KPMG

#KPMG josh

Navigating Disruptions – Maharashtra Power Sector 2030

February 2020

Disclaimer

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Agenda

1 Disruptions in power sector

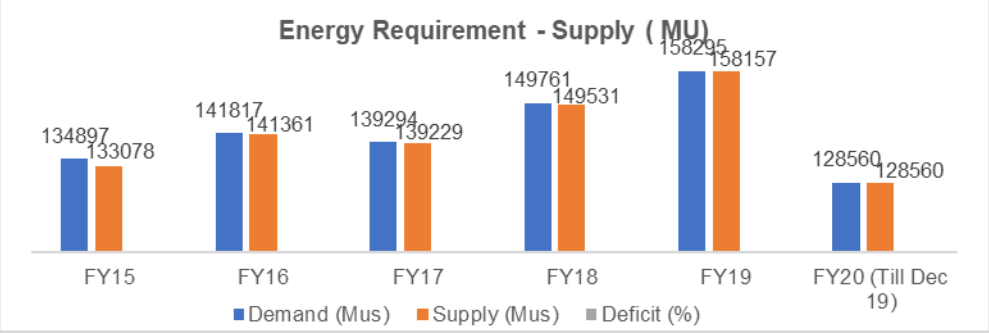
2 Levers for an effective power sector

3 Priorities for Maharashtra power sector

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

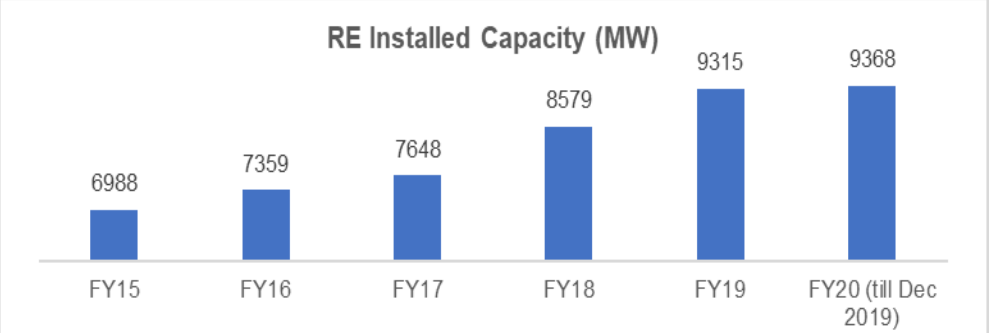
Key achievements of the Maharashtra power sector

Power surplus situation



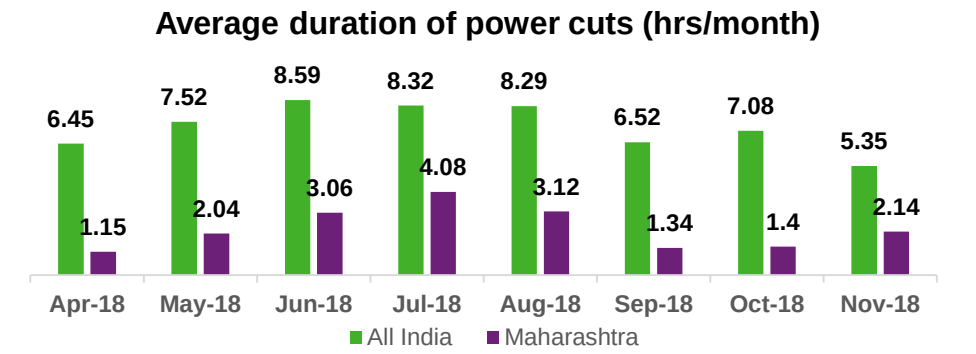
- State has been in a power surplus situation since FY 16

High installed RE capacity



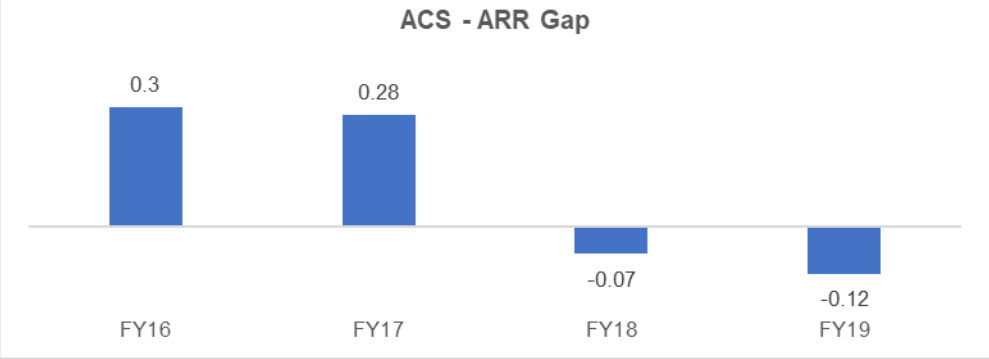
- State with 3rd highest installed capacity of renewable energy in India

High availability and reliability of power



- In FY19, avg. duration of power cuts less than half of all India
- 100% electrification of households achieved

Discoms operationally profitable



- ACS-ARR gap has been reducing and according to UDAY data has reached surplus in FY 18

Source: Various public sources, CEA, Urja India, Discom filings

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Global disruptions in the energy sector, signal an imminent transition in the power sector scenario

Decarbonisation

- **RE** likely to address **40% of increase in primary demand**
- **Coal** based capacity growth largely **limited to assets under construction**
- EVs to grow from 3 mn in 2017 to 125 mn by 2030 (electricity demand growth of **5% by 2040**[2)]

Decentralization

- **Solar rooftop**: countries like Australia have more than **20% household penetration**
- **Storage: Reduction in price** by over 50% from current price levels could further stimulate RE adoption

Digitalization

- Globally, **P&U companies** have **invested** more **heavily** in **IoT** (48% vs 21% for all industries) and in **AI/ ML** as compared to other industries
- **Business process efficiency** and **customer experience** are key drivers for digital
- Digital is a **key enabler to integrate emerging technologies** such as DRE, EV, storage etc.

1 IEA's World Energy Outlook 2017
2 Redburn analysis

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

How is the power sector responding globally?

Improving flexibility, sustainability and profitability of conventional segments

- Flexibilization of coal plants in Germany
- Sensor based plant management of a thermal power plant in China helped reduce operating cost by 30%
- **Digital twin technology** helped an European utility **reduce verification cost by over 60%** during investment planning

---

Reorientation of businesses

- EON. Germany, Duke Energy, US, Engie, France: Acquired **stakes in roof top cos**
- RWE, Germany: **Launched NEST** - Demand Response in partnership with Google
- Focus on better consumer experience (**e.g, energy monitor TOON**) supplied by Dutch utility ENECO

Risk mitigation for investors

- Financial risk mitigation techniques such as credit enhancements (Europe Project Bond Initiative)
- Liquidity guarantee for payment delays (West Nile Rural Electrification Project in Uganda)

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Priorities of the Indian power sector need to evolve to address the next level of challenges

2003 onwards

- Focus on demand supply gap
- Delicensing generation
- Open access
- Electricity trading
- Competitive bidding

2011 onwards

- Focus on profitability of state utilities - UDAY
- Focus on electrification - DDUGY
- Increasing RE deployment

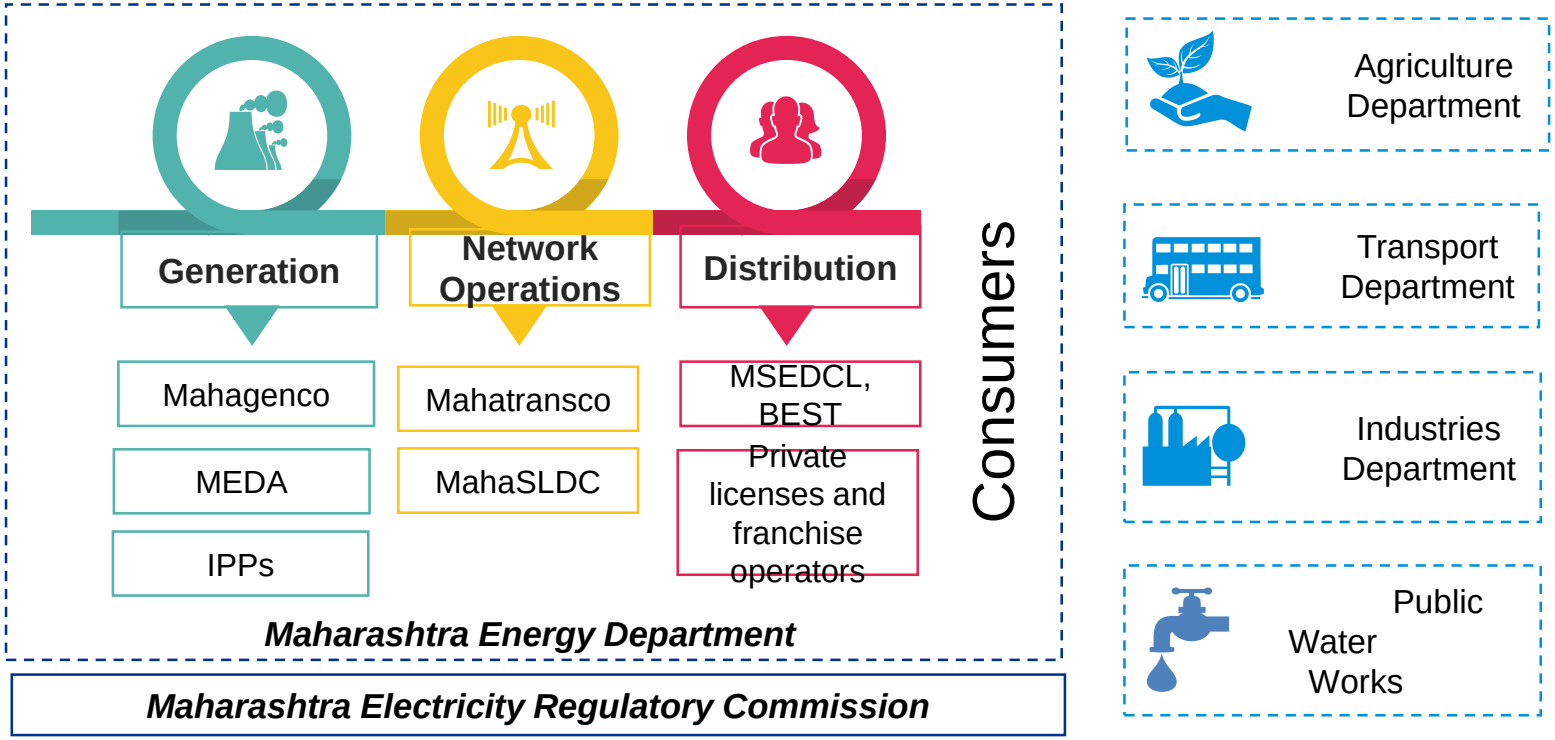
2020 onwards

- Focus on **RE Integration**
- **Higher efficiencies** across the **value chain**
- Improved **customer experience**
- Creating a culture of **innovation**, digital orientation and creativity
- Bringing about **governance** and structural modifications
- Integration of **new technologies** -DER/ EV

PAST **CURRENT** **FUTURE**

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Critical to have alignment between all stakeholders of the Power Sector



A cohesive point of view on current challenges and emerging issues is critical for working towards a power sector vision for the state

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Key vision elements for Maharashtra Power Sector 2030

- Affordable and reliable power supply
- Efficiency
- Financial sustainability of stakeholders
- Clean energy transition
- Digitalized power sector
- An open power sector which nurtures entrepreneurship and innovation
- World class consumer services
- Fosters economic growth of the state

3

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Levers to an effective Maharashtra Power Sector 2030

Focusing critically on the efficiency paradigm

- Cost efficiencies throughout the value chain from generation to distribution
- Generation/ power procurement optimization
- Power demand management

Encouraging clean energy adoption

- Floating Solar, off-shore wind etc.
- Battery storage and pumped hydro storage.
- Enhancing capabilities for forecasting and dispatch.

Seamless integration of renewable energy sources with the grid

- Flexible thermal plant
- Local distribution system operations
- Demand side flexibility, through policy, technological and business model innovations

Increasing consumer centricity

- Reliable power at cost effective prices.
- Mapping the consumer journey to serve them better
- Providing value added services to consumers

Creating a culture of innovation, digital orientation and creativity

- Culture that is open to new ideas and thinking.
- Competitions such as hackathons
- Encouraging exchange programs
- Attracting youth to the sector

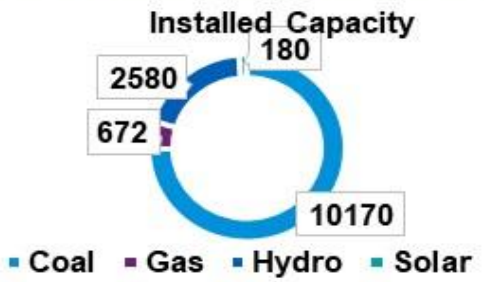
Bringing about governance and structural modifications

- Explore initiatives such as tariff based competitive bidding for transmission lines, franchisee models in certain high loss distribution areas, etc
- A culture of constructive stakeholder discussions and interactions

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Generation - Mahagenco

Current status/ achievements



Installed Capacity as on FY18 (MW)	13,602
Total Revenue for FY18 (INR Crs)	21,318
Net Profit for FY18 (INR Crs)	723
Average PLF of coal plants (%)	69.75

- Mahagenco has **replaced smaller old capacities** with larger capacities and modern technologies.
- Mahagenco has undertaken several measures such as coal swapping, third party sampling for **improvement of operational efficiencies**
- Mahagenco is developing **pilots in new generation technologies** such as floating solar, hydroponic solar power plants, cogeneration of solar at thermal power plant locations

Emerging priorities

Priorities	Key imperatives	Challenges / Threats
Capacity Addition (RE and new tech)	• **Add RE** inline with India govt. targets • Pilots for **new technologies** and existing resources (**pumped hydro** etc.) • Evaluate **hybrids/ flexible** power for meeting demand patterns • Evaluating **storage** at various levels • Implement better forecasting tools	• Higher cost for new thermal units • Requirement of base load demand • Change in technology
Operational Improvement	• Pilot for **flexibilisation** of thermal power • Improvements in **coal handling** logistics • Improvements in **project execution** through **digital technologies**	• Cash flow for additional capex
Revenue protection/ enhancement	• Improve **cost competitiveness** • Identify alternate modes for sale	• Capabilities • Regulations

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Network operations and transmission - Mahatransco

Current status/ achievements

MAHATRANSCO
Maharashtra State Electricity Transmission Co.Ltd.

Total Revenue as on FY18 (INR Crs)	3968
Net Profit as on FY18 (INR Crs)	512.
Total Network as on FY18 (ckms)	46,217
Number of EHV substations as on FY18	660
Transformation capacity - FY18 (MVA)	123,000.

- **Investments of over INR 6,300 crores in network development** over the past 5 years with **real-time visualisation** of network and power flow
- **Reduction of the transmission loss** in its system over the years despite the increase in power transmitted through its network
- Consistently exceed the benchmarks set by the regulator for **availability of HVAC and HVDC systems** for the past decade

Emerging priorities

Priorities	Key imperatives	Challenges / Threats
Transmission costs optimization	• Better network **planning and optimization** of existing network • Improving efficiencies through **automation, digitalization** and **upskilling**	• Change management
Cost of development of new transmission network	• **Cost optimization** for building of new asset • **Integrated planning** for dedicated transmission corridors	• Cash flow for additional capex
Transmission congestion in Mumbai	• Planning for **capacity addition** in a phased manner to keep costs under check and cause minimal disruption	• Right of way • Space constraints
High RE Generation	• Improved **forecasting and scheduling** for power generated through RE sources • Studies on **change in power flow and intermittency** • Evaluate **storage solutions**	• Accuracy of forecasting technologies

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of indepe

Distribution - Mahavitaran

Current Status

MAHAVITARAN
Maharashtra State Electricity Distribution Company Limited

Total Revenue for FY19 (INR Crs)	85,595
Net Profit for FY19 (INR Crs)	845
No. of consumers as of FY19 (Crs)	2.56
No. of agricultural pumpsets - FY19 (Lakhs)	42
Solar RPO (Cumulative till FY17)	35% achieved
Non-Solar RPO (Cumulative till FY17)	80% achieved

Source: CEA, ARR of all DISCOMs

Achievements

- **Demand supply deficit** for the state has been reduced to **almost 0% since FY 16**.
- **Overall AT&C losses for MSEDCL** has reduced by 50% from a total of ~35% in 2005 to **~17% in 2018** through initiatives including **feeder segregation, metering, energy audits, digitalization of billing and collection process, implementation of distribution franchisee mode**l (in Bhiwandi & Nagpur), etc.
- The Infra 1 Scheme (INR 13,000 crores) and Infra 2 Scheme (INR 6600 crores) ensured that the **physical infrastructure nearly doubled from the status on FY06**. A significant improvement was also seen in the HT and LT network. (LT: HT ratio improved to 1: 1.78 by 2016)
- Mahadiscom has adopted **power cost optimization measures** such as **zero scheduling**, **banking** of surplus power with other utilities, competitive RE procurement, petitioning for **technical minimum reduction** of state genco plants, etc.
- **Improving consumer experience** (including mapping of more than 85% of mobile numbers of over 2.5 crore consumers), consumer centric IT initiatives such as omni-channel consumer touch points (such as mobile app, social media, facilitation centres), etc.
- **Increase operating efficiencies** through adoption of digitalization measures such as **centralised billing and collection, online vendor payments, online cash collection service, automated metering for high value HT and LT consumers, meter reading for LT consumers using mobile app** etc.

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Emerging priorities for distribution sector - Mahavitaran

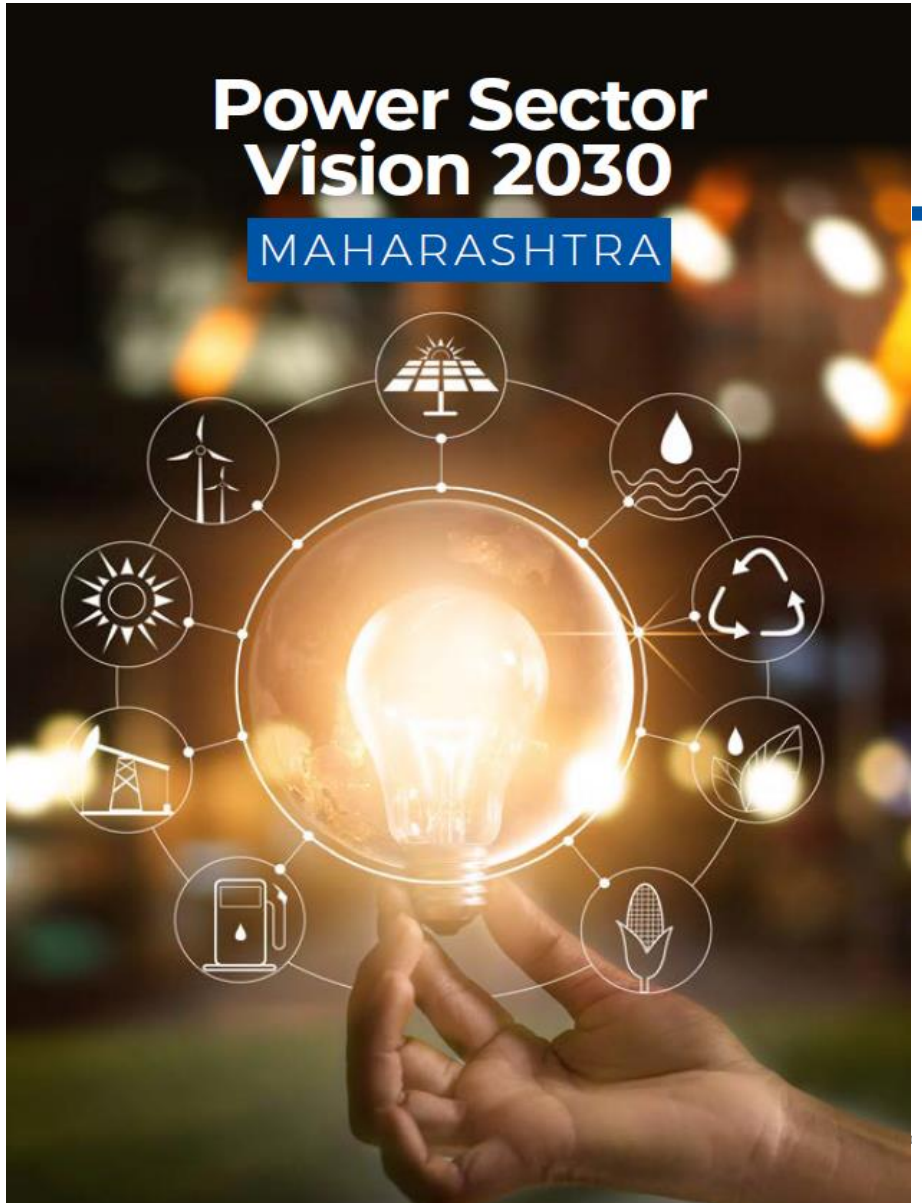
Priorities	Key activities	Challenges / Threats
Reduction of Power Purchase Cost	• Procurement from **cheaper RE sources** • **Time based contracts** • **Power trading** • **Models to segregate backup cost & supply cost & cost for reliable power supply** • Conduct interactions with other discoms to **share/transfer PPAs of base load** stations	• Catering to base load demand • Unavailability of land for large RE plants
Enable RE Integration	• Procurement of **flexible RE** through hybrid models • Models for **demand response** • Pilot projects for **storage** for improving reliability & quality of supply • Improve the **settlement and accounting procedures**	• Forecasting for RE • Market development and tariff for flexible contracts
Operational Improvement	• 100% **smart metering** for all consumers • **Network upgradation**	• Fund availability • Employee resistance
Increasing Consumer Centricity	• Determine ways to **retain consumers** through **VAS** • Enhance **customer service** • **Employee engagement** to improve customer service	• Misinformation to consumers • Migration of consumers
New businesses	• **Electric Vehicles Charging** - Time based supply to network of chargers; distributed RE based chargers; Pilots for various EV charging models • **VAS** for consumers	• Slow adoption by consumers
Organizational Change Management	• Programs for **upskilling** of employees • Improving **training facilities**	• Inadequate change management

Suggested way forward

Identify immediate priorities	• Identify **immediate priorities for action** for each of the sub sectors to align with the vision • Identify **initiatives and targets to achieve goals** under the immediate priorities
Establish governance structure	• Appointing an **appropriate task force/ nodal agency, for defining specific targets and goals to achieve the vision** • **Establish roles and responsibilities of the nodal agency** and members, along with an appropriate escalation matrix
Establish monitoring mechanism	• Establish **modes of communication** to monitor progress of each sub sector • Establish **timelines** to monitor targets established to achieve the vision
Policy and Incentives	• Define **policies to encourage with adoption of leading edge technologies** in digital, renewable energy etc. and strengthen investor confidence • Provide **fiscal incentives** to make new technologies and business models more affordable and economically viable
Continuous Improvement	• **Monitor key developments** in the power sector across the globe • Conduct **benchmarking analyses** with other utilities to establish best practices • **Update and improve capacities** and **capabilities** of employees through a continuous learning programme

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.

Power Sector Vision 2030 - Maharashtra



Vision, mission and values for the power sector of Maharashtra

The vision, mission and values for the power sector in Maharashtra are documented below. The vision statement reflects the aspirations for the sector in the next decade. Similarly, the mission reflects how the sector will achieve its aspirations. The values define key attributes that the sector stands by on the journey to achieve its aspirations.

Vision 2030

A **sustainable** and **forward looking** power sector providing **high quality customer service** and fostering the **socio-economic growth** of Maharashtra

Mission

- To make power supply **safe, cost effective and reliable**
- To enhance **customer service**
- To **digitalize** the power sector and bring **efficiency in operations**
- To make power sector operations **financially sustainable**
- To increase **clean energy adoption** in a sustainable manner

Values

- We aim to provide **exceptional quality to customers**
- We ensure a culture of **respect, trust** and **accountability**
- We adhere to highest standards of **ethics** and **governance**
- We encourage **collaboration** and **innovation**
- We are **open** to change

This document along with defining the vision, mission and values of the power sector also identifies the broad initiatives needed within each of the subsectors to meet the aspirations.

Thank You

Applicability of the Power Sector Vision

An integrated vision can….

01 Help to look beyond immediate priorities and consider long-term and transformative opportunities

02 Help synergize efforts between stakeholders

03 Guide decision making as per clearly defined principles and non-negotiables

04 Guide decision making during sector transitions and disruptions

05 Help track progress towards shared goals

06 Strengthen investor confidence

© 2020 KPMG, an Indian Registered Partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved.