# Role of Distributed PV in system flexibilization

IEA Workshop on Transforming Gujarat Power System

IGEN-Solar | 07 October 2020

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

# IGEN Solar TA Matrix

**2 + 3 + 5 +1.5 + .5 + 2 + .95 + 4.9 = 19.85 Mio. €**

2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024

**I-RE (2 Mio. €)**
- **GRID INTEGRATION STUDY 1 – capacity of RE with DISCOMS**
- **GRID INTEGRATION STUDY 2 – Grid services with RE for DISCOMS**

**BMZ**

**IGEN PVRT 1 (3 Mio. €)**
- **Capacity building of min 10,000 in solar sector**
- **10 policy recommendations**

**BMUB**

**IGSEP RTPV 2 (6.5 + 0.5 Mio. €)**
- Support to discoms
  - Unified State solar Portals, USRP
  - Capacity Building Int / Nat, Study Tours
  - IT Support / Digitilization
- Demand Agg in States and Smart Cities
  - **1 GW in 6 States – iSMART, additional 5 States allocaed by MNRE**
- Innovative business models for sector
  - PV Port & Store – concept
  - Upskilling and business models for Suyrmitra‘s
- Replacing GenSets – Pilot with Solar and Battery Storage

**IGEN New Innovative Solar (4.9 Mio)**
- **Preparatory Steps underway**
- **Preparing the appriasal mission**

**Pipeline:**

BMZ - 2.5 Mio for DA of PV Port in add. States

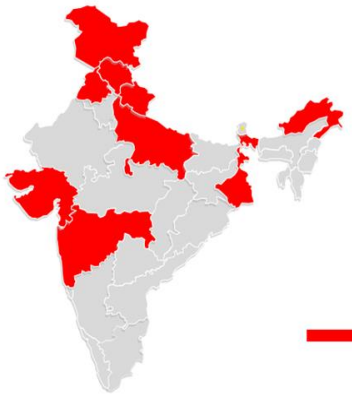
BMU - 0.95 Mio for add business models RTS in Smart Cities



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# IGEN-Solar flagship activities in 11 States

**SDG's 7&13**
Potentially reaching 550 Million People on Climate Change and affordable energy






Grid Integration Study 1 & 2 for the Indian Distribution Sector

1) Across states, accepted DT Capacity is now 75%; 2) Grid Services from Solar and Storage

I-SMART
Indian Solar Market Aggregation for Rooftop

iSMART – demand aggregation for solar rooftop reaching 1 GW target in 2 years in 6 states and 14 Smart Cities. Additional 6 States allocated by MNRE



KW to kWH Study

Study in 4 states on underperforming rooftop solar plants of performance < 1300 kWh/kW




Unified Single Window Clearance Portals in 6 states. Current allocated capacity in Gujarat with Portal 1 & 2 is 725 MW, 600MW is under Tendering



Affordable & Portable Solar - PV PORT & STORE 2.0 solar & storage for the mass / of the shelf / No Discom permission – Field Test of 40 systems

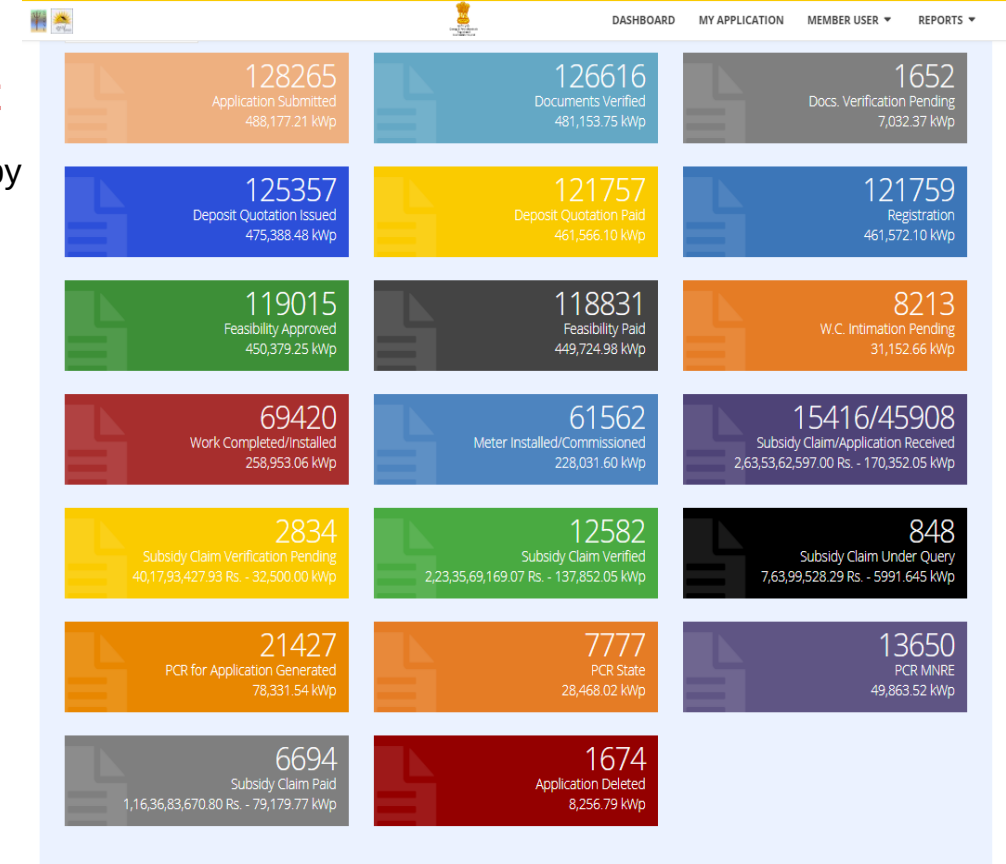
iRISE

iRISE – upskilling project in Solar Sector reaching up to 60,000 Suryamitra to create Employment & Entrep…

# Distributed PV development in Gujarat

- Target for the State of Gujarat is 3GW solar rooftop by 2022 ~ 800,000 residential rooftop PV
- Total installed capacity of rooftop PV > 700MWp ~ close to 200,000 rooftop PV systems 489 MWp is registered on the Portal in last 1 year
- 288 MWp is registered on the GEDA Portal which includes 134MWp residential under Phase-I
- HT Industrial – 98MWp
- Industrial +Commercial – 46
- Non-subsidy – 164MWp
- 600 MWp is under Tendering stage, new scheme for this year to commence in October 2nd week

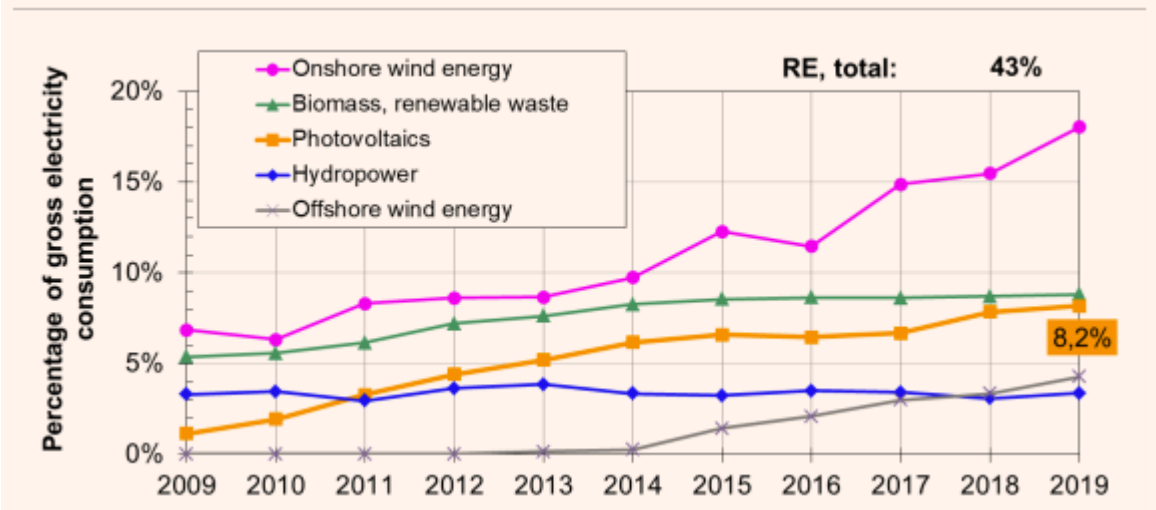
https://suryagujarat.guvnl.in/



# Challenges and Opportunities

| Challenges | Opportunities |
| --- | --- |
| Inequitable billing methods | Reduction in T&D losses |
| Revenue loss | Demand management |
| Infrastructure upgradation | Network decongestion |
| Inadequate technical staff | RPO targets |

# German Distributed rooftop PV Experience

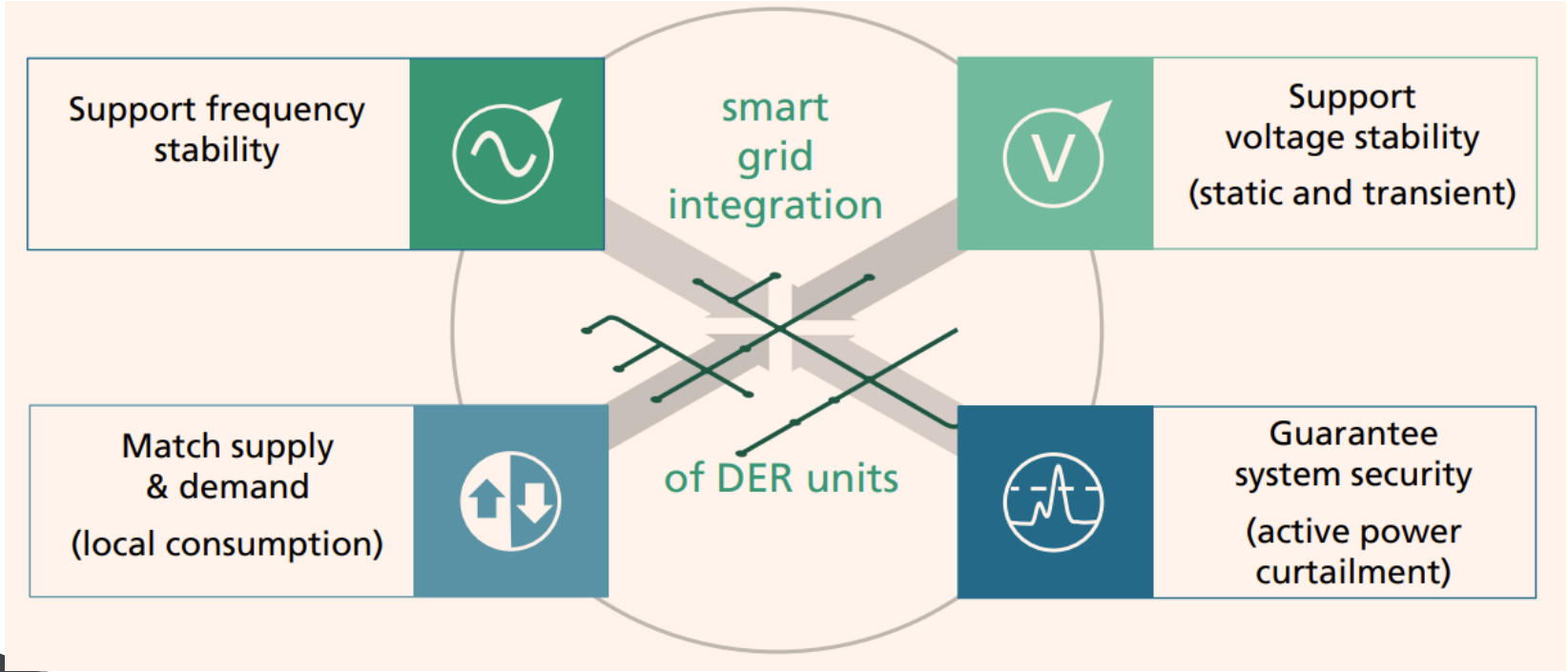



- Rooftop PV generated 8.2% of gross electricity consumption in 2019, share of all RE sources was 43% in total generation.

- Germany has close to 1.8 million distributed PV systems

Source: Fraunhofer

# Integration of Distributed Energy Resources




Source: Fraunhofer

# Reactive power support from rooftop PV Inverters

- The rooftop PV inverters are capable of dynamically absorb/generate reactive power
  - thus they can support in maintaining the voltage in the low voltage network without requirement of any additional infrastructure costs.

- As per the Grid codes in German power system, the PV inverters must be capable of providing reactive power support.
  - The inverters are pre-set from the factory, however the grid operator can also set the characteristics of the inverter individually.

- Recommendation –
  - PV inverters available in the Indian market are capable of providing the reactive power support – GIZ study in the area of Delhi Discoms
  - Necessary changes in the CEA connectivity regulations are proposed to allow this functionality.

# Thank You

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In cooperation with:

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

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