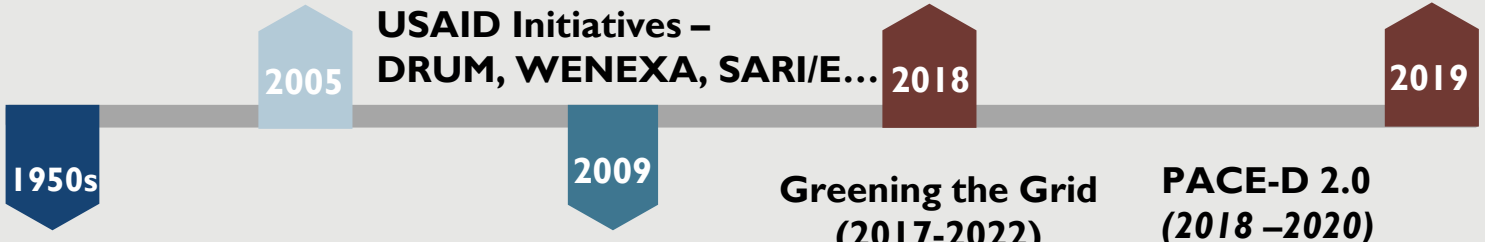

USAID
FROM THE AMERICAN PEOPLE
GOVERNMENT OF INDIA
MINISTRY OF NEW
AND RENEWABLE ENERGY
PARTNERSHIP TO ADVANCE CLEAN ENERGY DEPLOYMENT (PACE-D 2.0) TECHNICAL ASSISTANCE PROGRAM
February 2019

U.S. - India Energy Cooperation

U.S. INDIA ENERGY DIALOGUE

U.S. INDIA STRATEGIC ENERGY PARTNERSHIP (SEP)

ASIA EDGE



Beginning of US-India Energy Cooperation

USAID Initiatives – DRUM, WENEXA, SARI/E…

Partnership to Advance Clean Energy Deployment (PACE-D, 2009-2018)

Greening the Grid (2017-2022)

PACE-D 2.0 ***(2018 –2020)***

PACE-D Achievements

Renewable Energy (RE) Installed	Utility Engineers and Entrepreneurs Trained	Investment Leveraged
600MW	**4000+**	**$800M**

- **Focused on increased deployment of**
  - **Energy Efficiency**
  - **Renewable Energy and**
  - **Cleaner fossil technologies**

- $3.3 billion Green Bonds Market in India
- 240 MW Solar Wind Hybrid by NTPC
- TA for Rooftop Solar in 10 States
- 1.8 million individuals have Access to Energy
- Three NSC Approved Training Programs
- RPO and USRTP Web Portal

PACE–D 2.0 – Program Rationale & Goal

- **Rationale**
  - *RE is now a competitive and mainstream energy resource – the last decade has seen a significant RE capacity addition, cost reduction and maturity of market actors*
  - *Accelerated RE adoption is required to achieve the national RE target of 175 GW by 2022*
  - *Mainstream RE requires a new look to power sector planning – to balance the economic and environmental benefits among consumers and Discoms, and strengthen the systems for the adoption of emerging technologies.*

- **Program Goal**
  - *PACE-D 2.0 aims to enhance and accelerate the deployment of RE technologies by making them more economical and reliable to meet India's energy and economic security objectives.*

PACE–D 2.0 Program

Program Components

Strategic Energy Planning for RE Deployment

- Demand Forecasting
- Resource Planning
- Least-Cost RE Procurement Options for Discoms
- Methodologies, Tools and Guidelines for Resource Adequacy

Scaling Grid-Connected Distributed RE

- New Compensation Models for DPV
- DPV Quality and Safety
- DPV for Low-paying Consumers
- Regulatory Frameworks for DPV+Storage

Innovation in Procurement of RE (RE hybrid, storage, repowering, time, etc.)

- Design of Solar-Wind Hybrid Business Models, Bidding Frameworks and Tenders
- Regulations for Solar-Wind Hybrid Projects
- Discom Procurement of RE for C&I Consumers

Cross-cutting Activities

- Training and Capacity Building
- Outreach to Non-partner States/Discom
- U.S.-India Business Collaboration

Approach

- Framework and Methodologies
- Knowledge Products
- Open Source Models
- White-papers/Studies/ Regulatory Discussion Papers
- TA/Institutional Strengthening

Benefits to the States

Better planning

- New tool/methodologies for Discom power planning
- Higher RE uptake based on economic prudence in addition to RPO compliance
- Better regulatory tools to ensure adequacy of resources

Financial and economic benefits

- Lower power procurement cost for Discoms
- Lower losses and deferred network costs for Discoms due to higher distributed RE
- Increased private investment and economic activities in RE in the state.

Capacity building

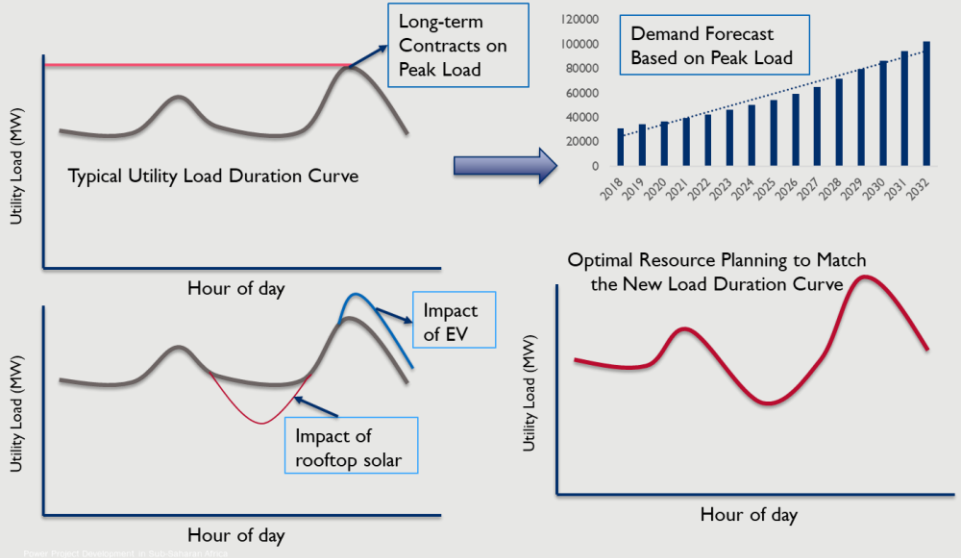
- Support to state institutions to develop RE policies and regulations
- Enhanced state stakeholders capacity to meet RE policy objectives

PACE-D 2.0 - Program Components

Component A: Strategic Energy Planning for RE Deployment

Current Status:

- Current practices for demand forecasting are more than 10 years old and based on trend analysis and economic parameters.
- Inflexible resource planning to match the variations of supply and demand.

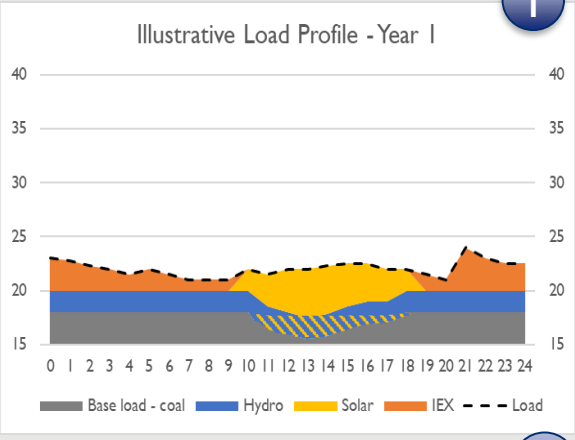


Proposed Technical Assistance

- Granular demand forecast to accommodate planning for higher RE.
- Planning generation resources matching the hourly demand forecast.
- Methods and tools to optimize medium and long term procurement plans
- Support new regulations for demand forecasting and resource planning

Component A: Optimization of procurement plan

1



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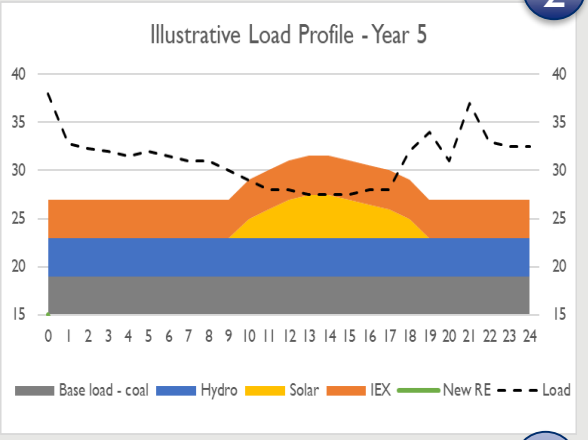

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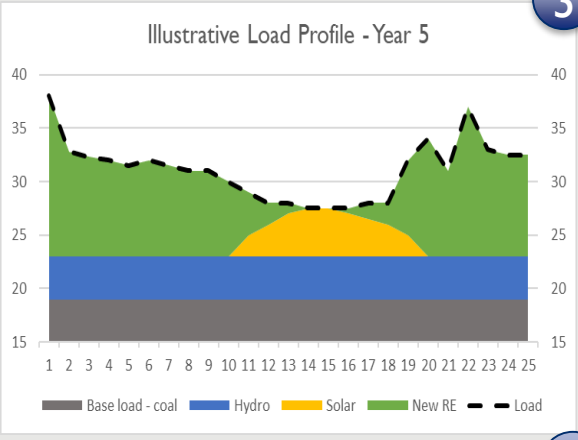

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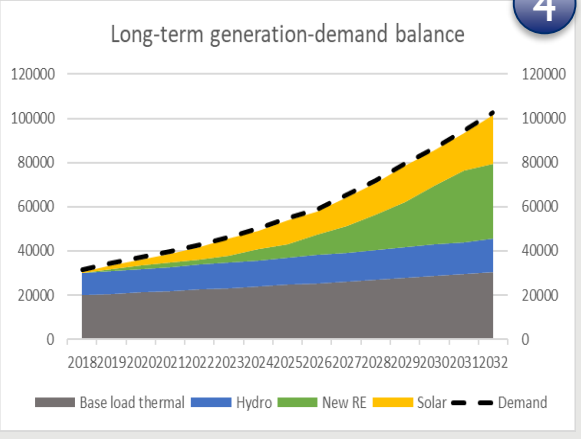

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Optimized procurement plan

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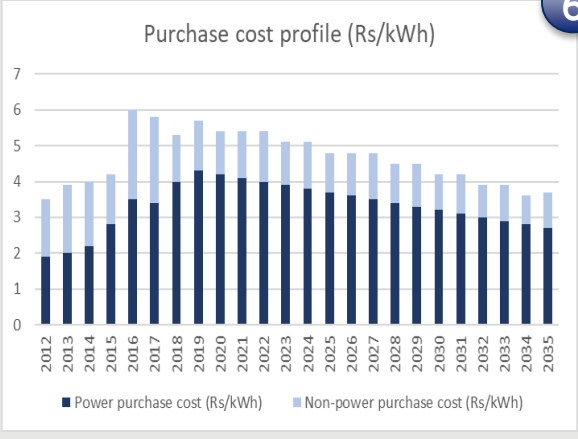

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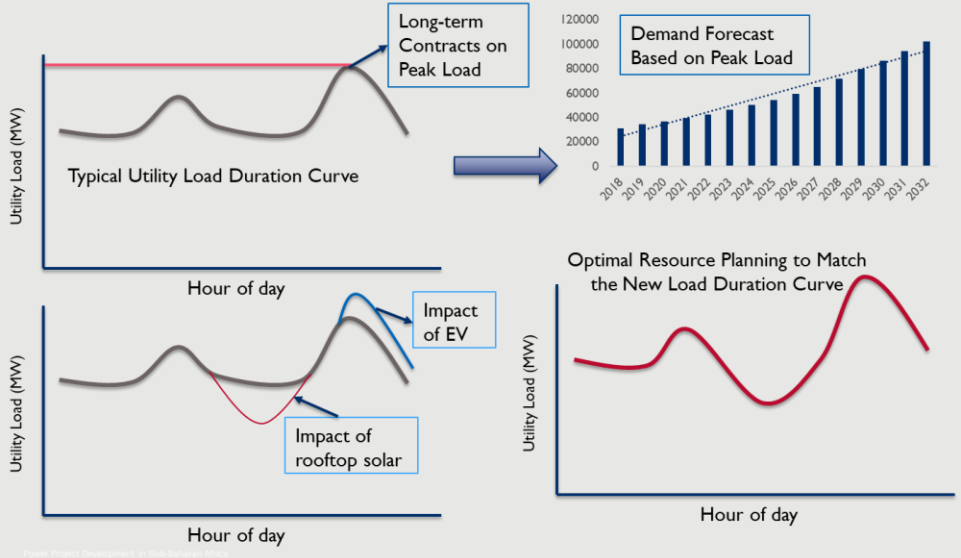

Proposed Technical Assistance

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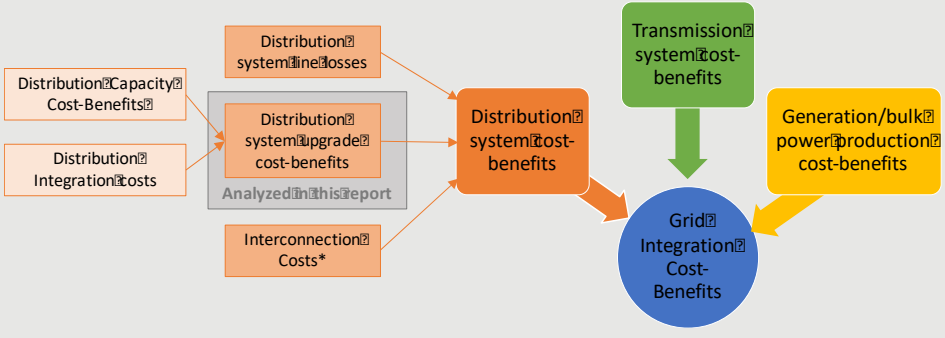
- Methods and tools to optimize medium and long term procurement plans
- Support new regulations for demand forecasting and resource planning

Component B: Scaling Grid-Connected Distributed RE

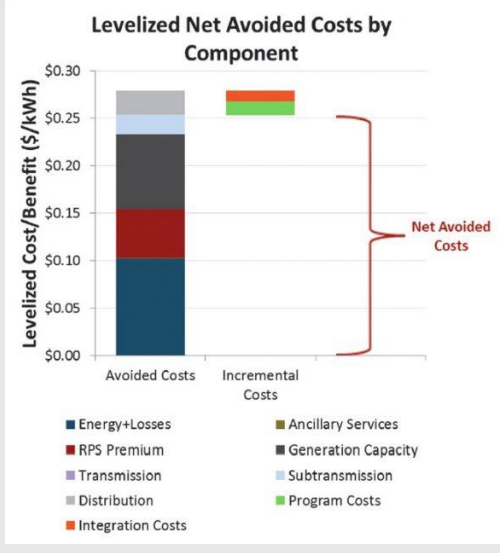
Challenges:

- Net metering scheme has encouraged C&I but not residential
- Net metering scheme results in losses for the Discoms
- Free/subsidized electricity to low-income and agricultural consumers results in loss of substantial revenue to Discom/State.
- Scale up requires alternative schemes to better balance the benefits to both the Discoms and consumers (both C&I and residential)



Proposed Technical Assistance

- Evaluate DPV costs and benefits – alternate compensation models.
- Enabling regulations for DPV + storage
- New DPV programs or analyze and expand existing for low- income consumers



Component C: Innovation in Procurement of RE

USAID
Partnership to Advance Clean Enegy - Deployment Technical Assistance Program

NTPC SOLAR WIND HYBRID AT KUDGI
Approach for Measurement and Metering of Wind-solar Hybrids

Current Status:

- Bihar has limited RE penetration
- Bihar imports most of its electricity needs
- States are exploring procurement of off-shore wind, round-the-clock, biogas, pumped storage

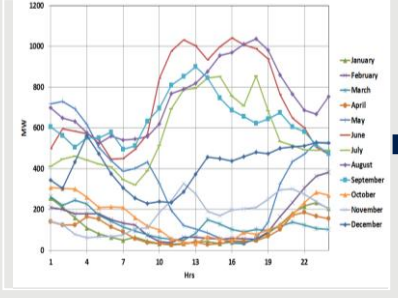
Proposed Technical Assistance

- Tender documents aligned with Discom demand and resource requirements
- Draft regulations for RE hybrid projects.
- Policy and regulatory interventions of RE procurement for C&I customers

Sample objectives

- System reliability
- Reduced congestion costs
- Resiliency
- RE targets

Daily Solar/Wind Power Generation Pattern



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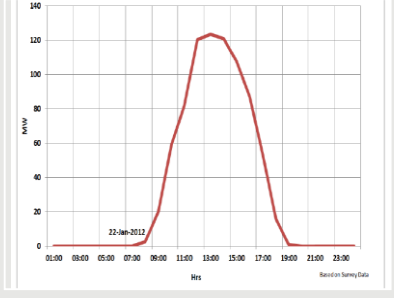

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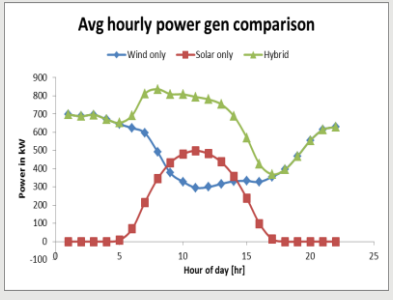
Optimized System/tender documents



PACE-D 2.0 Approach

National Activities

Institutions
- MNRE
- CERC
- FOR
- SECI
- CEA

Component B
- DPV quality and safety
- Regulatory frameworks for DPV+Storage

Component C
- Design of solar-wind hybrid business models, bidding frameworks and tenders
- Regulations for solar-wind hybrid projects

Policy, regulations, capacity building

States Scale-Up

Nodal State Activities

Institutions
- Ministry of Energy
- Regulatory Commission
- RE Nodal Agency
- SLDC
- DISCOM
- Bulk Power Purchaser

Component A
- Demand forecasting
- Resource planning
- Least cost RE procurement options for Discoms
- Methodologies, tools and guidelines for resource adequacy

Component B
- New compensation models for DPV
- DPV for low-paying consumers

Component C
- Discom procurement of RE for C&I consumers

Workshops, capacity building, models, tools.

Expectations from the State

- Letter of acceptance from the state on the PACE-D 2.0 TA Program.
- Steering committee to meet quarterly
  - Chaired by principal energy secretary
  - Managing directors (MDs) of all Discoms, SLDC and bulk power procurement entity
  - CEO of RE nodal agency
  - Representatives from the regulatory commission
  - PACE-D team representative
- Nodal person from participating Discoms (director and above) for PACE-D activities
- Access to data, documents and reports to PACE-D team upon request
- Participation of national and international events
- Knowledge sharing with other states.

Project Schedule

PACE-D 2.0 Activities	Jun-18	Jul-18	…	Jan-19	Feb-19	Mar-19	Apr-19	…	Aug-19	Sep-19	Oct-19	…	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
Design Conceptualization	■	■															
MNRE Approval				■													
State Identification					■												
Acceptance of State						■											
Work Plan										■				■			
Early Results/Updated Work Plan							■	■	■	■							
Component Completion						■	■	■	■	■	■	■	■	■			
Scaling and Outreach												■	■	■			
Capacity Building							■	■	■	■	■	■	■	■			
Project Closeout															■	■	■

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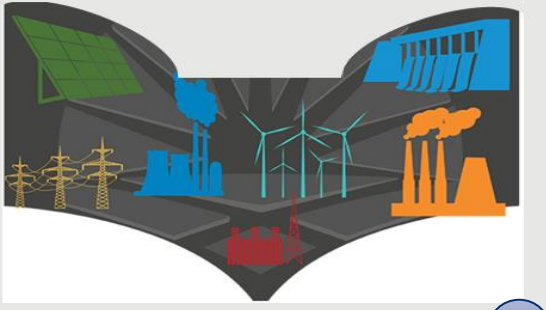
Component A: Strategic Energy Planning for RE Deployment

Generation Resources 1



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Short, medium and long-term contracts

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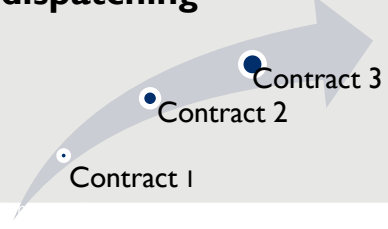
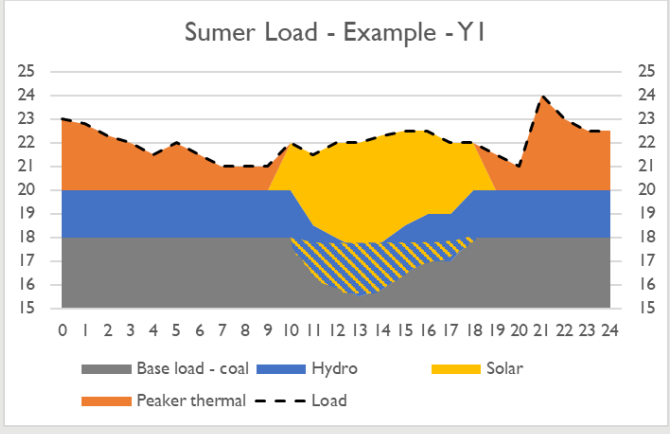
Least-cost dispatching



Load-generation balance (peak, low, seasonal, long-term) 4



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Optimized procurement plan