आर ई सी
REC
असीमित ऊर्जा, अनन्त संभावनाएं
Endless energy. Infinite possibilities.

Interventions for Improving Reliability of Power Supply

Date: 21.01.2026

Power Reliability | Role and Importance

Why Power Reliability matters?

Pillar 1
Economic growth
Industrial Expansion ,
Manufacturing and Services

Pillar 2
Essential for Sectoral growth
Agriculture, Healthcare, etc

Pillar 3
Quality of life
Improving living standards

Pillar 4
Investment Attractiveness
Domestic and Foreign

Pillar 5
Technology Advancements
Development and usage

Pillar 6
Decarbonization
RE Integration and DER

From Infrastructure Investment to Measurable Outcomes

SAIDI (Hrs.)
141 → 108
FY 21-> FY 24 | +23%

System Average Interruption Duration Index (SAIDI)

SAIFI (Nos)
167 → 138
FY 21-> FY 24 | +17%

System Average Interruption Frequency Index (SAIFI)

CAIDI (Nos)
0.84 → 0.78
FY 21-> FY 24 | +07%

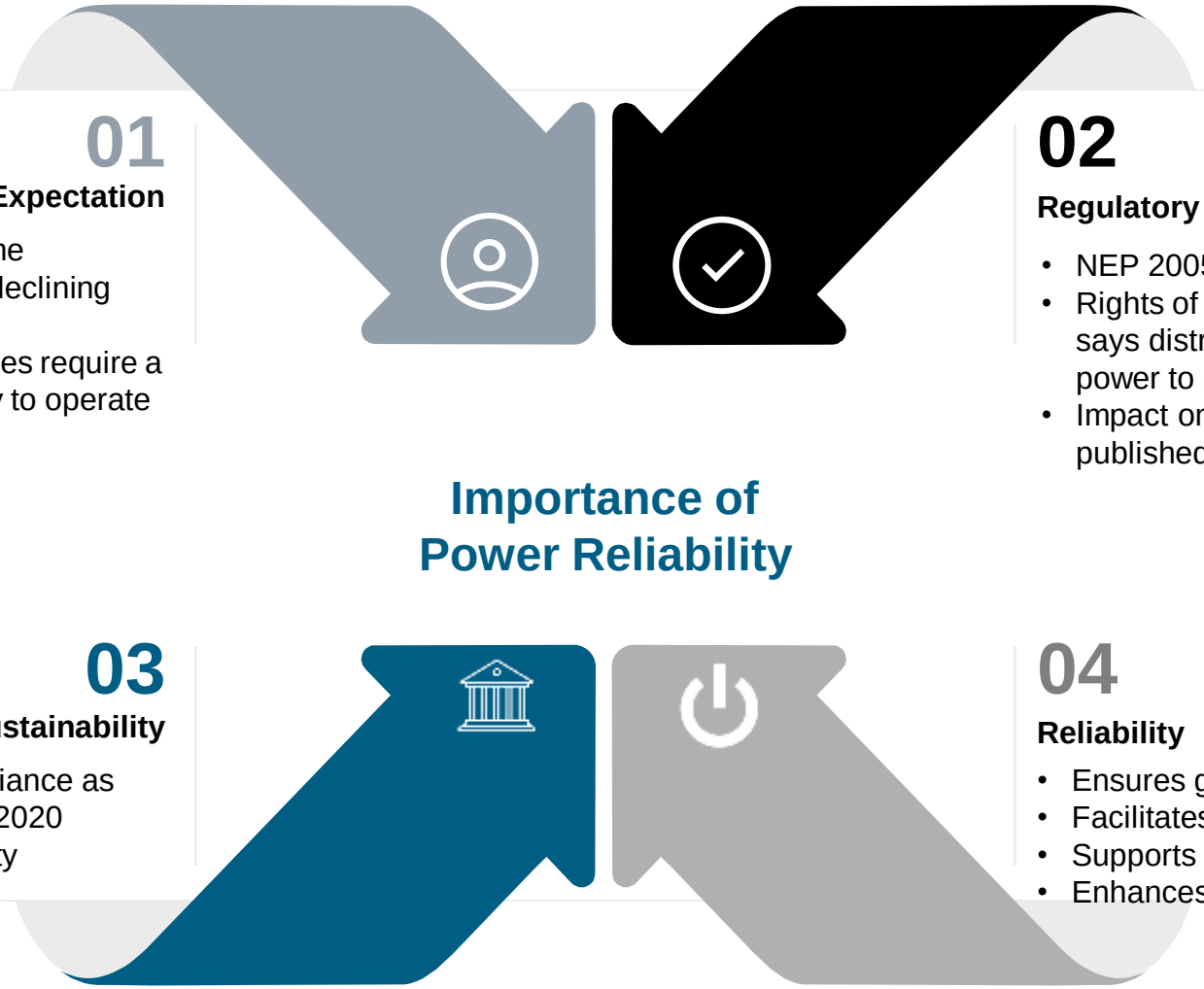
Customer Average Interruption Duration Index (CAIDI)

DER: Distributed Energy Resources

State details

Reliability as a Strategic Priority in the Power Sector

Importance of Power Reliability



01
Customer Expectation

- 24x7 uninterrupted supply is baseline expectation; tolerance for outages declining sharply
- Commercial and industrial enterprises require a reliable, uninterrupted power supply to operate efficiently.

02
Regulatory Perspective

- NEP 2005 mandates reliability reporting to CEA
- Rights of Consumer Rules (2020) Rule 10 (1), says distribution licensee shall supply 24*7 power to all
- Impact on ratings in the CSRD and DUR published by Ministry of Power

03
Financial Sustainability

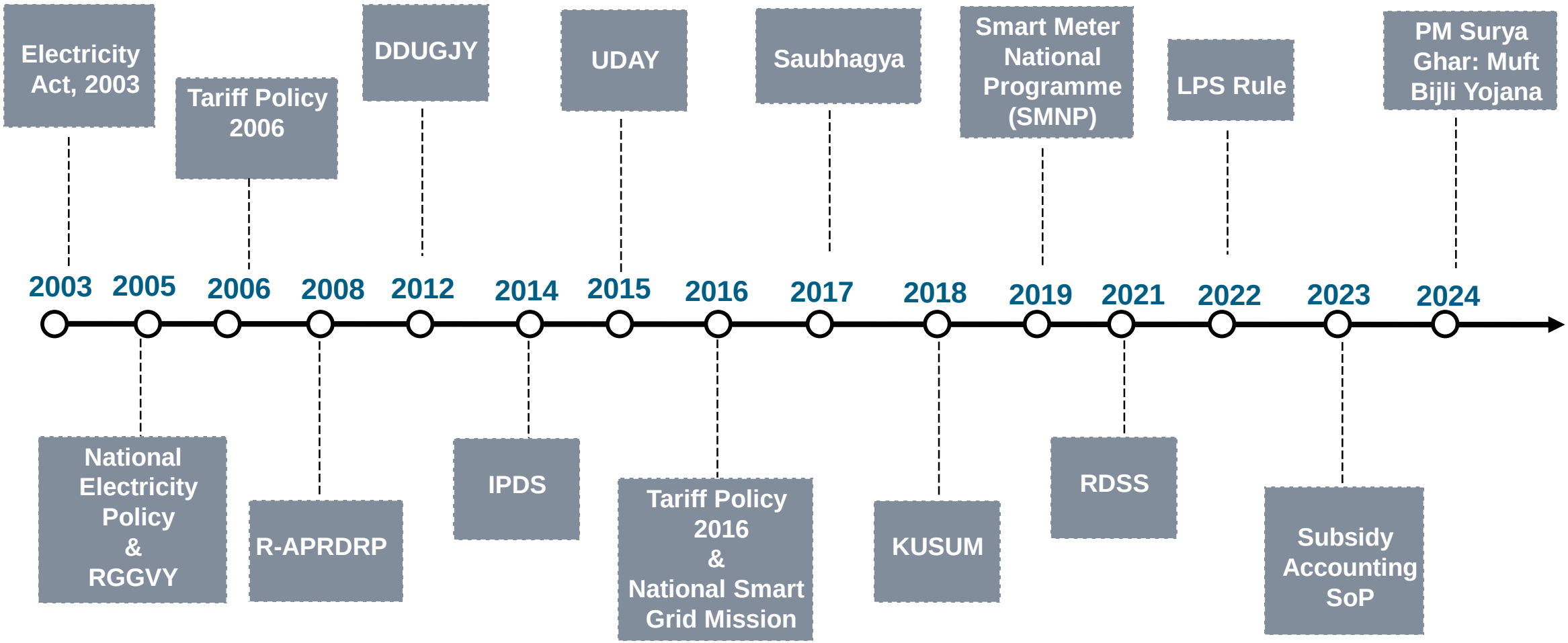
- Compensation incase of non-compliance as per Rule 13(4) of Consumer Rules,2020
- Revenue loss incase of low reliability

04
Reliability

- Ensures grid stability
- Facilitates Predictable Power Supply
- Supports Planning and Investment
- Enhances Operational Efficiency

Govt. of India Initiatives

India's power distribution sector is undergoing a structural shift from infrastructure-centric reforms to data-driven, efficiency-focused transformation. Recent initiatives like RDSS, building on earlier schemes, aim to resolve legacy issues, reduce AT&C losses, and enhance financial sustainability through technology, process optimization, and policy interventions.



RDSS Scheme | Background and Scheme design

Financial Metrics for DISCOMs | FY 2024

AT&C Loss	ACS-ARR Gap
16.12%	0.39 INR/kWh

Smart Metering Works under RDSS

Sanctioned GBS	GBS Released
24,366 Cr	1,491 Cr

Infrastructure Works under RDSS

Sanctioned GBS	GBS Released
95,294 Cr	30,974 Cr

Reliability Trends

- **SAIFI:** Improved from **167 Nos/Year in FY22** to **137.86 Nos/year in FY24.**
- **SAIDI:** Improved from **141 Hr in FY22** to **108 Hr in FY24.**
- **DT Failure Rate:** Reduced from **7.1% in FY22 to 6.4% in FY24**

RDSS

- GoI launched a Reform Based and Result Linked - **Revamped Distribution Sector Scheme (RDSS)**
- The scheme incentivizes the DISCOMs, by means of budgetary support from the central government, for achieving the targets for smart metering works and loss reduction works along with implementation of structural reforms

Scheme Objectives

Improve quality, reliability and affordability of power supply

Reduce AT&C losses to pan-India levels of 12-15%

Reduce ACS-ARR Gap to zero

Key Features

- **Outcome based** scheme with **performance linked** fund disbursals etc.
- State owned discom and State/UT power dept. are eligible
- Outlay of **₹ 3 Lakh Cr** and GBS of **₹97,361 Cr.**
- **REC and PFC** are Nodal Agencies
- Scheme duration: **5 years [extended upto March 2028]**
- All ongoing schemes to be subsumed within RDSS

Overview

Part-A

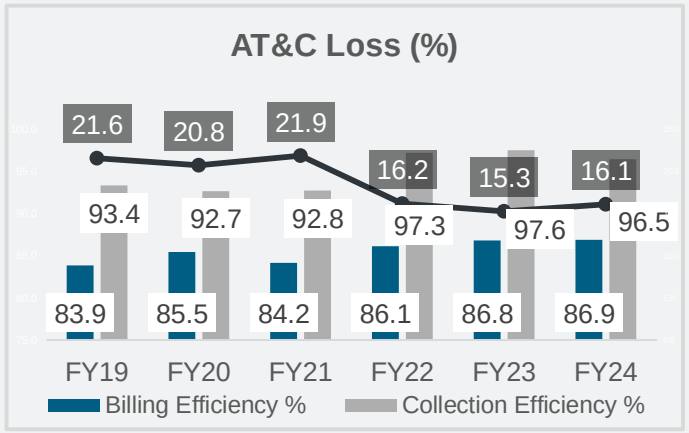
- Component - I Metering
- Component – II Distribution Infrastructure works
- Component – III Project Management

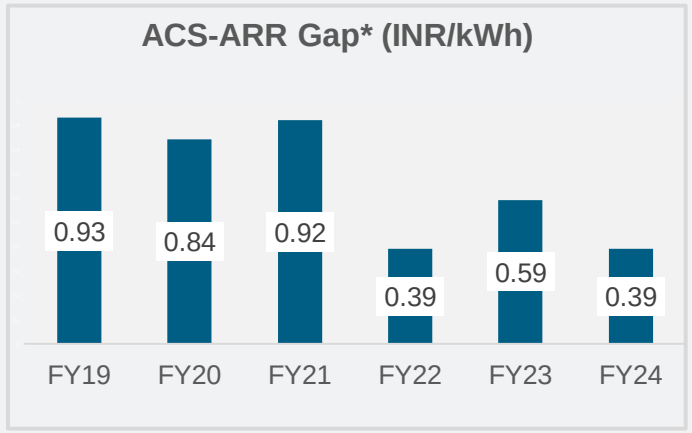
Part-B

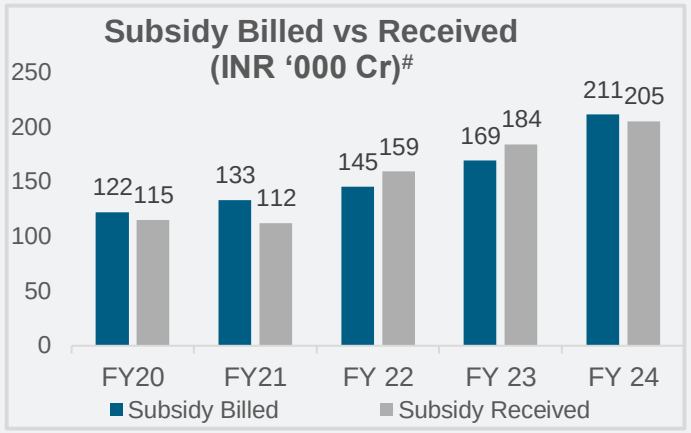
- Training, Capacity Building and other Enabling & Supporting Activities

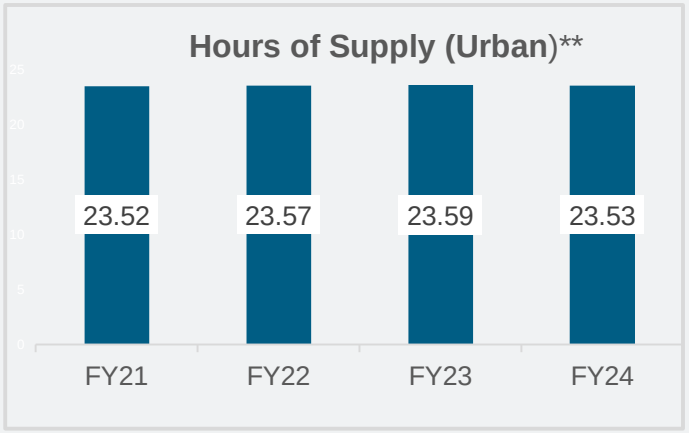
RDSS interventions have transitioned from groundwork to measurable operational and financial outputs, setting the base for sustained distribution reforms.

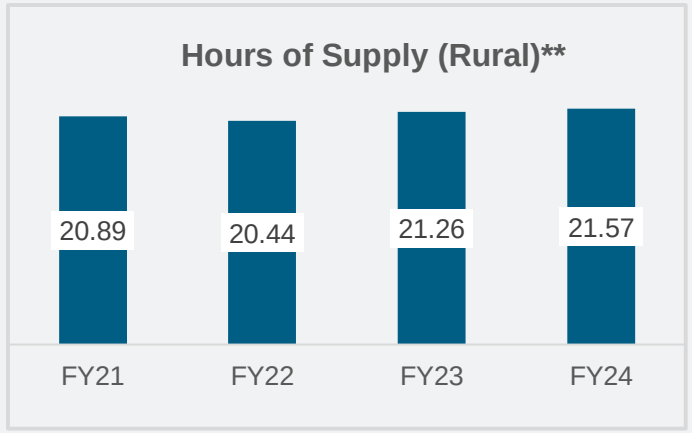
RDSS Emerging Trends| National Level performance

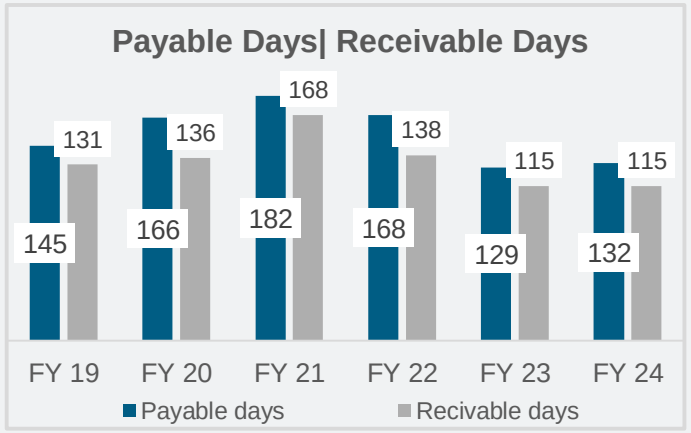












Operational and financial performance has improved over FY19 to FY24: AT&C losses reduced from 21.6% to 16.1% (~25% reduction); cash-adjusted ACS–ARR gap narrowed from ₹0.93/kWh to ₹0.39/kWh (~58% reduction). Working-capital efficiency strengthened, with payable days declining from 145 to 132 days and receivable days from 131 to 115 days.

 # Higher subsidy billed and received reflect demand growth, cost escalation and improved billing accuracy under RDSS; sustained subsidy reduction will require tariff rationalization and state-level policy reforms beyond RDSS.

What's Working | RDSS Interventions Linked to Reliability Outcomes

Infrastructure Strengthening

S. No.	Interventions	Progress	Reliability Impact
1.	**LT Lines**	**51% Completed**	Reduced fault incidence in last-mile connectivity
2.	**HT Lines**	**42% Completed**	Improved 11kV network redundancy
3.	**Sub-Stations**	**45% Completed**	Enhanced capacity and voltage stability
4.	**DT Works**	**24% Completed**	Lower DT failure rate: 7.1% (FY22) → 6.4% (FY24)
5	**Modernization**	**Underway in Major Cities**	Implemented in major cities* which helps in improvement of reliability indices

Technology & Innovation Deployment

S. No.	Interventions	Progress	Reliability Impact
1.	**Smart Metering**	**4 Cr Installed of 19.8 Cr Sanctioned (19%)**	Real-time outage detection and faster restoration, Improvement in collection efficiency
2.	**Prepaid Meters**	**1.3 Cr in Prepaid mode**	Reduced billing disputes, improved supply continuity
3.	**SCADA/ADMS Rollout**	**Ongoing across 15+ states**	Remote fault isolation reducing SAIDI
4.	**AI/ML Conference**	**51 solutions showcased; 7 awarded at National Conference**	Potential for Predictive maintenance, fault prevention
5.	**Powerthon**	**Phase 2 focused on SAIFI/SAIDI monitoring, N-1 topology**	Field-ready solutions for real-time decision-making

Cities for Modernization Works: Varanasi, Kanpur, Noida, Patna, Gurugram & Faridabad

Key challenges

Frequent Outages	• Due to radial networks, limited redundancy, ageing assets, vegetation issues, and construction-related faults
Slow fault detection	• Limited real-time visibility, weak OMS/GIS/SCADA integration, and outdated switching procedures
High Restoration time	• Resulting from limited tools, insufficient patrolling on long feeders, and terrain constraints (hilly/remote areas).
Protection system issues	• Including mis-operations, nuisance tripping, improper relay settings, and lack of feeder studies.
Limited automation	• leading to slow isolation/restoration of faults and longer outages.
RE Integration Risk	• High rooftop solar penetration causing voltage instability and protection mal-operations at feeder level - a new reliability threat requiring network augmentation and advanced voltage control.

Way forward

RDSS is reforms-based & results-linked; projects worth ~₹2.78 lakh crore are already sanctioned — States must fast-track award, execution & commissioning to realize reliability gains.

Fast Track Implementation of System Strengthening Works

- Move rapidly from Sanction → Award → Execution → Commissioning
- Strengthen project governance: milestones, LDs, vendor/contractor readiness

Adaptive Sectionalization and Protection for Modern Grids

- Sectionalization + redundancy: reclosers/sectionalizers/RMUs, feeder bifurcation/ring-main
- Protection coordination + vegetation/ROW drives; DER-aware settings

Faster Fault Location and Restoration

- OMS + restoration SOPs; improve switching readiness (SLDs/network model)
- Remote switching/SCADA where critical; scale FLISR/FDIR on worst feeders

Modernization + AI/ML as Multipliers

- Use smart meter + IT/OT data for outage analytics, anomaly detection, predictive maintenance
- Scale validated AI/ML use-cases from RDSS ecosystem initiatives into production

Reliability Governance- Focused Approach

- Feeder/category baselines; Top-20 worst feeders monthly RCA + action tracker
- Outcome tracking: SAIFI/SAIDI/CAIDI (with consistent exclusions/thresholds)

Thank you

Annexure

Reliability Indicies| DISCOM wise

S.No	State	FY 2021-22		FY 2022-23		FY 2023-24	
		SAIDI (hr)	SAIFI (No.)	SAIDI (hr)	SAIFI (No.)	SAIDI (hr)	SAIFI (No.)
1	Ladakh	230.32	117.725	227.89	125.42	173.48	121.96
2	Goa	8.97	10	6.27	7	6.27	7
3	West Bengal	99.6	235.06	92.01	185.26	97.54	188.65
4	Karnataka	152.02	78.76	128.14	62.15	125.02	56.96
5	Chhattisgarh	23.51	163.5	23.53	177	23.49	165.5
6	Bihar	249	399	242.38	391	235.55	388
7	Nagaland	29.4	280	26.4	290	24	280
8	Tamil Nadu	8.29	19	13.1	12	13.1	12
9	Uttar Pradesh	-	-	187.17	154.94	187.17	154.94
10	Rajasthan	67.32	59.8	66.65	61.12	62.39	64.47
11	Assam	270.1	88.31	156.95	91.44	120.78	66.51
12	Andhra Pradesh	87.12	106.35	67.21	125.57	65.87	106.95
13	Delhi	2.1	3.1	1.54	2.3	1.28	1.87
14	Gujarat	81.25	50.3	61.19	45.8	67.96	52.4
15	Haryana	38.6	76.91	35	62.69	31.54	47.29
16	Himachal Pradesh	25.36	.-	25.46	20.32	21.01	24.84
17	Jharkhand	924	960	760	768	588	660
18	Kerala	65.67	12.98	62.67	12.48	63.15	12.58
19	Madhy Pradesh	152.32	124.49	141.71	124.42	132.63	150.87

Reliability Indicies| DISCOM wise

S.No	State	FY 2021-22		FY 2022-23		FY 2023-24	
		SAIDI (hr)	SAIFI (No.)	SAIDI (hr)	SAIFI (No.)	SAIDI (hr)	SAIFI (No.)
20	Maharashtra	44.37	16.79	25.55	16.74	21.09	13.52
21	Odisha	297.25	472.5	264.25	428.75	275.25	404.5
22	Puducherry	7.95	15.53	8.7	8.74	6.33	6.84
23	Telangana	96.24	39.5	106.87	42.5	103.56	45
24	Uttarakhand	180	348	223.2	384	154.4	276
	National	**140.75**	**167.16**	**123.08**	**149.99**	**108.37**	**137.86**