

**MINUTES OF THE SPECIAL MEETING OF THE FORUM OF
REGULATORS (FOR)**

(Through Video Conferencing)

Day/Date: Monday 10th May & Tuesday 11th May, 2021

The meeting was chaired by Shri P.K.Pujari, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). He welcomed all the members of the Forum to the Special meeting of the FOR. The list of participants is at **Appendix-I**.

Chairperson, FOR/CERC appraised the Forum that the meeting has been convened at the request of the Members for discussing the draft National Electricity Policy 2021 circulated by the Ministry of Power seeking comments inter alia of the SERCs/JERCs.

Thereafter, the Forum took up the agenda items for consideration.

AGENDA ITEM NO.1: Confirmation of minutes of 75th meeting of the Forum of Regulators

Deputy Chief (RA) presented the minutes of the 75th meeting for discussion including the proposal for adoption of the FOR Report on Retail Tariff. After deliberation, the Forum approved the minutes of the 75th Meeting of FOR held on 30th April, 2021 and adopted the FOR Report on Retail Tariff. The Forum also directed FOR Secretariat to circulate the report and upload the same on the website of FOR.

AGENDA ITEM NO.2: Discussion on draft “National Electricity Policy 2021”

The draft National Electricity Policy 2021 prepared by the Ministry of Power (MOP) was placed before the Forum for discussion. Some Members pointed out that the MOP has constituted an Expert Committee to prepare and recommend National Electricity Policy (NEP). It is understood that the Committee is likely to meet various

stakeholders before recommending NEP. Therefore, the draft NEP circulated by MOP does not seem to be the final document and it might be pre-mature to send comments of FOR at this stage. However, the Members felt that the broad issues covered in the draft may be discussed as this might help SERCs/JERCs to finalise their views should they choose to send their comments directly to MOP. The draft policy document was accordingly discussed and the following emerged:

- NEP should lay stress on innovation and Safety & security including cyber security.
- Resource adequacy is an important aspect that needs emphasis, so as to ensure optimal choice of cost effective generation resources and to avoid stranding of assets.
- As regards quality of coal, the electricity consumers should pay for the GCV grade as received at the power plant.
- There are a number of cost effective options of balancing the grid as compared to two-shift operation of thermal power plants. NEP should lay a road map drawing lessons from several studies available in this context. Special emphasis should be laid on storage including pumped hydro and battery storage as balancing resources.
- Hybrid technologies with/without storage should be explored with due regard to cost effectiveness and per unit cost of generation.
- Separate RPO for solar and non-solar is not required. Further, as per the provisions of the Act, the responsibility of fixing RPO trajectory rests with SERCs/JERCs.
- While compensation for curtailment of renewable for reasons other than grid security/transmission constraints is appreciated, the concept of two-part tariff for RE should be studied further before making a policy recommendation in this regard.
- States, STUs and Discoms should be involved not only in the initial stage of the transmission planning process but also at the decision making stage where the techno-economic aspects involved in construction of a transmission system are discussed in detail.
- The roadmap for distribution reforms should be laid out in clear terms . for instance, whether the intent is to go for delicensing or sub-licensing or

separate registered distribution companies or separation of carriage and content of distribution etc.

- The concept of DSO needs further clarity with respect to roles/functions/status.
- A comprehensive Ancillary Services framework is being developed by CERC. States should also evolve complementary framework and ensure maintenance of adequate reserves at the state level.
- Framework of market design evolved by CERC through various regulations and discussions/ approach papers should be suitably captured in NEP.

The comments/observations recorded on various provisions of the draft NEP are appended as Annexure-I.

Conclusion

It was decided that the draft policy along with the recorded comments (Annexure-I) may be circulated to the Members as it may serve as a guiding document for the SERCs to send their comments to the Ministry of Power. The Forum also noted that comments of FOR may not be sent at this stage. Final view can be taken by the Forum after the Policy formulated by the Expert Committee is received.

At the end of the meeting, Chief (Regulatory Affairs), CERC thanked all the members for their valuable inputs. He also thanked the FOR Secretariat for their efforts in organising the FOR meeting online.

The meeting ended with vote of thanks to the Chair.

LIST OF PARTICIPANTS OF THE
SPECIAL MEETING
OF
FORUM OF REGULATORS (FOR)
HELD DURING 10TH MAY AND 11TH MAY, 2021.
[THROUGH VIDEO CONFERENCING (MS TEAM)]

S. No.	NAME	ERC
01.	Shri P.K. Pujari Chairperson	CERC / FOR . in Chair.
02.	Justice (Shri) C.V. Nagarjuna Reddy Chairperson	APERC
03.	Shri Kumar Sanjay Krishna Chairperson	AERC
04.	Justice (Shri) Satyendra Singh Chauhan Chairperson	DERC
05.	Shri R.K. Pachnanda Chairperson	HERC
06.	Shri M.K. Goel Chairperson	JERC (State of Goa & UTs)
07.	Shri Lokesh Dutt Jha Chairperson	JERC for UTs of J&K and Ladakh
08.	Shri Shambhu Dayal Meena Chairperson	KERC
09.	Shri P. W. Ingty Chairperson	MSERC
10.	Shri U.N. Behera Chairperson	OERC
11.	Shri Viswajeet Khanna Chairperson	PSERC
12.	Shri M. Chandrasekar Chairperson	TNERC
13.	Shri T. Sriranga Rao Chairperson	TSERC
14.	Shri D. Radhakrishna Chairperson	TERC
15.	Shri Raj Pratap Singh Chairperson	UPERC
16.	Shri Sutirtha Bhattacharya Chairperson	WBERC

17.	Shri Ramesh Kumar Choudhary Member	BERC
18.	Shri Arun Kumar Sharma Member	CSERC
19.	Shri Vinod Deshmukh Member	CSERC
20.	Shri Mehul M. Gandhi Member	GERC
21.	Shri Bhanu Pratap Singh Member	HPERC
22.	Shri Mukul Dhariwal Member	MPERC
23.	Ms. Anjali Chandra Member	PSERC
24.	Shri S.C. Dinkar Member	RERC
25.	Shri M.K. Jain Member	UERC
26.	Dr. Sushanta K. Chatterjee Chief (RA)	CERC
SPECIAL INVITEES		
27.	Shri Indu Shekhar Jha Member	CERC
28.	Shri Arun Goyal Member	CERC
29.	Shri Pravas Kumar Singh Member	CERC
30.	Shri Vijay Menghani Chief (Engg.)	CERC
OTHERS		
31	Ms. Rashmi Somasekharan Nair Dy. Chief (RA)	CERC
32.	Mr. Sanjeev Tinjan, Asst Chief (RA)	CERC
33.	Mr. Ankit Gupta Research Officer	FOR

MINISTRY OF POWER
RESOLUTION

New Delhi, the 0 .th March, 2021

NATIONAL ELECTRICITY POLICY 2021

No. 0 0 0 -R&R (Vol-..)

1.0 INTRODUCTION

1.1 Section 3(1) of the Electricity Act, 2003 requires the Central Government to formulate, inter alia, the National Electricity Policy (NEP) in consultation with the Central Electricity Authority (CEA) and the State Governments. This provision is quoted below:

“The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or material, hydro and renewable sources of energy”.

1.2 The National Electricity Policy was first notified on 12th February 2005. Section 3 (3) of the Electricity Act enables the Central Government to review or revise the National Electricity Policy from time to time. In exercise of the powers conferred under this Section, the Central Government hereby notifies the revised National Electricity Policy. Notwithstanding anything done or any activity undertaken or purported to have been done under the provisions of the National Electricity Policy notified in the year 2005, the same shall, in so far as it is not inconsistent with that Policy, be deemed to have been done or undertaken under provisions of the revised National Electricity Policy 2021.

1.3 Since the notification of the National Electricity Policy in the year 2005, a lot of ground has been covered in many areas such as generation capacity addition including from renewable resources, transmission network expansion, rural electrification, grid operation, electricity markets etc. Additional power generation capacity of 2,51,681 MW, inclusive of renewables has been added up to 31.3.2020 since the year 2005 and the per capita consumption of electricity has increased to 1,208 units in the year 2019-2020 from 631.4 units in the year 2005-2006. Further, about 2,52,112 ckt-kms of transmission lines (above 220 kV) have been added up to

March 2020 since the year 2005 which has enhanced interregional transmission capacity from 10,150 MW (March 2005) to 1,02,050 MW (March 2020). The process of village electrification has been completed in the month of April 2018. There has been significant improvement in the quality of power and grid management; the average grid frequency now hovers between 49.98 Hz to 50.02 Hz for most of the time. The share of renewable generation in the year 2019-20 was 9.96% of the total electricity generation compared to share of only 0.75% in the year 2004-2005. A number of regulations have been made by CERC and the SERCs, which has brought discipline in the grid operations, introduced efficiency in generation, transmission and distribution of power and enabled development of Power Markets through operation of Power Exchanges in the country. CEA has also issued several Technical Standards such as Grid Standards, Grid Connectivity Standards, connectivity of Distributed generation Resources, installation and operation of meters, measures related to safety and standards for construction and O&M.

1.4 While the growth in the sector is visible, further work needs to be done to enhance accessibility of electricity 24x7, especially in the rural areas and to the lowest strata of society. The financial health of distribution companies has become a primary concern since the regulatory regime has not been able to provide remunerative tariffs reflecting the true cost of supply and the AT&C loss levels continues to remain substantially high except certain areas, despite the fact that substantial investments have been made towards metering and on other distribution infrastructure.

Comment [st1]: Needs Redrafting

1.5 Government of India has set a target of having renewable capacity of 1,75,000 MW by the year 2022. Further, India's Nationally Determined Contributions (NDC) includes commitment to achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by the year 2030. Such large scale integration of renewables is expected lead to increased balancing and ramping requirements. However, the falling share of hydro generation and shortage of domestic natural gas, has led to difficulties in meeting fast ramping requirement during peak hours. This flexing of generation is therefore, being attempted through coal based thermal generation. The balancing and ramping requirement shall further increase significantly as more renewable capacity comes into the grid.

1.6 The aim of the revised National Electricity Policy 2021 is to find policy interventions to address the issues being faced particularly those mentioned in para 1.4 and 1.5 above.

2.0 AIMS & OBJECTIVES OF NATIONAL ELECTRICITY POLICY 2021

The National Electricity Policy 2021 aims at achieving the following objectives:

- i) Promote clean and sustainable generation of electricity
- ii) Development of adequate and efficient transmission system

- iii) Revitalization of Discoms
- iv) Development of Efficient Markets for electricity
- v) Supply of reliable and quality power of specified standards in an efficient manner.
- vi) Move towards light touch regulation
- vii) Promotion of manufacturing of goods and services in India in the Generation, Transmission and Distribution segments of the power sector under the Make in India initiative and Aatmanirbhar Bharat Abhiyan.

Comment [st2]: 1. Affordability?
2. Consumer interest?

3.0 NATIONAL ELECTRICITY PLAN

3.1 Section 3 (4) of the Electricity Act, 2003 requires the Central Electricity Authority to frame a National Electricity Plan once in five years and revise the same from time to time, in accordance with the National Electricity Policy. According to Section 3(5) of the Electricity Act, the Authority may review or revise the National Electricity Plan in accordance with the National Electricity Policy. Also, Section 73(a) of the Electricity Act, 2003 provides that CEA shall formulate short-term and perspective plans for development of electricity system and coordinate the activities of various planning agencies for optimal utilization of resources, keeping in view the interests of the national economy and to provide reliable and affordable electricity to all consumers.

3.2 One of the primary components for preparation of the National Electricity Plan is the estimation of power demand in the years to come, which is done in Central Electricity Authority (CEA) periodically every five years by way of Electric Power Survey. The exercise of Electric Power Survey needs to be carried out in consultation with the State Governments and other state utilities. Increasing thrust of Government of India on improving efficiency, deployment of electric vehicles, adoption of newer technologies like storage etc are likely to affect the electricity demand in future; therefore, CEA should carry out mid-term review of the Electric Power Survey and may make appropriate modifications in the projected demand, if required and accordingly also revise the National Electricity Plan.

4.0 AREAS ADDRESSED

4.1 The National Electricity Policy covers the different areas as given below:

- i) Optimal Generation mix
- ii) Transmission
- iii) Distribution
- iv) Grid operation
- v) Power markets
- vi) Regulatory Process

Comment [st3]: 1. Innovation can be included.
2. Safety and security including cyber security

- vii) Research and Development (R&D) and adoption of new technologies
- viii) Power Quality
- ix) Energy Conservation & Energy Efficiency
- x) Environmental Issues
- xi) Skill building and Human Resource Development
- xii) Coordinated Development
- xiii) Creation of Electric Vehicle Charging Infrastructure
- xiv) Make in India initiative and Aatmanirbhar Bharat Abhiyan
- xv) Disaster Risk Reduction

These areas are further elaborated in the following paragraphs.

5.0 OPTIMAL GENERATION MIX

5.1 The installed capacity in the country as on 31.03.2020 is about 3,70,106 MW, including about 87,028 MW (as on 31.03.2020) of renewable sources of energy, which comprises of 37,694 MW wind, 34,628 MW solar, 9,875 MW biomass power (co-generation), 148 MW Waste to Energy and 4,683 MW small hydro and contributes about 19% of the total installed capacity. Currently there is about 75 GW of captive generating capacity in the country. While there has been an appreciable increase in total installed capacity, the share of hydro generating capacity has reduced from 26.12% in March 2005 to 12.35% in March 2020.

5.2 Adequate hydro capacity with storage or pondage including pumped storage hydro power plants /combined cycle power plants, battery storage and other emerging technologies such as Hydrogen Storage, which are capable of relatively quick ramp up and ramp down and store energy with higher efficiency for long duration, are options for meeting the peak demand in the country in an efficient manner. In future, coal based stations may have to resort to two shift operation and may have to be operated at reduced generation levels to provide flexibility to cope with variable generation from renewable energy sources. Further, to make the existing coal based plants more flexible, retrofitting of existing coal based stations and combined cycle gas stations, coupled with adoption of suitable operating practices may be explored to achieve higher degree of flexibility.

Comment [st4]: There are technologically efficient and cost effective options which need to be explored (refer to LBNL/FRI studies)

5.3 Differential tariffs between peak and off-peak hours for consumers and generating stations by CERC/SERCs, as envisaged in the Tariff Policy, should be introduced expeditiously in order to appreciate the value of peaking power. SERCs need to frame a scheme whereby consumers willing for curtailment in their demand, part or full load, get the benefit of a lower tariff.

Comment [st5]: Condition precedent is 100% METERING at consumer level and feeder level

5.4 A regulatory framework for determination of adequate (national, regional and state level) primary, secondary and tertiary reserves should be developed by CEA so that demand can be met at all the times even with planned outage/tripping of generating units, variability of generation and fluctuation of load so that the frequency is maintained at the nominal value of 50 Hz.

Comment [st6]: CERC

5.5 Along with an increase in the conventional modes of generation, there has also been a significant rise in installed capacity of renewables. While the total installed capacity through renewables was only about 3,812 MW as on 31.03.2005, the capacity has since increased to about 87,027.68 MW as on 31.03.2020. Government has set a target of 1,75,000 MW of generation capacity from renewables by the year 2022. In order to meet the variable generation from renewable energy sources, the long-term requirement of Balancing Capacity should be assessed periodically by CEA in consultation with various stakeholders. Based on the requirement of Balancing Capacity, pumped storage hydro power plants, open cycle gas power plants/ gas engines, new and viable forms of energy storage technologies need to be encouraged.

THERMAL GENERATION

5.6 While India is committed to add more capacity through non-fossil sources of generation, coal based generation capacity may still be required to be added in the country, as it continues to be the cheapest source of generation, though compliance to stricter environmental norms remain a challenge, particularly for the older stations. Therefore, endeavour should be to adopt the most efficient technology for coal-based power stations available at any point of time. All future coal based plants should only be of super critical/ ultra super critical technology or other more efficient technology.

Comment [st7]: Proper Resource Adequacy study needs to be done for optimal choice of cost effective generation resources, keeping in mind the pattern of load profile.

2. Should a specific fuel source such as coal be mentioned??

5.7 Adequate coal should be made available to meet the requirements of power plants so that generation capacity is not stranded due to shortage of coal. At the same time, coal based power plants should maintain adequate stocks in power stations to meet day to day and seasonal fluctuations of demand since coal cannot be transported instantaneously. In the past, there have been cases where shortages in coal supply and quality of indigenous coal have been constraints for generating plants. However, with the efforts made by the Government, coal shortages have been eliminated. To address concerns regarding quality of coal, third party sampling of coal has been started at loading as well as at receipt end. To reduce the margin of error in sampling, automated coal sampling and on-line quality control measurements should be encouraged.

Comment [st8]: Electricity consumers should pay for the GVC grade as received at the power plant.

5.8 India has the 4th largest reserves of coal in the world but still we are importing coal and thus, losing huge amount of foreign exchange. The domestic coal production has also been augmented to fully meet the demand of power sector. Therefore, there is need to minimize use of imported coal in the power stations.

5.9 Use of natural gas as a fuel for power generation would depend upon its availability at reasonable prices. At present, about 6.74% of total installed capacity is through gas based plants and the average PLF of such plants is about 22.15% only because of less availability of domestic gas and high landed cost of imported Regassified Liquefied Natural Gas. The possibility of utilizing the existing gas turbine/combined cycle gas based capacities for peaking or balancing may be explored. To facilitate this, wherever possible, the supply of gas should be made flexible with respect to time, depending on requirements, instead of constant flow. These gas stations should be compensated for reduction of efficiency and increased wear and tear due to fluctuations in generation.

HYDRO GENERATION

5.10 The share of hydro power in the country has been steadily on the decline after touching the maximum in early 1960s. Despite the fact that India has been endowed with large hydro power potential of about 1,50,000 MW, its growth has remained sluggish in the country and only about 36% of the identified potential has been developed. Though one-third of the hydro potential lies in the North-Eastern region, only 6.90% of the potential has been developed so far.

5.11 Delay in the construction of hydro projects is primarily due to the reasons like delays in environment and forest clearances, settlement of rehabilitation & resettlement issues, resolutions of inter-state issues, land acquisition, inadequate infrastructural facilities at hydro potential sites, law & order / local issues, funds constraint and contractual issues etc. causing significant time and cost overruns thereby impacting their commercial viability. Geological surprises are major contributors for delay in implementation of hydro projects. Efforts should be made to reduce geological surprise through advanced technological tools. Proper implementation of the National Policy on Rehabilitation and Resettlement (R&R) would be essential so as to ensure that concerns of project affected families are addressed adequately. For faster resolution of disputes with contractors, thereby reducing time and cost overruns, there is need to develop model contract document for award of work in hydro projects.

5.12 In light of the ambitious plan of the Government for large scale capacity addition from renewable energy sources in the coming years there would be need for huge balancing power for smooth integration of renewables in the system and for grid security and stability. Special efforts have to be made to promote more storage or pondage based hydro generation units in order to meet the peaking and balancing requirements of the country. In this regard, pumped storage power plants, assume significant importance since they are considered as one of the best sources for renewables integration and for supply of balancing power for grid stabilization. A potential of 96,524 MW of pumped storage capacity has been identified, of which just about 4,785 MW has already been developed so far. Some of the reasons which have impacted the growth of pumped storage plants in the past are continued focus on development of conventional hydro power, non-availability of adequate off-peak power for pumping, lack of differential pricing for peak and off-peak power and relatively

costlier tariff vis-à-vis tariff of conventional hydro power. For faster implementation of Pumped Storage Plants, there is need to expeditiously identify and develop Pumped Storage Schemes on existing hydro stations which are likely to be cost effective as well as likely to have lesser environmental issues due to availability of one or both the reservoirs. Apart from conventional pumped storage schemes on the rivers, off the river PSPs are also now being identified. These off the river PSPs do not involve the issues like optimal development of the river basin or e-flow or inter-state issues, and do not have any complex civil structures like spillways, de-silting chambers etc. associated with conventional stations. As such, these can be accomplished in a relatively shorter time frame. Moreover, these projects, as the name suggests, are located away from the main rivers and as such involve minimal environmental and R&R issues. Further, development of hydro project wherein solar and wind power shall be integrated with stand alone pumped storage schemes, also need to be explored wherever feasible in order to have assured trajectory to power supply.

5.13 The Central Government/ State Government agencies involved in the construction of hydro projects should review their procedures in order to ensure speedy execution of hydro projects. Further, Basin-Wise Cumulative Environment Impact Assessment and Carrying Capacity Study for all the river basins in the country should be carried out expeditiously so that e-flows are known in advance to the project developers and the projects are not delayed on this account.

Comment [st9]: Separate para on Hydro Pump Storage

5.14 The Government of India had introduced the concept of land bank/ forest bank long back. Delay in identification of land for compensatory afforestation especially in the North Eastern States where most of the area is under forest cover is one of the reason for delay in processing of forest clearance. Therefore, creation of land bank should be speeded up by the State governments by developing a suitable mechanism. There is also need for greater facilitation by the State Government in the matters relating to land acquisition, maintenance of law and order etc.

5.15 Some of the measures already announced by the Government such as softer loans of longer duration, grant for enabling infrastructure and storage, pre-agreed tariff profile and Hydro Purchase obligations will help in moderating the tariff for hydro stations and thereby enhancing their viability. Further, for faster implementation of hydro projects in general and to ensure the general competitiveness of hydro power in particular, there is even greater need for tools like Standard Bidding Documents for Hydro Power in medium and long-term etc.

NUCLEAR POWER

5.16 Existing Nuclear Stations in the country are suited for operation as a base load stations. It is also a clean source of energy. The overall tariff of existing nuclear power plants is comparable with that of pithead based thermal power plants. However, tariff of new nuclear plants is projected to be high mainly due to very high capital cost.

5.17 The installed capacity, of nuclear power stations as on 31.3.2020 is about 6,780 MW, which is about 2% of our total installed capacity. Government of India plans to enhance the by 10,000 MW in the next 10 years. In order to ensure materialization of such a large capacity, efforts would have to be made to reduce the capital cost. One of the possible options could be arrangement of Longer-term loans which would help to reduce the tariff in the initial years. The possibility of flexible operation in the existing nuclear generating stations, to the extent possible, should be explored and the future nuclear stations may be designed for flexible operation. There is also need to move towards two-part tariff consisting of fixed and variable charge.

5.18 Although safety concerns of nuclear power plants have been addressed in the country quite successfully, public engagement in the same would help allay fears to prevent delays in setting up such plants.

RENEWABLE ENERGY SOURCES AND COGENERATION

5.19 There is an urgent need to promote generation of electricity based on renewable energy sources due to its environmental benefits coupled with energy security. Hybrid renewable energy generation like wind-solar, solar-biomass, solar-mini hydel, etc. with or without energy storage system should also be encouraged. Further, hybrid operation of variable renewable source like solar and wind with conventional generation sources and energy storage systems would facilitate self-balanced portfolio with Round-the-clock power supply of acceptable profile.

Comment [RSN10]: Hybrid technology with / without storage should be explored with due regards to cost effectiveness

5.20 All future procurement of power from new and renewable source of energy should be through tariff based competitive bidding, except from Waste to Energy plants which is still at an infant stage in order to reduce the tariff to end consumers. However, exemption to Large Hydro Power Stations from competitive bidding will be subject to conditions laid down in the Tariff Policy. (Should it be covered in Hydro section) Government has already announced vide OM dated 8th March 2019 certain measures which will inter-alia help in rationalization of tariff for Hydro Stations. Waste to Energy plants producing electricity needs hand holding and incentives commensurate with efficiency of the process because such plants free up the land filling/ dumping grounds besides avoiding pollution.

5.21 Tariffs for renewable energy sources like wind and solar power which are dependent on nature for generation are presently energy only tariffs and are thus paid only when energy is drawn by the State Distribution Companies. This gives a perverse incentive for them to not draw this power although it is in the must-run category. Tariff of such generators must cover the risk for any curtailment of power by the distribution licensee for reasons other than grid security or transmission constraints. Two-part tariff mechanism may be an option, particularly in case of medium/long-term procurement with hybrid operation of renewable energy source with conventional generation.

Comment [RSN11]: This mechanism needs to be studied before making a policy statement in this regard

5.22 Energy intensive industrial processes such as those occurring at refineries, steel mills, glass furnaces, cement kilns, etc. release considerable amount of heat

after doing the useful work in the form of hot exhaust gases. These exhaust gases, if not put into any practical use, get otherwise wasted or dumped into the environment. A system of recovering the waste heat provides efficiency gain, benefits to the concerned industry and benefits to environment. Since waste heat recovery systems require capital investment, there is a need to give incentives to the industries which implement such systems.

5.23 Long term growth trajectory of RPOs for non-solar as well as solar sources has been issued by the Ministry of Power uniformly for all States/UTs up to year 2021-22. Trajectory beyond this period, if required, shall be notified by the Ministry of Power in consultation with MNRE from time to time. Large hydropower projects (with capacity more than 25 MW) shall also be treated as renewable source of energy. The Ministry of Power shall also notify a trajectory for Hydropower Purchase Obligation for a period upto 2029-30 and may extend it further, if required.

Comment [RSN12]: 1. Separate RPO for solar and non solar not required
2. RPO trajectory to be set by SERCs

5.24 In the past it has been seen that the system of Renewable Purchase Obligations (RPOs) supported by REC (Renewable Energy Certificate) mechanism have not worked satisfactorily. However, going forward there may be need for huge and unprecedented investment in the renewable generation. This can be achieved by not only protecting the interest of developers alone but also required to be funded by the end consumer via DISCOMs. There may be need to remove the short-coming of the existing RPO-REC based system and/or supplementing it with market based options. Further, the rapid pace of RE development and falling RE tariffs indicate potential for market-based mechanisms. Market-based options need to be explored, which can help to strike a desired balance between capping investor's price risk while ensuring some exposure to basic market risks of forecasting, scheduling and balancing

5.25 The intermittent renewable sources of electricity are concentrated in certain states. Therefore, power from such states is likely to flow to other states, whereas the host state would be left to bear the variability of generation. There is need to devise a pragmatic mechanism for either sharing of the cost arising due to such variability by entities concerned or sharing such costs on country wise basis. A similar mechanism may be required at intra-state level.

5.26 There are a number of advantages of distributed generation, as most of the energy generated is used at the point of consumption and, therefore, it reduces the requirement of transmission and distribution infrastructure. It also helps to reduce congestion and transmission & distribution losses. Therefore, renewable distributed generation such as solar roof top need to be promoted. Central Government is promoting Off-grid solar PV applications through various schemes for use in home lighting systems, street lighting systems, solar power plants, solar pumps etc. One way of promoting solar PV systems, particularly in household applications and small industries is through net metering. The Electricity (Rights of Consumers) Rules, 2020 provide such metering for loads up to 10 kW. State Governments should consider installing solar PV system in office & school building, panchayats and other public service institutions.

Comment [RSN13]: Or 500 kW?

MICROGRIDS

5.27 Traditionally, microgrids with distributed generation, have been used to supply electricity in areas where it is not feasible or cost effective to provide electricity to the consumers through the main grid. For example, in India, solar generation based microgrids have been used to electrify some remote villages. The distributed generation sources, should preferably be, renewable sources of energy. Micro grids are increasingly being used in cities or towns, in urban centers, on university or corporate campuses, in hospitals or at data centers having some local renewable energy generation for enhancing the reliability of power supply. Such micro grids may have to be strengthened to enhance reliability of supply and wherever feasible, these should be integrated with the main grid in accordance with the relevant Technical Standards for Connectivity to the Grid notified by the Authority.

5.28 The Discoms, in areas prone to natural disasters, should explore possibility of automatic islanding of the distribution system into multiple micro grids with their own distributed generation during storms/cyclones etc.

5.29 In view of the fact that micro grids are beneficial for the environment, power system and consumers by enabling deployment of greater quantity of renewable energy, creating efficiencies by reducing transmission and distribution losses and ensuring more reliability, respective SERCs/JERCs should make necessary enabling provisions to promote micro grids in the States/ UTs.

RENOVATION & MODERNISATION (R&M)

5.30 Traditionally, Renovation and Modernization of old thermal power stations was being done for achieving higher efficiency level with state of the art technology, life extension, raising the operative capacity with improvements in performance parameters and complying with prevailing environmental norms. Recently, CEA has issued revised guidelines for R&M to facilitate compliance to environmental norms, enhancing flexibility, facilitating biomass firing and lowering water consumption. Before undertaking any renovation and modernization exercise, a proper cost benefit analysis needs to be done to decide whether to undertake renovation and modernization of the stations or to retire it and replace it with a new generating station with more efficient **supercritical** units of higher size, especially in view of the revised environmental norms introduced in December, 2015 by the MOEFCC. Government has, under the National Mission on Enhanced Energy Efficiency (NMEEE), introduced the PAT scheme, to incentivize efficiency improvements including that for thermal power plants. Penalties under PAT scheme would also enable the owners to take a rational economic decision.

Comment [RSN14]: Minimum qualifying

5.31 In the case of hydroelectric power plants (HEP), the significance of R&M is even more as civil works, contributing to significant part of capital cost and

considered to have a useful life of about 100 years, whereas the Electro-Mechanical (EM) works have a life of about 40 years. Therefore, the life of old HEP can be further extended by about 40 years with operational performance, the same as that of a new HEP, at a cost of about 20-30% of a new HEP. This would also obviate the need for obtaining various statutory clearances involved in case of new HEPs i.e. Forest & Environment clearances, Resettlement & Rehabilitation (R&R) etc. besides saving a lot of time, as the civil activities take the longest time. Further, there would be no civil/geological surprises in a running plant as could be the case in new HEPs.

5.32 R&M of old wind power plants by replacing them with modern and more efficient wind generating units, results in flexibility of generating power across a higher range of wind speed and thereby generating more power at the same location with high Capacity Utilization factor. The Ministry of New and Renewable Energy, in August 2016 released a Policy for repowering of Wind Power Projects with an objective to promote optimum utilization of wind energy resources by creating a facilitative framework for repowering.

6.0 TRANSMISSION

6.1 According to Section 73 of the Electricity Act 2003, CEA is to formulate short term and perspective plans for development of electricity system. Accordingly, CEA should draw up short term plan for next 5 years and perspective plan for next 10 years period. In doing so, CEA should also coordinate activities of the planning agencies for the optimal utilisation of resources to subserve the interests of the national economy and to provide reliable and affordable electricity in accordance.

6.2 While formulating the perspective plan CEA should consult with all the relevant stakeholders such as Central Transmission Utility(CTU), State Transmission Utilities(STUs), System Operators, generating and distribution companies, industry associations and the State Governments etc. and after assessing the rate of growth in demand as well as the rates of growth of generation in different areas of country.

6.3 The CTU and the STUs should draw up implementation plans for Inter-state (ISTS) and Intra-state(Intra-STs), respectively and for up to next five (5) years period identifying specific transmission projects which are required to be taken up along with their implementation time lines, after considering the plans made by CEA and studying the progress of in generation capacity and demand. Regarding ISTS, CTU should take note of the requests made by inter-state transmission customers, congestion in any part of the ISTS and difficulties in obtaining Right of Way for development of transmission corridors. A similar approach should also be undertaken by STUs for development of the transmission system in their respective states.

Comment [RSN15]: 1. Discoms and State Govts should be consulted
2. The capacity building of Discoms (Pvt and Govt) and STUs needs to be addressed for planning purpose

6.4 The principle for planning of transmission system should be that prior agreement between buyers and seller of electricity might not be a pre-condition for network expansion. The transmission system should be available as per the

requirements of transmission customers and developed matching with growth of generation and load, as far as possible. However, a system for fair compensation should be developed either through back-to-back standard agreements or through suitable regulations to facilitate matching completion of two or more transmission systems and /or generating stations.

6.5 While doing the planning, care shall be taken that there is no wasteful investment. Therefore, the economic signal in the form of variable cost of generators, congestion, transmission losses and incremental investment in transmission shall be considered for achieving optimal transmission capacity addition.

6.6 The transmission projects could be of two categories i.e. (i) the generator or drawing customer specific projects which will cater to specific needs of generator or drawing customer, or (ii) system strengthening projects which could be required for transferring power from area/regions where the availability or generation is high or is growing, to areas where demand is high or growing and the supply is constrained or in the process of getting constrained.

6.7 There is a need to stream line the process of approval of transmission projects, before any investment is made in creating these infrastructures. The ISTS projects drawn up by CTU shall be placed before the National Committee on Transmission constituted by the Central Government. A similar mechanism should be drawn by State Governments for approval of Intra-STS projects of STUs.

Comment [RSN16]: STUs, Discoms and States are involved in the process under Clause 6.3, but in the decision making under Clause 6.7, they seem to have no role. These entities should be involved in the process of decision making

6.8 The transmission projects as approved by the appropriate government(s) would be executed either through regulated tariff mechanism under Section 62 of the Act or through tariff based competitive bidding under Section 63 of the Act, as to be notified by the respective government, in accordance with the Tariff Policy of Government of India.

Comment [RSN17]: Competitive bidding, as far as possible as in Tariff Policy

6.9 To facilitate cost effective transmission of power across ISTS, a transmission tariff sharing framework has been implemented by the CERC. This transmission sharing framework is sensitive to distance, direction and related to quantum of flow. This framework shall be reviewed and revised to remove its inefficiencies that may come up during its application or due to changing market structure of our power sector. As far as possible, consistency needs to be maintained in transmission pricing framework in inter-State and intra-State systems.

Comment [RSN18]: Anomalies?

6.10 Right-of-way (RoW) issues are increasingly affecting construction of new transmission lines. Upgradation of existing AC transmission lines to higher voltage AC lines with multi circuits / multi voltages and uprating by use of new generation High Temperature Low Sag (HTLS) conductors needs to be explored to conserve existing RoWs in order to enhance power flow per unit (per meter) of RoW and to reduce losses.

6.11 India is centrally placed in South Asian region and with cross border interconnections with neighbouring countries, can play a major role in effective utilization of regional resources. India is also a member of BIMSTEC countries. Presently, India is connected and transacts electricity with Nepal, Bhutan, Bangladesh and Myanmar with transmission capacity of about 4000 MW. In the year 2019-20, India imported a total of 6310 MU of electricity and exported 9369 MU. Further, to facilitate import/ export of electricity between India and neighbouring countries, Ministry of Power, Govt. of India have issued the "Guidelines for Import/Export (Cross Border) of Electricity-2018" on 18th December, 2018. Import/export of power with neighboring countries should be promoted for mutual benefit, which ultimately will lead to optimum utilization of regional resources.

7.0 DISTRIBUTION

7.1 Distribution sector is the most vital part of whole power sector chain which is connected directly to the consumers. However, this sector is marred with many inefficiencies like high AT&C losses, inadequate system planning, poor upkeep & maintenance of equipment etc. which are affecting the financial health of the distribution companies and leading to poor consumer satisfaction. Hence, distribution sector should be the focus area in the power sector.

7.2 Although, many remarkable achievements have been made in distribution sector during last few years and achieving 100% electrification in the country is one of the major achievements. Section 6 of the Electricity Act,2003 mandates that both the Central Government and the State Governments would jointly endeavour to provide electricity to all areas including villages and hamlets through provision of rural electrification infrastructure and electrification of households. Government of India is committed to improve the quality of life of its citizens by providing 24x7 power to all households.

7.3 Government had launched Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) Scheme for electrification of rural areas in the country in the year 2015. Under this scheme, 100% village electrification has already been achieved in April 2018. Further, Government of India launched 'Saubhagya' Scheme to provide last mile connectivity and electricity connections to all un-electrified households in rural areas and all remaining economically poor un-electrified households in urban areas in Oct 2017. Under this scheme also, almost 100% households have been electrified in the country, barring a few households due to remoteness /unwillingness of the consumers to take the electricity connection. However, quality of electricity and the duration for which it is made available in the rural areas need to be improved by taking concrete steps by the distribution companies.

7.4 There is need to strengthen distribution system to ensure 24x7 power supply. In large urban areas, reliable power supply can be ensured to the consumer by installing Ring Main system of power supply to provide an alternate route, in case of any interruption in the supply from one feeder.

Comment [st19]: Semi urban areas may be also be covered subject to cost benefit analysis. Large / semi urban areas may be defined.

7.5 One of the major factors causing financial losses to State Discoms is high AT&C losses. States should reduce the AT&C losses to reasonable levels expeditiously and necessary steps need to be taken on an urgent basis for financial turn-around of the distribution sector. The Government of India supports the states with various schemes for improving the distribution infrastructure and to bring down the losses. Government has launched schemes like Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) Scheme for rural areas and Integrated Power Development Scheme (IPDS) for the urban areas for creation/up-gradation of distribution infrastructure for facilitating 24x7 power supply and reduction of losses., however, the onus lies on the distribution companies to ensure that 24x7 reliable electricity of adequate quality is supplied to consumers. There is need to evolve a unified scheme for development of adequate distribution infrastructure wherein Central assistance to States may be linked to the reform milestones.

7.6 Feeder segregation has been carried out in many states in order to have better load management in the rural areas. This has not only resulted in better load management and increased supply to the rural households and small industries but also helped in correct estimation of agricultural subsidy announced by the state governments. Further, increasing the solarization of agricultural pumps such as under PM-KUSUM scheme, will not only help improve the quality of life of farmers by enabling irrigation during the day time but will also help in reducing the subsidy burden of State Governments. There are various modes of feeder segregation and each state should adopt a model best suited to it based on a cost-benefit analysis for implementation within the time frame.

Comment [st20]: Respective State govts. have their own ground water policy. Subject to compliance of the State policies.

7.7 For the progressive growth of the electricity distribution sector, it is essential that the sector becomes sustainable. Public Private Partnership (PPP) in electricity distribution sector is one of the effective ways to improve the efficiency, enhancing consumer satisfaction and reduce financial losses of the distribution companies. Franchisee model being one of the PPP model, has emerged as the preferred route for introduction of privatization in the distribution sector by delegating some distributing related responsibilities in an area to a third party on a contract basis and many states have already taken action in this direction. Another variant of the PPP model could be in the form of sub-licensee to be appointed with the approval of the State Commission. Thus, there is a need to create right environment for public private partnership in the distribution sector in the country. An element of competition can also be brought in the distribution sector by separation of the carriage (lines) and content (supply) business. To introduce the system of sub-licensee as well for separation of carriage and content, the Electricity Act 2003 will have to be suitably amended.

7.8 The regulatory commissions should ensure that all the reasonable and legitimate costs are accounted for in the tariff without taking recourse to regulatory assets. Tariffs determined by Regulatory Commissions should be able to finance necessary CAPEX to be undertaken by Discoms for improving the quality of supply. The Regulatory Commissions should ensure that tariff petitions are filed in time and processed expeditiously so that new tariffs could be made applicable w.e.f. the very

first day of the following financial year, enabling the utilities to recover full revenue during each financial year. Trueing up of accounts of the utilities should be done at the earliest possible to ensure that unnecessary carrying costs are not allowed to inflate tariffs.

Comment [st21]: To be part of Tariff Policy

7.9 Distribution System Operator (DSO) for real-time operation of the Distribution System needs to be introduced. Distribution SCADA systems must be implemented by the utilities as a tool with the DSO, on a priority basis, to facilitate creation of network information and customer data base and to help in the management of load, improvement in quality, detection of theft and tampering, customer information and also for prompt and correct billing and collection. The DSO would play a major role in dealing with distributed generation resources like roof- top solar PV power connected to the grid, to ensure security and reliability of supply to consumers as well as the security of the grid. DSO may be made a separate and independent entity if separation of carriage and content takes place.

Comment [st22]: Concept of DSO needs further clarity. Roles/functions/status

7.10 Special emphasis should be placed on consumer indexing and asset mapping in a time bound manner. The Government of India is providing support for the same to the states through information technology based systems under the IPDS program.

7.11 The Forum of Regulators has notified the Model Smart Grid Regulations for improving reliability of supply to consumers, dealing with variability of generation from intermittent type of renewable sources of energy, reduction of theft and bringing about efficiency in operations. All SERCs should either adopt these regulations or bring out their own regulations using this as a base document. Efforts should be made to install substation automation equipment in a phased manner. The focus should be on reducing AT&C losses, improving reliability and quality of power and reducing cost of supply of power to the consumer. Technological interventions should be explored for reduction of technical losses to a minimum level, elimination of commercial losses, prevention of theft, improved voltage profile and better consumer services.

7.12 Ministry of Power has notified the Electricity (Rights of Consumer) Rules 2020 which include the provisions of compensation to the consumers in case of deficiency of any particular service by the DISCOM. The State Electricity Regulatory Commissions have already specified the expected Standards of Performance of Distribution Licensees, however, for strict enforcement, these need to be monitored at regular intervals by them, to make available reliable and quality power supply at consumers' doorsteps. Parameters to be monitored may include voltage variation, harmonics, reliability indices like transformer failure rate, percentage of defective meters, average waiting time for new connections etc. However, all the SERCs must make reporting of three reliability indices namely SAIDI, SAIFI and CAIDI to facilitate fair and transparent comparison of Discoms. All the monitored parameters must be prominently displayed on the website of Discom. The data on Reliability Indices should be submitted by the licensee to the Appropriate Commission and to CEA at the end of each year and this data should be put in public domain and published by SERCs (state-wise)/CEA (All India).

7.13 Integrated Planning by distribution companies is essential to ensure optimum utilization of assets. The inter-State transmission system, intra-State transmission system and the distribution system have to be planned in a harmonious manner so as to avoid stranded assets. The state distribution companies have, by and large, been lacking in this aspect. Discoms should prepare their distribution plan for next five years in consultation with CEA.

7.14 Demand forecasting by the distribution utilities should be done under various time horizons and also on season-wise basis to decide on long-term, medium terms and short-term power procurements. After analyzing the expected load curve, procurement decisions regarding base load capacity and peaking capacity should be taken. The distribution utilities should acquire technological tools of load forecasting, portfolio management etc. for operational planning.

7.15 The State Commissions need to ensure that Distribution licensees tie up adequate supply to meet anticipated demand, which may be reviewed as an Annual process. Distribution licensees shall prepare a power portfolio management policy and get it approved by the State Commissions.

Comment [st23]: Resource Adequacy framework should be developed and enforced by SERCs to ensure cost effective procurement of resources and to avoid stranding of assets .

7.16 In accordance with Section 43 and 45 of the Electricity Act, 2003 all consumers shall be metered and shall be required to pay electricity charges for the electricity consumed in accordance with the tariff fixed by the Appropriate Commission. Despite the repeated emphasis on metering, Discoms are yet to achieve hundred percent metering of all consumers. The achievement in the agricultural sector is not satisfactory and requires attention on priority basis. Discoms should take necessary steps to achieve 100% metering of all consumers within one year of the notification of this Policy.

Comment [st24]: Can directive be given through a policy document?

7.17 The use of automation and smart metering can play a pivotal role in bringing the positive transformation in the distribution sector. Smart meters have advantages of remote metering and billing, implementation of peak and off-peak tariff and demand side management through demand response. The shift to the pre-paid system will do away with all the problems associated with meter reading, billing, collection and disconnection in case of non-payment. All new electricity connections should be released with smart pre-paid meters/simple pre-paid meters. Further, existing meters should also be replaced with pre-paid meters in a phased manner so as to achieve 100% pre-paid metering within 3 years from the date of issuance of this policy. The State Commissions should also put in place an independent third-party meter testing arrangement.

Comment [st25]: Availability, financial implication and technological issues need to be addressed.

7.18 Incentives for demand response also shall be notified by all SERCs. Consumers should be given a choice to offer their part or full load for interruption in case of exigencies in the grid in lieu of a lower tariff. Such consumers must have smart meters with appropriate features.

7.19 The process of achieving 100% feeder metering has almost been completed. Meters installed on about 70% feeders have communicating modems and are linked to National Power Portal (NPP) presently. Efforts should be made by all Discoms to connect all the feeders to NPP by replacing non-communicable meters with communicable /AMR meters by December 2022. The status of metering for the distribution transformers is not satisfactory in the country as about 37% Distribution Transformers only are metered presently in the country. As the metering of all Distribution Transformers is essential for accurate energy auditing & accounting, efforts should be made by all Discoms to complete the metering of distribution transformers within next 3 yearsqtime. Any new feeder and distribution transformer should be commissioned only with the associated meter. All the existing meters on feeders and distribution transformers should also be converted into AMR meters so that need for taking manual reading for such meters gets avoided.

7.20 Use of Smart meters along with the energy audit systems is helpful to detect theft of electricity. The Electricity Act, 2003 has provided for stringent measures against theft of electricity. The States and distribution utilities should ensure effective implementation of these provisions.

7.21 If the State Government desires to grant any subsidy to any consumer or class of consumers in the tariff determined by the SERC, the same shall be in the form of Direct Benefit Transfer (DBT).

8.0 GRID OPERATION

8.1 Grid Operation has become an important issue in ensuring reliability and security of supply to consumers. The Grid currently caters to a maximum demand of about 1,84,000 MW on an all-India basis as upto 2019-20, which is likely to increase to about 2,25,000 MW by 2021-22 as assessed in the 19th Electric Power Survey. In view of the large scale integration of renewable sources of energy of intermittent nature, grid operation would become more challenging in the coming years.

8.2 The System Operator has to be equipped with state-of-the-art technologies to ensure safety and security of supply with load variations and variations of the intermittent generation, causing fluctuating active and reactive power injection and drawal and consequent stability implications. Ancillary Services would need to be made available to the System Operator for active and reactive power balancing, black start services etc. Demand response is a quick mechanism for active power balancing for tackling the variability of intermittent sources of generation and should be enabled by the State Regulators through appropriate Regulations. The CERC should introduce regulations on various kinds of ancillary services based on response time in consultation with Central Electricity Authority. SERCs should also introduce matching provisions in their regulations.

Comment [st26]: SERCs should ensure maintenance of adequate reserves at the state level .

8.3 With rapid expansion of the grid to meet the requirements of electric power of all consumers along with integration of renewable sources of energy to the grid, reliability of the grid is becoming a major issue. NLDC and RLDCs are carrying out studies to assess Transfer Capability. Similar studies should be undertaken by SLDCs as well for ensuring reliability and security in their respective control areas.

8.4 A multi-pronged approach is required for dealing with the variability of generation of intermittent type of renewable energy sources like expanding of the balancing areas, combined operation of renewable energy sources with conventional generation/storage system and development of market for ancillary services. Further, Deviation Settlement Mechanism for inadvertent exchanges and real-time markets may need to evolve continuously depending on emerging requirements.

8.5 Forecasting and scheduling of renewable energy sources, as is being done for conventional generating plants, should be made mandatory by Appropriate Commissions; though a margin for error need to be specified, beyond which deviation charges would become applicable. Till SERCs bring out these standards, the CERC standards should apply by default to help the State Load Dispatch Centers.

8.6 Protection system mal-operation is one of the leading factors for tripping of grid elements. Regional Power Committees should take up protection audit at regular intervals to minimize such tripping. The States shall be encouraged for implementation of schemes such as Automatic Demand Management System (ADMS) and scheme for intra state deviation settlement, to enhance the security and reliability of the grid.

8.7 In order to ensure fair play in grid operation and for implementing non-discriminatory open access, system operators i.e. NLDC, RLDCs and SLDCs should be an independent entity. Towards this, Central Government has already created a new PSU named Power System Operation Corporation Limited for operating RLDCs and NLDC after separation from POWERGRID. The State Governments should take similar action for separation of SLDCs from State Transmission Companies. The autonomy of system operation needs to be ensured by providing its fee and charges through a regulatory mechanism so that it is not dependent on the government. The functioning of the SLDC should be ring fenced, in letter and in spirit, and made completely independent. Technical upgradation of SLDCs is necessary to ensure availability of real time data and requisite analytical tools.

8.8 NLDC, RLDCs and SLDCs should make information of Real Time system operation as specified by the CERC, available in public domain through its web site.

9.0 POWER MARKETS

9.1 The Tariff Policy already mandates that all future procurement of power by state distribution companies should be on competitive basis, based on which power

procurement is being done through the competitive bidding route.. The Short-term markets provide a platform for taking care of any variation in actual load from the anticipated load. The relevant personnel in the state distribution companies need to be specifically trained on these aspects so as to optimize power procurement portfolio.

9.2 Government is committed to introduce suitable market mechanisms and also to deepen the spot markets by enhancing its percentage share to about 25% during the year 2023-24. These mechanisms may include capacity markets/auction mechanisms that help do away with the rigidity of the present long term PPA driven arrangements while catering to the need for reliable capacity. The government is also working proactively to usher in the next level of reforms in the power markets by introduction of longer duration forward contracts and derivatives on power exchanges. CERC has already approved a term-ahead product for renewable energy in power exchanges. There is need to take measures for encouraging trade of renewable energy in day-ahead markets as well. Further, the emphasis has to be on broadening the scope of ancillary services and to move towards market based procurement of such services. One important measure to maintain fairness and to minimize possibility of collusion and gaming in power markets is to put in place a strong regulatory framework and infrastructure for market monitoring and surveillance.

Comment [st27]: May need to be defined (Day Ahead/Intra day/ Real Time).

Comment [st28]: ???

Comment [st29]: The framework of market design evolved by CERC through various regulations and discussions/ approach papers should be suitably captured.

9.3 DEEP portal has been created by Ministry of Power for e-bidding for procurement of short-term and medium term power. This has resulted in lower lead time for procurement as well as highly competitive prices. All states should use this portal for procuring power on competitive basis under various time horizons.

Comment [st30]: After CERC PMR regulations 2020i DEEP portal may not be required

9.4 A new entity called aggregators may be created to aggregate demand, renewable power generation, demand response, micro-storage etc. to help small consumers, prosumers and producers reach the market. This would also help in promotion of open access which is presently allowed for consumers with a load of only 1 MW and above.

10.0 REGULATORY PROCESS

10.1 Regulatory Commissions should adopt regulatory process consistent with the policy of gradually moving towards light touch regulation. As more and more power is procured on competitive basis either through power exchange or through bidding, the burden of regulatory Commissions in tariff setting would come down. Even in cases where tariff is to be fixed by the regulatory Commission, they should follow performance based cost of service regulations with multi-year tariff (MYT) as laid down in the Tariff Policy. The Regulatory Commissions should focus more on emerging tasks such as market monitoring and surveillance, ensuring resource adequacy, balancing, demand response etc.

10.2 Forum of Regulators may evolve procedures for move towards light touch regulation. For example, certain pass-through costs may be get added to tariff after calculations are carried out based on pre-defined formula or algorithm and shared with stakeholders in a transparent manner.

10.3 Wherever power or transmission service is being procured based on guidelines issued by the Central Government under Section 63 of the Electricity Act, 2003, the role of Appropriate Commission is primarily to ensure compliance to the process. It needs to be ensured that regulations framed by Appropriate Commission are aligned to the aforesaid guidelines or Standard Bid Documents issued thereunder. In such cases, only those claims or disputes that do not get settled in accordance with the provisions of the contract, should be referred to the Appropriate Commission.

Comment [st31]: Two way process.

Comment [st32]: Meaning not clear. Appears superfluous.

11.0 RESEARCH AND DEVELOPMENT (R&D) AND ADOPTION OF NEW TECHNOLOGIES

11.1 Effective utilization of all available resources for generation, transmission and distribution of electricity using efficient and cost effective technologies is of paramount importance. Effective control of power system at state, regional and national level can be achieved through use of Information Technology. Application of IT has great potential in reducing technical and commercial losses in distribution and providing consumer friendly services. Integrated resource planning and demand side management would also require adopting state of the art technologies.

11.2 Special efforts should be made for research, development, demonstration and commercialization of various types of renewable energy technologies, retrofitting of existing coal based power plants with new equipment to make them act as flexible generating plants and energy storage systems. Demonstration projects for new types of balancing technologies for intermittent generation including MW scale batteries, hydrogen storage etc. should also be encouraged.

11.3 There is a need to progressively introduce various components of Smart Grid technologies, particularly those which would contribute towards demand side management, reliability improvement, efficiency improvement and integration of renewable resources.

11.4 An efficient and reliable communication system is a pre-requisite for Smart Grid technologies. After implementation of extensive Information technology and communication infrastructure, there would be vast amounts of useful data available with the various players in the power sector. However, this data needs to be processed and analysed to obtain useful inferences, which requires faster adoption of data mining and data analytics techniques. The concerned stakeholders must have specialized personnel to examine this data and use it for the benefit of the utility.

11.5 In addition, cyber security would need to be ensured to (a) thwart an undesirable action to control or manipulate one or more elements of power system and (b) to deny access to a confidential data to outside parties. The confidential data should be defined by the regulatory commissions in consultation with CEA. To minimize the possibility of cyber attacks, cyber security standards should be made specifically for the power system.

11.6 The country has specialized institutions engaged in research and development in the electricity sector which should be further augmented. Large power companies should set aside a portion of their profits for support to R&D.

12.0 POWER QUALITY

12.1 Frequency excursions, supply interruptions, voltage variations and harmonics injection are the critical power quality issues that result in problems for the grid and for consumers like unnecessary losses, false readings of electronic meters, burning of equipment and appliances etc. With the introduction of Deviation Settlement Mechanism and progressive tightening of the provisions thereof, there has been considerable improvement in operating frequency of the grid. There is need to give due attention to the other aspects of power quality such as interruptions, voltage variation, harmonics, flicker etc. Although there are technical standards by CEA and regulations by CERC and SERCs on these issues, there is need for proper monitoring and enforcement of penalties for violations. Regulatory Commissions should take up this issue on priority basis.

Comment [st33]: The model regulations on power quality evolved by FOR should be mentioned.

13.0 ENERGY CONSERVATION AND ENERGY EFFICIENCY

13.1 The SERCs must mandate utility-driven DSM programme and customer engagement as a means of peak load management, energy conservation and saving in cost of power.

13.2 The Standards and Labelling programme is to provide consumers an informed choice about the energy and cost saving potential of the labelled appliances/equipment being sold commercially. This scheme entails laying down minimum energy performance norms for appliances / equipment, rating the energy performance on a scale of 1 to 5, 5 star being the most energy efficient one. Energy labelling is one of the most cost-effective policy tools for improving energy efficiency and lowering associated energy cost of appliances or equipment. As on 2020, the programme covers 26 appliances out of which 10 appliances are under the mandatory regime and the remaining 16 appliances are under the voluntary regime. The labelling programme is being extended to more equipment and appliances. State Governments and distribution companies specially in urban areas need to encourage energy efficient lighting and appliances. Further, installation of energy-efficient pumps conforming to standard specifications needs to be encouraged for use in agricultural sector and incentivized by innovative financing schemes.

13.3 Energy efficiency in buildings is being achieved through adoption of the Energy Conservation Building Code (ECBC) which sets minimum energy standards for new commercial buildings. The updated version of ECBC code was launched in 2017 which provides current as well as futuristic advancements in building technology to reduce building energy consumption and promote low-carbon growth. The residential building energy conservation code and labeling program for residential building has been launched. In order to promote energy efficiency in residential building sector, CO-NIWAS Portal has been developed.

13.4 Government of India has launched the National UJALA programme, which aims to provide LED bulbs to domestic consumers and the Street Light National Programme (SLNP) programme to replace conventional street lights with smart and energy

efficient LED street lights. These schemes have led to significant savings and reduction in CO₂ emission.

13.5 National Mission for Enhanced Energy Efficiency (NMEEE) is one of the eight national missions under the National Action Plan on Climate Change (NAPCC). One of the flagship schemes under NMEEE, the Perform, Achieve and Trade (PAT) scheme is a mechanism designed to achieve emissions reduction in energy intensive industries and it is designed on the concept of reduction in Specific Energy Consumption (SEC). The PAT scheme is in its sixth cycle now and covers 1073 energy intensive industries / establishments from 13 sectors. The recently concluded second cycle of the PAT scheme has resulted in energy savings of 13.28 Million Tonne of Oil Equivalent (MTOE). This saving is worth INR 31,445 crores and contributed in reduction of 61.34 Million Tonne of carbon dioxide.

13.6 MSMEs in India have started to shift from a traditional strictly cost and quality approach to energy efficiency, zero waste and reduced carbon emissions. Further, for bringing more competitiveness and making this sector more energy efficient, it is quintessential to understand the consumption of energy and its flow within the facility along with the classification of energy usage and its relationship to processes and production outputs in present scenario. Bureau has also developed more than fifty (50) multimedia tutorials on energy efficient technologies for more than twenty (20) sectors for knowledge transfer and thereby easy adoption of these technologies. Bureau of Energy Efficiency is also implementing energy efficient technologies in many energy intensive clusters of India with the support from Global Environment Facility through UNIDO and World Bank towards the common goal of facilitating development of the SME sector in India through promotion and adoption of clean, energy efficient technologies and practices. A knowledge portal namely Simplified Digital Hands-on Information on Energy Efficiency in MSMEs (SIDHIEE) was developed. The portal hosts variety of knowledge resources like case studies, best operating practices, details of latest energy efficient technologies etc.

13.7 To promote energy efficiency in the transport sector, average fuel consumption standards for passenger cars were issued. The fuel consumption standards are under implementation from April 2017 onwards, and a second set of standards would come into force from 2022-23. The fuel efficiency norms for Heavy Duty Vehicles and Light Commercial Vehicles have also been issued.

14.0 ENVIRONMENTAL ISSUES

14.1 India's Nationally Determined Contributions (NDC) builds on its goal to reduce its emissions intensity per unit GDP by 33 to 35 percent below 2005 level by 2030. In accordance with the global concerns, carbon emissions need to be minimized. This is being done through the National Mission on Energy Efficiency through the PAT and other Schemes of the Government of India and the clean energy thrust given by the Government of India.

14.2 Power sector projects involve substantial land usage. In view of increasing difficulty in getting land, land usage should be minimized. All new plants must reduce land usage for the same quantum of power generated. Land banks may be identified by the State Governments for setting up power plants. Right-of-way for transmission lines is also becoming increasingly difficult to obtain. In order to economize use of land for sub-stations, Gas Insulated Sub-stations (GIS) should be adopted, particularly in urban areas, which require about 30% less land as compared to conventional sub-stations. Wherever required, MW scale batteries should be installed at the sub-stations to mitigate the requirement of additional land.

14.3 There is also substantial usage of water for coal based stations. There is a need to conserve water, keeping in view the demand for water in the future years. The thermal power plant(s) including the existing plants located within 50 km radius of sewage treatment plant of Municipality/local bodies/similar organizations shall in the order of their closeness to the sewage treatment plant, mandatorily use treated sewage water produced by these bodies and the associated cost on this account is to be allowed as a pass through in the tariff as provided in the revised Tariff Policy dated 28.1.2016. Air cooled condensers may be considered for future coal based plants instead of water cooled condensers provided a techno-economic analysis supports the same. Solar PV plants should consider use of robotic dry cleaning instead of water cleaning based on cost-benefit analysis.

14.4 Indian coal is of low grade having high ash content of the order of 30-45% which produces large quantity of fly ash. The disposal of fly ash requires large area of land and causes pollution of air and water. It is, therefore, necessary to enhance the gainful utilization of fly ash in various modes e.g. manufacturing of cement, preparation of concrete, in making bricks, blocks and tiles, in raising of ash dykes, in reclamation of low lying areas, in mine filling, in agriculture and waste land development and in other modes as per MOEF&CC norms.

14.5 Stringent emission norms have been notified by MoEF&CC for SO₂, NO_x, mercury and water which are required to be achieved in accordance with a notified time schedule and have cost implications on the operation/design of coal based plants. In addition to the equipment cost to be incurred to meet the revised norms, there will be auxiliary power consumption. Efforts must be made to meet the compliance norms in the most cost effective way in order to minimize cost to consumers. These impacts should be captured by Regulators in the tariff determined under Section 62 of the Electricity Act. In case of tariff determined through tariff based competitive bidding under Section 63 of the Electricity Act 2003, these impacts should be allowed under Change of Law+provision. Additionally, the use of biomass pellets (agro residue based) in co-firing with coal for power generation should be encouraged in order to curtail environmental pollution due to burning of crop residues.

Comment [st34]: Add SPM

Comment [st35]: And reagent consumption , other O&M expenses and opportunity costs

14.6 Disposal of electronic waste is one of the major concerns for solar photovoltaic power projects. The State Governments (Central Government) should formulate a disposal policy so that the developer can easily dispose of the waste materials in line with the policy. With reduction in prices of batteries, usage of batteries is likely to

increase in future. Recycling/disposal policy for the batteries also need to be formulated.

15.0 SKILL BUILDING AND HUMAN RESOURCE DEVELOPMENT

15.1 It is very important that the persons employed in the power sector have the required skills to enable them to adopt good operating practices so as to improve the efficiency of operation of power plants, transmission and distribution system, power procurement etc. Skill building in the sector, especially at the State level, has so far been neglected. The National Training Policy of 2012 had recommended that each Ministry/Department/Organization should set aside at least 2.5 percent of its salary budget for training. The Electricity Act 2003 also emphasizes about the importance of trained human resources for the electricity industry. Training infrastructure especially in the field of electricity distribution, regulation, trading and power markets needs to be strengthened. Availability of adequate man power needs to be ensured by the power utilities as per the requirement of the job.

15.2 Skill building of institutions in the power sector should be done at regular intervals. This would promote institutional capacity building and provide the technical institutions, policy makers and regulators with the necessary skill sets. The respective State Governments should also initiate steps to provide skill building to the staff of their institutions and regulatory commissions since it has been observed that the in-house capacity of most of the SERCs is inadequate. Specialized training programme should be organized covering all facets of power sector including that of the distribution sector in the form of On-the-Job Training (OJT), refresher courses, etc.

Comment [st36]: Including dedicated team for monitoring and compliance

15.3 With increase in size and complexity of our power sector, there should also be a review of roles/functional skill set of personnel in the statutory bodies like CEA, CERC, SERC and other organizations like CTU, STUs, NLDC, RLDCs and SLDCs, to align with new requirements.

16.0 COORDINATED DEVELOPMENT

16.1 Power being a concurrent subject, it is imperative that there is uniformity in the policies which are being promoted by the Centre and the States. The Electricity Act 2003 provides for a mechanism like the Coordination Forum and the Advisory Committee to facilitate this consultative process. While these mechanisms are in place, an important role has to be played by the Forum of Regulators which provides for a common platform for all regulators to deliberate on the policies and regulations which can be uniformly applied to the whole country.

17.0 CREATION OF ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

17.1 The shift to electric mobility has become necessary on account of fast depletion of fossil fuels, rapid increase in energy costs, impact of transportation on the environment and concerns over climate change. The Government of India has given a thrust to electric vehicles (EVs) and launched the National Electric Mobility Mission Plan (NEMMP) 2020. Further, it has launched the FAME . India (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles in India) Scheme as a part of the National Mission for Electric Mobility (NMEM) from 1st April 2015. With support of the government, electric vehicles have started penetrating in the Indian market. One of the challenges in faster adoption of electric mobility is lack of charging infrastructure. Ministry of Power has issued %Charging Infrastructure for Electric Vehicles . Guidelines and Standards+ mentioning the roles and responsibilities of various stakeholders at Central & State level for expediting the development of public EV charging infrastructure across the country. Ministry of Power has designated Bureau of Energy Efficiency (BEE) as the Central Nodal Agency (CNA) for the National-level rollout of charging infrastructure in the country. CEA has also amended their technical standards to ensure safety aspects and to minimize impact of EV charging on the supply system.

17.2 Certain tariff related measures may be required to be undertaken for Public Charging Stations (PCS). For example, there may be a need to create a separate consumer category due to specific nature of load. Time of the Day tariff may also be desirable to avoid charging load during peak demand hours. This in turn should be reflected in the rates for charging levied by the PCS on EV owners to discourage them from approaching PCS during peak demand hours.

17.3 Quick charging stations are likely to come up in malls, metro stations, office complexes etc. There could also be a provision of injecting power back to the grid from the electric vehicle batteries when the grid needs the same, when these vehicles are parked and are connected to charging points. Thus, there is a need to fix the tariff and rules of EV charging by the concerned SERC, including that for injection of power back to the grid.

17.4 Distribution Licensee should be proactive in identifying part of distribution network that needs strengthening due to EV charging. SERCs may need to come out with special provision for early approval of the augmentation proposed by Distribution Licensee to facilitate EV Charging.

17.5 Full potential of environmental benefits of electric mobility will be realized when use of renewable energy for charging is maximized. To facilitate this, aggregators may be allowed to aggregate demand of several PCS to purchase renewable energy using open access.

18.0 MAKE IN INDIA INITIATIVE AND AATMANIRBHAR BHARAT ABHIYAN

18.1 The primary goal of Make in India initiative is to establish India as a global manufacturing hub, by encouraging both multinational as well as domestic companies to manufacture their products within the country. Atmanirbhar Bharat Abhiyan aims towards becoming a self-reliant economy.

18.2 Ministry of Power and CEA will continue to take measures for promoting manufacturing of goods and services in India related to Generation, Transmission and Distribution segments of the power sector under the Make in India initiative. In pursuance to Order of Government of India, Department for Promotion of Industry and Internal Trade (DPIIT) Public Procurement (Preference to Make in India), dated 03.03.2018 and subsequent amendments issued from time to time, Ministry of Power has issued Orders giving purchase preference to local suppliers in power sector. These orders are applicable in respect of the procurements made by all attached or subordinate offices or autonomous body under the Ministry of Power, Government of India including Government Companies as defined in the Companies Act, and /or the States and Local Bodies making procurement under all Central Schemes/ Central Sector Schemes where the Scheme is fully or partially funded by Government of India. The aforesaid orders shall also be applicable in respect of funding of capital equipment by PFC/ REC.

18.3 Ministry of Power has constituted two committees for independent verification of self-declarations and auditor's / accountant's certificates produced by the suppliers related to local content percentage on random basis and in the case of complaints and to examine the grievances in this regard, respectively.

18.4 Further, since power is a sensitive and strategically important sector and involves critical infrastructure for economic and social development of the country, Ministry of Power vide OM No.11/05/2018-Coord dated 23rd July, 2020 had issued Order to encourage, adopt and use only 'Make in India' equipment/materials/parts/items in the power sector. Accordingly, all equipment/materials/parts/items required in the power sector which are domestically manufactured with sufficient domestic capacity shall necessarily be used from the domestic manufacturers only as per the extant provisions of the Public Procurement (Preference to Make in India) Orders issued by DPIIT and MoP.

18.5 Policy framework for equipment/materials/parts/items, where domestic capacity is not available, through phased manufacturing programme, vendor development, Research & Development, tax & other incentives is under finalization by MoP. Till such time the goods so imported shall be tested in certified laboratories designated by the Ministry of Power to check the presence of any embedded malware/trojans or other cyber threats and also to check adherence to Indian Standards.

18.6 Efforts are being made so that imports of items, which are available in the country, gets restricted. Only those equipment/ components/ raw material which are not manufactured in India will be allowed to be imported. Further, efforts are being

made to incentivize domestic manufacturers to indigenously produce more and more equipment/ components.

18.7 Through transfer of technology route, foreign manufacturers shall also be invited to establish their manufacturing units in respect of the items which are not being manufactured in India at present. They shall be offered suitable incentives and provided with other infrastructure facilities. Government is also planning to create manufacturing zones for manufacturing of power sector equipment. In these zones, the land on concessional rates and other common infrastructure facilities shall be made available on reasonable rates. Rail and road connectivity shall also be ensured. These steps will boost the manufacturing of quality equipment at competitive prices and will be helpful in reducing the dependence on import.

18.8 Testing for cyber security of imported power sector equipment has been made mandatory for prevention of cyber-attacks on the power sector and to protect the strategic interest and national security of the country. Testing facilities shall be developed as well augmented to cater to the need of the sector.

18.9 For ensuring the quality of the indigenous products, Quality Control Orders are being contemplated for certain power products/equipment. Standards are being developed for the products and equipment for which no national standards exist. Where the national standards have become out of tune with the technology or developments, the standards are being upgraded keeping in view fast pace of development of technology and obsolescence.

18.10 Further to ensure the quality and reliability of the equipment, approved list of Models and Manufacturers has been planned. Only those products which have been registered on the portal shall be procured in the Government procurements.

18.11 There should be endeavour to promote manufacturing of critical raw materials, such as special steels like CRGO, high pressure tubes etc in India.

19.0 DISASTER RISK REDUCTION

19.1 Power Sector is one of the most important sector of the overall economic development of the country and healthiness of the power sector has to be given top priority. Any disruption in the functioning of the sector affects the process of economic development. The impact can be minimized or reduced significantly if adequate risk reduction measures are incorporated.

19.2 There is need to incorporate measures for reduction of disaster risk into planning, design, construction and operational aspects of power sector projects. CEA

should review the Standards of Construction and other Technical Standards and carry out changes, wherever necessary to minimize disaster risks.

19.3 All the licensees and generating companies must comply to the provisions of Disaster and Crisis Management Plan prepared by the Central Electricity Authority.

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