

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.

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.

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.

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.



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.

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.

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.

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 consumer's 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.

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.

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.

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 years' time. 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.

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.

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.

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.