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India Smart Grid Forum

DISTRIBUTION UTILITY MEET DUM 2024

Session : RE, EV and Grid Stability and Challenges of 10 Million Rooftop Solar PV Systems

Presented By

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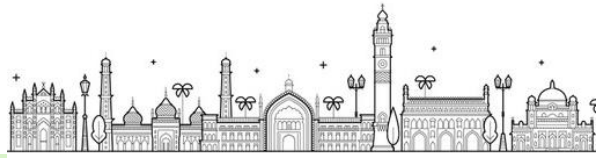
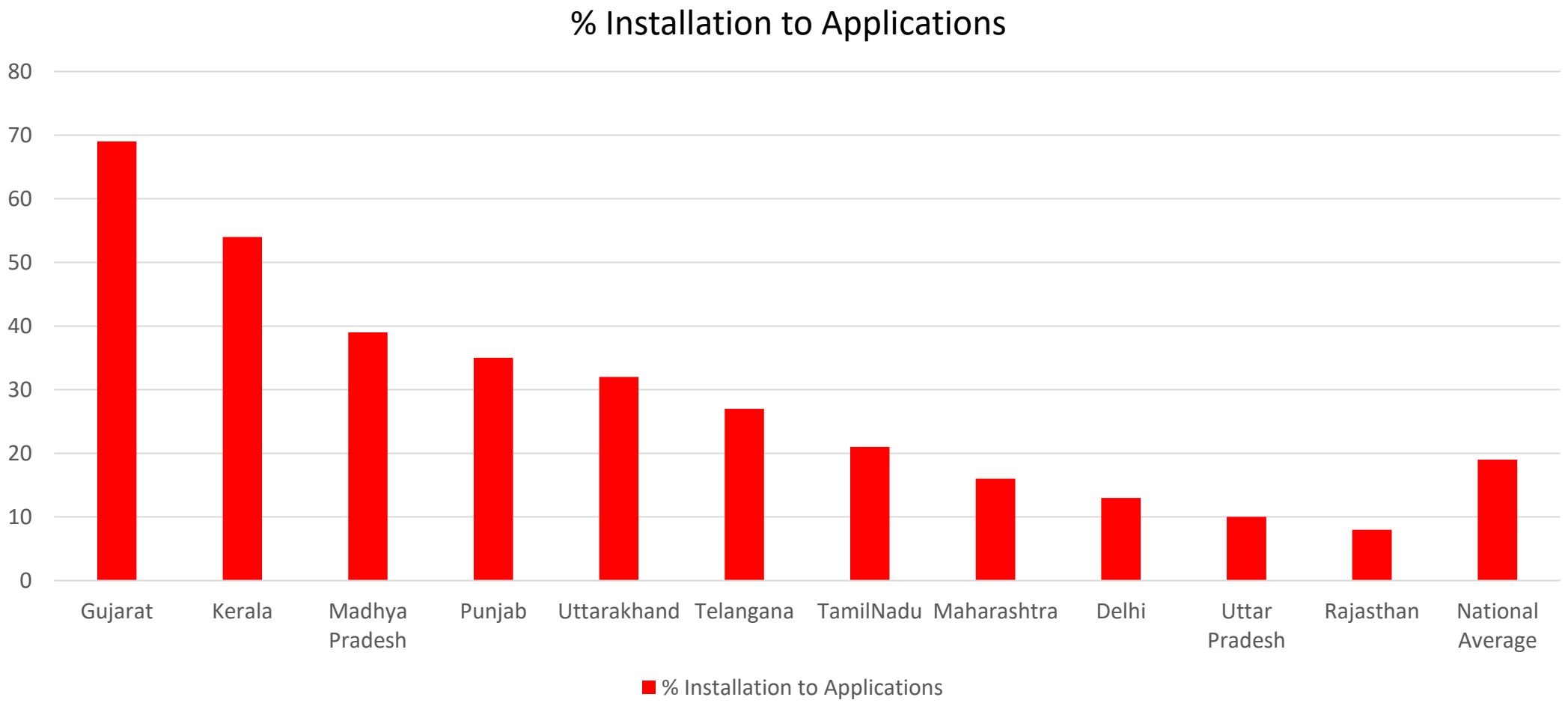


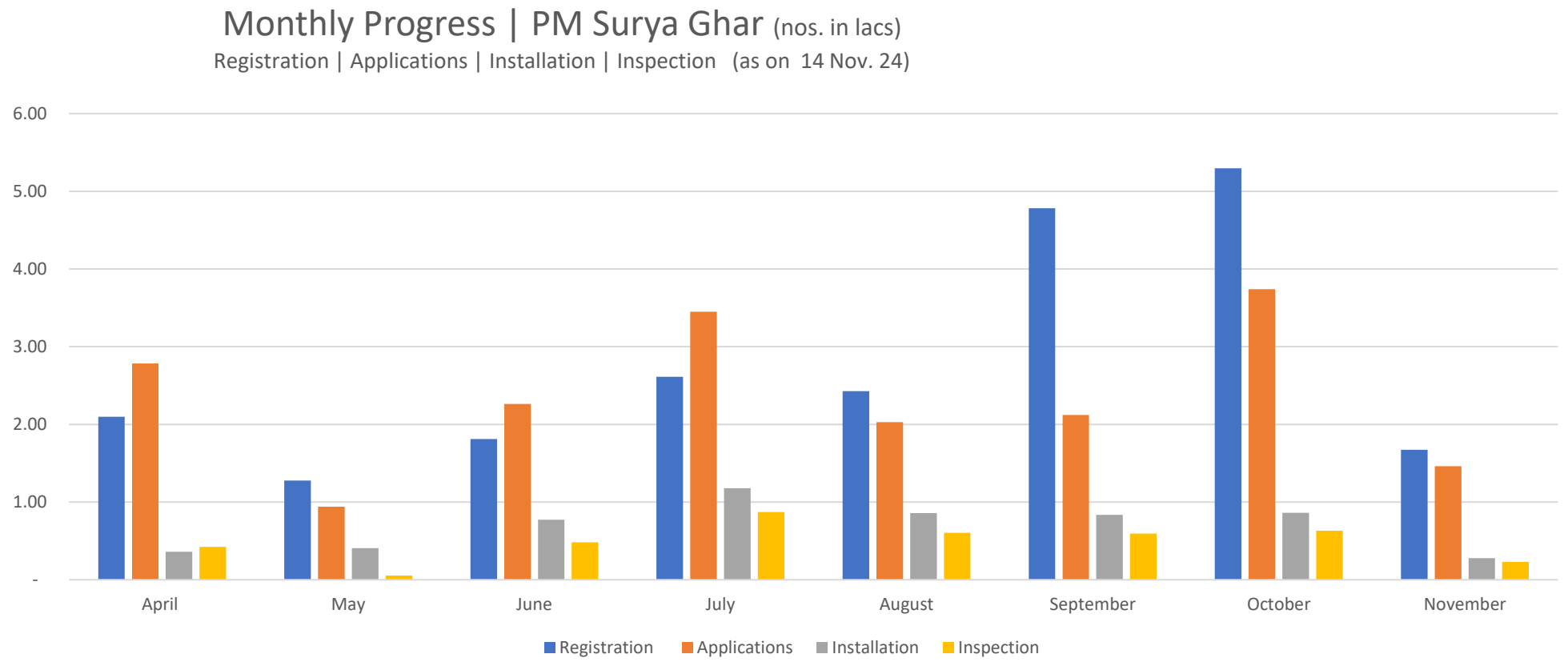
INTRODUCTION

- The union cabinet approved the **Rs 75,000 crore PM Surya Ghar—Muft Bijli Yojana** to benefit **1 crore families** in February 2024
- Subsidy for residential households Rs. 30,000/- per kW up to 2 kW Rs. 18,000/- per kW for additional capacity up to 3 kW Total Subsidy for systems larger than 3 kW capped at Rs 78,000
- Subsidy for **Group Housing Society/ Resident Welfare Association** (GHS/RWA) **Rs. 18,000 per kW** for common facilities, including EV charging, up to 500 kW capacity (@3 kW per house) with the upper limit being inclusive of individual rooftop plants installed by individual residents in the GHS/RWA

STATE WISE INSTALLATIONS



Month Wise Progress



CHALLENGES

Technical issues:

- Glitches and frequent malfunctions on the online portal used to apply for the scheme can cause delays and frustration for applicants and officials alike.

Bureaucratic hurdles:

- Complex application procedures and lengthy approval processes at the local level can deter people from participating in the scheme.

Awareness gap:

- Lack of awareness about the scheme's benefits and application procedures among potential beneficiaries in rural areas can limit participation.

Resistance from DISCOMs:

- Some electricity distribution companies might be hesitant to integrate rooftop solar power into their grid due to concerns about potential revenue losses.

DIGITAL TRANSFORMATION

- **Creating a Digital Ecosystem**
  - End-to-end digitalization enhances transparency, reduces delays.
  - Integration across stakeholders (government, DISCOMs, EPC companies, consumers).
  - Accelerated approval times:
    - Less than 30 days from previously 80-100 days.
  - Further Digital empowerment of Solar Vendors with PM Surya Ghar Portal as a platform like USI (Unified Solar Interface) to increase the adoption under PMSG

- **Paperless and Standardization Process**
  - Eliminates redundant documentation, enhancing efficiency.
  - Standardization of documentation at all Discom offices across the country

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CAPACITY BUILDING

- **Training and Capacity Building**
  - Focused training for DISCOM officials and EPC vendors.
  - Regular workshops and technical upskilling to maintain high standards and program compliance.
  - Enhanced workforce capabilities drive successful program execution.

- **Dedicated Solar Cells in all Discoms**
  - Specialized teams at all Discoms for consistent Support

SYSTEM STABILITY ISSUES

Renewables can cause system stability issues

- Imbalances can affect frequency and voltage
- Reduce the capacity of the system to recover
- Cannot contribute to black-start (unless grid forming)
- Main challenge is to provide:
  - Reactive power
  - Inertia
  - Frequency control reserve
- Frequency and voltage trip limits need grid codes

System wide

- Blackouts/brownouts
- Redispatch
- Curtailment
- Reduced short-circuit power
- Complications on fault-detection

- Voltage control
- Technical studies
- Monitor and control
- DER forecast
- Smart grids and other technologies

GRID REINFORMENT

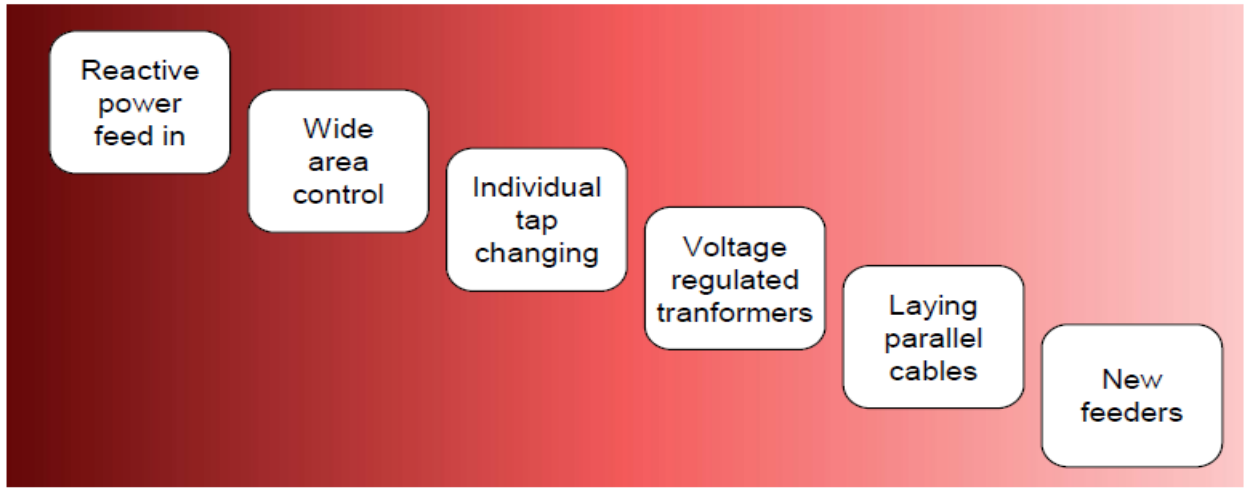
Reinforcements

Multiple

- Overload impacts
- Feeder voltage profile
- Grid stability
- Protection
- Power quality

More copper in the ground: The simplest, but not the cheapest option

- Changes in power flows might ultimately need upgrades in the system
- Distribution grids were not designed for DER
- Load growth and new tech developments can push for reinforcements before DER
- Should not be the default to-go option → effective but expensive!



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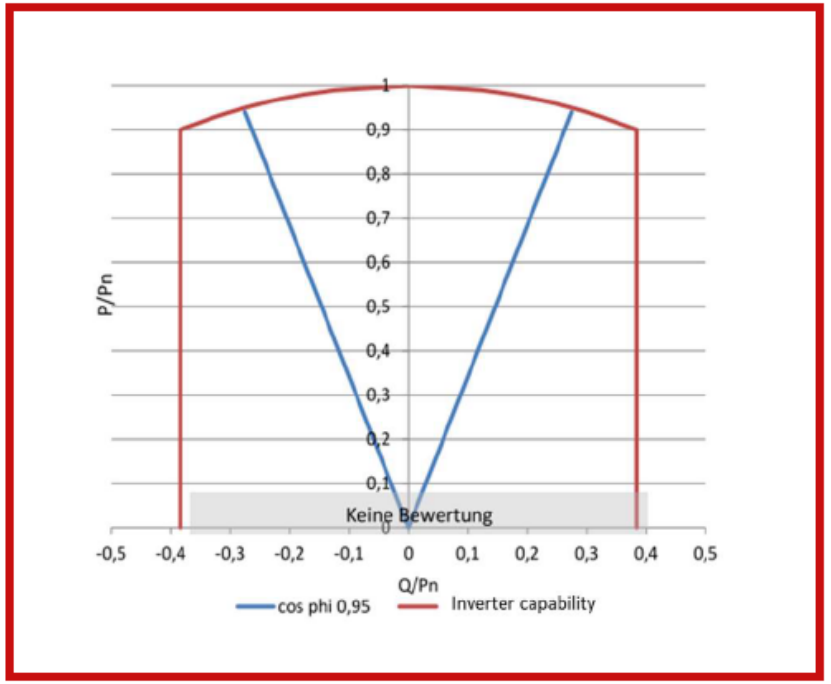
VOLTAGE CONTROL

Reactive Power Requirements for PV Inverters

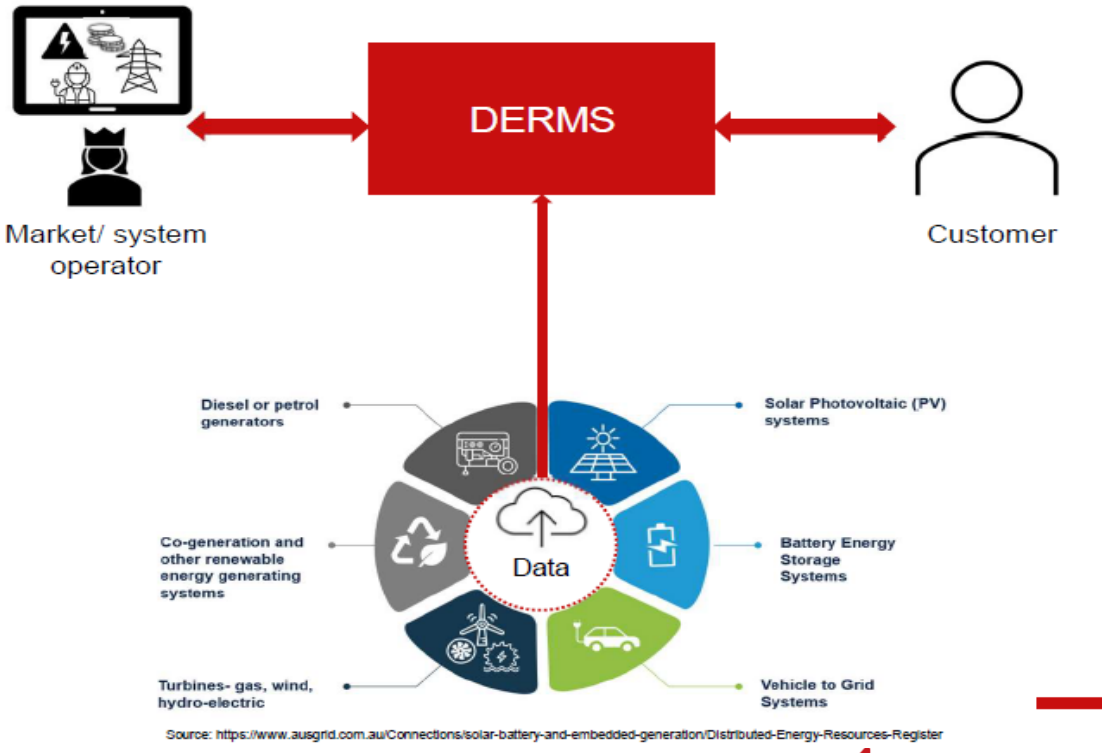
- Typical distribution code requirement: Inverters must be capable of realizing certain off-unity power factors
- More advanced requirement: Q/P requirement, no problem for inverters
- As of 2022 no additional cost factor → standard equipment for worldwide distribution



MONITORING AND CONTROL

Visibility = better reactions to the system needs

- Before detailed visibility of distribution grids was not necessary (or feasible)
- Complex relations between DER created new patterns in the system
- Helps harness the potential of different resources
- Allows for a better operation and planning



Source: https://www.ausgrid.com.au/Connections/solar-battery-and-embedded-generation/Distributed-Energy-Resources-Register

Key Takeawys

- Removal of physical or hard copy documentation before net-metering
- Trained Discom Officials to handle the workload
- Digital Ecosystem for Third Party Inspection, Module verification
- Prioritize funding support for emerging business models like RESCO and solar + BESS and Virtual Net-metering
- Monitoring and Voltage Control
- Grid Reinforcement
- Forecasting
- Integrated Resource Planning

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THANK YOU

For discussions/suggestions/queries email: ***dum@indiasmartgrid.org***

www.dumindia.in

Links/References (If any)