

TA-9672 PAK: Developing Electricity Market in Pakistan(52323-001)

CTBCM IMPLEMENTATION ROADMAP

Prepared for

ASIAN DEVELOPMENT BANK



Beneficiary

CENTRAL POWER PURCHASING AGENCY



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*"Individually, we are one drop. **Together**, we are an **ocean**."*

(Ryunosuke Satoro)

"Together, reforming the Sector, improving the lives"

(Team Power Sector)

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Report on CTBCM Implementation Roadmap

1. PREAMBLE OF THE REPORT

The development of the wholesale competitive electricity market in Pakistan was envisioned at the outset of power market reforms of the 1990s and was further provided in the Regulation of Generation, Transmission, and Distribution of Electric Power Act, 1997 amended 2018 (the "NEPRA Act"). Further the ECC in its decision dated April 2015 mandated CPPA-G to prepare and submit the model of the Competitive Trading Bilateral Contracts Market (CTBCM) to National Electric Power Regulatory Authority (NEPRA) in consultation with the stakeholders. In compliance with its functions prescribed under the Market Rules and pursuant to the decision of ECC, CPPA-G submitted a high-level conceptual design of the proposed CTBCM Model and the Roadmap on March 5, 2018, for review and approval of the Authority.

CPPA-G received the approval of the Authority on the CTBCM Model via determination dated December 5, 2019. The determination encapsulated several directions for CPPA-G and other relevant stakeholders to perform certain time-bound actions. The directions of the Authority are mentioned in **Section F** of aforementioned determination. The summary of decision of the Authority is presented in the following section of this report.

One of the key actions was to prepare and submit for the approval of the Authority a detailed updated CTBCM Implementation Roadmap. This report is written pursuant to the compliance of the direction of the Authority and presents the updated CTBCM Implementation Roadmap which has been prepared in consultation with the relevant stakeholders including Ministry of Energy (Power Division), NEPRA, Ex- WAPDA Distribution Companies (DISCOs), K-Electric, National Transmission and Dispatch Company, National Power Control Center (NPCC), Alternate Energy Development Board (AEDB), Private Power Infrastructure Board (PPIB) and Independent Power Generation Companies (IPPs).

1.1. SUMMARY OF DETERMINATION AND DIRECTIONS

The decisions of the Authority mentioned in the CTBCM approval determination and the approved CTBCM Model enlists certain action items for the DISCOs, NTDC, NPCC, AEDB/PPIB and CPPA-G that are required to be completed within the Authority's specified timeframe.

The model submitted to NEPRA for approval included recommendations related to necessary adjustments within legal, policy and regulatory framework to be undertaken by policy makers and the regulator. The approval of the CTBCM Model warrants the endorsement of such recommendations and the updated Implementation Roadmap presents the revised indicative timelines for the actions related to alignment of policy and regulatory framework as discussed and agreed with the relevant stakeholders.

Actions Relevant to CPPA-G

In this connection, CPPA-G is obliged to perform the following actions. Deliverables against the following three actions need to be submitted for the approval of the Authority within 60 days of the receipt of the determination i.e. on or before February 04, 2020:

1. Updated detailed CTBCM Implementation Roadmap along with the timelines after consultation with stakeholders. The Roadmap will include timelines for various aspects that will be covered in Detailed Design Report among other things
2. Updated Detailed Design Report of CTBCM Model in consultation with the stakeholders
3. Updated version of the Integrated Electricity-Market Simulation Model Report (IE-MSM)
4. Submission of the Quarterly Progress Reports to the Authority informing about the progress made, hurdles found, corrective measures, external support required, necessary interventions from the stakeholders and other necessary actions required for the smooth implementation

Actions Relevant to DISCOs

The DISCOs are responsible to perform the following actions as per the directions of the Authority:

1. Formation and notification of the Market Implementation Groups (MIGs) by each DISCO within 60 days i.e. on or before February 04, 2020
2. Detailed report/plan on strengthening of the DISCOs in the areas specifically demand forecasting, and bilateral contract portfolio management, among others within 80 days i.e. on or before February 24, 2020
3. Submission of Quarterly Progress Implementation Reports

Actions Relevant to NPCC as System Operator

Following actions are required to be undertaken by NPCC pursuant to the Authority's directions:

1. A detailed report on the scope of IT/Technology and other interventions required in NPCC for its strengthening to efficiently and transparently perform its functions, within 80 days of the approval of CTBCM Model i.e. on or before February 24, 2020
2. Submission of Quarterly Progress Implementation Reports

Actions Relevant to NTDC as Transmission Network Operator, Planner and Metering Service Provider

Following actions are required to be undertaken by NTDC pursuant to the Authority's directions:

1. A detailed report on the scope of IT/Technology and other interventions required in NTDC for bringing transparency, data institutionalization, metering, planning, forecasting, and improving processes, structure, proposing amendments in grid code and proposing connection agreements, within 80 days of the approval of CTBCM Model i.e. on or before February 24, 2020
2. Submission of Quarterly Progress Implementation Reports

Other Actions

Apart from the directions specified by the Authority in the CTBCM approval determination, there are certain other action items and responsibilities mentioned in the approved Model that are required to be undertaken by the relevant entities. These actions will be covered in detail under the updated Roadmap.

It is important to highlight that there are certain actions that are required to be undertaken by the MoE (PD) and NEPRA. These actions were part of the high-level Model and Roadmap. During mid of

2017, a Special Committee of CPPA Board was formed, headed by Joint Secretary (Power Finance) MoE (PD) with participation from NEPRA, Ministry of Finance and CPPA.

The Committee thoroughly reviewed the Model including the policy and regulatory actions before submission to NEPRA and as such agreed with the recommendations in the Model regarding necessary adjustments within the policy and regulatory framework in line with the Model. These actions as part of the Roadmap accompanying the Model were endorsed by NEPRA while approving the Model.

These actions related to alignment of policy and regulatory framework were discussed with the relevant stakeholders during the consultative sessions and meetings and the Implementation Roadmap updated with the revised timelines as agreed.

1.2. UPDATION OF THE IMPLEMENTATION ROADMAP

CPPA-G as the central facilitator has prepared an updated Implementation Roadmap, in consultation with the relevant stakeholders, within the stipulated time frame for submission to NEPRA. It would be pertinent to highlight that the Authority has directed CPPA-G to assume the lead role of central coordinator to facilitate the implementation of the CTBCM and to ensure timely completion of the associated tasks on the agreed target dates.

The updating of the CTBCM Implementation Roadmap required effective coordination to bring all the stakeholders on a platform where they could provide their contribution in updating the Roadmap. For this, CPPA-G organized and convened several consultative sessions and meetings at multiple organizational hierarchies of the participating entities i.e. MOE (PD), NEPRA, DISCOs, NTDC, NPCC, PPIB, AEDB, KE and IPPs.

To highlight the systematic process of engagement, for instance, DISCOs are one of the main stakeholders of the entire process and their role is envisaged as both the Supplier of Last Resort and the Service Provider in the target market. It is very crucial that the DISCOs are informed of their respective actions so that they could arrange the required resources for the completion of the assigned tasks.

Therefore, given the important role that DISCOs are required to play in the transition process, CPPA-G organized the consultative sessions for DISCOs at two-levels. Initially, a one-day consultative workshop was organized exclusively for the Senior Management and the Board Members of the DISCOs and KE where CEO CPPA-G apprised them about the respective directions of the Authority in the CTBCM approval determination and presented the strategy to update the Roadmap in consultation with DISCOs and other stakeholders. Moreover, the actions envisaged in the approved model were also deliberated upon by the participants of the workshop.

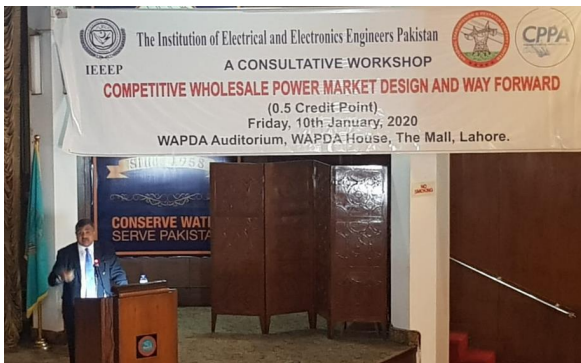
Subsequently, a five-day consultative session was arranged for the senior managers / operational-level staff of relevant stakeholders including NEPRA, DISCOs, NTDC, NPCC, KE, PPIB and AEDB, most of them were participants from the Electricity Market Professional (EMP) Program-2018 or nominees for the EMP-2019 program and hence possesses the knowledge to contribute effectively in the consultation process for updating the Detailed Design and Implementation Roadmap.

The following table illustrates the details of all the meetings, workshops and consultative sessions that were held by CPPA-G with relevant entities similar to the DISCOs consultative session:

S. No.	Title of the Meeting/ Consultative Session	Target Audience	Date	Details
1	One-Day Conference for CEOs, Board Members and Senior Management of DISCOs and KE	CEOs, Board Members, and Senior Mgmt. of DISCOs and KE	December 29, 2019	Annex-I
2	Five-Days Consultative Session on CTBCM Implementation Roadmap and Detailed Design	Senior Management and Operational Staff of NEPRA, DISCOs, NTDC, NPCC, KE, PPIB and AEDB	December 30, 2019, to January 3, 2020	Annex-II
3	Consultative Session for IPPs on CTBCM Implementation Roadmap and Detailed Design	Senior Management and Operational Staff of IPPs, GENCOs, Consultants	January 3-4, 2020	Annex-III
4	Consultative Session on Detailed Design of Competitive Market and Way Forward	IPP Association, IEEEEP, NTDC, LESCO, NESPAK, DESCON, UET Lahore, Nishat Power & other IPPs	January 10, 2020	Annex-IV
5	Meeting with NEPRA Authority on Regulatory Framework Alignment, Re-operationalization of MIMG, Working Group Formation, etc.	NEPRA Authority	January 16, 2020	Annex-V
6	Presentation on CTBCM Determination and Implementation Roadmap in NTDC Board Meeting	Board of Directors, NTDC	January 18, 2020	Annex-VI
7	Meeting with Secretary MoE(PD) on Legal and Policy Framework, Institutional Actions, Re-operationalization of MIMG, etc.	Ministry of Energy (Power Division)	January 20, 2020	Annex-VII
8	Meeting with K-Electric Management on CTBCM Implementation Roadmap and KE's Integration in the CTBCM.	Senior Management of KE	January 21, 2020	Annex-VIII
9	Meeting with PPIB on CTBCM implementation Roadmap.	MD PPIB and other Senior Officials of PPIB	January 21, 2020	Annex-IX

Glimpse of the Consultative Sessions and Meetings

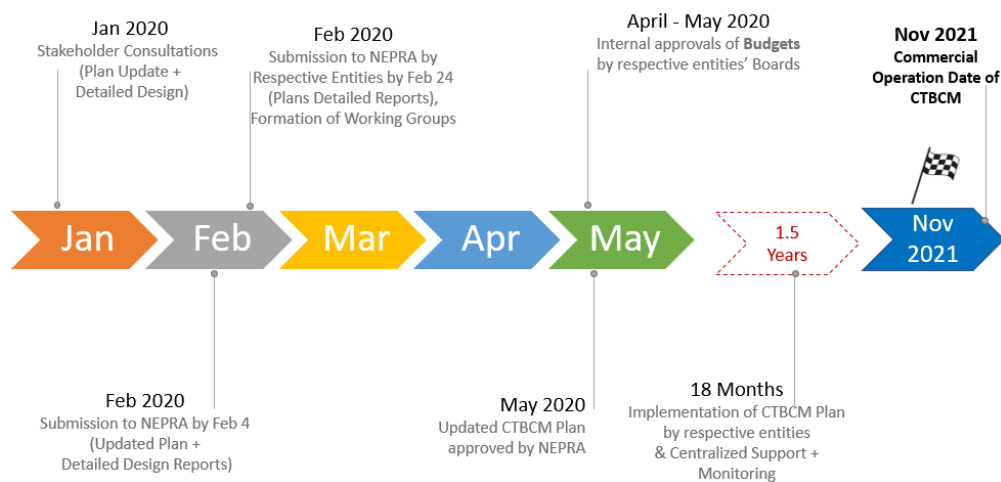




2. UPDATED DETAILED IMPLEMENTATION ROADMAP

CPPA-G has been working towards transition of the existing market from the single buyer model to a competitive wholesale power market since it was given the mandate by the ECC in 2015. To lead the development of a competitive wholesale electricity market and facilitate its implementation in Pakistan, department of Strategy and Market Development (SMD) was formed within CPPA-G. Right after its inception, SMD department started working on the must-do actions that are important for the development and implementation of the competitive wholesale market mentioned in the Roadmap.

Several activities including detailed design of the CTBCM Model, training and capacity building of the stakeholders and institutional strengthening of participating entities were already in progress at the time when NEPRA approval on the CTBCM model was received. Consequently, the Implementation Roadmap in consultation with the stakeholders has been updated with the revised timelines pursuant to the directions of the Authority.



The figure above illustrates the timelines of the market reform process starting from the start of the stakeholders consultation process in January 2020. The Detailed Design and Implementation Roadmap have been updated in consultation with stakeholders pursuant to the direction of Authority to be submitted for approval to NEPRA by Feb 4, 2020. This will be followed by submission of detailed implementation reports by respective entities by Feb 24, 2020 and in the meantime, working groups would also be formed and nominated by the entities. By May 2020, the participating entities shall secure approvals from their respective Boards for the important activities and interventions required for the CTBCM implementation as perceived in their respective implementation plans.

It is anticipated that NEPRA approval on the updated Roadmap will be received within three months after its submission i.e. by May 2020. The window of 1.5 years targeted for CTBCM implementation will be effective from the time of receipt of NEPRA approval on the Roadmap, translating into the indicative Commercial Operations Date (COD) of November 2021 when the competitive wholesale market in Pakistan shall become operational.

It is pertinent to highlight that the last 5-6 months before the COD of the competitive market are reserved for pilot testing of the shadow market to test live systems, mechanisms, information exchange and procedures and starting of the commercial operations of the market.

2.1. UPDATED GROUP OF ACTIONS

The groups of actions that have been approved as a part of the CTBCM Model by the Authority were prepared back in 2017 and submitted in early 2018. Eventually, it reflected the thought process that was carried out as per the needs and requirements envisaged at that time. However, there have been many changes in the last two years based on the continuous detailing of the model and performing certain must-do-actions that were necessary to be initiated even before the approval of the model such as the capacity building of the stakeholders and institutional improvements. Considering the recent developments that have been taken place from the submission of the CTBCM model to its approval, the Authority directed CPPA-G to update the CTBCM Implementation Roadmap to align it with the current scenario while taking into account the existing ground realities.

The actions and commercial arrangements required to transform the sector to start commercial operation of the CTCBM will involve different stakeholders. For each group of actions identified in the Roadmap, there will be one entity primarily responsible for its implementation. Wherever required, other entities involved in the implementation of the group actions will extend their support to the entity responsible for the implementation of respective actions.

Each group of actions will have to be completed within the available time, consistent with the Competitive Market Commissioning Date, by the primarily responsible stakeholder as made explicit in the attached Gantt chart.

Given the large number of activities and complexity associated with the the actions to be executed as part of the CTBCM Roadmap, active coordination would be required to ensure that the respective actions are executed and completed in a timely fashion by all responsible stakeholders.

In order to materialize this coordination effort, the Authority has designated CPPA-G to play this coordination role with relevant entities that are responsible for the execution of their respective group of actions assigned to them under the Implementation Roadmap. CPPA-G, with in-depth knowledge of the future market structure and its different aspects, will also provide guidance and support to the stakeholders in the implementation of the CTBCM roadmap, as well as organize capacity building and consultative sessions and will procure specialized resources, if required.

Also, in case of any implementation constraints, hurdles found, corrective measures necessary, external support required, necessary interventions from other entities or stakeholders and any other measures required to ensure smooth execution of detailed Implementation, CPPA-G will try to find ways to resolve the issues and bring the actions back to the plan, or eventually propose adjustments to it.

As part of the coordination role, CPPA-G will submit Quarterly Progress Report to the Authority, informing about the progress made and would raise the flags in case of any implementation constraints, bottlenecks and barriers for the information and necessary actions by the Authority. This will ensure the smooth and timely implementation of the activities under the roadmap.

2.2. SUMMARY OF GROUPS OF ACTIONS

Following table provides a list of the group of actions under the updated Implementation Roadmap mentioning the primarily responsible and supporting stakeholders involved with each action and the summary of activities to be undertaken for each action. The actions are differentiated into the groups, based on the specific nature of activities under each group.

The Preparatory Actions enlist the activities associated with updating the Implementation Roadmap in consultation with stakeholders, its approval and mechanism of reporting and monitoring the Roadmap. The subsequent group (**Group Actions 2 – 5**) discusses the actions pertaining to the alignment of policies, rules, regulations and codes with the approved model.

All the institutional actions pertaining to the strengthening of participating entities are congregated in one group (**Group Actions 6 – 11**). Under the Other Actions (**Group Actions 12 – 16**), the activities that are necessary for CTBCM such as detailed design, allocation of existing contracts, new market contracts and market data institutionalization are discussed. Finally, the last group (**Group Actions 17 – 18**) encapsulates the important actions pertaining to the readiness of the sector for commencement of the commercial operations of the competitive market in Pakistan.

Updated Action Plan for CTBCM Implementation			
#	GROUPS OF ACTIONS	STAKEHOLDERS	ACTIONS/ACTIVITIES
Preparatory Actions:			
1	Baseline Plan Preparation and Other Preparatory Actions	CPPA in the role of Central Coordinator, in consultation with stakeholders NEPRA MoE (PD) NTDC NPCC DISCO KE AEDB PPIB	<ul style="list-style-type: none"> • CPPA in consultation with stakeholders will update the CTBCM Implementation Roadmap & Detailed Design Reports • CPPA submits to NEPRA for approval a detailed Implementation Roadmap and for deliberation the detailed design reports • NEPRA approves the Roadmap and circulates among the responsible stakeholders • MIMG re-operationalized • MIMG continues to centrally facilitate the implementation of the Roadmap including policy and other actions • NEPRA continues to monitor the actions of its licensees and NEPRA/MoE/CPPA work together in facilitation and monitoring • CPPA G, NTDC, NPCC, DISCOs, PPIB/AEDB reports to NEPRA on a quarterly basis on implementation progress & MIMG
Alignment of Legal, Policy and Regulatory Framework:			
2	Promulgation of National Electricity Policy and Review of Other Power Policies	Federal Government through MOE (PD) to Lead NEPRA, PPIB and CPPA-G to support along with other relevant stakeholders	<ul style="list-style-type: none"> • National Electricity Policy (NEP) <ul style="list-style-type: none"> ◦ Draft of the National Electricity Policy (NEP) to cover the Market Development and Operations ◦ Approval at the Appropriate Forum • Review of Existing Policies for adjustments/additions <ul style="list-style-type: none"> ◦ Formation of Working Group ◦ Review of existing power policies, making required adjustments/additions (especially Generation Policy 2015) • Approval at the appropriate forum

3	Development of New Rules and Modification to Existing Rules	Federal Government through MOE (PD) to Develop New Rules, NEPRA to Propose Amendments in Existing Rules CPPA-G to support along with other relevant stakeholders	<ul style="list-style-type: none">● Development of new Rules<ul style="list-style-type: none">○ New Rules Development○ Approval at the appropriate forum● Modifications to Existing Rules<ul style="list-style-type: none">○ Formation of Joint Working Group○ Review of the eisting Rules by JWG and propsoe amendments○ Approval at the appropriate forum
4	Modifications (Review and Additions) to Power Sector Regulatory Framework	NEPRA in support of relevant entities	<ul style="list-style-type: none">● Review and Modification of Regulations (Existing and New)<ul style="list-style-type: none">○ Formation of Working Group○ Identification, review, amendments and approvals of existing Regulations○ Identification and development of new Regulations based on Concept Papers developed as part of the Detailed Design○ Review and approval of new Regulations● NEPRA Guidelines consistent with the new rules and regulations
5	New Commercial Code and SPT Code	<div>CPPA prepares drafts for NEPRA's consideration and approvals</div> <div>CPPA prepares, CCRP reviews and NEPRA approves</div>	<ul style="list-style-type: none">● Development of new Commercial Code for MO<ul style="list-style-type: none">○ Preparation of the Draft Commercial Code for MO○ Review and Approval by NEPRA● Amendments in the SPT Code (existing Commercial Code)<ul style="list-style-type: none">○ Identifying necessary adjustments in the existing Commercial Code for SPT and revision○ Review by Commercial Code Review Panel (CCRP)○ Review and Approval by NEPRA
6	Grid Code	NTDC to draft, CPPA to support for consistency with CTBCM, NEPRA to review and approve.	<ul style="list-style-type: none">● Formation of Group to finalize the Strategy with the Consultation for Grid Code Review● Grid Code Review (by the Consultant & Core Group formed by NTDC to work with Consultant); preparation of the Report on recommendations including draft Grid Code● Review of the Report by NTDC and Consultation with Stakeholders● Review and Approval by NEPRA
Institutional Actions (Strengthening):			
7	Separation of CPPA G into Market Operator (MO) and Special Purpose Trader (SPT) Functions	CPPA G and approvals by relevant agencies including NEPRA for licensing of MO and registration of SPT	<ul style="list-style-type: none">● Finalization of CPPA Restructuring Strategy and Overall Approach● High Level Organization Design of MO and SPT including main functions and organogram - The Generic MO● Development of the documentation associated with MO and SPT including SOPs, manuals, systems specifications, JDs, KPIs, etc. consistent with the organizational design (MO's Adjustments with approved framework)● Organizational Implementation including personnel reallocation, capacity building, purchasing and or hiring IT and other systems, Website Development, etc. (MO's Adjustments with approved framework)● Functional Separation of the Business Units including Trial Run

			<ul style="list-style-type: none"> • Legal Separation and creation of the two separate entities of MO and SPT • Licensing for MO and Registration for SPT
8	NTDC as Transmission Network Operator, Planner, Metering Service Provider (MSP) Actions Including Strengthening	NTDC to lead. CPPA G to support	<ul style="list-style-type: none"> • Formation of Working Group • Preparation and submission of NTDC Report required by NEPRA (as TNO, Planner and Metering Service Provider) • Preparation of budgets, internal approvals and petitions • Strengthening of NTDC as Planner <ul style="list-style-type: none"> o Discovery of Requirement Specifications (Gap Analysis) o Procurement of tools o Necessary Re-structuring & Staffing o Preparation of Expansion Plans (Generation and Transmission) and Demand Forecasting using upgraded tools • Deployment of SMS Metering Project <ul style="list-style-type: none"> o Complete installation of revenue meters for all existing CDPs o Automation of information transfer to CPPA G / Market Operator o Development of SOP for inclusion of future DISCOs CDPs o Interface agreement with the MO to solve disputes about metering • Connection Agreements <ul style="list-style-type: none"> o Review of International Practices or Drafts of Connection Agreement o Preparation of Standardized Connection Agreements for Demand, DISCO and other Transmission Companies o Preparation of Standardized Connection Agreements for Generation o Submission to NEPRA for review and approval o Implementation of the Connection Agreements • Capacity Building • IT Infrastructure <ul style="list-style-type: none"> o Data institutionalization through NTDC ERP Team o NTDC (TNO, Planner and MSP) Data storage and Retrieval in ERP Data Center of NTDC • Transparency and Information Sharing <ul style="list-style-type: none"> o Revamping of Website • Capacity Building • Submission of Quarterly Progress Report to NEPRA
9	NPCC as System Operator (SO) Actions Including Strengthening	NTDC/NPCC to lead. CPPA G to support	<ul style="list-style-type: none"> • Formation of Working Group • Submission of Report by NTDC as SO, required by NEPRA • Preparation of budgets, internal approvals and petitions • Dispatch and Processes Improvement • SO Restructuring <ul style="list-style-type: none"> o Finalization of NPCC Restructuring Strategy and Overall Approach o High Level Organization Design of SO

			<ul style="list-style-type: none"> o Development of the documentation associated with including SOPs, manuals, systems specifications, JDs, KPIs, etc. consistent CTBCM requirements o Staffing or adjustments • Capacity Building • IT Infrastructure o Process automation in CDXP Phase-II, this includes automation of SO processes & data institutionalization o SO Data storage and Retrieval in ERP Data Center of NTDC o IT Developers Hiring o Handing over CDXP Phase 2 to NPCC • Transparency and Information Sharing o Development of Website • Submission of Quarterly Progress Report to NEPRA
10	DISCOs Actions Including Strengthening	DISCOs to lead, PPIB/AEDB and CPPA-G to support	<ul style="list-style-type: none"> • Formation of Dedicated Market Implementation Groups (MIGs) • Submission of Report by DISCOs as required by NEPRA • Preparation of Budgets, internal approvals and Petitions • Establishing Dedicated Market Implementation Department (MIDs) • Creation of Association of DISCOs • Financial Health Assessment of DISCO to ascertain credit worthiness for contracting power under CTBCM through collaterals <ul style="list-style-type: none"> o Credit worthy DISCOs completing all pre-requisites for credit covers before start of market o Other DISCOs work with IAA/(PPIB+AEDB) to have government guarantees • Connection Agreements <ul style="list-style-type: none"> o Preparation of Standardized Connection Agreements for Demand o Preparation of Standardized Connection Agreements for Generation o Submission to NEPRA for review and approval o Implementation of the Connection Agreements • Preparation of Demand Forecasts for Capacity Obligations (Short and Medium/Long Term) & Transmission Plans • Amendment in Distribution Code <ul style="list-style-type: none"> o Distribution Code review and propose amendments o Submission to DCRP for review o Submission to NEPRA for review and approval • Capacity building • Submission of Quarterly Progress Report to NEPRA
11	Actions of PPIB/AEDB for Independent Auction Administrator (IAA) Including Strengthening	PPIB/AEDB to lead MoE (PD), NEPRACPPA G, DISCOs to support	<ul style="list-style-type: none"> • Formation of Working Group • Registration with NEPRA to undertake the IAA function <ul style="list-style-type: none"> o Analysis of registration requirement and develop internal consensus o Identification of actions for the registration with NEPRA and complete the registration process • Strengthening of IAA Function <ul style="list-style-type: none"> o Gap Analysis of existing functions

			<ul style="list-style-type: none"> o Capacity Building and strengthening of PPIB/AEBD to perform the IAA function
			<ul style="list-style-type: none"> ● Assessment of Security Package and Concession Agreements
			<ul style="list-style-type: none"> o Analysis and Revision of Security Package/Concession Agreement (incl. New Market Contract Templates)
			<ul style="list-style-type: none"> o Approval at the appropriate forum
			<ul style="list-style-type: none"> ● Liaison with the DISCOs for financial health assessment and arrangement of credit covers / guarantees
			<ul style="list-style-type: none"> ● Website update for Information Transparency
			<ul style="list-style-type: none"> ● Submission of Quarterly Progress Reports
12	Capacity Building of Market Participants and Service Providers and Support to Other Power Sector Entities for Integration to CTBCM	CPPA Related Entities KE	<ul style="list-style-type: none"> ● Capacity Building o Electricity Market Professional (EMP) Program by CPPA for knowledge transfer on different levels on Competitive Electricity Markets in general and CTBCM in Particular o Specialized Training Workshops for CPPA and power sector stakeholders especially MIGs o International Exchanges and Strategic Partnerships with international organizations o Training Workshops by other entities in respective specialized areas for their own staff ● KE Integration to the CTBCM
Other Actions:			
13	Detailed Designing of CTBCM	CPPA to lead, NEPRA to support in consultation with Relevant Stakeholders	<ul style="list-style-type: none"> ● CTBCM Detailed Design o Concept papers for Regulations on Detailed Design and aspects and system development including, but not limited to: o Balancing Mechanisms for Capacity and Energy (Marginal Prices) o Commercial Part of New Market Contracts Template o Treatment of Losses o Firm Capacity Factors and Capacity Obligations o Market Simulations (including Financial Modeling) o Settlement Procedures o Guarantees and Credit Covers o Open Access o Suppliers, Traders and other concepts related to market design given in NEPRA Act o Others (Tariffs supports, etc.)
14	Legacy Contracts: Commercial allocation of pre-existing PPAs/EPAs	MOE (PD) and CPPA G, IPPs and GENCO's, DISCOs, K Electric	<ul style="list-style-type: none"> ● Preparation of commercial allocation methodology and Allocation Factors by CPPAG in consultation with DISCOs ● NEPRA approves the Methodology and Allocation Factors ● Modification in the Power Purchase Agency Agreements (PPAA) to reflect the allocations ● Necessary adjustments in the Commercial Code for SPT
15	New Market Contracts, Market	PPIB/AEDB/ MoE(PD) to lead	<ul style="list-style-type: none"> ● Security Package: Market Contracts o New Market Contracts for regulated consumers

	Participation Agreement (MPA)	and CPPA to support and NEPRA CPPA to lead and NEPRA to approve	<ul style="list-style-type: none"> o Approval at the appropriate forum o Minimum conditions for market contracts for non-regulated market participants • Market Participant Agreement o Preparation of Market Participation Agreement by MO o Submission to NEPRA for approval
16	Market Data Institutionalization	CPPA G to lead. NTDC and NPCC to support	<ul style="list-style-type: none"> • Identification of Domain Data and Attributes in CPPA-G, NTDC and NPCC • Design of System Architecture including databases, servers and applications • Procurement and Installation of IT infrastructure and applications • Define Data Governance through SOPs and user manuals • End User Training on the databases, applications and hardware maintenance
17	Associations of Generators, BPCs and Transmission Companies	Generators Transmission Comp BPCs	<ul style="list-style-type: none"> • Creation of the Association of Power Generators of Pakistan • Creation of the Association of Transmission Companies of Pakistan, if required • Creation of the Association of Bulk Power Consumers of Pakistan
Readiness and Commercial Operation:			
18	Readiness for commercial operation of electricity market (Pilot shadow market, to test live systems, mechanisms, information exchange and procedures)	Lead by CPPA G, includes all market participants; CPPA G reporting of readiness tests and results to MOE (PD) and NEPRA	<ul style="list-style-type: none"> • Test the proper functioning of the following (not limited to): <ul style="list-style-type: none"> o Power Policies aligned, Rules amended/prescribed o New and amendment regulations done and approved by NEPRA o CPPA G restructuring completed. MO and SPT companies incorporated and ready o MO systems for BME, BMC, settlement, marginal prices etc. o Templates of New Market Contracts in place o Market Participation Agreement in place o Commercial Allocation of existing PPAs done o Standardized Connection Agreements in place o Dispatch Software operational o Test Revenue Meters, data collection center, transfer of information to the MO o Capacity building of participants and services providers o Required credit cover in the market and testing of credit or guarantee systems • Collect comments and feedback from Participants • Develop required improvement or correction • Inform the MOE (PD) and NEPRA test results and whether readiness has been achieved
19	Declaration of date to start commercial operation of CTBCM	MOE (PD)	<ul style="list-style-type: none"> • Activation of MO and SPT as independent companies • Activation of new and amended regulation • Declaration of COD

2.3. DETAILED DESCRIPTION OF GROUP OF ACTIONS

PREPARATORY ACTIONS

GROUP ACTION NO 1: BASELINE PLAN PREPARATION: CTBCM UPDATED IMPLEMENTATION ROADMAP

Primarily Responsible Stakeholder: CPPA G

Support Stakeholder(s): MoE (PD), NEPRA, PPIB/AEDB, NTDC, NPCC, DISCOs and KE

This Group Action is part of the preparatory activities associated with CTBCM Implementation and comprises the preparation of the updated Implementation Roadmap as directed by the Authority in the CTBCM Approval Determination.

Under this action, CPPA-G in role of the central coordinator is obliged to prepare an updated Implementation Roadmap in consultation with stakeholders. This report is the outcome of this group of actions that is being submitted to NEPRA for regulatory approval.

Although, NEPRA has granted its approval on the Implementation Roadmap submitted with the CTBCM Model. Therefore, the actions mentioned in the Roadmap have already become a regulatory directions for participating entities. After review and approval of the updated Implementation Roadmap, the approved timelines will become binding on the entities and consequently respective entities will be responsible for the execution and timely completion of such activities prescribed in the Roadmap.

It is foreseen that the Market Implementation and Monitoring Group (MIMG) will be re-operationalized by end of April 2020 to play the supervisory role of overseeing the implementation of the roadmap by participating entities for ensuring the smooth implementation. Chapter 3: Monitoring and Coordination of this report covers in detail the proposed structure of MIMG along with terms of reference (TORs) and the monitoring mechanism of the implementation Roadmap through MIMG.

Moving forward, CPPA-G will continue to coordinate with entities responsible for the execution of their respective tasks in accordance with the central coordination role assigned by the Authority for smooth and timely implementation of the activities of implementation roadmap. Moreover, CPPA-G will ensure the timely submission of its Quarterly Progress Report to NEPRA and MIMG the progress made, hurdles found, corrective measures, external support required, necessary interventions from the stakeholders and other necessary actions required for the smooth implementation.

ALIGNMENT OF LEGAL, POLICY AND REGULATORY FRAMEWORK

GROUP ACTION NO 2: PROMULGATION OF NATIONAL ELECTRICITY POLICY AND REVIEW OF OTHER POWER POLICIES

Primarily Responsible Stakeholder: Federal Government through MoE (PD)

Support Stakeholder(s): PPIB, CPPA G, NEPRA and other relevant entities

This group of Actions entails the adjustment of existing policies required for market implementation and new policies. Similarly, the adjustment of existing rules that will have to be modified and the new ones that will have to be developed in accordance with the NEPRA (amendment) Act, 2018 (the Act) and subsequently with the approved market model.

National Electricity Policy: The NEPRA Act amendment 2018 under Section 14A: National Electricity Policy and Plan, has mandated the Federal Government for the promulgation of the National Electricity Policy (NEP) that shall cover inter alia (i) development of efficient and liquid power market design (ii) development of system based on optimal utilization of resources (iii) development, reform, improvement and sustainability of power sector.

With the promulgation of the NEP, also existing policies for generation, etc. shall be aligned with it.

In order to be consistent with the COD of the competitive wholesale market, it is envisaged that this action will be completed by Feb 2021, however, this is not a prerequisite condition for commencement of the wholesale market. The following activities will be performed to meet the target date:

- *Draft of National Electricity Policy:* The draft of the NEP is under preparation which will include several sections related to power sector reforms including governance improvements, generation, transmission, distribution, market operations and market development as required under the NEPRA Act. The draft is expected to be completed by Apr 2020.
- *Promulgation of NEP After Approval:* The final draft of NEP may be consulted with the relevant stakeholders for their comments and feedback. Subsequently, the draft will be submitted to Cabinet for review and then to the Council of Common Interest (CCI) for approval which is anticipated by Feb 2021. All efforts will be made to ensure that market related objectives stated in the Act are reflected in the draft Policy. Once the NEP is promulgated, there will be a need to check consistency and alignment of the approved market model with the NEP, and if deemed necessary, appropriate adjustments in the model may be carried out to make it consistent with the NEP.

Existing GoP Policies: Other GoP policies for the power sector will need to be reviewed and amended if required to reflect the approved market model and institutional arrangements. It is estimated that this action would be completed by Mar 2021.

- *Formation of Joint Working Group:* It is proposed to establish a joint working group (JWG) comprising representatives from MoE (PD), PPIB, CPPA and other related stakeholders to perform a gap analysis of the prevailing power policies with the approved model.

- *Review of the Existing Policies:* Currently, there are policies on power generation, transmission, and others referring to expansion and investments, which guides the sector under the current arrangements. The currently applicable policy envisaged to be reviewed and revised is Power Policy 2015, others may also be seen. The gap analysis report that will be prepared by the JWG will cover the recommendations to revise these policies in accordance with the approved market model among others. The MoE (PD) shall prepare the draft of the revised power policy. Similarly, for any other aspect which the existing policies do not cover and require policy level intervention, the JWG will also identify such policies.
- *Approval at the Appropriate Forum:* The modifications/additions in the existing policies may be circulated for stakeholder consultation and subsequently submitted to Cabinet for review and then to CCI for approval.

GROUP ACTION NO 3: DEVELOPMENT OF NEW RULES AND MODIFICATION TO EXISTING RULES

This group of actions entails the prescription of the new rules by the Federal Government for the enablement of the approved competitive market model pursuant to the NEPRA (amendment) Act, 2018 (the Act). Similarly, adjustment of existing rules that will have to be modified in accordance with the Act and subsequently with the approved market model would be covered under this group of actions.

Development of New Rules

Primarily Responsible Stakeholder: Federal Government through MoE (PD)

Support Stakeholder(s): n/a

The Act gives the whole framework to enable the competitive market by creating the regime of different licences for Market Operator, Electric Power Trader and Electric Power Supplier. Moreover, under section 23A, of the Act, it is clearly mentioned that the Market Operator will centrally organize and administer the market and perform the settlement function. Similarly, the Act gives the basis for buying and selling of electric power services between multiple generators, traders, and suppliers through bilateral contracts.

International experience shows that electricity laws are enacted or adapted/modified for the start of competitive electricity markets, which in the case of Pakistan, Act is already in place. However, the regulatory framework that includes rules, regulations, codes and procedures for the market will require modifications to ensure full consistency for the implementation of the approved market and to avoid challenges due to gaps.

Under the amended NEPRA Act 2018, prescription of Rules is the competency of the Federal Government. In this regard, new Rules need to be prescribed to fill the gaps that currently exist in the legal framework. It is expected that this action will be completed by Apr 2021 and during this timeline, the following sub-actions will be performed to meet the target date:

- *Development of New Rules:* The Federal Government through MoE (PD) will prescribe the new Rules that are mandatory for the implementation of the competitive electricity market. The draft of the new Rules will be prepared by Oct 2020.
- *Approval at the Appropriate Forum:* MoE (PD) will follow the standard procedure for approval of the Rules stated in Section 46: Rules of the NEPRA Act, which requires that the proposed draft is subject to the consultation with the Provincial Government and the NEPRA. Subsequently, the final draft of Rules after consultation shall be forwarded to the Cabinet for approval. The approval of the new Rules is anticipated to be granted by the Federal Government by April 2021.

Modifications in the Existing Rules

Primarily Responsible Stakeholder: NEPRA, Federal Government through MoE (PD)

Support Stakeholder(s): CPPA and other relevant entities

The Act warrants review of certain rules that require modifications to ensure full consistency for the implementation of the approved market and identification of other rules which are envisaged to be transformed into regulations for implementation of the new competitive regime. Following activities would be performed in this regard under this sub-action:

NEPRA will identify the rules that require modification and propose to the MoE (PD) the adjustments that are needed to be made in the existing rules for alignment with the approved market model. Similarly, the rules that are to be converted into regulations will be listed by NEPRA and the respective regulations would be drafted keeping in view the operational features of the approved market model. This action will be completed by April 2021.

- *Creation of Joint Working Group:* A Joint Working Group (JWG) comprising members from NEPRA and CPPA has been established to implement the approved CTBCM Model. The JWG will work on the identification of the existing rules requiring modification/transformation into the regulations.
- *Review of Existing Rules:* Based on the analysis by the JWG, NEPRA will propose to the MoE (PD) the adjustments that are needed to be made in the existing rules for alignment with the approved market model.
- *Approval at the Appropriate Forum:* Subsequently, the MOE (PD) will review the proposed amendments and will follow the standard procedure for approval of the Rules stated in Section 46: Rules of the NEPRA Act, which requires that the proposed draft is subject to the consultation with the Provincial Government and the NEPRA. Subsequently, the final draft of Rules after consultation shall be forwarded to the Cabinet for approval. The approval is anticipated to be granted by the Federal Government by April 2021.

GROUP ACTION NO. 4: MODIFICATIONS (REVIEW AND ADDITIONS) TO POWER SECTOR REGULATORY FRAMEWORK

Primarily Responsible Stakeholder: NEPRA

Support Stakeholder(s): MoE (PD) for review of existing Rules, CPPA G

The existing legislation envisages the development of competitive market arrangements, with considerations on new entrants in the competitive market regime including Electric Power Supplier (the Supplier), Electric Power Trader (the Trader) and Bulk Power Consumers (BPCs). This gives rise to a need to prepare regulations, guidelines and procedures associated with the features of the approved market model. Keeping this in view, the regulatory framework requires modifications to ensure full consistency with the approved market model.

This Group Action encapsulates the alignment of the existing regulatory framework with the Act and the approved Model. Following sections illustrates the details regarding, modifications/additions in the existing regulations, guidelines, and codes in consistency with the approved Model:

Review of the Regulations (Existing and New): This sub-action entails the review of the existing regulations that are in place as of today in order to make them consistent with the amended NEPRA Act, and approved market model. Similarly, it will also include the drafting of the new regulations that are required for market implementation under the approved model. The time period anticipated to complete this action is May 2021.

- *Creation of Joint Working Group:* A Joint Working Group (JWG) comprising members from NEPRA and CPPA entities has been established to implement the approved CTBCM Model. The JWG will work on the detailed design of the CTBCM Model and other necessary actions required for establishing the competitive wholesale electricity market in Pakistan.
- *Formation of Working Group:* A Working Group (WG) has been formed within NEPRA comprising representation of respective departments including Technical, Legal, Tariff/Finance and Licensing. The WG will work on amending the existing regulations and drafting new regulations that shall govern the operations of the approved competitive market.
- *Identification, Review, and Amendments of Existing Regulations:* The WG reviews the existing regulations to identify the list of regulations that require modification in connection with the Act and the approved market model. The WG shall perform detailed review of the identified regulations and prepare the gap analysis report. The amendments will be proposed in the existing regulations on the basis of the gap analysis report by the WG for subsequent regulatory review and approval.
- *Draft New Regulations:* The WG shall recognize the new regulations that are prerequisites for the implementation and smooth operations of the approved market model. Later, concept papers will be developed by CPPA as part of a detailed design for every new regulation in order to illustrate the intricate details of the different parameters of the market model design and the new licensing regime established by the Act. Based on the concept papers, the WG shall draft the new regulations which will be followed by the due regulatory review and approval process for finalization.

Additionally, NEPRA will prepare the draft of the regulations based on those rules which were identified to be transformed into the regulations as mentioned under the Group Action No. 2.

- *Review and Approval:* Pursuant to requirements of the Act, the draft of the new regulations and the proposed modifications in the existing regulations will be published for the comments and feedback of the stakeholders before approval by the Authority.

Review/Modification of the NEPRA Guidelines: Under this sub-action, the NEPRA guidelines will be reviewed by the NEPRA for alignment with the new regulatory framework as well as the approved market model. The necessary changes in the existing guidelines will be proposed and if necessary, new Guidelines will be issued following the due regulatory process. It is expected that this sub-action will be completed by May 2021.

GROUP ACTION NO. 5: NEW COMMERCIAL CODE AND SPT CODE

Primarily Responsible Stakeholder: CPPA G

Support Stakeholder(s): Commercial Code Review Panel (CCRP) for Review of SPT Code, NEPRA for approval of both codes

CPPA-G is currently performing two functions i.e. Agency function for the procurement of capacity on behalf of DISCOs and payments settlement, and Market Operator to facilitate the transition from the current regime towards a competitive market. Before the commencement of the approved competitive market, it has been directed by NEPRA, and is part of the approved market model as well, to remove the conflict of interest that lies between the Agency function and the MO function. Therefore, moving forward, CPPA-G will be bifurcated into two separate entities i.e. Market Operator of the competitive wholesale market and Special Purpose Trader (SPT) for managing legacy contracts.

One of the most important actions in the implementation roadmap of CTBCM is the amendment of the existing Commercial Code in accordance with the needs and requirements of the approved market model that will facilitate and reflect the new market structure and institutional arrangements.

The existing Commercial Code mostly covers in detail the agency function of the CPPA-G as well as certain provisions to promote and enable the development of the competitive power market. However, it does not incorporate all the requirements of the approved competitive market regime.

The existing Commercial Code will be modified by deleting a few provisions pertinent to the competitive market and adding the provisions related to the commercial allocation of existing PPAs and will become the Commercial Code for the SPT. A separate new code will be prepared to govern the functions and operation of the MO in the competitive regime. This new code will be called MO Commercial Code.

New Commercial Code for MO:

The new Commercial Code for MO will set the objectives, principles, rules, procedures, rights and obligations that govern the trading in the wholesale market carried out between market participants supported by service providers, as established in the detailed market design. It will also cover the details and requirements of settlement process including the market balancing mechanism for energy and capacity, its pricing, the market settlement process and period etc. Moreover, it will include provisions and procedures for metering system registration, compliance to capacity obligations, contract information and contract register, market operation fee, market credit cover calculations etc.

CPPA-G will finalize the draft of the new Commercial Code. After internal review, the draft of the new Commercial Code will be submitted to NEPRA for regulatory approval. The approval of new Commercial Code is anticipated by May 2021.

Code for SPT:

CPPA-G will work on revising the existing Commercial Code in order to align it with the functions of the SPT in the competitive regime. It is envisaged that certain provisions relevant to the competitive market development will be omitted and few related to commercial allocation of existing PPAs and others will be added to make the existing Commercial Code compatible for SPT operations.

This effort will be performed jointly by the relevant functional departments of CPPA-G so that all the concerned sections especially those that are envisaged to take over the role of SPT are fully aware of the role of the SPT Code in the overall market regulatory structure, while analyzing typical contents and usual structure, so as to enable them to propose and adapt the necessary amendments in the code.

The revised code for SPT will be submitted to Commercial Code Review Panel (CCRP) for review as per the standard regulatory process. The draft of the SPT Code with recommendations will be finalized for submission to NEPRA for review and approval. The expected completion time for this sub-action is by June 2021.

GROUP ACTION NO. 6: GRID CODE

Primarily Responsible Stakeholder: NTDC

Support Stakeholder(s): CPPA G for coordination/inputs on market related modifications, NEPRA for approval

The Grid Code shall be updated in order to incorporate and take into consideration features of approved market model (mainly but not limited to operational planning and dispatch, generation availability commitment etc.). It shall also reflect applicable system security constraints and required operational planning studies and ancillary services, information requirements, communication systems, dispatch operations of the generators including those having bilateral contracts etc. This action will be led by NTDC.

A consultant has been hired by NTDC to undertake the task of Grid Code amendment and will be mobilized by February 2020. It is agreed with NTDC that a joint group to be created comprising nominees from NTDC, NEPRA, CPPA-G and other relevant stakeholders to finalize the strategy and plan with the consultant to review and update the Grid Code.

Pursuant to the agreed strategy and plan, the consultant will undertake detailed review of the Grid Code and will recommend changes in the subsequent report after discussion and consultation with the group mentioned above. Though the complete Grid Code will be reviewed by the consultant, it is important to highlight certain sub-codes which must be revised accordingly to harmonize with the approved market model inter alia Scheduling and Dispatch, Planning, Metering, Connection and Data Registration Codes. Keeping in view the Secured Metering System (SMS) project being implemented by NTDC, the Metering Code needs special focus in order to clarify all requirements and procedures for Revenue Meters, including remote reading.

After completing the review of the complete Grid Code, the consultant will prepare a report on the recommendations pertaining to the necessary changes identified during the review. The report will be finally reviewed by NTDC, and will submit it to NEPRA following the due process. It is expected

that the Grid Code with the proposed amendments will be approved by June 2021. The Grid Code, its amendments and operational procedures will be made public as per the prevailing practice.

INSTITUTIONAL ACTIONS AND THEIR STRENGTHENING

GROUP ACTION NO. 7: SEPARATION OF CPPA G INTO MARKET OPERATOR (MO) AND SPECIAL PURPOSE TRADER (SPT) FUNCTIONS

Primarily Responsible Stakeholder: CPPA G

Support Stakeholder(s): n/a

Market Operator is the institution responsible for centrally administering market mechanisms for participants to buy and sell electricity. Therefore, one of the most important requirements of a competitive wholesale electricity markets (as is the case of the CTBCM) is to avoid any conflict of interest of the Market Operator with another entity. Additionally, the Market Operator must be completely independent of any commercial interest of participants and not be involved in buying electricity in contracts to resell.

Currently, the CPPA-G mainly performs two functions, the Market Operator and the Agent of DISCOs. Its role as the agent of DISCOs and purchaser in PPAs/EPAs cannot continue along with the Market Operator of the competitive wholesale electricity market (the CTBCM) due to this clear conflict of interest. Recognizing this conflict of interest, in the Registration Certificate, NEPRA has provided clear directions to CPPA-G to get these two functions separated in both operational and legal aspects before the commencement of the competitive market operations. Therefore, to ensure that the Market Operator function is independent of any commercial interest (or contract trading with Market Participants), the CPPA-G needs to be separated into its different functions:

1. The Market Operator as a service provider administering centrally the competitive wholesale electricity market
2. The Agent of DISCOs as the administrator of the power purchase from existing PPAs/EPAs on behalf of DISCOs, which will be the Special Purpose Trader (SPT)

The following strategy will be adopted for the bifurcation of CPPA-G into two separate entities:

- First, functional separation, by creating two business units within the CPPA-G, each unit with its own management, staff and accounting separation; and
- Second, as per the approved market model, legal separation into two companies prior to the start of the CTBCM.

This action has been principally approved by the CPPA-G Board.

Strategy for the Creation of SPT

The SPT will assume functions of settlement and administration of the legacy PPAs that today is part of CPPA-G. In the new market, new capacity procurement will be done bilaterally between DISCOs and generators.

Therefore, settlement functions of CPPA-G will continue as they are carried out today, with minor adjustments to accommodate the organization to the new set up. The relevant departments involved in the legacy contract administration will be transferred from the CPPA-G to the SPT, isolating them from the MO functions.

Additionally, the contractual framework of CPPA will be reviewed for consistency with the approved model and necessary amendments will be made accordingly. Accordingly, the SPT will need to be registered with NEPRA and for that will apply for its registration pursuant to the Act.

Strategy for the Creation of MO

Most of the processes that the MO will have to execute are in response to NEPRA's regulations, which will establish how most of the MO functions shall be carried out. That means that as far as these regulations are not finished and approved, in order to start with the CPPA G detailed restructuring (including detailing of MO functions, organizational hierarchy, business processes, SOPs, manuals etc.), some assumptions regarding subject regulations will have to be made .

It is presumed that as the CTBCM high-level model has been approved by NEPRA, the regulations will be based on the approved principle concepts of the Model and there would not be significant deviations in the regulations to be drafted at a later stage. Therefore, the detailed design of the generic MO will be developed based on the approved principle concepts of the CTBCM model. As soon as the regulations are finalized and approved, the same will be reflected in the detailed design of the MO, and its processes and IT systems as well. Therefore it is very important that the regulations are drafted and approved as per the stipulated timelines mentioned under Group Action No. 3.

MO will be a licensed entity and for that apply with NEPRA for issuance of the MO license pursuant to the Act.

Phased Implementation

The process of designing and creation of the MO has been divided into the following stages to mitigate potential risks:

- a. **Stage 1-Design:** Identify the MO functions and grouping them into different departments; identify the organizational actions required to implement them; propose the organogram appropriated for carrying out these functions, identification of MO HR and IT requirements, high-level budget estimation etc. This phase will continue till Apr/May 2020.
- b. **Stage 2-Development:** Prepare SOPs, manuals, systems specifications, JDs, KPIs, etc. consistent with the design prepared in the previous stage. Additionally, development of IT plans and rollout strategy, training and capacity building plans etc. This phase will start in Mar 2020 and completed by Sep/Oct 2020.
- c. **Stage 3-Implementation:** Personnel reallocation and recruitment, capacity building, purchasing and or hiring IT and other systems, development of MO applications, implementation and deployment of IT infrastructure, training and capacity building of the employees etc. This phase will continue from Oct 2020 till Jun 2021.
- d. **Stage 4-Functional Separation and Trial Run:** Functional separation of the two entities involve that the MO and SPT assume their respective roles. During the last 6

months of the restructuring activity, a trial functioning of the MO will be carried out in parallel emulating its future scope of work, to test in integration the procedures and systems etc. Trial run of the shadow market will be completed by Oct 2021.

- e. **Stage 5-Legal Separation:** The legal separation will include preparation of MO Articles and Memorandum of Associations, company registration, recruitment of Board, licensing application etc.

GROUP ACTION NO. 8: NTDC AS TRANSMISSION NETWORK OPERATOR (TNO), METERING SERVICE PROVIDER (MSP) AND PLANNER ACTIONS INCLUDING STRENGTHENING

Primarily Responsible Stakeholder: NTDC

Support Stakeholder(s): CPPA G in the role of central coordinator, other relevant stakeholders

This group of actions is the responsibility of NTDC, required to implement a credible competitive wholesale electricity market and achieve the objectives of strengthening the security of supply at reasonable costs within system reliability and performance standards.

Formation of Working Group: A working group has been created by NTDC which in the short-run will ascertain the preparation of the Implementation Reports identifying all interventions required for CTBCM start to be carried out by NTDC as Transmission Network Operator (TNO), Metering Service Provider (MSP) and Planner. The working group will also ensure the preparation of budgets required to undertake the interventions and internal approvals from the appropriate forums. Moving forward, based on the actions identified, shall ensure that the actions are completed as per set deadlines.

Strengthening of NTDC as Planner: Under the current regime, NTDC as Planner is required to prepare least cost expansion plans i.e. generation and transmission expansion plans in consultation with the stakeholders as per the requirement of the Grid Code and submit to NEPRA for review and approval. Additionally, NTDC prepare regression-based econometric long-term forecast at the system level in addition to consolidating the medium-term PMS based forecast of DISCOs.

NTDC with the help of consultants from the World Bank has already initiated the process of preparation of the IGCEP on state-of-the-art tools and has procured PLEXOs. The capacity building of the staff is on this tool is already going on. In future, a gap analysis will be performed regarding procurement of other tools regarding demand forecasting, generation as well as transmission planning. Measures for sustainable deployment of the tools will also be proposed that will require the identification of structural and procedural changes at the planning department of NTDC.

Based on the requirements identified during the gap analysis, NTDC shall acquire off-the-shelf, state-of-the-art tools available for the preparation of transmission expansion plans and demand forecasting etc. Similarly, NTDC will also strengthen its planning function with adequate staffing, systems, and processes to fill the gaps identified during the analysis.

Deployment of SMS Metering Project: In the role of Metering Service Provider, NTDC verifies existing metering in connection points for sale and purchase of electricity, and compliance with requirements in the Metering Code of the Grid Code, in accordance with revisions. This requires testing of existing revenue meters at CDPs to identify faulty equipment and take corrective measures to ensure that quality revenue meters are available for the start of the market.

For ensuring transparency in the market, it is mandatory that the collection of metering information is done through an automated process free from any human interventions and thus immune to any manipulation. To achieve this, an Secured Metering System (SMS) project is being implemented by NTDC which should be timely implemented in order to reap the benefits right before the commencement of the approved market.

The project is being implemented with assistance from USAID and the contractor has already been hired for the execution of this project. The project is expected to be completed by May 2021 which will cover all the Common Delivery Points (CDPs). This initiative will enable automatic data retrieval from the meters which will be transmitted to a centralized database being managed by NTDC.

It is pertinent to highlight that all the existing Common Delivery Points (CDPs) will be covered under the SMS being implemented by NTDC. However, moving forward, a mechanism is required to be established for the forthcoming CDPs at generation as well as BPCs, requiring connections with the NTDC/DISCO network and as such the SMS system should cover the newly connected CDPs. If the new CDPs are connected with the DISCOs network, DISCOs will be obligated to liaison with NTDC to get the new CDP integrated with the SMS and as such NTDC would be responsible for ensuring this integration.

NTDC shall provide metering information generated vide the SMS system to the MO to develop and maintain the Revenue Metering Database. NTDC shall also develop a mechanism with the MO for resolution of disputes if any regarding metering. MO will further share this metering information to other market participants and service providers as per the regulations and codes that will be specified under the CTBCM approved model.

Connection Agreements: NTDC will be responsible for the preparation of the standard template of the Connection Agreements (CAs) and its implementation as required in the Grid Code, to clarify limits, rights and obligations of power plants, distribution licensees, other transmission licensees and Bulk Power Consumers (BPCs) connected to transmission network of NTDC. The CAs will also cover the rights and responsibilities of the NTDC in providing the connection to the market participants in the capacity of the Transmission Network Operator.

NTDC has been reviewing standard templates which will be amended as per requirements of the new market design, international best practice and local peculiarities. Standardized Connection Agreements will be drafted by NTDC for the demand, generation, DISCOs and transmission companies' connections. Once drafted, the Connection Agreement templates will be circulated to take comments from stakeholders. Finally, the draft of the Connection Agreements will be submitted to NEPRA for review and approval by Nov 2020. The approval of NEPRA on the standardized Connection Agreement templates for demand and generation is a prerequisite for the commencement of CTBCM, however, the implementation of the Connection Agreements by NTDC i.e. signing Connection Agreements with the existing demand, generation, DISCOs and transmission companies can continue even after start of CTBCM.

NTDC will also provide the necessary support to DISCOs in drafting and finalizing the Connection Agreements for DISCOs to ensure standardization.

Capacity Building: NTDC shall carry out training and capacity building of the relevant staff and officials in the areas of generation expansion planning, transmission expansion planning, demand forecasting, and other specialized areas in transmission to become an efficient service provider. Moreover, awareness among higher management will be created highlighting the importance of training and capacity building initiatives to serve as an efficient service provider.

IT Infrastructure: The data being generated at the NTDC demands a robust IT infrastructure and applications for efficient handling and management of data. Keeping this in view, NTDC is

considered a main beneficiary and implementing partner in the Data Institutionalization Project (covered in Action No. 15), which will be carried out with the assistance of NTDC ERP Team. Under this initiative, the data being generated will be identified and collected using standardized templates for automation. Moreover, the ERP data centre of NTDC will perform the data storage and retrieval function of the market data necessary for making decisions regarding market operation. It is expected that this sub-action will be completed by Dec 2020.

Transparency and Information Sharing (Revamping of Website): NTDC is also required to have a dedicated website through which the important data pertaining to planning, metering and transmission network could be accessed by the market participants and other service providers. In this regard, the existing website of NTDC will be revamped to enhance the transparency of the information generated by NTDC for access by the relevant stakeholders. The development of the website is expected to complete by May 2021.

Submission of Quarterly Progress Reports to MIMG and NEPRA: Pursuant to the direction of Authority in CTBCM determination, NTDC will prepare the progress reports on a quarterly basis highlighting the progress achieved in terms of above-mentioned sub-actions, identifying the bottlenecks in implementation and their resolution, and identification of areas where support at the higher level is required. The reports will be submitted to MIMG and NEPRA for information and necessary action.

GROUP ACTION NO. 9: NPCC AS SYSTEM OPERATOR (SO) ACTIONS INCLUDING STRENGTHENING

Primarily Responsible Stakeholder: NTDC/NPCC

Support Stakeholder(s): CPPA G in the role of central coordinator

NPCC being the **System Operator (SO) is a very critical entity** for the smooth operation of an electricity market. Therefore significant efforts are essential to modernize NPCC which is the technical pillar of the competitive market and its strengthening should be given utmost attention to bring it at par with the standards of an international System Operator.

This group of actions corresponds to the strengthening of the System Operator having adequate capacity to cope up with the requirements of approved market structure. This includes IT and communication systems to ensure real time operations of the system and operational planning in the most efficient manner.

Formation of Working Group: A working group has been created by NPCC which in the short-run will ascertain the preparation of the Implementation Reports identifying all interventions, required for CTBCM start, to be carried out by NPCC as System Operator (SO). The working group will also ensure the preparation of budgets required to undertake the interventions and internal approvals from the appropriate forums. Moving forward, based on the actions identified, shall ensure that the actions are completed as per set target dates.

Dispatch and Processes Improvement: NPCC has developed a model utilizing state-of-the-art tool for operational planning purposes. The operational planning exercise requires capturing certain data as input extracted from different entities. NPCC will formalize the exchange of data from multiple sources and will develop SOPs that would facilitate and govern this data exchange seamlessly. This activity is expected to be completed by Jun 2020.

Additionally, unit commitment and economic dispatch are the areas which offers maximum potential for optimization of operating cost in the power system. The dispatch of generation facilities

to produce demanded energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities and other parameters requires sophisticated mathematical tools. NPCC has acquired a state-of-the-art tool to perform this exercise.

However, NPCC lacks the capability to have an accurate demand and VRE generation forecasts which are the critical inputs to the unit commitment model. Therefore, NPCC will develop its capacity in these two areas within one year i.e. by May 2021 before the commencement of the approved market model.

IT Infrastructure: System Operator is considered the technical pillar of the competitive market and the quantum of data generated at the SO required for operation of competitive market necessitates a robust IT infrastructure and applications. CPPA-G is already facilitating NPCC through Central Data Exchange Portal (CDXP) in automating core NPCC processes including dispatch instructions, plant availability, day-ahead dispatch, compliance to the dispatch instructions, etc. The storage and retrieval of the data are being managed by CPPA-G.

Moving forward, it is necessary that the portals of CDXP relevant to NPCC processes will be handed over to NPCC by Feb 2021. However, NPCC needs to have a team of IT Developers to manage the data applications and any future needs to develop customized applications. For these purposes, NPCC will initiate need assessments based on which hiring of the human resources and procurement of IT infrastructure will be carried out. According to initial discussions with NTDC IT team, it is agreed that the data storage and retrieval function of SO will be managed by the ERP data centre of NTDC.

Transparency and Information Sharing: Online reporting of the short-term plans and actual operations summary will be published as per the frequency established in the Grid Code and the Commercial Code. Moreover, information related to system constraints, import/export and demand control (load shedding if any) should also be published. Monthly reporting of operational planning of the next 12 months (generation/demand balance, system constraints, availability) and actual results of previous month should also be available to the market participants. Besides this, the necessary Market Monitoring System would be deployed for ensuring compliance with the Grid Code.

- *SO Website:* SO is also required to have a dedicated website through which the data pertaining to the daily, monthly and annual operational planning, demand forecasts, availability, and results of system operations could be published. In this regard, a website will be designed and launched that will enhance the transparency of the information generated by SO for access by the relevant stakeholders. The development of website is expected to complete by May 2021.

SO Restructuring: NPCC has created a dedicated Research and Development (R&D) Department and staffed it with some limited resources to perform market-related functions. However, it is necessary for NPCC to have dedicated sections to perform the activities that are related to the operation of Electricity Market. Since the operations carried out by System Operator have a direct impact on trading between the market participants, it is therefore necessary that the relevant sections of NPCC must have adequate capacity, staffing, infrastructure and other resources. For this purpose, NPCC will perform restructuring in order to make itself ready for the operations in competitive market structure and will pursue necessary budget approvals for staffing and deployment of required infrastructure for the establishment of such department by Jun 2021. This will also include hiring of programmers for development and maintenance of customized application and some key resources for HR.

Moving forward, the organizational structure of NPCC as a whole needs to be reviewed and adapted to the upgraded functions of the SO, in relation to the approved market model. For this purpose,

there should be developed a restructuring strategy and overall approach for the creation of SO function within NTDC similar in the line of what is being done for the creation of MO within CPPA-G. This should be followed by the detailed design of the complete organizational structure of the SO. The implementation of the restructuring activity of SO may involve development of the complete associated systems, procedures and documents including SOPs, manuals, systems specifications, JDs etc. compatible with the SO function in the competitive wholesale market coupled with strengthening of the staff and infrastructure to bring it at par with the global practices in terms of efficient system operations.

Another strategy that may be considered by the policy makers in this regard is the merger of the MO and SO to create Independent System Operator (ISO) at appropriate stage keeping in view the future evolution of the market.

Capacity Building: NPCC will strengthen operational planning and dispatch function among others (including staffing, systems and capacity building). In this regard, NPCC will carry out training and capacity building of the relevant staff and officials in the areas of economic dispatch and unit commitment, operational planning, short-term demand forecasting, development and maintenance of IT infrastructure including custom applications, and other specialized areas in system operations to become an efficient System Operator.

Submission of Quarterly Progress Reports to MIMG and NEPRA: Pursuant to the direction of Authority in CTBCM determination, NPCC will prepare the progress reports on a quarterly basis highlighting the progress achieved in terms of above-mentioned sub-actions, identifying the bottlenecks in implementation and their resolution, and identification of areas where support at the higher level is required. The reports will be submitted to MIMG and NEPRA for information and necessary action.

GROUP ACTION NO. 10: DISCOs ACTIONS INCLUDING STRENGTHENING

Primarily Responsible Stakeholder: DISCOs

Support Stakeholder(s): PPIB/AEBD in the role of IAA, CPPA G in coordination function and other relevant stakeholders

Each DISCO shall implement systems and procedures for the participation in the competitive wholesale electricity market in relation to its function as Electric Power Supplier and Distribution Network Operator. Each DISCO shall be responsible for the implementation of the respective interventions required to function in the market whereas the MoE (PD) in representation of the owner of DISCOs shall supervise this task in preparing DISCOs to be ready for integrating into the new wholesale market and provide necessary guidance and support wherever required.

The following paragraphs explain the required interventions and activities envisaged under this group of actions.

Market Implementation Groups (MIGs): MIGs are being formed at each DISCO as per the direction of the Authority with representation from planning, marketing, legal and finance departments of the DISCOs. The MIGs will be responsible for commencement and implementation of the transitory activities required at DISCOs to operate in the approved competitive wholesale market. The MIGs will ensure the preparation of the Implementation Reports identifying immediate interventions required for the strengthening of DISCOs and its submission to NEPRA within the stipulated time. The MIGs will also ensure the preparation of budgets required to undertake the interventions and

internal approvals from the appropriate forums. Further, based on the actions identified by DISCOs in the implementation Reports, MIGs shall ensure that the actions are completed by the respective DISCOs as per set deadlines.

Market Implementation Departments (MIDs): DISCOs are required to have a dedicated interface to operate in the capacity of Electric Power Supplier and as such staff having specialized knowledge and competency to inter alia administer the bilateral contracts portfolio and perform short and medium-term demand forecasting would be inevitable.

It is envisaged that MIGs formed at the initial stage would have acquired enough experience and capability during the transition period through participation in the training programs and working with CPPA-G and other stakeholders for the implementation of the competitive wholesale market. However, to secure the sustainability of the MIGs, DISCOs will ensure the transformation of MIGs into a formal and dedicated Market Implementation Departments (MIDs) by April 2021 with staff deputed on a permanent basis with formal Job Description and SOPs, deploy necessary infrastructure and allocate the budget to make these departments sustainable in the long-run.

Association of DISCOs: Associations are formed by the entities who are required to work together for a common interest or cause. Association of DISCOs is an idea that was long foreseen but not yet implemented. It is required that DISCOs will form their association by following the standard process so that they could collaborate in the areas of mutual interest, watch their interest, and have their voice heard at the relevant platforms and forums. This association will also enable DISCOs to have a combined representation in the Boards of different service providers and market participants, if required. However, bare minimum conditions that the association need to meet to be eligible for assuming position in the boards of entities will be defined in the concept paper prepared CPPA, endorsed by NEPRA and approved by the competent authorities. The formation of the Association of the DISCOs should be completed by Dec 2020, however, it is not a condition precedent for the commencement of the CTBCM.

Financial Health Assessment of DISCOs: Under this sub-action, financial health assessment of their organizations will be carried out by the DISCOs to ascertain their credit worthiness. This assessment will identify the good performing DISCOs which can arrange for the credit covers through commercial banks based on their financial statements, and low performing DISCOs for which government guarantees will have to be arranged as an alternative through Independent Auction Administrator.

In order to assess the financial health of the DISCOs, TORs will be developed by CPPA-G in consultation with DISCOs and PPIB/AEDB, describing how this activity would be carried out by DISCOs in support by PPIB/AEDB. Moreover, the quantum of credit covers required by DISCOs with respect to the exposure of their imbalances in the market would be evaluated.

Eventually, a liaison mechanism would be established through which low performing DISCOs through the MoE (PD) would coordinate with the PPIB/AEDB, in the role of IAA, in order to arrange the required credit cover/guarantees. It is expected that this action will be completed by June 2021.

Standardized Connection Agreements: The existing Connection Agreements being used by DISCOs for granting connection to the BPCs and generators vary from DISCO to DISCO. Therefore, it is required that DISCOs develop a standardized template of the Connection Agreement each for the demand side and the generation side in consultation with NTDC and CPPA-G's support. Once drafted, the Connection Agreement templates will be circulated to take comments from stakeholders. Finally, the draft of the Connection Agreements will be submitted to NEPRA for review and approval. This action is expected to complete by March 2021. The approval of NEPRA on the Connection Agreements is a prerequisite for the commencement of CTBCM, however, the

implementation of the Connection Agreements by DISCOs i.e. signing Connection Agreements with the existing demand and generation participants could continue even after start of CTBCM.

Commercial Allocation of PPAs/EPAs: DISCOs shall coordinate with the CPPA-G for the commercial allocation of existing PPAs/EPAs and would provide their inputs regarding the same to finalize the allocation factors. DISCOs shall also participate in the regulatory approval process of the allocation methodology and factors.

Demand Forecasting (for Capacity Obligations) and Transmission Planning: Pursuant to the requirement of the Distribution Code and the Grid Code, DISCOs will carry out the function of demand forecasting: (i) Short-Term Forecast to project the day-ahead demand and accordingly submit this information to NPCC through their Distribution Control Centers and (ii) Medium/Long-Term Forecast on the annual basis which would inform the Transmission Plans of the DISCOs and Generation Plans of the NTDC. The medium/long-term demand forecasting will also enable DISCOs to ascertain their capacity obligations for the upcoming years.

DISCOs will also carry out the preparation of transmission plans for the expansion of secondary transmission network under their jurisdiction in accordance with the requirement of Distribution Code and get it approved with the competent authority as per the due regulatory and approval process on a continual basis.

This is a continued action that is required from DISCOs on a prescribed frequency as per the Grid Code and Distribution Code. Capacity of DISCOs will be enhanced to perform these important functions.

Amendment in the Distribution Code: This sub-action comprises reviewing the existing Distribution Code in order to align it with the approved market model (if required). This is expected to be completed by May 2021, however, it is not a precondition for the start of CTBCM .

Within the stipulated timeframe, the working group designated to perform the review of the regulatory framework shall review the Distribution Code along with DISCOs and propose required amendments to bring it in line with the approved market model. The amendments proposed jointly by the working group and DISCOs shall be submitted to the Distribution Code Review Panel (DCRP) for review. Finally, the DCRP shall submit its recommendations regarding proposed amendments in the Distribution Code for review and approval by NEPRA.

Capacity Building: Capacity building is one of the key requirements for DISCOs to actively participate in the market. DISCOs are required to ensure capacity building of their staff nominated for the MIGs and other relevant officials of the DISCOs in the areas of demand forecasting, capacity obligations, negotiation and administration of the bilateral contracts, electricity markets, transmission expansion planning and other specialized areas for the enablement of DISCOs and make themselves prepared to participate in the competitive wholesale market.

Submission of Quarterly Progress Reports to MIMG and NEPRA: Pursuant to the direction of Authority in CTBCM determination, all DISCOs will prepare the progress reports on a quarterly basis highlighting the progress achieved in terms of above-mentioned sub-actions, identifying the bottlenecks in implementation and their resolution, and identification of areas where support at the higher level is required. The reports will be submitted to MIMG and NEPRA for information and necessary action.

GROUP ACTION NO. 11: PPIB/AEDB ACTIONS FOR INDEPENDENT AUCTION ADMINISTRATOR (IAA) INCLUDING STRENGTHENING

Primarily Responsible Stakeholder: MoE (PD), PPIB/AEDB

Support Stakeholder(s): NEPRA, CPPA G as central coordinator

The Independent Auction Administrator (IAA) will be an entity responsible for running the competitive auctions for new capacity procurement / new contracts of DISCOs, aggregating the demand of DISCOs to comply with their capacity obligation. The IAA will procure as a procurement service provider/demand aggregator for DISCOs, but each DISCO will sign a bilateral contract on its own.

Another function of the IAA will be managing the required processes to get the guarantees granted to the DISCOs eligible for guarantee support of the GoP. The procurement process for regulated consumers will be governed by the procurement regulations to be promulgated by NEPRA.

Additionally, the IAA will manage the calculations and the mechanism to ensure that each and all DISCOs have contracted in advance the quantities required to comply with each DISCOs capacity obligations. In addition to auction administrator, the IAA will liaison with DISCOs for assessment of their financial health and credit-worthiness and would also be responsible for administering the GoP guarantee support for the financially weak government-owned DISCOs.

In this regard, as stated in the approved model, IAA will be a single entity registered with NEPRA. The role of IAA, as mentioned in the approved model, can be assumed by the two Government-owned entities i.e., Alternative Energy Development Board (AEDB) and Private Power Infrastructure Board (PPIB). This is because presently the AEDB and PPIB are merged and represent one single legal entity, therefore IAA role can be assumed by PPIB/AEDB. However, they will need to get registered with NEPRA for this purpose.

The following sub-actions describes the necessary activities to be taken by PPIB/AEDB to be able to perform the role of IAA in the competitive electricity market:

Registration with NEPRA: IAA will be an entity registered with NEPRA under the Act. For PPIB/AEDB assigned to undertake the proposed role of IAA, they will be required to get registered with NEPRA to act in the capacity of IAA, pursuant to the requirement of the approved model. However, it may not be an immediate requirement for the commencement of CTBCM.

For the purpose of obtaining registration with NEPRA, it is agreed that a Working Group (WG) having lead representation from PPIB/AEDB will be formed. This WG will carry out the analysis that how the AEDB/PPIB being entities formed under their own Act, will pursue registration under NEPRA Act for performing the IAA function.

Once internal consensus is developed and legal possibility is established, the WG will identify and perform the necessary steps required to get registered with NEPRA as per the registration rules and regulations envisaged to be developed under Group Actions 2 and 3 of the Implementation Roadmap. Subsequently, the application for registration will be submitted to NEPRA as per the due regulatory process to complete the registration with NEPRA. The anticipated timeframe to complete the registration process is May 2021.

Strengthening of IAA Functions: The WG with support of other required resources (to be determined) will perform the gap analysis of existing HR processes and IT systems with respect to the functions of the IAA that need to be operationalized in the competitive electricity market as per the approved model. The gap analysis that will be performed in this regard, will evaluate the

competency of PPIB/AEDB in terms of people, process and technology to run the competitive bidding auctions to procure new capacity for DISCOs, the arrangement of guarantees/credit covers for DISCOs, preparing standard bidding documents, among others.

Based on the finding of the gap analysis report, WG shall propose actions required to compensate for the areas that require strengthening. This may include capacity building initiatives to build the skills of the existing staff, expansion in HR strength to undertake additional role, deployment of software, application, portal and associated IT infrastructure required for running competitive auctions and data acquisition from the respective DISCOs related to capacity procurements. It is recommended that PPIB/AEDB complete the implementation of the necessary and immediate actions proposed by WG for strengthening of IAA, by Mar 2021, however, the capacity building activities could be prolonged on a continual basis even after start of the market.

Assessment of Security Package and Concession Agreements: The introduction of the competitive regime would accordingly require revision of the Security Package and necessary adjustments in the Concession Agreements. The PPIB/AEDB will evaluate the existing Security Package and Concession Agreements and make required amendments to align with the structure of the approved market model. Similarly, the drafts of new Market Contracts would be developed by PPIB/AEDB in consultation with CPPA-G. CPPA-G will provide the commercial part of the market contracts, however, PPIB/AEDB will be responsible for preparation of overall templates of the market contracts. Finally, approval of the competent authorities as per the due approval process will be pursued by PPIB/AEDB on such agreements and contracts.

The expected time to complete this sub-action is by June 2021.

Liaison with DISCOs for Financial Health Assessment and Arrangement of Credit Cover/Guarantees: PPIB/AEDB in the role of IAA will be responsible for administering the GoP guarantee support for financially weak low performing government-owned DISCOs. For this purpose, PPIB/AEDB will support DISCOs in carrying out the assessment of their financial health. DISCOs considered non-credit worthy will be identified and subsequently, PPIB/AEDB through a mechanism will arrange guarantees/credit covers against exposure to imbalances for respective DISCOs and new capacity procurements would be established.

Website for Transparency of Information: IAA will be required to have a dedicated website through which the important data pertaining to demand aggregation, bidding and auctions and other necessary information could be accessed by the market participants. In this regard, a dedicated website for IAA will be designed and launched that will enhance the transparency of the information generated by the IAA for access by the relevant stakeholders. The development of website is expected to complete by Feb 2021.

Submission of Quarterly Progress Reports to MIMG and NEPRA: PPIB/AEDB will prepare the progress reports on a quarterly basis highlighting the progress achieved in terms of the above-mentioned sub-actions, identifying the bottlenecks in implementation and their resolution, and identification of areas where support at the higher level is required. The reports will be submitted to MIMG and NEPRA for information and necessary action.

GROUP ACTION NO. 12: CAPACITY BUILDING OF THE MARKET PARTICIPANTS AND SERVICE PROVIDERS AND SUPPORT TO OTHER POWER SECTOR ENTITIES FOR INTEGRATION TO THE CTBCM

Primarily Responsible Stakeholder: CPPA G (Coordinator)

Support Stakeholder(s): Other Stakeholders, LUMS and similar other institutions, specialized local and foreign trainers.

It is essential for the implementation of the approved model and the updated detailed roadmap that all the stakeholders involved have some level of a common understanding of market concepts so that they not only feel comfortable in collectively implementing the market, but also provide valuable contribution during implementation moving forward. It is important that all key stakeholders are well aware and well informed about their intended roles, and functions that are envisaged for them under the approved market model. Further, it is also essential for them to develop concepts of the electricity markets in general, and have a clear understanding of the main features and design of the approved market model, the policy, legal, regulatory and contractual framework and interface of various entities acting in the market.

Capacity Building Initiatives by CPPA-G: In order to meet the pressing requirement regarding information sharing among stakeholders and capacity building of the power sector entities, CPPA-G over the last two years has been organizing a number of consultative sessions, training workshops, and specialized training programs engaging international consultants and trainers such as MRC, PSR Brazil, CRA, Homulor Consulting to name a few. Among such training programs, the Electricity Market Program (EMP) in association with LUMS being the most prominent one; two of the annual iterations have been completed. Moving forward, CPPA-G in the role of MO would continue to organize EMP Program on an annual basis on multiple levels considering the emerging needs of the market participants and service providers. Additionally, specialized training sessions would be organized by CPPA-G related to advanced concepts of the market design keeping in view the needs of its staff as well as for the relevant power sector entities, IPPs and BPCs. The capacity building of the participating entities are important for the competitive wholesale market.

Electricity Market Team: The transition towards a competitive electricity market would not be possible without the dedicated involvement of the relevant power sector entities. Keeping this in view, a team of stakeholders including representatives from MoE(PD), NEPRA, NTDC, NPCC, DISCOs, and K-Electric has been established which is known as Electricity Market Team (EMT). The objective is to bring professionals from relevant sectors of the market on a centralized platform to work closely and collaboratively toward the development and implementation of a competitive market in Pakistan. It is anticipated that due to the possession of advanced knowledge of the electricity markets in general and market model in particular, the members of EMT will be absorbed in the MIGs and ultimately become part of the MIGs of the DISCOs. The MIGs of entities will play a central role in implementation of this reform and as such their capacities will be built.

Training by other Entities: As it is envisaged that various power sector government-owned organizations would be operating in the approved competitive electricity market either in the role of market participant or as a service provider. Therefore, these entities should also be mandated to arrange and organize training programs, sessions and workshops in consideration of the needs of their employees so that they could develop the required skill to assume and perform their respective functions in the market. It is also recommended that entities should perform the training-need-assessment of their organizations before organizing trainings for their employees. If necessary, they may also deploy specialized consultants for on-the-job training of their staff.

Strategic Partnerships and Knowledge Exchange Programs: MO is obligated to liaise with other international bodies having similar market functions or administering competitive power markets. Doing this would enable MO to have a knowledge-sharing platform and to have an opportunity to grow. This will also open avenues for the MO to arrange knowledge-sharing exchange programs with partner organizations and other entities may also be invited to join the same.

KE Integration to the CTBCM: With the present status of KE in the power sector, KE will have to undertake some actions for its integration to the CTBCM. CPPA G as the overall coordinator, will provide assistance to KE aimed to facilitate its integration to the CTBCM in aspects that affect its interaction with it, such as the potential interest of continuing the purchasing of power from the power market, the registration as trader or supplier according to potential interest of participating in the electricity market, etc. KE will establish a formal dedicated relationship for this purpose, such as the creation of a MIG and interact with the CPPA as the rest of the stakeholders through the MIG.

OTHER ACTIONS

GROUP ACTION NO. 13: DETAILED DESIGN OF CTBCM

Primarily Responsible Stakeholder: CPPA G

Support Stakeholder(s): NEPRA and others

Moving from existing single buyer structure to a wholesale electricity market constituted by multiple sellers and buyers with bilateral contracts, requires an adequate market design to take that into consideration bilateral trading and, in consequence, also the review and adjustment of the regulations, codes, agreements, and procedures keeping in view the principle concepts of the detailed design of CTBCM including but not limited to the following:

- **Balancing Mechanisms for Capacity and Energy:** This will include the establishment of pricing mechanisms through which the generation energy and capacity imbalances are measured and valued. Further, the methodology for the discovery of the marginal prices would be finalized. The design, development and implementation of the process, structures and systems associated with the software and hardware infrastructure would be undertaken.
- **New Market Contracts:** Contracts are the instruments to manage risks. The purpose of the Market Contract is for a company participating in the market to be able to manage its risks and share risks among those that can best manage each risk. Considering that the interest of a Participant is to manage the risk of price volatility and manage imbalances, the design of the market contracts needs to allow and enable sufficient flexibility on how Participants agree to trade bilaterally (agree on quantities and prices, and conditions). Keeping this in view, the contract designs would be tailored to reflect the needs and conditions of different load profiles (the buyers in the contract market) and of different generation technologies (the sellers in the contract market). Additionally, different types of contracts would be proposed for the approved market model. The variety of designs will allow each Participant to choose the preferred contract design(s) and contract portfolio to optimize the needs, conditionality and interests of the Participant. AEDB and PPIB will develop draft templates for new market contracts. CPPA-G will develop the commercial parts of these contract templates.
- **Treatment of Losses:** This will include devising a mechanism for the explicit allocation of losses (or cost of losses) among demand participants (such as distribution licensees, bulk power consumers, and suppliers representing demand/consumers) connected to the grid.

- **Firm Capacity Factors and Capacity Obligations:** Firm capacity is the capability of the generation unit to be available for the production of electricity which can be (and in many cases must be) guaranteed at a given time. In order to provide sufficient and adequate capacity for the medium and long-term security of supply, the concept of firm capacity for a different type of technologies would be captured in the detailed design of the CTBCM Model. A methodology will be devised to calculate the firm capacity of each technology i.e. Thermal, Hydro (Run of River and storage based) and Variable Renewables (Wind and Solar) will be determined based on their contribution to the security of the system.
- **Market Simulations:** For the successful operation of any competitive market reliable information about market-based transactions should be available to all stakeholders in a transparent manner. For the purpose of generating this intricate information including projected market prices, projected revenues of generators based on different market contracts, simulation of the contribution of intermittent resources to the security of supply and allocation of the existing and future PPAs/EPAs costs among different DISCOs, CPPA-G has developed an Integrated Energy-Market Simulation Model. During the detailed design phase, this model would be refined using the improved input parameters and the project outcomes would be updated based on the changing scenarios.
- **Settlement Procedures:** For all types of contracts and based on the information collected from the commercial settlement metering systems, the MO will establish a procedure for settlement. This procedure will be prepared based on a commercial metering system that complies with the Grid Code specifications (included accuracy and information security) and is subject to the monitoring process as indicated in the same Code.
- **Guarantees and Credit Covers:** One of the main objectives for the new market is to create the proper conditions to reduce government liabilities by reducing or eliminating the need for sovereign guarantees. The goal is to attract or develop knowledgeable investors or operators that take the risk of bringing financial resources and managerial skills to ensure the sustainability and performance of the power sector and its companies. Credit cover detailed design be carried out in collaboration with DISCOs for (i) assessment of financial health of the DISCOs (ii) quantification of the quantum of credit cover/guarantees required by each DISCOs (iii) Arrangement of requisite covers through Banks (for good performing DISCOs) and government guarantees through IAA (for low performing DISCOs).
- **Others:** The elements of the detailed design mentioned above are just few among the whole spectrum of the detailed design, there are many others which will be worked out as the need arise.

Although, the above-mentioned features of the target market are principally covered in the high-level design of the CTBCM Model approved by NEPRA. However, there lies a need to further refine the modalities associated with the features and intricacies of the market design after internal deliberation. Such attributes of the detailed design of the approved market model would further inform the regulations, codes, agreements, and procedures required to be prepared under a different group of actions. Additionally, the finalization of the elements of the detailed design would also contribute to designing the institutional structure of the Market Operator.

CPPA-G with the help of its market development consultants would develop **concept papers** on different aspects of the CTBCM which will form the basis of regulations to be developed by the Regulator.

GROUP ACTION NO. 14: LEGACY CONTRACTS-COMMERCIAL ALLOCATION OF PRE-EXISTING PPAs/EPAs

Primarily Responsible Stakeholder: MoE (PD)

Support Stakeholder(s): CPPA G, DISCOs, KE

The CTBCM is based on a Contract Market with bilateral contracts as the main for selling and buying electricity at the wholesale level.

Under the existing regime the Power Purchase Agreements (PPAs) and Energy Purchase Agreements (EPAs) are not signed directly between generators and the DISCOs as buyers, instead the CPPA-G signs these contracts on behalf of DISCOs in the role of Agent. The invoices are sent to the single-buyer (CPPA-G) for settlements.

This group of actions corresponds to the commercial allocation of pre-existing PPAs/EPAs among DISCOs, consistently with the wholesale market design. Eventually, the legacy contracts will be administered by the Special Purpose Trader (SPT), which will be formed after the separation of CPPA-G's Market Operator and Agency functions.

In order to commercially allocate the existing PPAs/EPAs, it is necessary to define what share (percentage) of each PPA/EPA will be allocated to each one of the existing ten (10) ex-WAPDA DISCOs and KE. The allocation factors will be calculated during the implementation phase based on agreed mechanisms.

Finally, the allocation methodology and the factors will be submitted to the Regulator for review and approval. Further, the necessary adjustments will be made in the related applicable documents.

This commercial allocation of existing PPAs/EPAs among DISCOs will be used for the settlement of imbalances arising during wholesale trading (imbalances arising from the difference between the contracted quantities and the actually taken quantities) and also one of the primary objectives to incentivize DISCOs to decide on the future capacity procurements based on their forecasted loads in proportion to the allocation factors assigned respectively to each DISCO.

GROUP ACTION NO. 15: CONTRACTUAL FRAMEWORK-NEW MARKET CONTRACTS, MARKET PARTICIPATION AGREEMENT

Primarily Responsible Stakeholder: PPIB/AEDB, CPPA

Support Stakeholder(s): MoE (PD), NEPRA

Security Package including New Market Contracts: One of the main features of the approved CTBCM Model is the bilateral contracts enabling trade between the buyers and sellers. The existing PPAs/EPAs prevailing in the single-buyer model were designed keeping in view the peculiarities persisted in the single buyer regime. These contracts are inflexible and don't allow a fair allocation of

risks between the parties. There is a need to adopt a new contractual framework compliant with the needs and requirements of the competitive wholesale market.

Under this action, the existing Security Package and Concession Agreements would be evaluated by AEDB/PIIB and required amendments would be made to align with the structure of the approved market model. One of the main objectives of the new market contracts is to minimize and eventually eliminate the take or pay conditions and introduce flexible for new contracts (once the CTBCM starts) formulas for sellers and buyers trading in the market. Existing legacy contracts for generators will not suffer modifications due to the start of the new market.

Additionally, the draft template of the new market contracts for the procurement of power for the regulated consumers will be developed which will be led by PIIB and AEDB with support from CPPA-G. CPPA-G will develop the commercial part of the new market contracts. The principle difference in the legacy contracts and the new market contracts is that these are supply contracts under which generators have obligations to supply but not necessarily produce whereas the buyers have obligation to pay but not necessarily to consume. Both sellers and buyers will have access to the balancing mechanisms to settle their deviations in a transparent way.

The non-regulated consumers will be allowed to negotiate freely with the generators and not required to have standardized approved market contracts. However, MO will define minimum conditions such as metering, connection points, contracted quantity, etc. to be included in the template of the bilateral contracts between BPCs and the generators to get these contracts registered in the Contract Register.

Once the drafts of the new market contracts are finalized by PIIB/AEDB, these will be submitted to the competent authorities for review and approval in compliance with the prevailing policy regime.

Market Participation Agreement: All market participants intending to do bilateral trading in the wholesale electricity market are obliged to register with the Market Operator by signing a Market Participation Agreement (MPA). As part of the Market Participation Agreement, each Participant assumes the obligation to participate in the balancing mechanism and pay (or be paid) for imbalances.

Market Operator will draft the template for the Market Participation Agreement and the same will be submitted to NEPRA for review and approval. Once the MPA is in place, the MO may initiate the process of information collection and sign an agreement with each participant allowing them entry in the competitive market.

GROUP ACTION NO. 16: MARKET DATA INSTITUTIONALIZATION

Primarily Responsible Stakeholder: CPPA G, NTDC and NPCC

Support Stakeholder(s): n/a

Reliable data availability and its timely sharing with market participants is the key to ensure transparency and predictability in the market. On one side, accessibility to accurate and transparent information from a 'single source of truth' will boost the investors' confidence and on the other side will result in informed decision making by the market players, however, this action is not a condition prerequisite for the commencement of CTBCM.

Under this initiative of Data Institutionalization, crucial data in CPPA, NTDC and NPCC related to system operations, forecasting, planning, simulation, and competitive market operations and settlement will be identified along with data sources for proper data input, validation, warehousing, retrieval and reporting afterward. This will include an end-to-end auditable process to capture,

transmit, validation, storage and retrieval of the above-stated information and steps, being the different parties accountable for the provision of the information generated under their responsibility. Capacity building of the relevant stakeholders and establishment of data storage solutions (servers, applications, databases, reporting software etc.) will be part of this initiative. Once implemented other entities of the sector like Ministry, NEPRA, Provincial Energy Departments, IPP's, IRSA etc. can benefit from the data repository to run their analysis for decision making.

Likewise, to perform market simulations for future price projections and basket price assessment, CPPA uses extensive data regarding generation planning and forecasting as well as plants historic availability and dispatch data and future maintenance plans data. This data forms the input of the SDDP tool which is used to forecast market prices which can be used by the potential investors to analyze their anticipated future returns and hence to make investment decisions.

Similarly, in NTDC, forecasting and generation planning data is stored using conventional methods without having a centralized database. As a result, different versions of data exist with field formations/entities. The initiative of Data Institutionalization will address such issues.

NPCC being the System Operator generates extensive data that has huge financial implications in the settlement process, as it is used as the basis for daily dispatch decisions. No centralized database is available to manage the data in a structured manner. A huge quantum of data is maintained on papers or faxes making the retrieval of the required information efforts and time intensive.

Implementing the Data Institutionalization Project will result in quick and accurate data available for the sector entities, market participants and potential investors.

The identification of the required data to be captured and processed through this initiative would be done jointly by all entities. Subsequently, the participating entities would be responsible for the timely sharing of the identified datasets to CPPA-G as and when required.

Following is the strategy to carry forward this project:

- MO in consultation with NTDC and NPCC will finalize the IT strategy and system architecture for this project. The implementation of an Application Integration Architecture to work as middleware among all the market participants to exchange the information at centralized level at MO
- IT infrastructure would be developed following a modular approach under the administrative control of MO with an option to handover the components (database, application and servers etc.) to the respective entities as and when required
- SOPs for the data sharing and retrieval by respective entities will be finalized after consultation and entities would be obligated to follow the same

GROUP ACTION NO. 17: ASSOCIATIONS OF MARKET ENTITIES

Association of Generation Companies of Pakistan: IPPs and Generation Companies will be required to create the Association of Generation Companies of Pakistan. The members will be companies in the power sector holding a generation license and in the future being registered in the MO as a Market Participant. Membership will be optional. The association will formally represent the interest of generators and it will represent the subsector in the entities that will be part of the CTBCM, according to the governance that will be designed and approved during the formation and creation of those companies.

The creation of the association shall follow a designated process so that they could collaborate in the areas of mutual interest, watch their interest, and have their voice heard at the relevant platforms and forums. The assistance to be provided by CPPA G will consist of preparation of a concept paper to be endorsed by NEPRA and approved by the competent authorities. This Association will also enable Generation Companies to have a combined representation in the Boards of different service providers and market participants. However, bare minimum conditions that the association need to meet to be eligible for assuming position in the boards of entities will be defined in the concept paper. The formation of the Association of Generators of Pakistan shall be completed by March 2021.

Association of Transmission Companies of Pakistan

If required, the transmission companies of Pakistan may form an Association of Transmission Companies of Pakistan (ATP). The ATP members will be companies in the power sector holding a transmission license. Membership will be optional. The ATP will include within its membership, NTDC, Provincial Transmission Companies and Special Purpose Transmission Companies.

The association will formally represent the interest of the transmission subsector in the entities that will be part of the CTBCM, according to the governance that will be designed and approved during the formation and creation of those companies

The creation of the association shall follow a designated process so that they could collaborate in the areas of mutual interest, watch their interest, and have their voice heard in the relevant platforms and forums. The assistance to be provided by CPPA G will consist of preparation of a concept paper to be endorsed by NEPRA and approved by the competent authorities. This Association will also enable Transmission Companies to have a combined representation in the Boards of different service providers and market entities. However, bare minimum conditions that the association need to meet to be eligible for assuming position in the boards of entities will be defined in the concept paper. The formation of the Association of Transmission Companies of Pakistan shall be completed by March 2021.

It is pertinent to highlight that since until the required quorum of the transmission companies to form such association is satisfied, the NTDC will represent the transmission companies in the Board of MO and other market entities.

Association of Bulk Power Consumers of Pakistan

The BPCs and traders registered with the MO for trading in the market will create the Association of Bulk Power Consumers of Pakistan (ABP). The members will be Bulk Power Consumers in the power sector holding a permit from NEPRA to purchase electricity from generators or retailers and are registered in the MO as a market participant. Membership will be optional.

The Association will also include within its membership Traders holding a license for trading electricity and registered in the MO as a market participant, regardless ownership.

The association will formally represent the interest of Bulk Power Consumers and Traders in the entities that will be part of the CTBCM, according to the governance that will be designed and approved during the formation and creation of those companies.

The creation of the association shall follow a designated process so that they could collaborate in the areas of mutual interest, watch their interest, and have their voice heard in the relevant platforms and forums. The assistance to be provided by CPPA G will consist of preparation of a concept paper to be endorsed by NEPRA and approved by the competent authorities. This Association will also enable BPCs and Traders to have a combined representation in the Boards of different service providers and market entities. However, bare minimum conditions that the association need to

meet to be eligible for assuming position in the boards of entities will be defined in the concept paper. The formation of the Association of Generators of Pakistan shall be completed by March 2021.

READINESS AND COMMERCIAL OPERATION OF CTBCM

GROUP ACTION NO. 18: READINESS FOR COMMERCIAL OPERATION OF ELECTRICITY MARKET

Responsible Stakeholders: Relevant Entities Responsible for their Respective Actions

This group of actions will be responsibility of all relevant stakeholders involved in the implementation of the CTBCM and as such the CPPA G in the role of central coordinator of the CTBCM implementation will ensure the readiness in an integrated manner. In order to commence the CTBCM, all parties are required to complete the assigned responsibilities in a timely manner so that the targeted Commercial Operation Date (COD) of the CTBCM could be achieved.

Actions are mostly related to testing whether all systems, procedures and data exchanges are ready, up and running to perform the intended actions and the entities are prepared to carry out their respective functions according to their perceived roles in the competitive wholesale market, to smoothly start the market without disruptions. Testing protocols shall be developed and coordinated by MO in consultation with other stakeholders responsible for those systems, procedures, and data exchanges. CPPA-G and the relevant entities shall report their readiness to the MoE (PD) and the NEPRA so that they could set the ground for the COD.

Following is a preliminary checklist of the actions that need to be completed by the respective entities to ensure readiness before starting the market:

MoE (PD):

- Power Policies aligned with the NEP and the approved market model
- New Rules are prescribed

NEPRA:

- Existing Rules amended in accordance with the Act and approved market model
- Existing Regulations aligned with the new/revised rules and approved market model
- New Regulations specified in accordance with the requirement of Act, Rules and approved market model
- Timely approvals granted on the Codes, SOPs, Guidelines, Contract Templates etc.

NTDC:

- NTDC performs final testing of quality and calibration of Revenue Metering systems in each market entry (sale) or exit (purchase) point
- Standardized Connection Agreements templates developed and approved

NPCC:

- NPCC as System Operator tests generation scheduling and dispatch security-constrained economic dispatch software and systems, information exchange, relevant components and information on transmission constraints etc.
- Testing of the SO Website

DISCOs:

- Arrangement of Credit Covers/Guarantees by the DISCO through commercial banks/IAA against their exposure to imbalances
- Standardized Connection Agreements templates developed and approved

PPIB/AEDB:

- New Market Contract templates are developed and approved
- Necessary amendments in the Security Package and Concession Agreement are done
- Arrangement of the Government guarantees/credit covers in place

CPPA-G:

- Operational and legal bifurcation of CPPA-G into MO and SPT
- CPPA-G as Market Operator tests balancing mechanisms including marginal price discovery, contract register, settlement and billing system, payment system and credit cover mechanism, quality control, and internal auditing systems
- Market Participants Agreements templates developed and approved
- MO Commercial Code and SPT code developed and approved
- Testing of market data management system including web-based information exchange with Participants and Service Providers.
- Allocation of existing PPAs/EPAs to DISCOs
- The initial determination of required credit cover in the market and testing of credit or guarantee systems
- Pilot shadow market, to test live systems, mechanisms, information exchange, and procedures
- Collect comments and feedback from each party participating in the tests
- Based on test results and feedback from parties, develop any required improvement or correction
- Inform the MoE (PD) and NEPRA test results and whether readiness has been achieved, including any transitory arrangement decided
- Testing of the MO Website

Once the tests are completed satisfactorily or transitional arrangements are agreed for systems to be further enhanced, the MoE (PD) in consultation with NEPRA will assess readiness and declare the date to start the commercial operation or require additional tests or enhancements.

GROUP ACTION NO. 19: DECLARATION OF COMMERCIAL OPERATION DATE OF CTBCM

Primarily Responsible Stakeholder: MOE (PD)

Support Stakeholder(s): Relevant stakeholders

This group of actions mentions the activities necessary to declare the Commercial Operation Date of the CTBCM model.

- MoE (PD) shall enforce the activation of MO and SPT as independent companies through the rules that will govern the operation of MO and SPT
- Activation of new and amended Regulations, SOPs and Guidelines by NEPRA which are necessary for the operations of the competitive wholesale market
- MO shall start the competitive wholesale electricity market on the COD declared by the MoE (PD)

3. MONITORING AND COORDINATION

Close monitoring and coordination of the implementation roadmap will be needed at multiple hierarchies. At the initial level, each entity responsible for the implementation of the assigned activities and actions as per the above roadmap would be required to monitor their progress and update the status to the Regulator and Ministry on a quarterly basis through submission of Quarterly Progress and Implementation Report as directed by the Authority.

CPPA-G in the role of central coordinator would also continuously monitor the implementation of the complete roadmap. In this regard, CPPA-G shall submit quarterly reports to the Ministry and NEPRA informing about the progress made, hurdles found, corrective measures that need to take, external support required, necessary interventions from other entities or stakeholders and any other measures required to ensure smooth execution of detailed Implementation.

3.1. MIMG ROLE, COMPOSITION & GOVERNANCE

In the approved market model, it was proposed that for the monitoring of the CTBCM Implementation Roadmap and provide guidance and support at the strategic level, a Market Implementation Monitoring Group (MIMG), with representatives of all involved stakeholders shall be formed.

MIMG will be responsible for monitoring the implementation of the roadmap based on reports from its members. It will also have the role of proposing corrective action to address the causes of delays and difficulties identified in implementing the roadmap.

3.2. TERMS OF REFERENCE (TORs) OF THE MIMG

3.2.1. FUNCTIONS

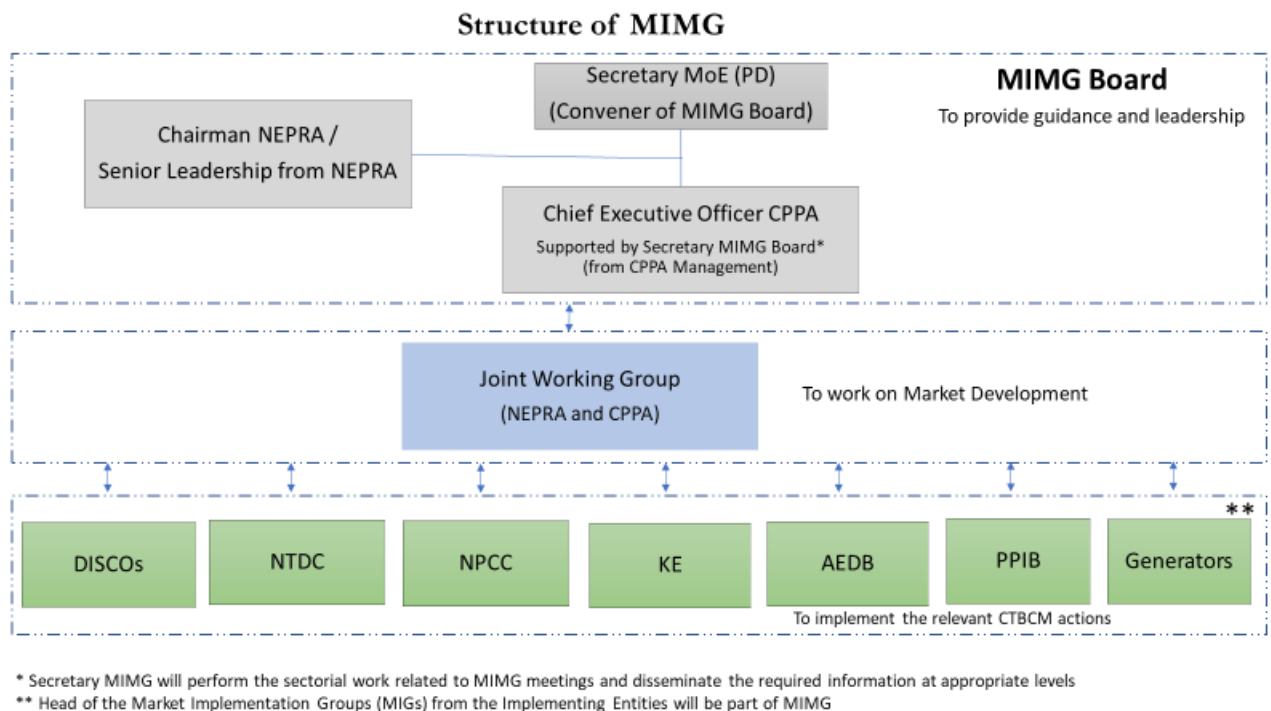
The MIMG will have the following functions:

- Provide guidance and support to all stakeholders with specific roles in the CTBCM implementation
- Seek the involvement of different authorities to authorize or take the appropriate decisions, as and when required, for implementation of CTBCM actions
- Provide for measures to mitigate the effects of delays, if any
- Propose solutions whenever implementation problems arise
- Coordinate with stakeholders, when implementation requires interaction at the interface among them
- Facilitate the provision of resources for implementing these reforms
- Prepare and disseminate information on appropriate level about the progress in the CTBCM implementation

3.2.2. COMPOSITION

The implementation of the CTBCM will require the involvement of a wide spectrum of stakeholders to ensure proper and smooth completion of all action points necessary for having the new market tested and ready to start operations by approved COD. The stakeholders include Ministry of Energy (Power Division), NEPRA, CPPA-G, NTDC, NPCC, DISCOs, PPIB/AEDB, IPPs, and K-Electric.

MoE (PD) being the owner of involved power sector entities shall lead the MIMG and would provide supervision, guidance, and leadership to its controlled entities. Similarly, NEPRA being the Regulator of the power sector would monitor the progress of its licensees and provide necessary directions where ever required.



There will be a Board of MIMG chaired by Secretary MoE (PD) and with Chairman NEPRA/Senior leadership from NEPRA and Chief Executive Officer of CPPA-G as members. A member of CPPA Management will be the Secretary of the MIMG Board to perform the sectorial work related to MIMG meetings and disseminate the relevant information at appropriate levels. Under the Board of MIMG, there will be a Joint Working Group (JWG) consisting of officials from NEPRA and CPPA that will work and facilitate the market development initiatives on a day-to-day basis. Market Implementation Group (MIG) will be created within entities to facilitate the implementation of CTBCM actions and head of MIG of each entity will be part of the MIMG.

Further, CPPA-G as the central coordinator would facilitate the entities during the implementation of the roadmap and would carry out the necessary capacity building of the stakeholders in terms of market development. CPPA-G would also keep track of the group of actions under the implementation roadmap and would raise red flags for the consideration and necessary action of the MIMG Board in case of any non-compliance is observed which may cause a delay.

The Board could invite other stakeholders to be MIMG Members by its own initiative, or by the proposal of any other MIMG Member. The MIMG will have standing quarterly meetings, and other meetings based on requirements.

The MIMG Members will be allowed to be represented by other alternate MIMG Members, however, the represented Member will be responsible for the decisions made.

The MIMG Members shall have the following roles:

- channel the MIMG requests into the entity they are representing
- produce the requested information in front of the MIMG
- channel requests from the entities they are representing to the MIMG
- coordinate the participation of experts of the represented entity in meetings in which their participation is requested by MIMG

3.2.3. GOVERNANCE

The MIMG will be governed by the following principles:

- The MIMG will be an ad-hoc body with the only purpose of providing coordination and support for the CTBCM implementation and execute the functions above indicated.
- The MIMG will have an executive management to deal with the day to day business. The executive management function will be entrusted to NEPRA and CPPA-G.
- MIMG will hold a quarterly progress review meeting to evaluate the progress of the implementation roadmap and to assess the performance of the entities responsible for their respective actions in the roadmap.
- The MIMG members will not have the power to enforce the execution of any of the action points of the Implementation Roadmap. Enforcement shall be made by the competent authorities through the formal communication/reporting channels.
- The MIMG will interact with the Grid Code and Commercial Code review panels.

4. ANNEXURES

ANNEX-I: ONE DAY CONSULTATIVE SESSION FOR DISCOs SENIOR MANAGEMENT

One-Day Consultation Session for CEOs, Board Members and Senior Management of DISCOs and KE

December 29, 2019

Participants: Shehryar Chishti (Chairman BOD LESCO), Mujahid Pervaiz Chatha (CEO LESCO), Abid Latif Lodhi (CEO CPPA-G), Imtiaz Hussain Baloch (ADG NEPRA), M. Latif (GMO GEPCO), Ayaz Jaffer Ahmad (Finance Director KE), Ch. Abdul Razzaq (GMO IESCO), M. Iqbal Khan (C.E MEPCO), Khalid Memon (C.E SEPCO), Fiaz Chaudhary (Director LUMS Energy Institute), Dr. Tariq Jadoon (LUMS), Dr. Nauman Zaffar (LUMS), M. Amir (SE GSO FESCO), Atif Jawad (DM Commercial PESCO), Syed Sameer Hassan (Manager KE), Sajid Hassan Ansari (DCM IESCO), Omer Haroon Malik (DGM SMD CPPA-G), CPPA-G Team

Agenda:

1. Historical Perspective of Market Structure in Pakistan
2. Market Development (GoP's Decisions and the Act)
3. Market Structures Evolution in Pakistan
4. Determination of the Authority on CTBCM Approval and Specific Directions for DISCOs
5. Preparation of the updated Implementation Roadmap pursuant to Direction of the Authority in Consultation with DISCOs and other stakeholders

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Important Comments and Responses

- 1 Chairman BoD (LESCO) asked about the treatment of the existing PPAs/EPAs and how the existing PPAs/EPAs will be allocated among the DISCOs.

It was explained that the PPAs/EPAs will be treated the same way as of today. The Special Purpose Trader (SPT) will administer these contracts. The legacy contracts will be commercially allocated to all the DISCOs (including KE) based on the allocation factors which will be calculated during the design phase based on transparent formulas and simulations. The DISCOs will be consulted in the process of finalizing the allocation factors and these will be adopted only after approval of NEPRA.

- 2 Some participants asked questions related to the mechanism of the credit cover/guarantees envisaged for participation in the competitive wholesale market.

It was discussed that DISCOs will be required to arrange credit covers/guarantees for the procurement of the new capacity and the credit covers will be required against the exposure of each DISCO in the balancing mechanisms. It was further explained that the DISCOs will be required to carry out the financial health assessment of their companies. The DISCOs which are financially strong based on their balance and account statements would make required credit covers via the commercial banks. Whereas, the financially weak DISCOs will make liaison with the AEDB/PPIB in the role of Independent Auction Administrator (IAA) for the arrangement of guarantees through the standard process.

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- 3** CEO LESCO showed his concern regarding directly negotiating and managing the bilateral contracts in the future competitive regime as currently DISCOs do not possess such experience and capacity to perform the same and it will create extra burden on DISCOs.

It was briefed that the existing contracts will only be allocated to DISCOs in commercial terms and the management of such contracts will be done through SPT. In the competitive regime, IAA will be responsible for procuring additional capacity for the DISCOs through Auctions. The contracts for the new capacity will be signed by DISCOs. It is envisaged that initially the quantum of such bilateral contracts will not be very large at the initial stage of market opening and also by that time DISCOs will have operational dedicated Market Departments and had built enough competency to perform this function.

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- 4** Participants asked about the CTBCM Implementation Roadmap being developed by CPPA-G in consultation with the stakeholders, its approval process and its dependency on the commercial operation date of the market.

It was explained that CPPA-G has organized multiple consultative sessions of stakeholders inviting participants at various organizational hierarchies and this session with the CEOs, Board Members and Senior Management of DISCOs is just one session of the series. As directed by the Authority, CPPA-G after consulting the stakeholders will update the detailed Implementation Roadmap and the same will be submitted to NEPRA for approval before the target date of February 5, 2020. The commencement of the implementation roadmap will be kicked off as soon as approval from NEPRA is received on the updated roadmap. The Commercial Operation Date (COD) of the CTBCM will be effective from the date of approval of the roadmap and its implementation will be completed in 1.5 years as per the extension recently granted by ECC in December 2019.

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- 5** Director Finance KE raised a concern regarding the current agreement for the supply to KE by CPPA-G from the DISCOs pool based on the apprehension that the CPPA-G will no longer be the agent of the DISCOs. It was claimed that the power supply through CPPA-G needs to be continued to KE.

It was responded that KE will also participate in the allocation of power to KE from the pool and as such this quantum of power will be treated as any other DISCO.

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- 6** Participants from KE were curious to know that how KE as a vertically integrated utility will integrate in the competitive wholesale market.

In response, it was explained that generally there are several options to integrate a Vertically Integrated Utility (VIU) in the competitive market inter alia:

- VIU remains as integrated utility and trade in the market through import and export.
 - VIU remains as integrated utility for certain period and trade in the market through import and export. However, a clear plan is established to integrate it fully into the market and one single market is established. This will require enhancement of the transmission network at the interconnection.
 - Two separate markets are established with clear boundaries for import and export.
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However, it was discussed that the regulator can decide which option to be exercised based on the provision of the Act, license and other privatization documents.

Pictorial



CEO CPPA with participants of the Consultation Session on CTBCM Implementation Roadmap for



Chairman BoD LESCO (in center) participating in Consultation Session



CEO LESCO (in center) participating in Consultation Session



Group Photo of the participants of the Consultation Session on CTBCM Implementation Roadmap

ANNEX-II: FIVE DAYS CONSULTATIVE SESSION FOR POWER SECTOR ENTITIES

Five-Days Consultation Session on Updated CTBCM Implementation Roadmap, Detailed Design and IE-MSM Reports

December 30, 2019 – January 3, 2020

Participating Entities: NEPRA, PPIB, AEDB, NTDC, NPCC, DISCOs, K-Electric and CPPA-G

Agenda:

1. Discussion on Determination of the Authority on CTBCM Approval and Specific Directions for DISCOs, NTDC and NPCC
2. Actions in the approved CTBCM Model for AEDB and PPIB
3. Deliberation with entities on the review and additions in the regulatory framework as per the approved model
4. Preparation of the updated Implementation Roadmap pursuant to Direction of the Authority in Consultation with stakeholders
5. Consultation on CTBCM Detailed Design and IE-MSM Report

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Important Comments and Responses

General Comments on CTBCM Approval Determination

- 1 Some participants argued that the revocation clause in the CTBCM approval determination would result in lowering the investor's confidence in the approved competitive market model and would give rise to a regulatory risk based on which the investors would demand premium against their investments and the guarantees. Therefore, the Authority may consider omitting the revocation clause.

It was proposed that the matter shall be brought into the knowledge of the Authority for their kind consideration.

- 2 Some participants referred to the clause in the determination regarding changes by the Authority in future in the high-level model of the CTBCM.

All participants were of the agreement that Authority has the discretion to make changes in the approved model any time by following the due process. However, the design of the approved Model and the actions under the implementation roadmap are inter-connected. Therefore, any change made in any one aspect of the approved high-level model design, will have cascading effects on the policy, regulatory, institutional and IT related actions and may delay the implementation. It was advised that the implication of such changes shall be presented to the Authority for their consideration.

DISCOs' Comments on Implementation Road Map

- 3 Participants from DISCOs inquired about the structure of the Market Implementation Groups (MIGs).

It was explained that DISCOs need an interface to interact in the competitive market in terms of management of bilateral contracts, demand forecasting and planning, Arrangement of Guarantees/Credit Covers, Connection Agreements administration, registration and dealing with the MO as market participant. Keeping in view this

requirement, it was deliberated upon by all DISCOs participants that the MIGs therefore should have representation from Legal, Planning, Commercial/Marketing and Finance Departments. It was further discussed that the staff of DISCOs who have participated in the 2018 and 2019 EMP Programs will be part of the MIGs as they have the required knowledge to pursue this function within DISCOs.

- 4** It was highlighted that the MIGs seems to be an interim function for the implementation of the Market Model. However, for long-term suitability of the same, what has been envisaged.

It was responded that a dedicated Market Department should be established within the DISCOs for managing the market interface on a permanent basis therefore it is proposed that MIGs formed at initial stage in compliance to the direction of Authority would be transformed into dedicated Market Implementation Departments (MIDs) moving forward.

It is also proposed that these departments be fully staffed as per the requirements with proper allocation of budget and resources to perform their function. It was further suggested that the DISCOs should pursue the necessary approval for staffing and budgeting of the MIDs from the competent authorities as soon as the implementation roadmap is approved by NEPRA.

- 5** Participants from DISCOs were curious to know about the criteria for assessing the financial health of DISCOs based on which the DISCOs will either arrange the credit covers/guarantees on their own or through IAA.

It was proposed that the DISCOs will be required to carry out the assessment supported by PPIB/AEDB of their financial health as per the predefined terms of reference (TORs) which will be developed by the DISCOs in consultation with CPPA-G. Based on the TORs the DISCOs may decide the method to carry out this activity.

- 6** It was proposed to have a Association of DISCOs with the objective to safeguard and advocate the rights and interests of the DISCOs, coordinate and communicate with all relevant stakeholders including the regulator / policy makers, keep DISCOs abreast with evolving landscape of the industry, study how to address changing trends / challenges within the industry etc. The participants from DISCOs and KE showed agreement on the idea and requested CPPA-G for preliminary assistance in order to move forward in this regard.

After deliberation it was decided that CPPA-G will prepare a concept paper for DISCOs regarding the formation of an Association having representation from DISCOs. The concept paper will provide guidelines and minimum conditions that the association must fulfil to be represented in the service providers board for further deliberation among relevant stakeholders on formation / functioning of the Association. The DISCOs taking guidance from the concept paper will move along on this task as per their action plan.

- 7** It was discussed that DISCOs currently use customized/different Connection Agreements for the demand and the generators seeking connection at the distribution network.

Therefore, it was proposed and agreed by all the participants that a standardized template of the Connection Agreements both for demand and generation side should be prepared by DISCOs in consultation with NTDC and same may be used so that the important terms and conditions are consistent across DISCOs and not get overlooked when signing Connection Agreements. Signing of these Connection Agreement between sellers/buyers with wire network owners (transmission/distribution) will be a pre-requisite before signing MPA with

MO for registering as market participant.

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- 8** Participants highlighted the importance of capacity building initiative for DISCOs assuming the future role that they have to play as market participants in the competitive regime.

It was explained several initiatives have already been taken by CPPA-G in form of training workshops, consultative sessions and Electricity Market Professional Program with the aim to socialize the knowledge among power sector entities including DISCOs regarding electricity markets and building their capacity to perform the intended functions in future. It is proposed that such initiatives would be continued by CPPA-G in the role of MO in order to keep the market entities updated on the latest developments happening and to abreast them with the required knowledge and information.

It was further proposed and agreed by all participants that the power sector entities should also take such initiatives on their own and impart necessary trainings for the staff enabling them to become informed market participants and efficient service providers.

Comments of PPIB/AEDB on Implementation Road Map

- 9** The registration of PPIB / AEDB to undertake the function of IAA requires registration with NEPRA. Participants from PPIB and AEDB highlighted that they are entities formed under their own Acts and as such clarity will be taken that how they will be a licensee under the NEPRA Act.

It was discussed and agreed that IAA function is mandated by the Regulator to be a registered function under the NEPRA Act, however, PPIB/AEDB agreed with the registration process and agreed to further work on technical and legal details to get registered with NEPRA.

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- 10** Participant from PPIB remarked that Commercial Guarantees are expensive than the Govt. Sovereign Guarantees and further it was commented that sovereign guarantees are not reflected on the balance sheet of GoP.

It was discussed and clarified that sovereign guarantees for sure increase the cost of borrowing for GoP. Moreover, CTBCM implementation will decrease several risks that will be reflected in the price of generation. Also competition in the market and for the market shall ensure adequate wholesale prices.

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- 11** It was queried that who will prepare the Procurement Plan? It will be IAA or DISCOs?

It was explained that IAA will prepare the procurement plan as per the approved IGCEP and will get it approved from the Regulator before initiating the auction process.

Comments from NEPRA on the Implementation Road Map

- 12** It was enquired that how the existing commercial code of CPPA-G will differ from new commercial code for MO?

It was explained that SPT will continue to perform the function of settlement of legacy PPAs while Market Operator (due to the conflict) will be separated from CPPA-G. The existing code has provisions on agency as well as MO function. Thus, the existing commercial code will be amended to remove the MO and contract registrar function from the code and to add commercial allocation factors so that it can truly reflect the functions which SPT have to perform in future. This code will be called SPT Code.

Market Operator will also require a new commercial code which will cover the functions of MO like contract registrar function, Market Payment System (for balancing and other system services), Management of Credit Covers required to operate in the balancing mechanisms in the market etc. This code will be called the MO Commercial Code.

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- 13** It was queried that which type of regulations are mandatory for the implementation of the CTBCM and how these will be developed?

Set of new regulations that need to be specified and others that need to be modified were discussed. However, it was further discussed that NEPRA will be requested to form a working group (WG) comprising its relevant professionals to work on the alignment of regulatory framework with the approved market model. The WG will finalize the required regulations and guidelines that needs adjustment and further it will identify the requirement of new ones.

Furthermore, CPPA-G will produce concept papers on important market design aspects with the help of market design consultants and such concept papers will inform the formulation of regulations.

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- 14** What will be the impact of delays in the regulations on the implementation of CTBCM?

It was explained that timely development / amendments of regulations are very critical for the completion of the CTBCM implementation roadmap within stipulated timeframe. Because, according to the regulations, necessary systems and processes will be developed and deployed across different entities. Certain milestones of the roadmap of different entities will depend upon the regulations. If regulations are not developed and approved on time it will impact the implementation and delay the commercial operation date of the competitive market.

-
- 15** It was highlighted that NEPRA is already working on amendments of certain regulations and guidelines.

It was commented that for the successful implementation of the CTBCM, it needs to ensure that any change in the regulatory framework is consistent with the approved market model. It is therefore proposed that NEPRA may form a WG of relevant professionals to scrutinize all the existing regulations, codes, guidelines etc and propose amendments, if required.

It was further proposed that concept papers will be prepared by CPPA-G covering the various aspects of the detailed design which will form the basis of and will inform the Regulations being developed/amended by the WG.

NTDC Comments on the Implementation Road Map

- 16** It was commented that as the CPPA-G has in-depth knowledge of the future market structure and its different aspects, continuous support and guidance will be required from CPPA-G in the implementation of the CTBCM roadmap.

CPPA-G re-iterated that it will continue to organize capacity building and consultation sessions with relevant market service providers and participants to build their capacity in the required areas. CPPA-G is engaged with NTDC planning team since last two years and building its capacity through in-house special consultants for preparing demand forecasts and generation plan. CPPA-G will further continue such initiatives for the capacity building of the stakeholders.

NPCC Comments on the Implementation Road Map

- 17** It was asked by the NPCC professionals that requirement of separate license for SO from TNO has been envisaged in the Act. How NPCC will have to deal this in the implementation roadmap?

It was explained that although Act talks about the separate license for SO but this clause is not effective at the moment. It will be effective in 2023 and afterward two more years will be available for getting the SO license. Also, NTDC can own two licenses i.e. TNO and SO. However, it was discussed that it is highly desirable to have ISO structure which MO & SO can join.

- 18** It was asked that would there be an independent and separate IT system for the SO?

It was discussed CPPA-G is already facilitating NPCC through Central Data Exchange Portal (CDXP) in automating core NPCC processes including dispatch instructions, plant availability, day-ahead dispatch, compliance to the dispatch instructions, etc. The storage and retrieval of the data are being managed by CPPA-G.

Moving forward, the portals of CDXP relevant to NPCC processes will be handed over to NPCC. Moreover, the data storage and retrieval function of the SO will be managed by the ERP data centre of the NTDC. In this regard, the restructuring process will cater the needs of IT resources required at SO.

- 19** It was queried by the NPCC professionals that under the current organizational structure it is challenging to retain the trained professionals? How it should be dealt with?

It was explained that some entities like SO, Planning Function of NTDC etc. needs specialized skills and thus special incentives maybe offered to retain the staff. However, this matter will be presented to the senior management of NTDC for their consideration and necessary action.

Pictorial



CEO CPPA delivering presentation in Consultation Session on CTBCM Roadmap Implementation



Director Legal PPMB discussing proposed Action Plan for IAA



Professors from LUMS in discussion with Consultation Session Participants



Overview of the Participants in the Consultation Session at LUMS



Representatives of DISCOs presenting proposed Actions Plan of DISCOs for CTBCM Implementation during Consultation Session

ANNEX-III: CONSULTATIVE SESSION FOR IPPs

One-and-Half-Day Consultative Session for IPPs on Updated CTBCM Implementation Roadmap, Detailed Design and IE- MSM Reports

Jan 03, 2020 – Jan 04, 2020

Participating Entities: Neelum Jehlum Hydro Power Company Limited, KAPCO, Fatima Energy, PEDO, Bridge Factor, Javed Group, REON Energy, Engro Energy, Engro Power, Dawood Hercules Corporation Limited, LUMS, CPPA-G

Agenda

1. Determination of the Authority on CTBCM Approval and Specific Directions for Different Entities
2. Consultation on CTBCM Approved Model and Implementation Roadmap
3. Deliberation on Association of Generators and Its Representation on the Boards of various Service Providers
4. Consultation on the Detailed Design of CTBCM
5. Consultation on the Integrated Electricity Market Simulation Model (IE-MSM) Report

Important Comments and Responses

General Comments on CTBCM Approval Determination

- 1 One of the participants argued that if one DISCO will have two licenses i.e. of wire business and supplier business, it will create conflict of interest as DISCOs will favor its supplier business over wire service.

It was replied that there would be conflict of interest, but in the beginning it will not be material. However, once the volume of bilateral contracts grows and more and more BPCs opt for the suppliers other than DISCOs, it will become material and then it must be removed by separating the supply business and the wire business. However, segregation of retail and wire business is a huge effort and should be started once the wholesale market has properly started functioning.

It was further explained that there is also a concept of last resort supplier. DISCOs in the role of last resort supplier will be the incumbent supplier in their territories. When there is no other supplier or supplier of a consumer gets defaulted, the last resort supplier provides electricity to the respective consumers on regulated tariff.

- 2 It was asked that in CTBCM, will BPCs give one-year notice to DISCOs before leaving?

It was replied that one-year notice is a binding in accordance to the Section 22 of the Act and as such has to be ensured by the BPC leaving the DISCO.

- 4 It was argued by the participants that why there are capacity obligation on BPCs?

It was explained that the capacity obligations are introduced to ensure the security of supply in the system and to make sure that each participant is contributing to it. As the market starts, the players do not behave rationally due to lack of understanding of the dynamics of the markets and commits mistakes which jeopardize the security of the whole system. In order to avoid such adventurism at the start of the market, capacity obligations are

introduced for all participants including BPCs. One the maturity in the market is enhanced and the participants start to understand the dynamics of the market, the capacity obligations will be reduced gradually to give rise to more short-term trading by the participants.

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- 5** It was asked by one of the participants that are markets consumers smart enough to analyze their load? e.g. some industries have intermittent loads like steel industry who is being run in batches and its demand is intermittent. Its capacity obligation is quite high while energy is comparatively low. Would risk of marginal price and capacity obligation be hinderance for them to participate in the market?

It was replied that such loads may opt from portfolio of contracts as discussed in the detailed design e.g. load following contracts on their mutual terms and conditions. Marginal price won't be hindrance for them in such cases. BPCs are smart enough to analyze their loads and have contracts based on their interest. Furthermore, for such type of demands there will also be aggregators in markets who will gather such intermittent demands and will negotiate for them as one smooth demand.

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- 6** It was asked by one of the participants that what will be the solution in the case if a Supplier or a BPC becomes defaulter.

It was explained that, in case if a supplier defaults, BPC can procure power from supplier of the last resort. Furthermore, it was argued that, in case of defaulter BPC, generator will sell its energy to BME/BMC unless he finds new contract.

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- 7** It was argued by one of the participants that practically for BPCs DISCOs are the most reliable source of electricity and if a generator wants to sign a bilateral contract with a BPC, the BPC desires to remain a consumer of DISCO as well. Will this be allowed in CTBCM ?

It was replied that this comes under hybrid BPC concept which is not allowed in CTBCM. There is no international example with such hybrid model exist either. Because there will be an arbitrage opportunity for the BPC to use the capacity of the system without adequately paying for that capacity and it will not be allowed in CTBCM.

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- 8** It was argued by one of the participants that practically, MO settlement process seems quite complex and can be an administrative nightmare. Marginal prices and settlement of every hour can be an administrative failure in Pakistani conditions.

It was replied that settlement will be done through automated processes and systems. Telecom sector example was brought under consideration where one international call pass through so many carriers, but billing is done in a smooth way. Related to readiness of Pakistani market it was further stated that, In CPPA, CDXP portal is already working. ERP Phase 2 is under progress for SO processes automation. All such interventions will ensure timely and automated settlement process.

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- 9** It was asked by one of the participants that if any BPC/Generator wants to enter into or leave a bilateral contract, how many days prior notice to MO will be required by the BPC/Generator? Moreover, with what frequency a BPC can leave the market and join the DISCO?

It was replied that BPC/Generator have to acknowledge MO prior to start/leave of the contract. Timeline of prior notice and frequency of leaving /entering the market will be worked out during the detailed design phase.

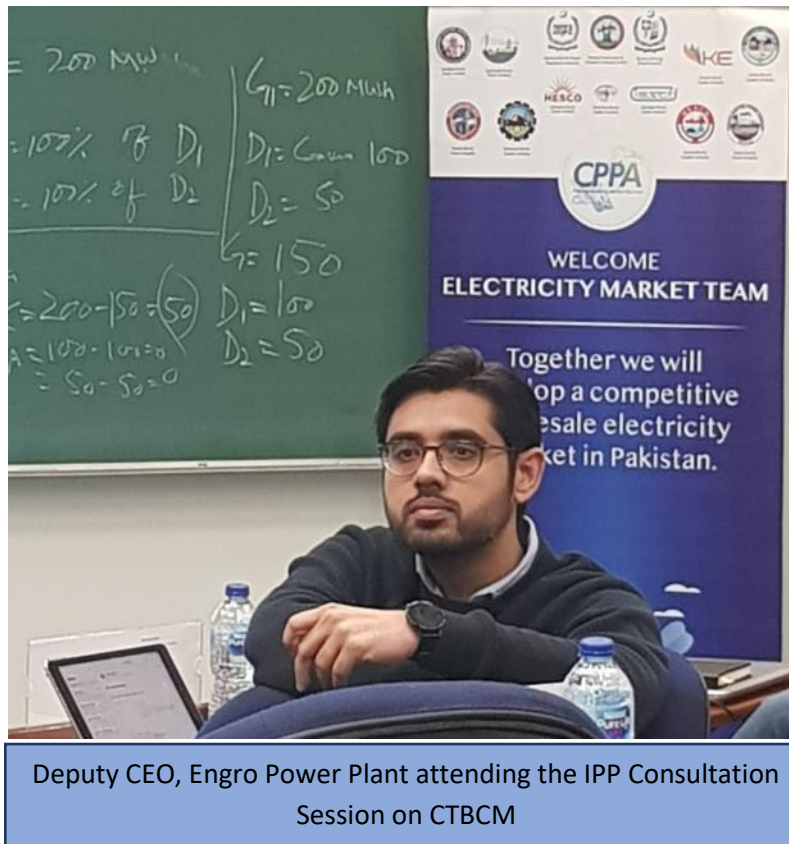
- 10 It was asked by one of the participants that in Generation Following Contract (GFC) if generator don't get dispatch by NPCC, will it get any revenue? Moreover, if the generator is instructed to dispatch and it don't comply with the instructions due to maintenance, will there be any penalties?

It was replied that in GFC if generator don't get dispatch, it will not get revenue based on its contract e.g. the GFC contract with take-or-pay capacity will be paid regardless of its contracts (examples of adapting legacy PPAs). On the second part of the question, it was replied that if the generator doesn't comply with the instruction of SO, it will have to settle the imbalances on the Marginal Price of the system which itself is a penalty for it to remain available.

- 11 It was asked by one of the participants that, will a generator with bilateral contract with a BPC inform SO about its price? What if the price quoted by him to the SO does not reflect the actual price and is over and above the same?

It was replied that bilateral generator will inform SO about its variable cost (VC) not the contract price. The VC will be used by the SO for dispatch purpose according to the merit order. However, it was explained that there will be no incentive for generator to provide SO other than its true VC.

Pictorial





CFO and Manager Finance of Fatima Energy Ltd. during the IPP Consultation Session on CTBCM



Overview of the participants attending the IPP Consultation Session on CTBCM



Chairman NEPRA with Director Energy Institute LUMS and other participants



Group Photo of the Participants of the IPPs Consultative Session

ANNEX-IV: CONSULTATIVE WORKSHOP FOR IPPs

One-Day Consultative Workshop on Competitive Wholesale Power Market Design and Way Forward

Jan 10, 2020

Participating Entities: IPPs Association (IPPA), Nishat Power, Institute of Electrical and Electronics Engineers Pakistan (IEEEEP), NTDC, NESPAK, DESCON, University of Engineering & Technology Lahore, WAPDA, LESCO and CPPA

Agenda

1. Determination of the Authority on CTBCM Approval
2. Consultation on CTBCM Approved Model and Implementation Roadmap
3. Consultation on Detailed Design of CTBCM
4. Way Forward

#	Important Comments and Responses
1	<p>One of the participants suggested that having pre-paid meters will solve the need of having settlement mechanism. Pre-paid meters won't let the consumers to consume beyond their payment. It will not only eliminate reason for introducing settlement mechanism but also will directly resolve theft issues leading to decreasing circular debt.</p> <p>It was replied that for retail business, this may be a useful solution but for wholesale it's not feasible. Imbalances will sure occur in a competitive bilateral market and as such require settlement mechanism.</p>
2	<p>It was asked by participants that the transmission network unavailability risk for renewables is currently parked on the purchaser in the form of Non-Project Missed Volume (NPMV). How this risk will be covered in the CTBCM?</p> <p>It was explained that the NPMV was offered under the policy framework for some investors to cover the transmission network unavailability risk under the security package to incentivize the penetration of renewables in the national grid.</p> <p>In future, the availability of the transmission network will be ensured through proper enforcement of the transmission performance standards defined by NEPRA. If the transmission company is performing as per the standards and some outages occur, then this risk will be borne by the party as agreed in the Connection Agreement.</p> <p>Also, as standard practice, the generators will make their due diligence before selecting a location in the transmission network and will properly assess all the risks. However, these aspects will be deliberated in detail while implementing the detailed design. The existing RE based IPPs will have the same treatment as of today.</p>
3	<p>It was asked by one of the participants that, will a generator with bilateral contract with a BPC inform SO about its price? What if the price quoted by him to the SO does not reflect the actual price and is over and above the same?</p>

It was replied that bilateral generator will inform SO about its variable cost (VC) not the contract price. The VC will be used by the SO for dispatch purpose according to the merit order. However, it was explained that there will be no incentive for generator to provide SO other than its true VC.

- 4 Some participants were of the view that NTDC is a specialized entity which is already working on 220kV or above network in an efficient way. Hence, 132kV grid stations should also be part of NTDC network for better management. Furthermore, it is also difficult for some of DISCOs to arrange funding for construction of grid station due to bad credit rating. Better credit rating of NTDC will eliminate this issue as well.

It was replied that it is difficult for low performing DISCOs to raise funds for reinforcement of transmission network. Better credit rating of NTDC may eliminate the issue of funding arrangement in reinforcing secondary transmission system of the regions where DISCOs are not credit worthy. However, it's also fact that managing 132kV grid network of 10 DISCOs will be in itself a huge task if given to NTDC. So, all aspects should properly be seen in this matter.

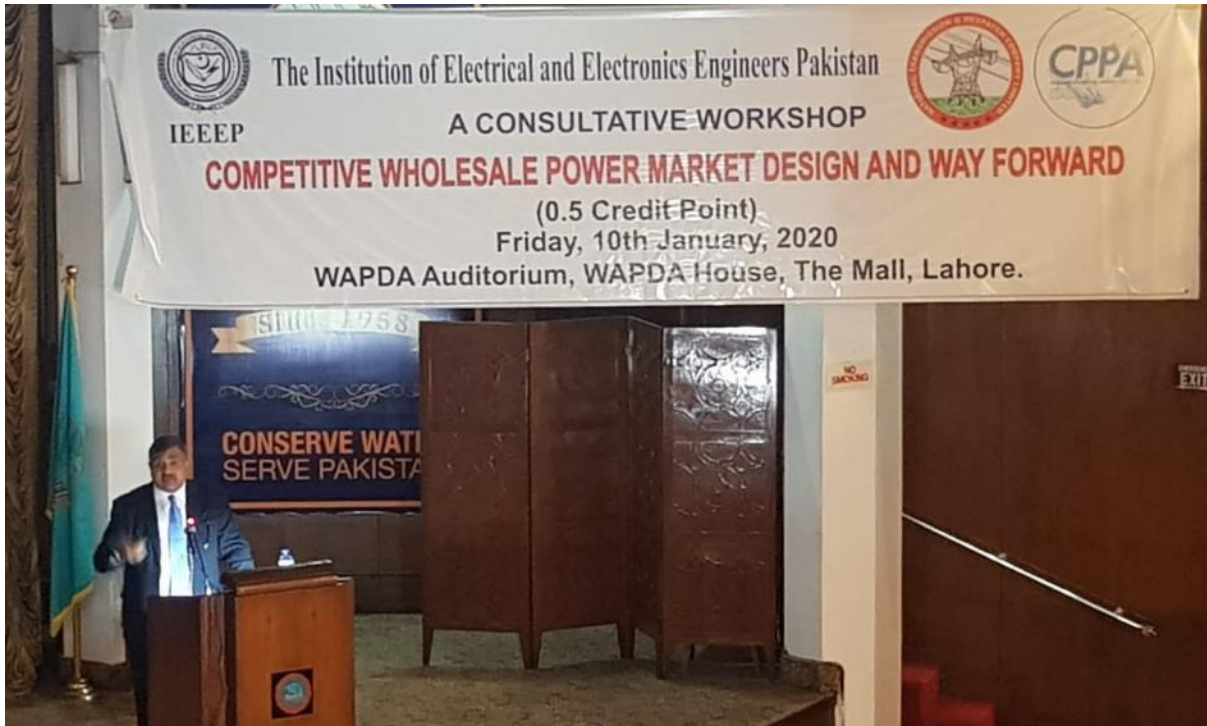
Pictorial



CEO CPPA Giving Presentation during the Consultative Workshop



Overview of the Participants Attending the Consultative Workshop



CEO CPPA Giving Presentation during the Consultative Workshop



DGM SMD giving presentation on the Detailed Design during the Consultative Workshop



Consultation on Roadmap and Detailed Design Session in Progress

ANNEX-V: MEETING WITH NEPRA

Meeting with NEPRA on CTBCM Implementation Road Map

Jan 16, 2020

Participants from NEPRA: The Authority (Chairman, Vice Chairman, Member Balochistan), Registrar, Addl. Director General (Licensing), Addl. Director General (Tariff), Legal Advisors

Participants from CPPA: Chief Executive Officer, Deputy General Manager (Strategy and Market Development), Member of SMD Team

Agenda

1. Deliberation upon CTBCM Approved Model and Updated Implementation Roadmap
2. Formation of Joint Working Groups
3. Actions Related to NEPRA and Way Forward

#

Important Notes

- 1 The Authority and other officials from NEPRA were briefed by CEO CPPA on the action being taken by CPPA in compliance with the determination of Authority regarding approval of the CTBCM model. Additionally, the Authority was also apprised regarding important actions and support sought from NEPRA for the implementation and timely completion of activities in the implementation roadmap being developed. These included:
 - i. Formation of Joint Working Group
 - ii. Alignment of overall framework with the approved Market Model that include:
 - Detailed Design of Wholesale Market
 - Concept Papers to form basis for Rules and Regulations
 - Alignment of Policy Framework
 - Alignment of Legal and Regulatory Framework (Rules, Regulations, Code and Guidelines)
 - Licensing & Registration (MO, IAA and Other Participants)
 - iii. Re-Operationalization of Market Implementation and Monitoring Group (MIMG)

Chairman NEPRA assured full cooperation to work as one team to achieve the common target date of implementing the approved model of the competitive wholesale electricity market in Pakistan.

- 2 It was proposed that a Working Group (WG) should be formed comprising of members from the relevant departments of NEPRA to have mutual collaboration on activities pertaining to the detailed design of CTBCM and its implementation roadmap.

Chairman NEPRA appreciated the idea and agreed to form a Working Group within NEPRA to work on the regulations.

- 3 One of the main actions of the implementation roadmap is the Detailed Design of the CTBCM.

CPPA apprised the Authority that the Detailed Design Report and other required reports under the CTBCM determination are being prepared by CPPA after consultation with the relevant stakeholders and will be submitted to the Authority as per the target date mentioned in the CTBCM Determination.

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- 4 During the meeting, the actions related to the alignment of legal and regulatory framework were discussed.

It was agreed by the participants that Concept Papers should be prepared to form basis for the revisions of existing Rules and Regulations and proposal for new Rules and Regulations related to wholesale market.

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- 5 The Authority was apprised regarding the body envisaged in the approved model for coordination and monitoring of the CTBCM implementation road map i.e. Market Implementation and Monitoring Group (MIMG) with the request to operationalize the MIMG.

Considering the importance and effectiveness of this role during the implementation phase, Chairman NEPRA fully supported the idea of MIMG re-operationalization. Chairman NEPRA proposed to form the Board of MIMG with participation from senior leadership of NEPRA, MoE(PD) and CPPA that was positively received by CPPA.

It was further agreed that after its operationalization, CPPA in the role of central coordinator will present progress update on quarterly basis to MIMG on the implementation status of different activities under the implementation roadmap and assist MIMG to oversee the activities pertaining to the alignment of Policy, Legal and Regulatory and institutional framework and other necessary actions needed for timely implementation of CTBCM roadmap.

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- 6 At the end of the meeting, the Authority assured that its full support is available for the implementation of CTBCM road map.
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Pictorial



NEPRA Authority with CEO CPPA

ANNEX-VI: MEETING WITH NTDC BOARD

Meeting with NTDC Board of Directors on CTBCM Implementation Roadmap

Jan 18, 2020

Participants: MD NTDC, Board Members of NTDC BoD, CEO CPPA, DGM SMD CPPA

Agenda

1. Historical Perspective of Market Structure in Pakistan
2. Market Development (GoP's Decisions and NEPRA Act 2018)
3. Market Structures Evolution in Pakistan
4. Preparation of the updated Implementation Roadmap pursuant to Direction of the Authority and actions for NTDC and NPCC
5. Implementation coordination as proposed and approved in CTBCM model

#	Important Notes
1	CEO CPPA and MD NTDC apprised NTDC Board regarding the approval of CTBCM Model granted by the Authority and actions pertinent to the NTDC and NPCC in the decision. The Board was also apprised about the roles of the NTDC as envisaged in the approved market model such as Transmission Network Operator, Metering Service Provider, Planners and System Operator and the actions needed to be undertaken in order to get prepared for such roles.
2	<p>NTDC Board endorsed the actions and appreciated the efforts of CPPA in facilitating the implementation of the competitive wholesale market. NTDC Board also consented the formation of Working Group at NTDC and NPCC to undertake necessary actions for CTBCM implementation.</p> <p>NTDC board further stressed upon the importance of capacity building of the members of Working Groups so that they could take active participation in not only during the implementation but also in the operations of the future market.</p>
3	<p>It was explained that System Operator is the technical pillar of the future market and it have one of the most crucial function in the competitive wholesale market. Therefore it was suggested that special focus should be given by the management of NTDC on the training, capacity building and restructuring initiatives of the SO to make them capable for efficient system operations.</p> <p>The Board endorsed the idea and agreed that the necessary strengthening, capacity building and restructuring of the SO will be performed to make SO ready for the future competitive market.</p>
4	<p>The Board was apprised that one of the actions for NTDC and NPCC stated in the determination is the preparation of the Detailed Report on the interventions required for CTBCM implementation.</p> <p>It was advised by the Board that these reports should be prepared by NTDC and NPCC</p>

within the stipulated timeframe. Subsequently, these reports should be presented before the Board for information before formal submission to NEPRA for compliance. The Board will review the scope of the proposed activities and interventions and would evaluate the cost implications so that necessary approvals of the funding could be granted during Apr-Jun for incorporation the next budgeting cycle.

- 5** It was apprised to the Board that after the submission of the detailed interventions report, there is also a requirement for NTDC and NPCC to submit their respective Quarterly Progress Reports to the Authority presenting the status update of the activities for CTBCM implementation.

The Board agreed to have standing quarterly progress review meetings to monitor the progress of the implementation so that any support/guidance could be extended to the implementing agencies if required, which demonstrates sign of ownership at the highest level.

- 6** It was proposed that a market interface committee of the NTDC Board to be formed for monitoring the SO strengthening actions and to oversee the licensing of SO in the future.

The Board principally agreed with the concept and endorsed that formation of such committee would be pursuant to respective recommendation included in the detailed report on CTBCM implementation being prepared by NPCC.

- 7** It was discussed that SCADA although not a condition precedent for the CTBCM, it is highly desirable to have SCADA operational in shortest possible time.

It was agreed that NTDC at the highest level will monitor the progress of SCADA implementation considering a high-priority activity.

Pictorial



CEO CPPA Giving Presentation during NTDC Board Meeting



MD NTDC with CEO CPPA during NTDC Board Meeting

ANNEX-VII: MEETING WITH SECRETARY MOE(PD)

Meeting with Honourable Secretary Ministry of Energy (Power Division) on CTBCM Determination and Actions Related to Ministry of Energy (Power Division)

Jan 20, 2020

Participants: Honourable Secretary MoE (PD), Mr. Ghias ud Din Ahmed (Member of BoD CPPA), Mr. Hamid Ali Khan (Independent Member of BoD CPPA), Mr. Zafar Abbas (MD NTDC / Member of BoD CPPA), Mr. Abid Latif Lodhi (CEO, CPPA), Mr. Noman Rafique (Company Secretary BoD CPPA), Mr. Omer Haroon Malik (DGM SMD, CPPA) and Nida Mukhtar (AM SMD, CPPA)

Agenda:

1. Determination of the Authority on CTBCM Approval
2. CTBCM Approved Model and Implementation Roadmap
3. Actions Related to Ministry of Energy (Power Division) and Way Forward

#	Important Notes
1	<p>The Honourable Secretary MOE (PD) was briefed by CPPA on the Determination of Authority regarding approval of the CTBCM model, and the specific actions related to each relevant entity that includes NEPRA, NTDC, NPCC, DISCOs and PPIB/AEDB.</p> <p>The Honourable Secretary MOE (PD) expressed that the approval of CTBCM is a positive move in the right direction.</p>
2	<p>The Honourable Secretary MOE (PD) inquired about the progress of DISCOs and other relevant entities on the actions required by the Authority in the CTBCM determination. Additionally, the Honourable Secretary remarked that there should be detailed plan/program for the strengthening of DISCOs, NTDC, NPCC and PPIB/AEDB regarding their IT processes, technology and people.</p> <p>It was apprised by CEO CPPA that all participating power sector entities are advancing on their actions and it is anticipated that the deliverables like formation of Market Implementation Groups and reports on the interventions required to implement CTBCM actions, will be timely submitted to NEPRA by all the entities.</p> <p>It was further apprised that there are specific actions for DISCOs, NTDC, NPCC and AEDB/PPIB in the implementation roadmap of the CTBCM, to strengthen the people, process and technology part of these entities.</p>
3	<p>It was highlighted by CPPA during the Meeting that there is a need to review and align the policy framework with the approved market model.</p> <p>Honourable Secretary MoE (PD) agreed with the idea and desired that the existing policies be revised according to the CTBCM and the National Electricity Policy (NEP) the draft of which is under preparation. Further he remarked that the draft of NEP should include a</p>

#

Important Notes

section on Market Development and Implementation.

Similarly, it was agreed to start the process to make new Rules that are required under the amended NEPRA Act 2018 and to facilitate the implementation of the CTBCM.

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- 4** It was deliberated during the meeting that a Working Group may be formed on Ministry level for the timely implementation of policy actions.

The idea was appreciated and agreed upon by the participants of the meeting.

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- 5** CPPA discussed the idea of Re-Operationalization of Market Implementation and Monitoring Group (MIMG).

Honorable Secretary highlighted the importance of having an oversight on the implementation of competitive market reforms. Further, the Honorable Secretary agreed with the proposal of having MIMG and its Board with membership from MoE (PD), NEPRA and CPPA. Secretary MoE (PD) will convene MIMG Board.

All relevant entities like PPIB, AEDB, DISCOs, NPCC and NTDC will submit their quarterly progress reports to MIMG. CPPA will perform the coordinator role between MIMG and the relevant entities. Further, CPPA will assist MIMG to oversee the activities needed for the timely implementation of CTBCM roadmap.

ANNEX-VIII: MEETING WITH K-ELECTRIC

Meeting with K-Electric Management on Competitive Wholesale Power Market and KE's Integration

Jan 21, 2020

Participants from KE: Head of Distribution Strategy, Director Business Development, Director Finance & Regulations, Manager Finance & Regulations

Participants from CPPA: CEO CPPA, DGM SMD CPPA and other members of SMD Team of CPPA

Agenda:

1. Unique structure of KE and the legal framework
2. Rights and obligations under KE's licenses
3. Current and upcoming transactions with CPPA-G including any additional supply from the National Grid
4. Future Plans / CTBCM model with respect to KE's market / service territory

#

Important Comments and Responses

- 1 CEO CPPA opened the meeting with a welcoming note and thanked KE for active participation in the previous consultative sessions organized by CPPA at LUMS on CTBCM Implementation Roadmap and Detailed Design. CEO CPPA further explained the CTBCM implementation roadmap, KE's structure in the existing regulatory framework and its integration with the new market model. Further he suggested to notify a working group from KE to interact and work with CPPA on competitive market related actions.

KE team responded positively and agreed to work together on market related interventions.

- 2 As there were some participants from KE who were not part of the previous consultation sessions, they were briefed by CPPA on the directions of the Authority stated in the approval of CTBCM regarding actions which DISCOs are obliged to comply with in the stipulated timeframe. These actions include formation of Market Implementation Groups and preparation of Implementation Plan regarding important interventions required by DISCOs for CTBCM implementation.

Participants from KE were of the considered opinion that although, these directions of the Authority are not a binding on the KE, these actions are important for the implementation of competitive market and as such KE should be involved in these activities from the start so as to be able to fully integrate in the market upon its commencement.

KE agreed to form a Market Implementation Group on the line of DISCOs. KE also principally agreed to participate with DISCOs in the formation of Association of DISCOs, however, the modalities that how KE will participate in this action will be deliberated internally after discussion with the higher management.

- 3 KE team inquired about the integration of K-Electric in the Competitive Wholesale Market.

In response, CPPA explained that generally there are several options to integrate a Vertically Integrated Utility (VIU) in the competitive market interalia:

- VIU remains as integrated utility and trade in the market through import and export.
- VIU remains as integrated utility for certain period and trade in the market through import and export. However, a clear plan is established to integrate it fully into the market and one single market is established. This will require enhancement of the transmission network at the interconnection.
- Two separate markets are established with clear boundaries for import and export.

However, it was discussed that the regulator can decide which option to be exercised based on the provision of the Act, license and other privatization documents.

In this regard, KE and CPPA agreed with the concept that to have a centralized economic dispatch will be beneficial for all participating entities in any market. However, KE principally agreed to carry out a detailed analysis of having one System Operator for whole country by forming a joint working group (JWG) of KE and CPPA. Based on the recommendations of JWG, the decision can be taken to go for this option. The recommendations if affirmative will also include a plan to make this transition. It was further agreed that having one SO is a desirable result however it is not a condition precedent for CTBCM and as such not part of the CTBCM implementation roadmap.

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- 4** KE Team highlighted that being vertically integrated utility, KE dispatches its own plants per the terms and condition of its license. However, KE if opts for central dispatch by System Operator, what benefits it will bring for the KE?

It was explained that central economic dispatch is beneficial for the whole system as well as for KE. India's example was quoted where their federal regulator is pushing all the states to come on economic dispatch to reap the least cost dispatch benefits. Further it was discussed that if the whole system is on central economic dispatch, it will not affect the bilateral contracts of any entity.

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- 5** Regarding commercial allocation of the existing contracts, KE inquired about the commercial allocation mechanism. And upon deliberation, agreed to participate in the commercial allocation.

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- 6** Keeping in view the experience of KE in managing capacity procurement with IPPs without sovereign guarantees, CPPA requested KE to share their experience in this regard so that lessons learned from KE could be replicated in acquisition of capacity for regulated consumers in the future competitive wholesale market.

KE team explained their approach and the mechanism evolved at KE for the acquisition for capacity procured from IPPs. KE further offered CPPA to have detailed deliberations with the concerned officials of the Treasury department of KE responsible for this activity to have a deep insight on the procurement process without the backing of the sovereign guarantees.

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- 7** It was also discussed that participation of KE as a supplier is no different from DISCOs. The participants agreed with this understanding.
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Pictorial



K-Electric Team During the Meeting



CEO CPPA Responding to a Query of K-Electric Team



CPPA and K-Electric Teams Exchanging Views during the Meeting

ANNEX-IX: MEETING WITH PPIB

Meeting with PPIB on CTBCM Implementation Road Map

Jan 21, 2020

Participants from PPIB: Managing Director, Senior Executive Director, Director Transmission Projects, Director Coal Projects, Director Human Resources, Director Legal, Senior Manager Thermal Projects,

Participants from CPPA: Chief Executive Officer, Deputy General Manager (Strategy and Market Development), Members of SMD Team

Agenda

1. Determination of the Authority on CTBCM Approval
2. CTBCM Approved Model and Implementation Roadmap
3. Actions Related to PPIB and Way Forward

#	Important Notes
1	<p>MD PPIB and other officials were briefed by CPPA on the Determination of Authority regarding approval of the CTBCM model. Actions stated in the approved model specific to PPIB were discussed in detail along with the anticipated timelines. These actions include:</p> <ul style="list-style-type: none"> iv. Registration of PPIB/AEDB to assume to role of IAA in the competitive market v. Review and amendments in the Policy Framework related to approved market model vi. Review of Security Package vii. Preparation and approval of the templates for new Market Contracts viii. Support in the financial assessment of DISCOs ix. Arrangement of guarantees/credit covers for DISCOs <p>MD PPIB assured full cooperation to complete the actions required for the implementation of the approved market model.</p>
2	<p>It was proposed that a Working Group (WG) should be formed comprising members from PPIB to work mutually on the implementation of the perceived actions.</p> <p>MD PPIB appreciated the idea and agreed to nominate officials of PPIB to be members of the WG.</p>
3	<p>One of the actions of the implementation roadmap is the review of the existing power policies in line with the approved model.</p> <p>It was discussed and agreed all support will be provided to MoE (PD) in reviewing the existing power policies and identify the adjustments/additions that are required to be incorporated in the policy framework for alignment with the approved market model. Subsequently, the approval of the competent authorities of the revised/new policies will be pursued.</p>
4	<p>It was discussed that in accordance with the approved model, the PPIB/AEDB will need to get registered with NEPRA in order to undertake the role of IAA in the future competitive market.</p>

For this purpose, it was consented that WG will perform the preliminary analysis of the technical and legal requirements required for the registration process. Subsequently, actions required to acquire the registration with NEPRA will be performed by PPIB/AEDB to complete the registration process before commencement of the competitive wholesale market.

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- 5** There was a discussion regarding the assessment of Security Package and Concession Agreements in view of the approved market model.

It was agreed that the PPIB will undertake the task of analyzing the Security Package and identify the necessary amendments that will be performed to make it fit into the competitive market. Similarly, it was also agreed that the preparation of templates of the new Market Model is one of the important activity and PPIB will undertake this task with necessary support.

MD PPIB suggested that the revision of Security Package requires finalization and approval of the revised/new power policies and as such this action would only be completed once the revised/new policies are in place.

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- 6** It was discussed that DISCOs will be required to analyze their financial health in order to secure the financial arrangements in terms of guarantees from respective sources.

It was agreed that necessary support will be extended to the DISCOs by PPIB in assessment of financial health of DISCOs and arranging guarantees for the deserving DISCOs.

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- 7** It was proposed by MD PPIB that PPIB should be invited to attend the important meetings related to the CTBCM model implementation.

It was explained that PPIB will be a regular member of the MIMG which will ensure its active participation in the meetings and other avenues of monitoring and coordination of the CTBCM implementation roadmap.

Pictorial



MD PPIB, CEO CPPA and other participants during the meeting



MD PPIB, CEO CPPA and other participants during the meeting