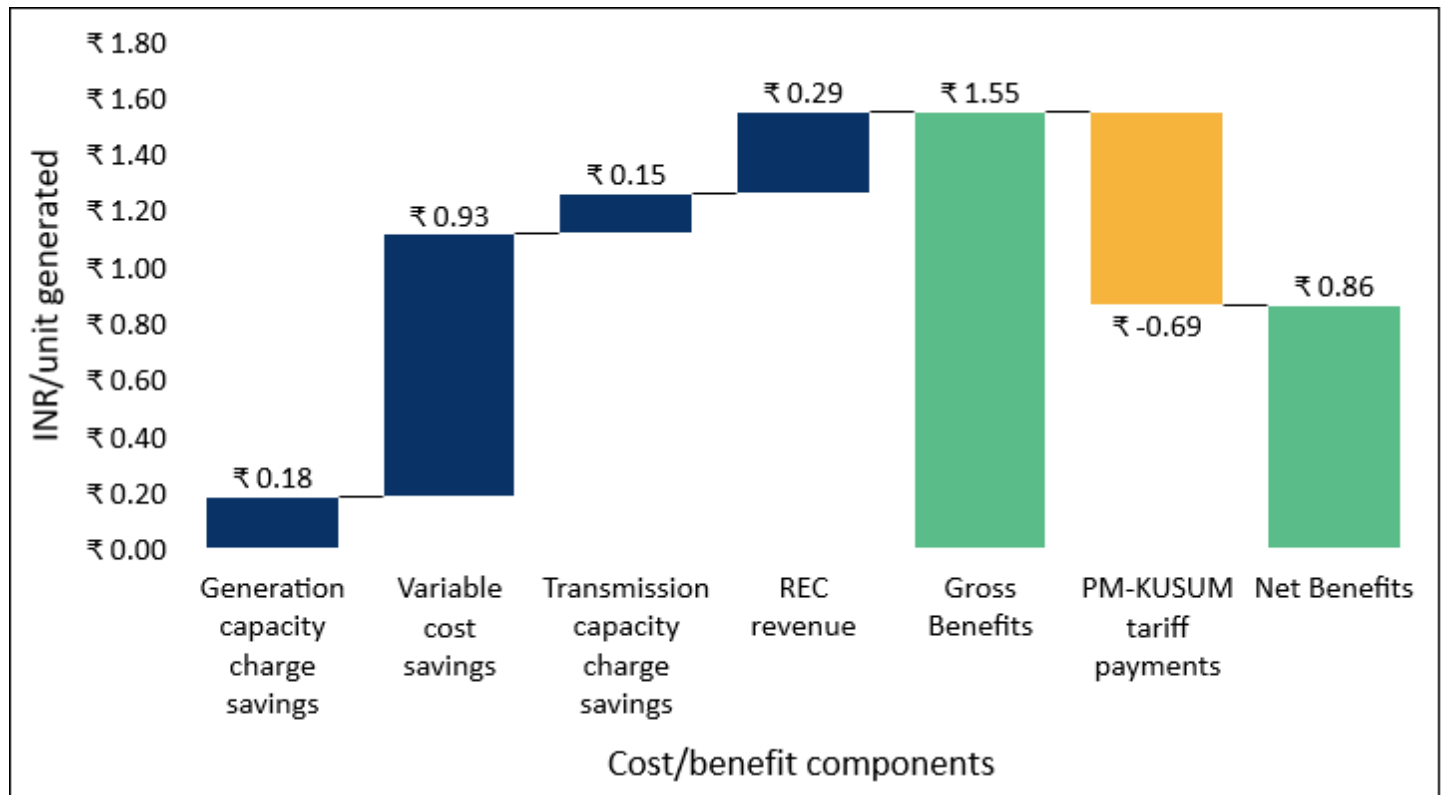
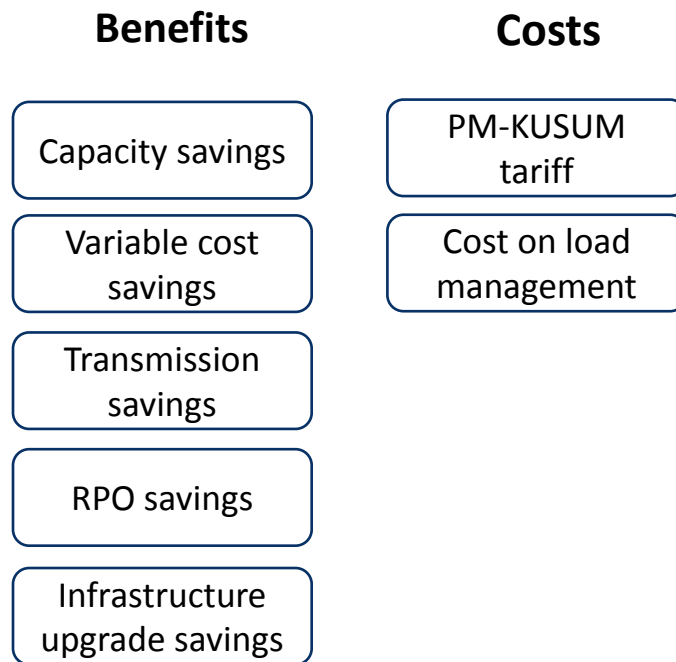
No change in the power supply side, only change in the power procurement side



- Power procurement for the target feeder changes from conventional sources to PM-KUSUM power plant
- No change in the distribution side
- No metering is needed

Cost-benefit analysis

Both components offers significant benefits to the state



This analysis is based on the VGRS model developed by [CEEW](#)

Progress in other states

Most have struggled to elicit interest from developers

State	Component	Tender quantum (MW)	Date of first tender	PPAs signed
Haryana	A	200 MW	13-Jan-2022	10 MW
Gujarat	C (FLS)	102.5 MW	14-Dec-2021	1.2 MW
Madhya Pradesh	C (FLS)	1258 MW	26-Apr-2022	120 MW
Kerala	C (FLS)	11 MW	19-Apr-2022	0 MW
Punjab	C (FLS)	54 MW	12-Aug-2021	0 MW
Uttar Pradesh	C (FLS)	(EoI for land)	07-Sep-2021	0 MW
Maharashtra	MSKVY	6304 MW	07-Jan-2018	2853 MW

What is holding back developers?

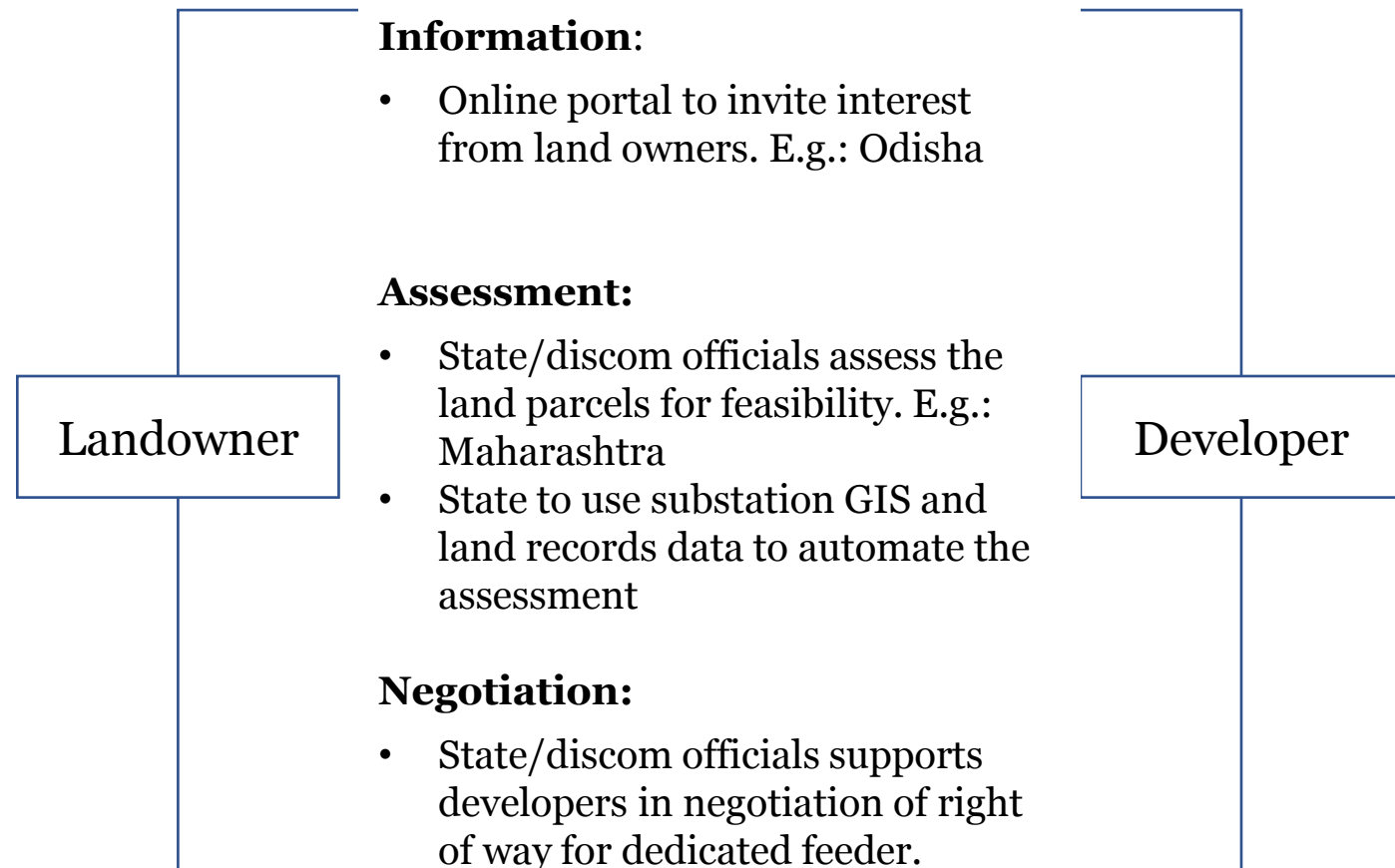
Our conversations with developers revealed multiple concerns

Land-related challenges

Developers flagged several challenges

- Scouting and identifying suitable land parcels
- Negotiating Right of Way
- Land for construction of bus bay and switchgears

Land Bank initiative in several states



Grid unavailability and voltage variation

- Grid availability at distribution level is often less than 95%
- Voltage often falls below 90% pu affecting the system

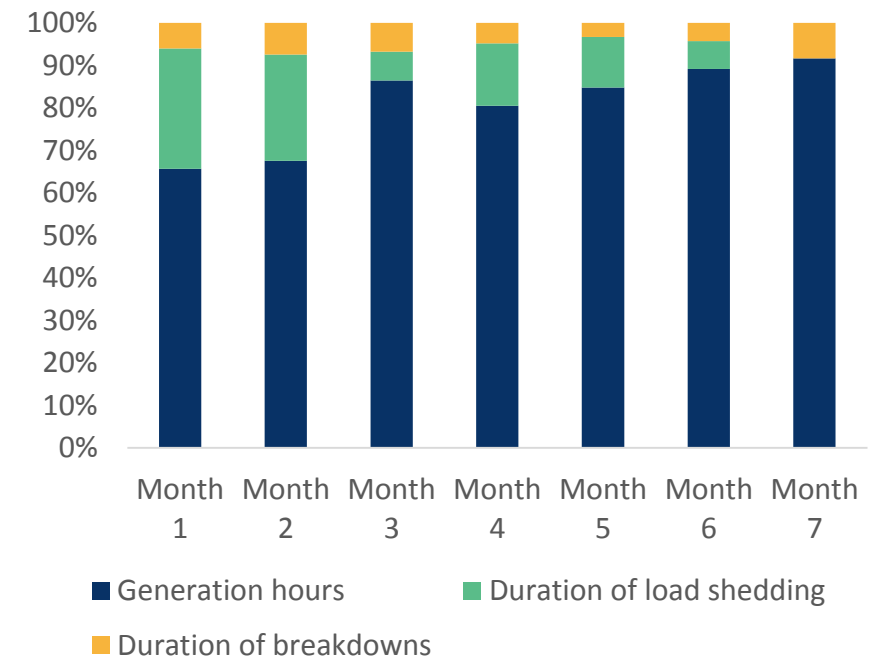
Guarantee a minimum % of grid availability

- Some states guaranteed a minimum percentage of grid availability to allay developers concerns
- State compensates any shortfall at a pre-determined tariff

Targeted improvement of substation infrastructure

- Bifurcation of feeders and adequate reactive power compensation
- PMKUSUM-RDSS convergence

Percentage of grid availability for a pilot power plant



Source: Authors' analysis based on data from [Padole et al. \(2022\)](#)

Developers' profile

Only SMEs and solar-rooftop developers show interest in the scheme

- Most big developers reluctant to participate in the scheme due to high logistical overheads for them
- Gujarat's experience
 - Initial tenders did not elicit response
 - Now SME developers and solar rooftop developers – relaxed technical criteria
 - Allowed joint ventures (JV) to participate
- Similar experience in Madhya Pradesh, Maharashtra

Offtaker risks

Payment delays from the discoms could severely impact cash flow for developers, especially SMEs. It also impacts the cost of financing for developers

- **Unconditional letter of credit:** Developers expressed higher preference for discoms ready to issue LC. But LC encashing is tedious and MSMEs hope for solid steps to ensure timely payment
- **State government guarantee:** Sovereign guarantee in PPAs can reduce the risk perception and thus financing cost
- **CPSU intermediaries:** Discoms can rope in NTPC/SECI as intermediaries to implement the schemes. CPSUs provide payment security to developers

Higher financing cost

States can facilitate low-cost financing

Higher project risks

+

Lower creditworthiness of SME
developers



Higher cost of financing

Alternative financing facilities. Examples:

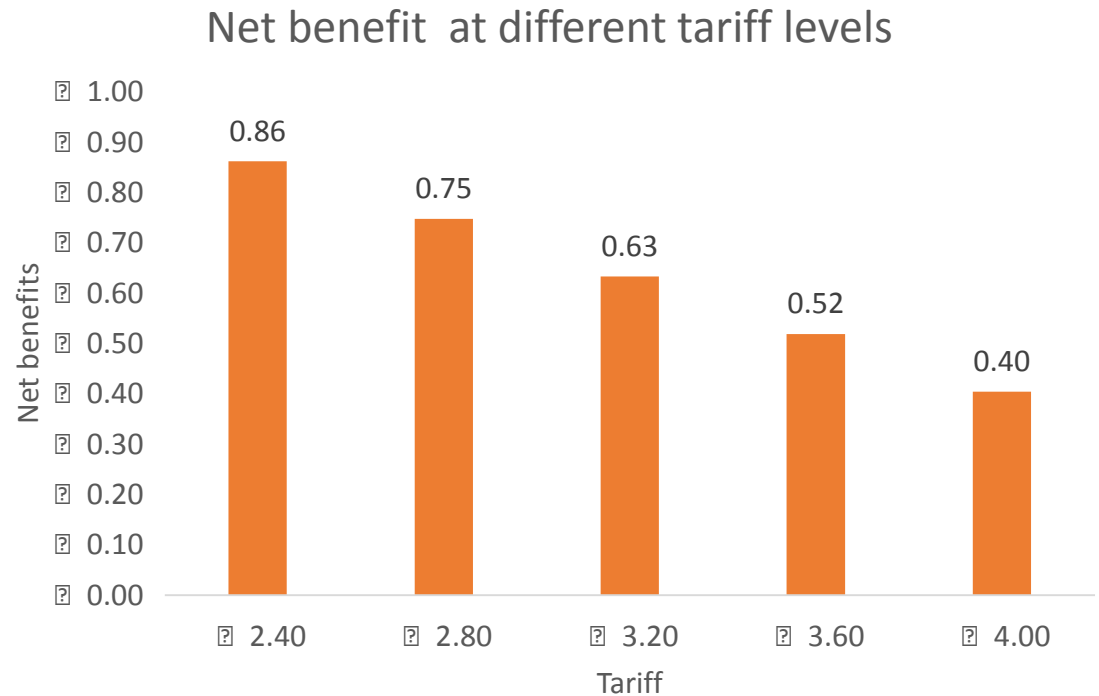
- Concessional loans from development finance institutions
- Credit enhancement measures:
 - Credit default fund
 - Securitization

Is tariff commensurate to risks?

Reason for high tariff bids

- Higher capital cost for small solar plants
 - BCD & GST changes and increase in international market price pushed capital cost to >4.5 Cr per MW
 - SME developers don't have scale to negotiate lower prices
- Higher O&M cost per MW
 - More manpower due to dispersed installations
- Logistical overheads
 - Land scouting and RoW issues

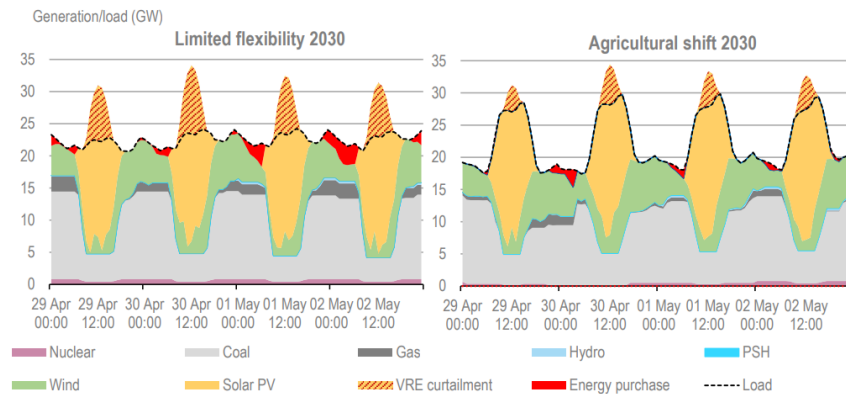
Impact of high tariff on discom



Other potential challenges and concerns

Challenges can be solved through intelligent planning

Impact on load management: When the share of solar power increases in the energy mix, shifting agriculture load to daytime would be the most cost-effective strategy for managing load.



IEA. All rights reserved.

Feeder segregation: PM-KUSUM works best when feeders are segregated.

- Virtual segregation is also possible

Seasonality of agriculture consumption: Strategic feeder selection and plant-sizing can resolve this concern

- Optimal feeder selection criteria:
 1. Feeders with significant agriculture load
 2. Substations in which non-agriculture load is also significant
- Optimal plant sizing
 1. Analysis of base load in the new power supply scenario
 2. Sizing based on the base load

Thank You!

For more information:

Email: arahman@iisd.org,
ssharma@iisd.org
rishu@cstep.in
mallik@cstep.in