Vision 2030

Paving the way ...

for a sustainable future

Objective

Strategically position KSEB as leading energy provider by 2030.

Key Focus Areas

- Energy Security
- Operational Reliability
- Operational Efficiency
- Customer Satisfaction
- Renewable Energy Integration

Our Vision is

Powering Kerala sustainably

KSEB aims to become:

- India's Leading Integrated Power Utility
- Driving socio-economic transformation through sustainable energy

Align with State goals…

100% RE by 2040

Carbon Neutral by 2050

Mission

- Provide quality electricity: Adequate, safe, sustainable, and affordable.
- Develop a reliable, resilient energy ecosystem.
- Support the development of 'Nava Keralam' with efficient and cost-effective energy.
- Green energy integration and e-Mobility promotion.

Goals include

- To ensure quality and cheap power
- To make Kerala power surplus by 2030
- To decrease the tariff for industries
  - support MSME and Heavy industries
- To decrease tariff during the day
  - MSMEs working in day time will flourish

Challenges (Opportunities?)

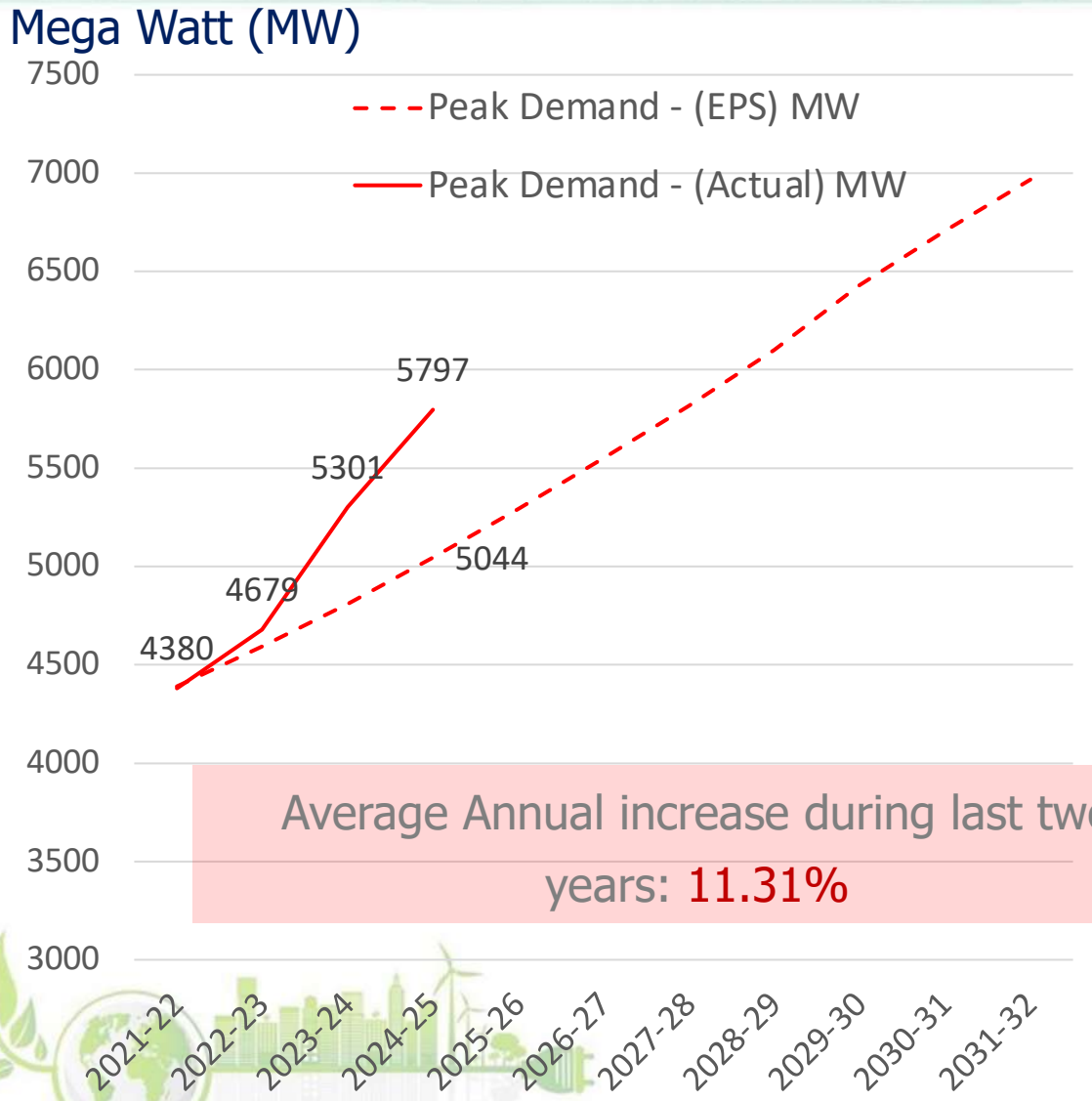
1. Increasing Demand
2. Dynamics of power market
3. Reliability Improvement
4. Aging Infrastructure
5. Renewable Energy Integration
6. Loss Reduction

7. Smart Grids and Digitalization
   - Digital Adoption
   - Data Management
8. Financial Constraints
   - Dependence on External Financing
   - Capex Limitations
9. Land and Resource Availability

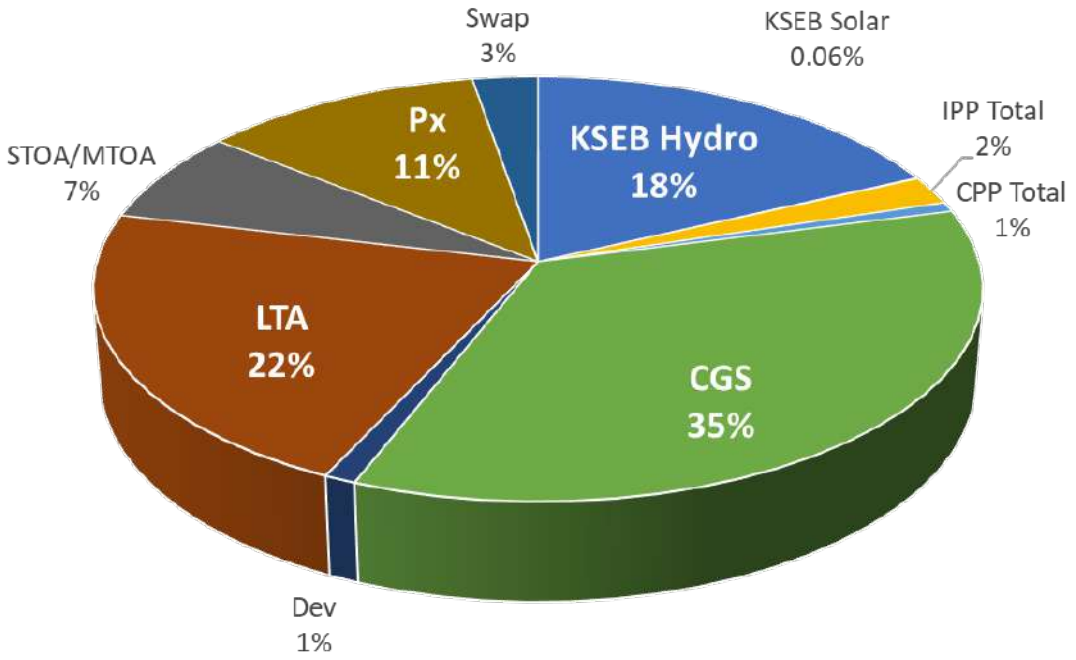
Focus Areas

1. Infrastructure Development
2. Zero Interruption
3. Environmental Sustainability
4. Energy Storage Solutions
5. Technological Innovation
6. Energy Analytics & Digital Services
7. Comprehensive Asset Management
8. Asset Monetization
9. Energy Services
10. Market Operations

Electricity Demand - EPS vs Actual

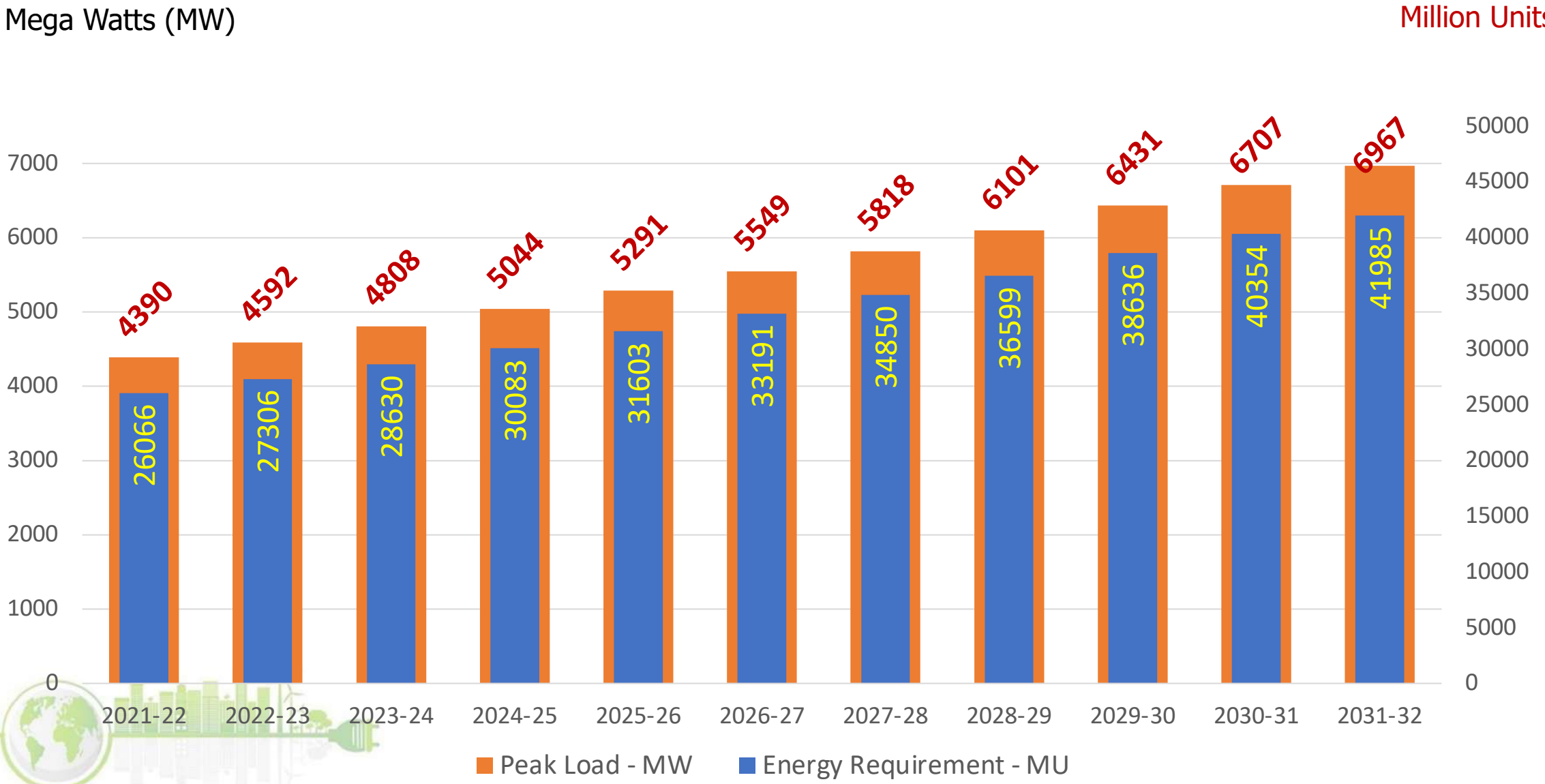


Average Annual increase during last two years: 11.31%

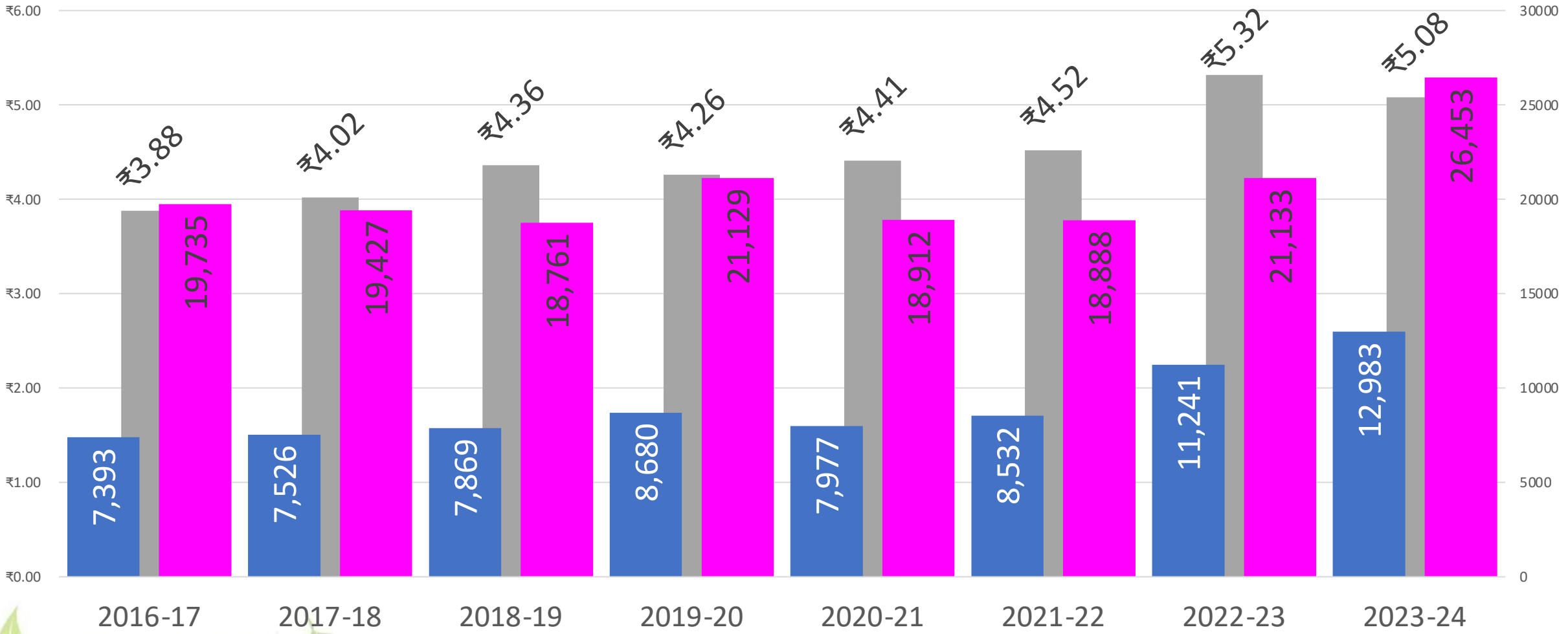


- ✓ Internal capacity is sufficient to meet only 30% of requirement
- ✓ Deficiency of 500-1000 MW during peak

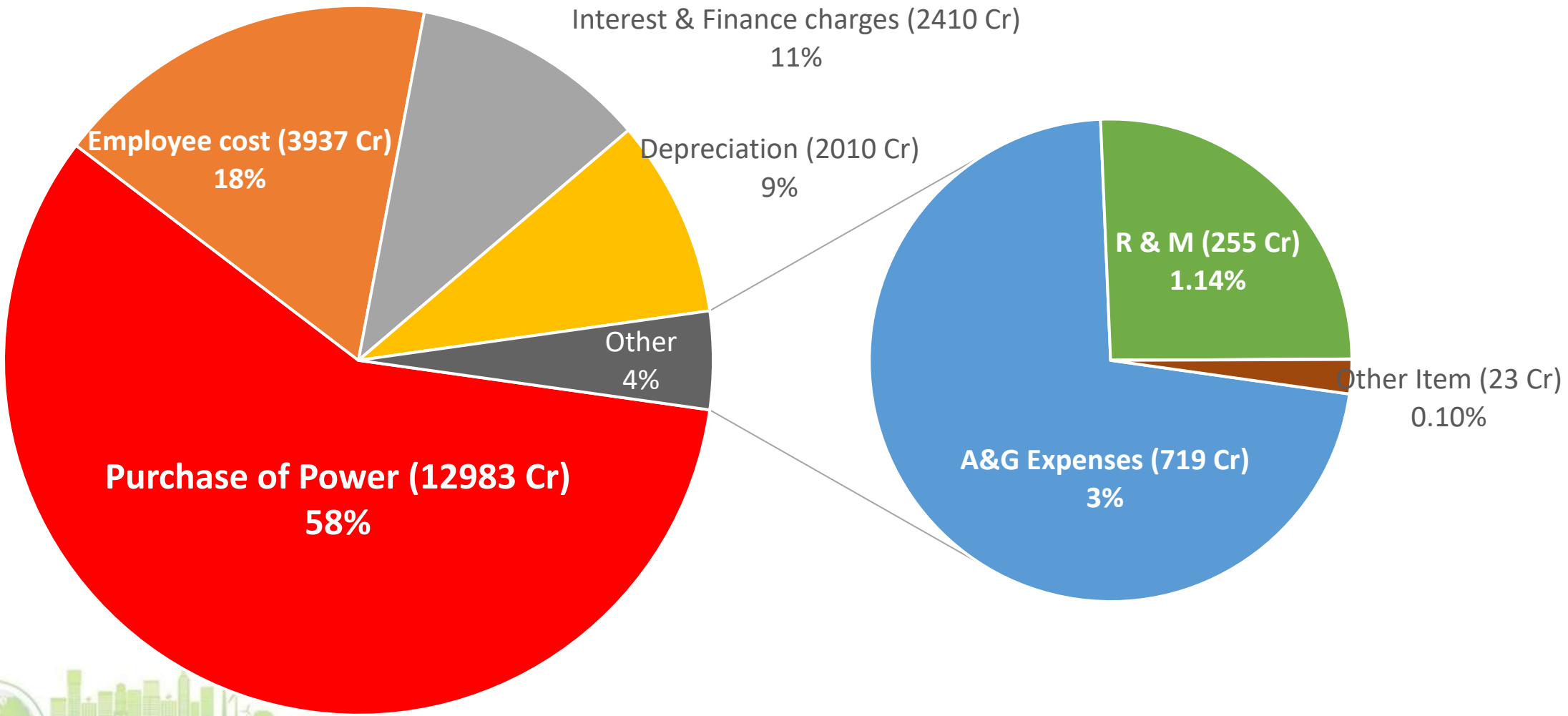
Expected demand in Kerala (as per 20th EPS)



Power Procurement – Cost and Quantum



Rupee Spent


Interest & Finance charges (2410 Cr)
11%
Employee cost (3937 Cr)
18%
Depreciation (2010 Cr)
9%
Other
4%
Purchase of Power (12983 Cr)
58%
R & M (255 Cr)
1.14%
Other Item (23 Cr)
0.10%
A&G Expenses (719 Cr)
3%

Installed capacity & RE Generation

KSEB owned	Capacity (MW)
Hydel	2096
Thermal KDPP	96
Wind	2
KSEB Solar	24
Soura (KSEB Fund)	24
Sub Total	**2243**
Others	**Capacity (MW)**
NTPC Kayamkulam* (359 MW)	0
BKPL** (157 MW)	0
Cogeneration	17
SHEP	87
Wind	69
Solar	1003
Sub Total	**1177**
Grand Total	**3420**

FY	Hydro (MU)	Solar (MU)	Wind (MU)
2014-15	7197	0	68
2015-16	6686	1	59
2016-17	4362	16	94
2017-18	5551	70	109
2018-19	7656	104	109
2019-20	5802	110	124
2020-21	7157	163	118
2021-22	10036	341	141
2022-23	8814	676	138
2023-24	5813	972	143

Only 1500-1700 MW Hydro available during Peak Hours

Solar & Wind power are infirm and NOT Schedulable

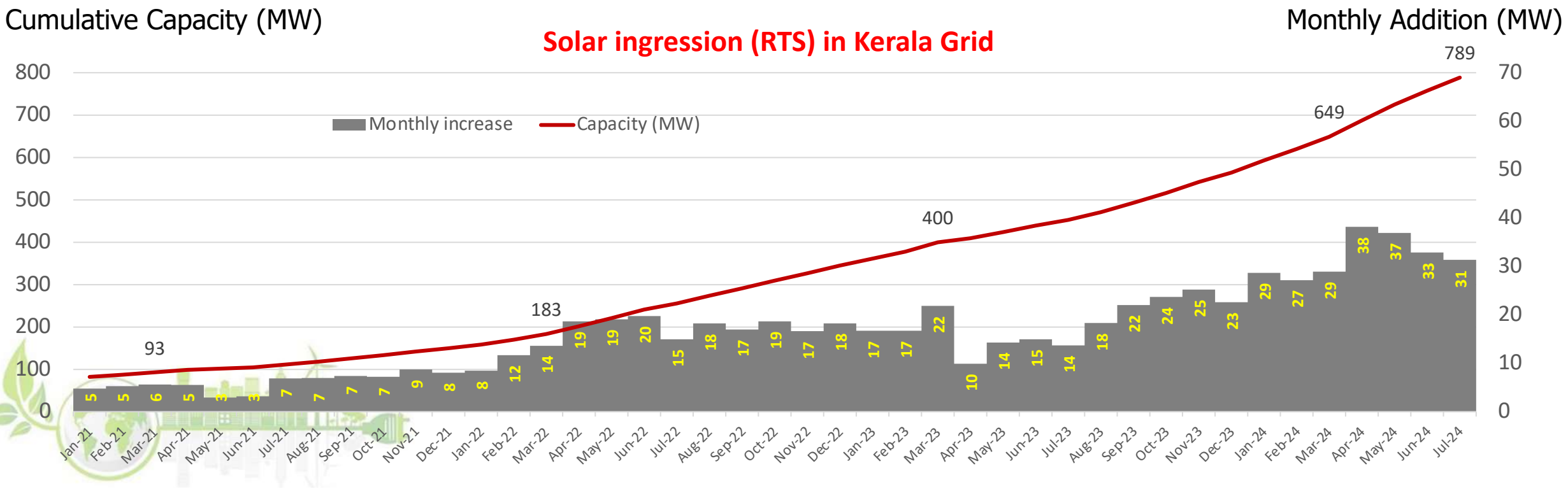
Huge potential for RTS and Floating Solar Projects

Challenges

- Availability is during low demand period
  - Not providing peak support
- Grid integration

Adds ~ 35 MW per month

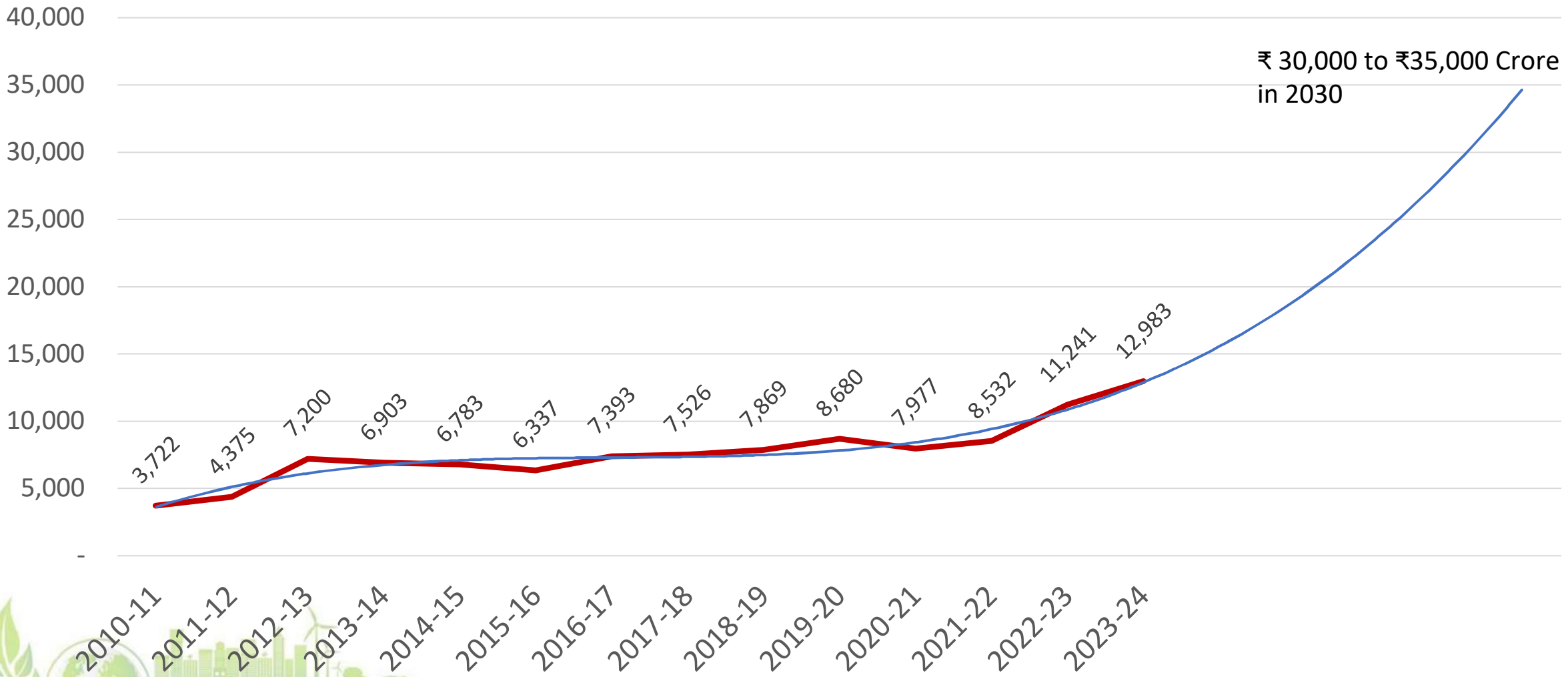
CUF ~ 18 %



Energy Mix (BAU scenario)

Source	Available Capacity FY 24 (MW)	Expected Mix for FY 2030 (MW)
Solar	1,726	3,000
Wind	135	700
Hydro	2,184	2,325
Nuclear	363	863
Coal & Lignite	2,141	3,100
Total	**6,549**	**9,988**

Cost of Power Purchase (₹ in Cr)



2023-24

Major Achievements

Major Achievements 2023-24

- Peruvannamoozhy SHEP (6 MW)
- Solar capacity addition – 244 MW
- Transmission Substations – 7 no
  - First 400 kV GIS SS (Kottayam)
- Transmission lines – 297 c.km
- Import capability – increased by 1000 MW
- Distribution Transformers – 2355 no
- HT Distribution line - 1297 c.km

Customer Service Rating by REC- **B+**

Plan Progress 2023-24 (Financial)

	Outlay 2023-24	Achievement	% Progress
Generation	717.84	331.43	46.17%
Transmission	1044.01	609.18	58.35%
Distribution	1105.00	1082.31	97.95%
IT & Other Works	439.03	231.68	52.77%
Overall Progress	3305.88	2255.95	68.24%

Major Achievements 2024-25

- Commissioning of Thottiyar HEP (40 MW)
- Pallivasal HEP (60 MW) by November 2024
- Solar capacity addition – 206 MW
  - RTS - 200 MW, GMS – 6.6 MW
- Commence Construction of Upper Shengulam (24 MW)
- Transformation Capacity - 4 Substations / Net Addition: 71 MVA
  - Two SS nearing completion
- Network Addition - 172 km EHT, 327 km HT and 1190 km LT line
- Distribution Transformers - 950 no

Capacity Addition expected in 2025-26

- Commissioning of Chinnar SHEP (24 MW) - May 2025
- Commissioning of Olikkal & Poovaramthodu (8 MW) - Aug 2025
- Wind (INKEL) (14 MW)
- Solar RTS - 350 MW

Plan Progress 2024-25 (Financial)

Sl. No.	Scheme	Outlay for 2024-25	Financial Progress	% Progress
1	Generation	576	398	69.06%
2	Transmission	914	217	23.69%
3	Distribution	1100	703	63.87%
4	IT works	40	1	1.38%
5	RDSS			
	Transmission Infra	156	90	33.96%
	Distribution Infra	5		
	IT works	104		
7	Other Works	494		
6	State Support Projects	34		
	Total	**3423**	**1318**	**38.51%**

Planning Priority

Meeting summer demand

- Execution of projects identified in CIP 2022-27
  - Advance projects scheduled for future years, if required
- Execution of projects additionally identified
- Carryout advance works for Long Term projects identified under Vision 2030

- New Substations & Transformers
- Capacity enhancements /Re-conductoring
- Construction of new transmission & distribution feeders
  - Constructing Ring Mains

Ensure Safe Installations

- Only Insulated and covered Conductors for new construction.
  - Strategic Undergrounding
- Redesign DT stations / interlinking points etc
- Fix percentage target for conversion
- Usage of feeder pillars in urban areas

Loss Reduction

- Improve HT:LT ratio to 1:3
- Promote HVDS
- LT Only on ECSC basis
- Distribution lines along the public path shall be 3 phase

General

- Geo-mapping of all assets
- Ensure system metering
- Software-based simulation studies on LT network.

Plan outlay

Sl. No.	Scheme	Outlay for 2024-25	Revised Outlay for 2024-25	Outlay for 2025-26
1	Generation	576	1588	1084
2	Transmission	914	856	1008
3	Distribution	1100	1100	1750
4	IT works	40	14	57
5	RDSS			
	Transmission Infra	156	152	46
	Distribution Infra	5	1282	1122
	IT works	104	120	467
7	Other Works	494	170	430
6	State Support Projects	34	17	1000
	Total	**3,423**	**5,299**	**6,964**

Future Plans

Projects to be taken up

Vision 2030

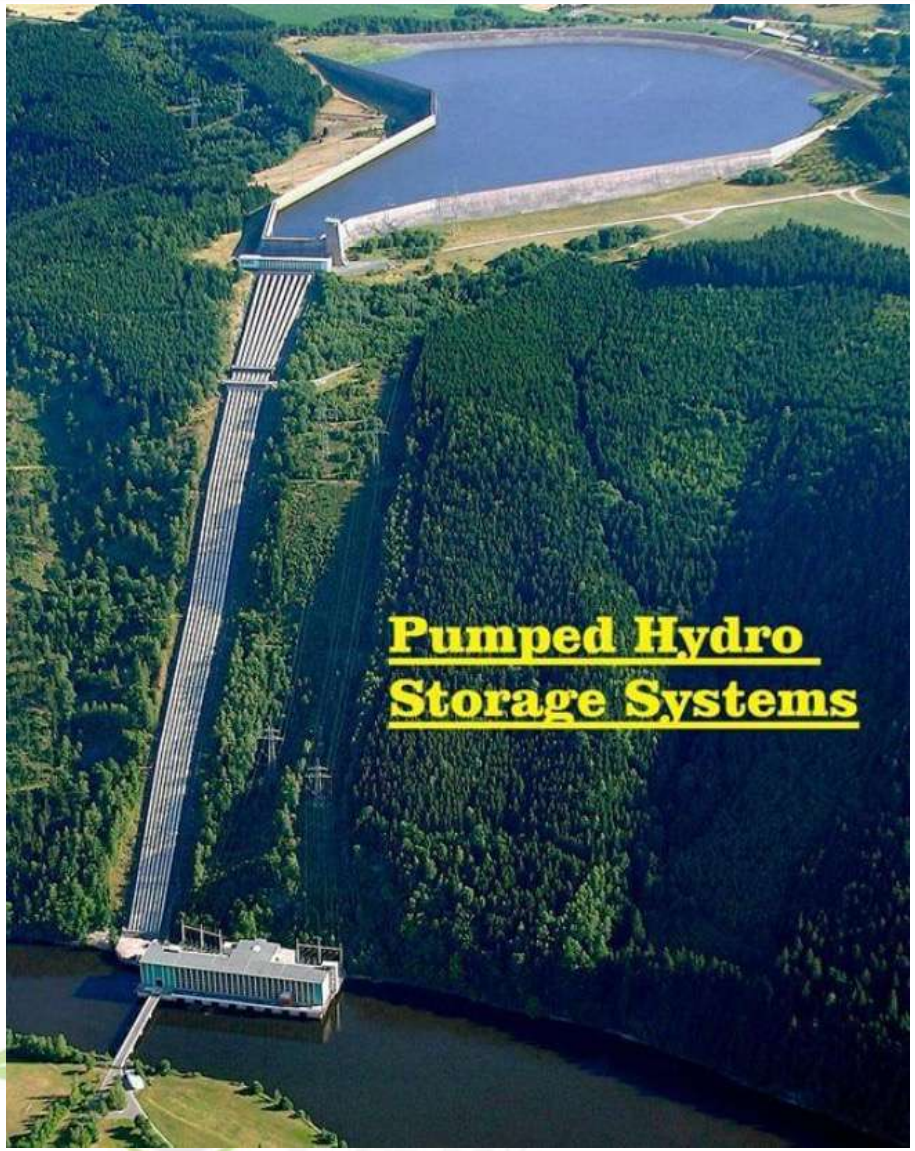
Source	MW
Present capacity (Hydro + Wind)	2,250
New Hydroelectric projects	1,500
Onshore Wind power projects	370
Offshore wind projects	50
VAWT (Tulip turbine)	30
Ground / Floating Solar projects	500
Pumped Storage Projects	2,000
Battery Energy Storage System	3,300
Total	10,000

Hydro Projects

Sl. No.	Name of Project	MW	Annual Generation (Mu)	Cost in Crores
1	Idukki Golden Jubilee HEP	800	1301	3062
2	Letchmi HEP	240	347	1630
3	Sabarigiri Extension Scheme	450	834	3128
4	Keerithodu SHEP	12	28	142
5	Maripuzha SHEP	6	15	81
6	Poringalkuthu Sage II SHEP	24	54	81
7	Ladrum SHEP	3.5	12	73
8	Marmala SHEP	7	23	115
9	Peechad SHEP	3	8	52

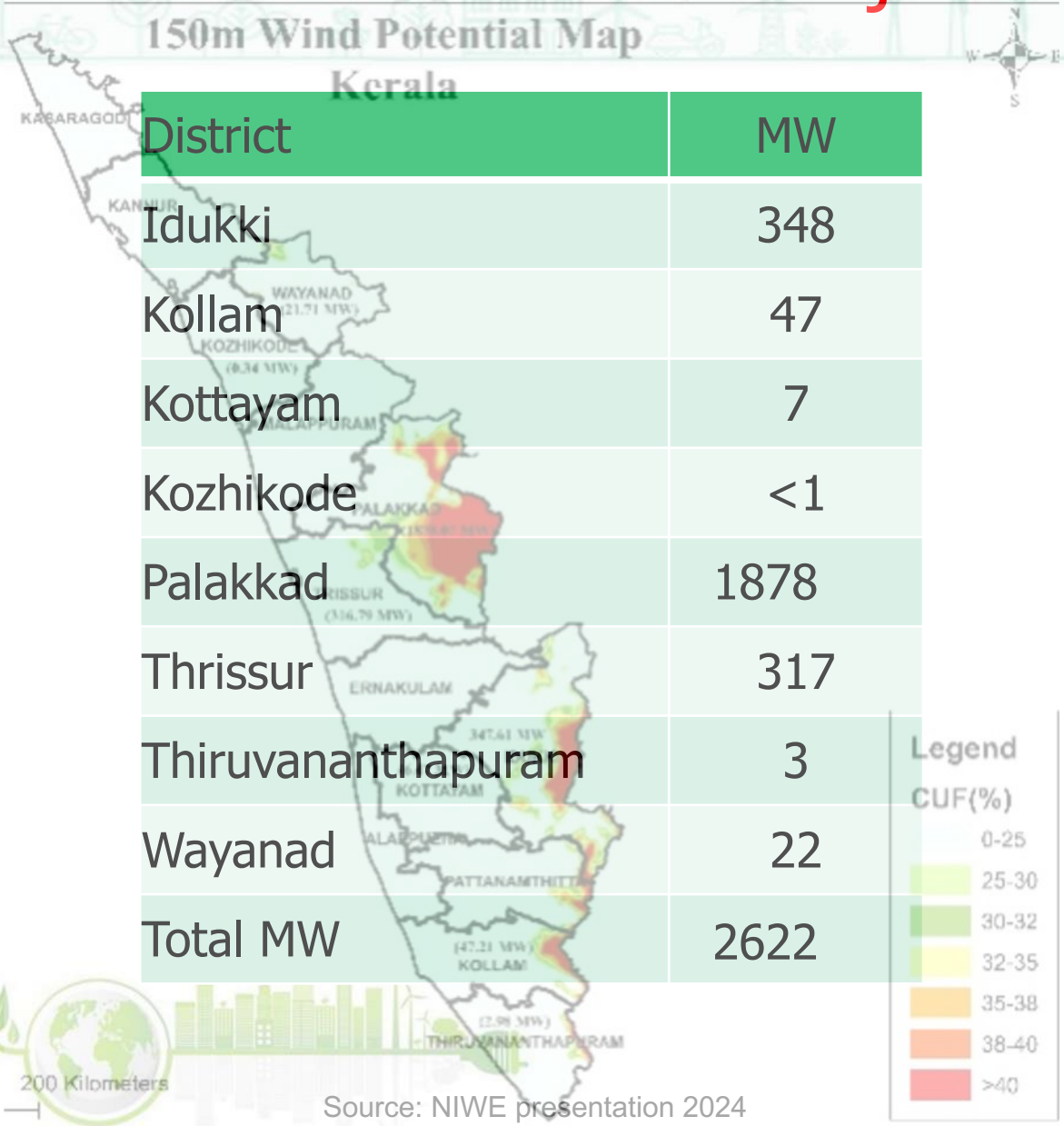
Sl. No.	Name of Project	MW	Annual Generation (Mu)	Cost in Crores
10	Western Kallar SHEP	5	17	87
11	Valanthodu SHEP	7.5	15	92
12	Anakkayam SHEP	7.5	22	140
14	Chembukadavu Stage III	7.5	17	106
15	Pasukkadavu SHEP	4	10	65
16	Chathankottunada Stage 1	5	12	98
17	Pathrakadavu	70	214	490
18	Kuriarkutti	26.3	115	1498
	Total	**1678**	**3045**	**11,746 Cr**

Pumped Storage Projects – 10 no



Project Name	Installed Capacity (MW)	District	Daily Generation (hours)	Daily Pumping (hours)	Annual Generation (MU)	Project Cost ₹ in Cr
Manjappara	30	Wayanad	05:00	06:40	53	180
Mudirapuzha	100	Idukki	06:00	07:16	208	573
Kakkayam	800	Kozhikode	06:00	08:00	1584	3400
Idukki	700	Idukki	06:00	06:55	1456	3083
Poringalkuthu	100	Thrissur	06:00	07:04	198	662
Amruth Pamba	300	Pathanamthitta	05:00	06:42	520	1645
Marayoor	160	Idukki	05:00	06:48	278	953
Upper Chaliyar	360	Wayanad	06:00	07:58	750	1974
Pallivasal	600	Idukki	06:00	06:53	1248	3150
Idamalayar	180	Ernakulam	04:00	05:22	237	1131
Total	**3330 MW**					**16,751**

On-shore Wind Turbine Projects



District	MW
Idukki	348
Kollam	47
Kottayam	7
Kozhikode	<1
Palakkad	1878
Thrissur	317
Thiruvananthapuram	3
Wayanad	22
Total MW	2622

Source: NIWE presentation 2024

- Ramakkalmedu 150 MW
- Agali 100 MW
- Mankuthimedu 50 MW
- Pappanpara 50 MW
- TOTAL 350 MW

Need for Battery Energy Storage System (BESS)

- Low Industrial (~20%) & Commercial (~17%) Consumption
- 60% domestic consumers avail cross-subsidy
- Substantial solar energy during daytime.
  - Kerala ranks third in India in RTS installations
  - Present capacity 1 GW, ~30 MW added every month.
- Energy from VRE sources needs to be stored.
- 3300 MW of BESS required in 5 years
  - Can be installed in 15 months
  - Cost ₹3.5 Cr/MW

Investment Requirements in Power Sector

Investments Needed

Category	Capacity (MW)	Rate (₹ Cr/MW)	Investment ₹ in Cr
Hydroelectric projects	1500	6 to 8	₹12,000
Onshore Wind projects	370	5.5 to 6	₹2,100
Offshore Wind projects	50	15 to 17	₹800
VAWT (Tulip turbine)	30	10 to 12	₹300
Ground / Floating Solar projects	500	4.5 to 5.5	₹2,500
Pumped Storage Projects	2000	5 to 7	₹12,000
Battery Energy Storage System	3300	4	₹13,000
Sub Total	**7750**		**₹42,700**

Category	Investment ₹ in Cr
Transmission System strengthening	₹10,000
Construction of 11 KV Feeders	₹4,050
Installation of Distribution Transformers	₹1,500
Construction of LT Lines	₹150
Implementation of SCADA	₹1,600
Consumer and System Metering	₹8,000
Sub Total	**₹25,300**
Grand Total	**₹68,000**

Public Private Participation on infrastructure projects

- Offshore Wind
- Wind - Solar - Storage Hybrid
- Greenfield Hydro/PSP
- RESCO in floating / GM Solar
- Storage as a Service
  - Grid Level Storage projects with BESS

Need for Govt Investment in Power Projects

- High Levelised Cost of Energy (LCoE) for domestic plants
- Industries sustain only if electricity is affordable
- State Government's investment in energy sector has been minimal
  - May lead to tariff shock
  - Power crisis
    - hindering industries
    - unemployment
    - Economic decline

Investment in power sector during last 5 years