

Host Utilities



Co - Host Utilities



ORGANIZER



India SMART UTILITY Week 2024

Supporting Ministries



समन्वय जयते
MINISTRY OF POWER
GOVERNMENT OF INDIA



समन्वय जयते
MINISTRY OF NEW AND
RENEWABLE ENERGY
GOVERNMENT OF INDIA



समन्वय जयते
नीति आयोग
National Institution for Transforming India



समन्वय जयते
MINISTRY OF ELECTRONICS &
INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA



समन्वय जयते
MINISTRY OF HEAVY INDUSTRIES
GOVERNMENT OF INDIA



समन्वय जयते
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION,
GOVERNMENT OF INDIA



समन्वय जयते
MINISTRY OF POWER
GOVERNMENT OF INDIA
CENTRAL ELECTRICITY AUTHORITY

Session : Digital Tools For DER Management Solva -

Evaluate the value of distributed solar and storage

Presented By

FRANO D'SILVA, RENEWABLE ENERGY ANALYST, AUROVILLE CONSULTING



isuw@isuw.in



www.isuw.in



@ISUW_India



@India Smart Utility Week (ISUW)



@India Smart Utility Week (ISUW)



@indiasmartgridforum

Solva – Evaluate the value of distributed solar and storage

Solva is a web application for simulating the economic and societal benefits of integrating distributed renewable energy resources into the modern power system.

Solva allows users to:

- Undertake a DT/HT Feeder/Substation level power flow analysis.
- Evaluate the network benefits and social benefits for distributed solar and energy storage.
- Identify system sizes and dispatch strategies to optimize the value of distributed solar and energy storage.

Solva – Evaluate the value of distributed solar and storage

1. Power flow analysis

- Active power
- Voltage

2. Value of distributed energy resources (VoDER)

- Network Benefits
- Societal Benefits

Grid interconnection points

HT Feeder

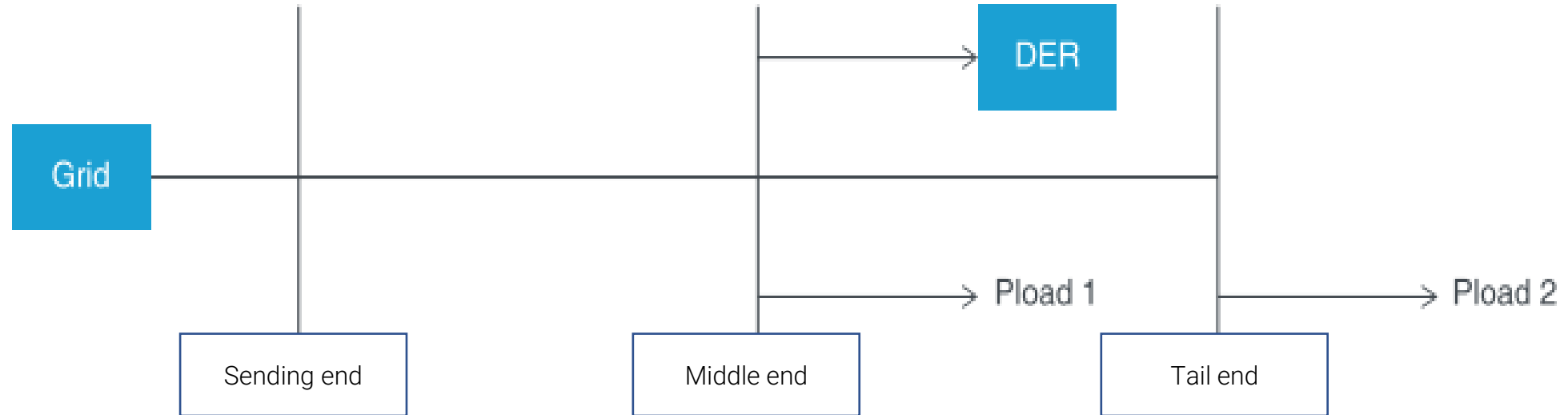


Figure 1: An HT feeder with DER located in the middle of the feeder.

Existing research - Methodology

- CEEW conducted a study to find the value of grid connected rooftop solar for a distribution company in Delhi
 - <https://www.ceew.in/publications/valuing-grid-connected-rooftop-solar-framework-assess-cost-and-benefits-discoms>
- NREL conducted an analysis to quantify the value of rooftop solar benefit – Gujarat & Jharkhand
 - <https://www.nrel.gov/docs/fy21osti/78442.pdf>

VoDER Methodology

Network benefits

Avoided cost of energy (INR/kWh)
Avoided distribution capacity cost (INR/kWh)
Avoided transmission capacity cost (INR/kWh)
Avoided generation capacity cost (INR/kWh)

Societal benefits

Avoided CO₂, NO₂, SO₂ & PM_{2.5} emission costs (INR/kWh)

Total VoDER benefit = Network benefit + Societal benefit

Link: <https://solva.in/about>

Solva tool – Data required

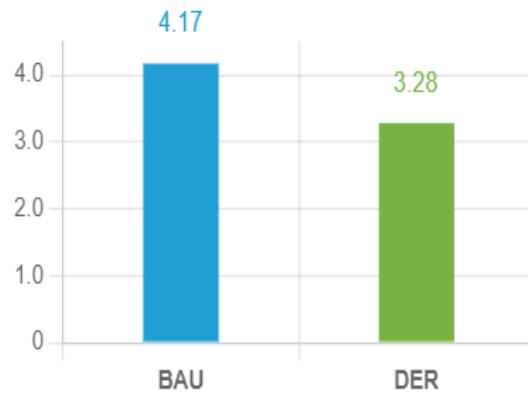
Data	Format
Load profile (DT,HTF,SS)	8760 hourly load values
State level net load profile	8760 hourly load values
Solar capacity addition (state) in the year of analysis	Single value (MW)
Marginal cost to be replaced	Single value (INR/kWh) or 8760 hourly marginal cost

Results

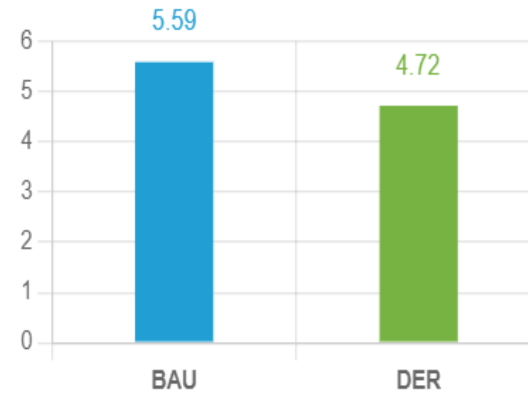
Result Summary:

Powerflow Analysis

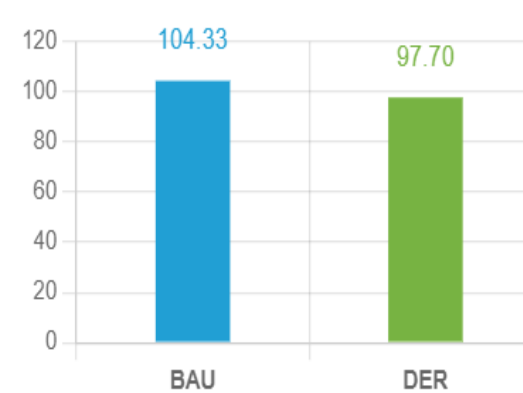
Voltage Violation % of hours - Year 1 !



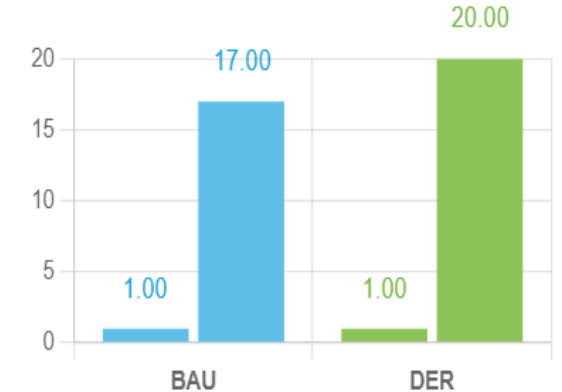
Average distribution loss % - Year 1 !



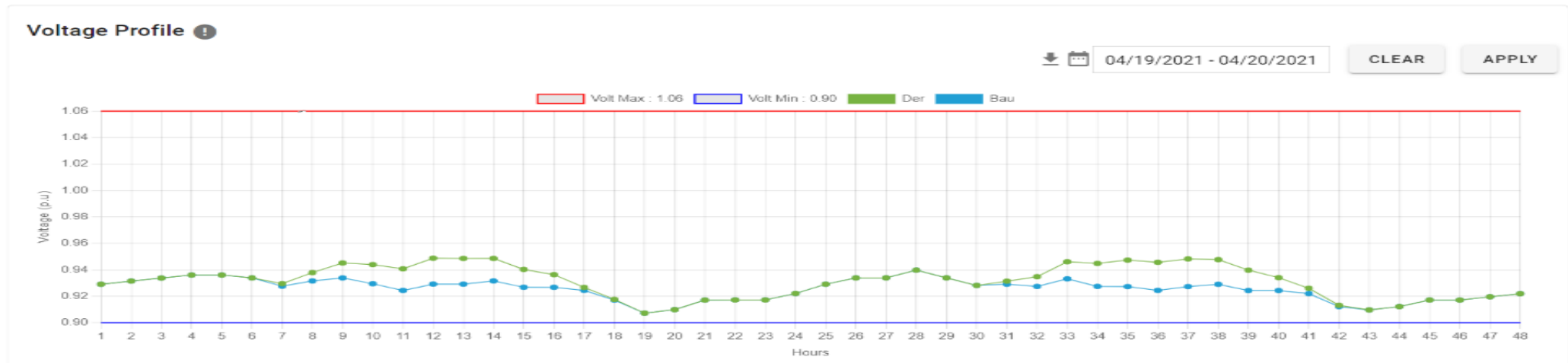
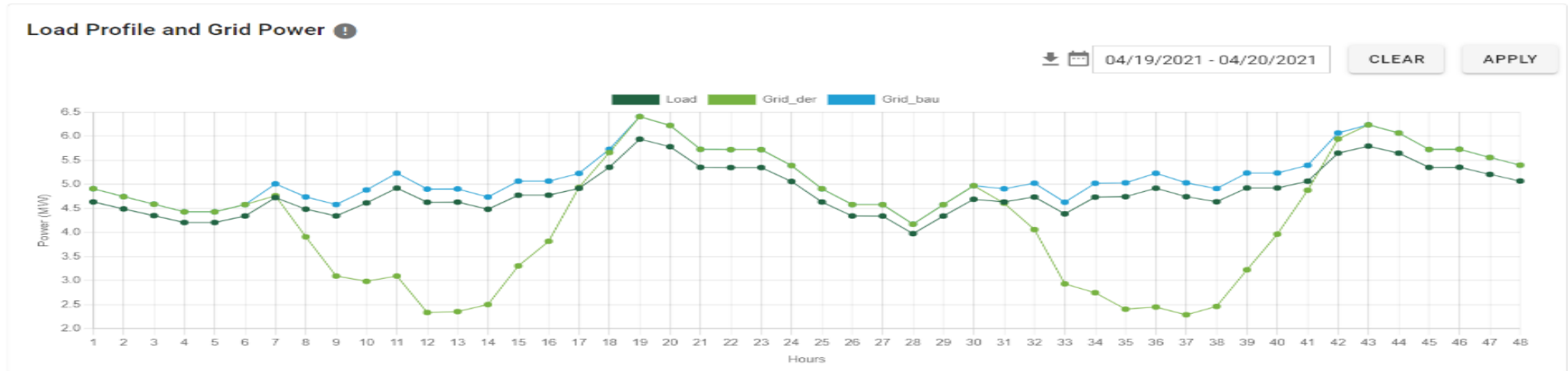
Peak as % of Feeder Capacity-Year1 !



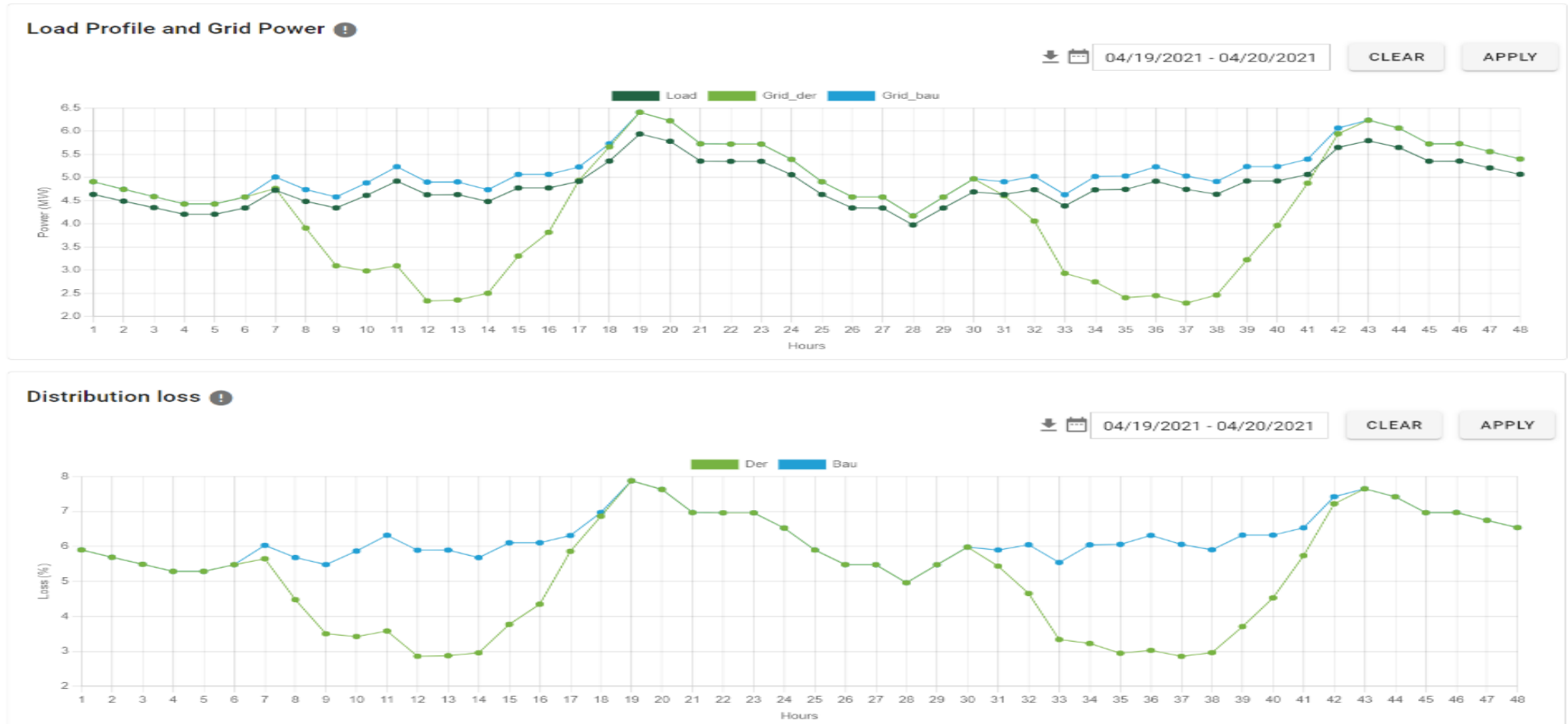
Capacity upgradation in years !



Results – Voltage violations



Results – Distribution loss



Future Possibilities

Application

1. Assessing integration of rooftop solar on the distribution network
2. Location specific feed-in tariffs could be estimated according to the network benefits
3. Policy makers and regulators can use the societal benefit to estimate the environmental impact of proposed integration
4. Un-used lands with solar potential can be assessed for DER integration on the distribution network



Future Possibilities

Technical Development

1. Capacity building: Training and dissemination of the tool
2. Upgrade and include multi network analysis for DT/HT Feeder/Substation
3. Build and share a repository of data for entities to conduct a VoDER analysis



THANK YOU

*For discussions/suggestions/queries email: isuw@isuw.in
visit: www.isuw.in*

Tool: <https://solva.in/>

Methodology: <https://solva.in/about>

Briefing note: [Maximising the benefits of distributed solar energy](#)

Other Tools

Solsavi – Your rooftop solar guide: <https://www.solsavi.in/>

LifeLands (LiLa): Earth Intelligence for Climate Action: <https://thelila.org/>