



EXECUTIVE SUMMARY

A] BACKGROUND

1. Availability Based Tariffs (ABT) has been implemented in the Western Region since June 1st 2002. One of the main reasons for implementing these tariffs was to encourage grid discipline by linking the pricing of power to the grid frequency, thereby forcing State participants to improve procedures for forecasting, scheduling and load despatch.
2. With the success of ABT implementation at Regional level and with improved grid frequency, reduced frequency variations and reduction of number of interruptions/grid failures, it is felt that such scheme may further help the Power System, if implemented at State level also. As per clause 5.7.1(b) of National Electricity Policy (NEP) notified by Central Government, Appropriate Commissions are required to introduce ABT regime at State level. Thus, it is clear that introduction of ABT mechanism at State level – its scope, pricing methodology, exclusions of some State participants, etc., is left to the discretion of respective SERCs. However, the Availability Based Tariff (ABT) mechanism at State level need not necessarily mean frequency linked UI mechanism as applicable at regional level.
3. Hence, it is necessary to identify these peculiarities and complications within the power sector at State level before finalizing appropriate design for implementation of ABT at State level. It is important to note that primary objective for introduction of frequency linked UI price based ABT regime at regional level has been to encourage grid discipline amongst pool participants at regional level.
4. Further, ABT mechanism with frequency linked UI pricing was introduced at the time when most of the State participants were structured as integrated/bundled entities. Thus, response of State participants at regional level has been a reflection of their system operations by managing their load as well as the generating stations at their disposal. It is important to understand change in role envisaged for various participants including SLDC upon un-bundling/restructuring of State Utilities, as mandated under Electricity Act 2003.
5. In view of above, the objective for introduction of ABT at State level needs to be ascertained in view of changing electricity industry structure. Further, selection of appropriate mechanism for introduction of ABT at State level should have minimal impact on sector entities and retail consumers while meeting the objectives of implementation of ABT at State level. In this context, an analysis of various issues and key concerns in extending intra-State ABT to various participants in the State system is presented under this 'Discussion Paper'.



B] REGULATORY FRAMEWORK

6. The National Electricity Policy (NEP) notified on February 12, 2005 states that the ABT regime introduced by CERC at the national level has had a positive impact. It has also enabled a credible settlement mechanism for intra-day power transfers from licensees with surpluses to licensees experiencing deficits. Accordingly, NEP advised SERCs to introduce the ABT regime at the State level within one year.

7. Subsequently, the National Tariff Policy notified on January 6, 2006 stipulated that two-part tariff structure should be adopted for all long term contracts to facilitate Merit Order despatch and the Availability Based Tariff (ABT) is to be introduced at State level by April 2006. This framework would be extended to generating stations (including grid connected captive plants of capacities) as determined by the SERC.

8. The Forum of Indian Regulators (FOIR) had formulated Sub-Committees during March 2005 to get into the details of introduction of ABT mechanism at State level. The two specific tasks assigned to the Sub-Committee were (i) to make recommendations to FOIR on implementation of ABT in intra-State systems and (ii) to co-ordinate with CEA on Metering Regulations. Upon several rounds of deliberations, the Sub-Committee finalized its recommendations during November 2005 on implementation of ABT mechanism at the State level. The Sub-Committee acknowledged that its recommendations are not mandatory and the SERCs are fully competent to decide on the subject matter within their respective State jurisdiction. However, it suggested that while introducing ABT mechanism at State level it needs to be ensured that intra-State ABT mechanism is not incompatible with the inter-State ABT system. Above recommendations were adopted by the FOIR during its 7th annual general meeting held on June 15, 2006.

9. Accordingly, while formulating the rules for development of ABT mechanism at State level, various key aspects of the power system operations as stipulated under Indian Electricity Grid Code 2005 (IEGC 2005) need to be taken into considerations such as – (a) Connection conditions for Generating Units (b) and power system security aspects. In addition, Clause 32 of MERC (State Grid Code) Regulations, 2006, provides for Commission to specify ‘Scheduling and Despatch Code’ separately upon consulting State Load Despatch Centre within six months from notification of the State Grid Code Regulations.

10. The Commission passed an Order on 27th June 2006 (Case 58 of 2005) in the matter of transmission pricing framework within Maharashtra, wherein the Intra-State Transmission System (InSTS) and principles for energy accounting for powerflows over InSTS have been outlined in detail. The above framework for intra-State Transmission system will have to be taken into consideration while devising Intra-State ABT mechanism. The monitoring schedules and accounting of the deviations thereof under



Intra-State ABT mechanisms will have to be undertaken at the interface points identified amongst the licensees as per above arrangement.

C] KEY CONSIDERATIONS FOR DESIGN OF ABT AT STATE LEVEL

11. Primary objectives for introduction of ABT regime at State level could include (a) To bring in more generation in the system and improve the grid frequency (b) To instill forecasting and load management discipline in Distribution Licensees (c) To instill despatch discipline in generators (d) To encourage participants within the State in balancing the system.

12. Key factors to be taken into consideration while designing ABT mechanism for State level are (a) Cost of power in the Maharashtra system as a whole should not increase (b) Quality of supply and the efficiency of various entities should improve (c) The new system should promote the development of market, i.e., encourage participation by many buyers and sellers. (d) Fair and equitable sharing of risks amongst various State participants (e) Safety and security of the system should be ensured on priority. The ABT mechanism at State level should facilitate system operations and should ensure stability of Grid.

D] CHARACTERISTIC FEATURES OF MAHARASHTRA POWER SYSTEM

(i) Industry Restructuring

13. Historically in Maharashtra, the generation, transmission and distribution systems have been developed over the period by different licensees such as MSEB, The Tata Power Company Ltd (TPC), Reliance Energy Ltd (REL – formerly known as BSES Ltd), Brihanmumbai Electric Supply & Transport Undertaking (BEST), and Mula-Pravara Electric Co-operative Society Ltd (MPECS). Government of Maharashtra (GoM) vide its GR dated January 24, 2005 has restructured the erstwhile Maharashtra State Electricity Board (MSEB) into four Companies. In addition, GOM has notified MSETCL to act as State Transmission Utility (STU) in accordance with the provisions of Section 39 of EA 2003. Further, MSETCL as Government Company continues to undertake State-wide load despatch related activities.

14. Prior to enactment of EA 2003 or even until recently, most of these licensees had integrated operations and continued to own distribution business and generation assets in addition to the transmission assets. However, pursuant to enactment of EA 2003, while generation activity has been de-licensed, the activities pertaining to transmission and distribution have to be viewed as distinct licensed activities to be regulated in accordance with the provisions of the EA 2003.

15. Accordingly, the Commission had recently issued Tariff Orders in respect of ARR/Tariff Petitions for FY 2006-07 filed by various licensees. Under these Orders, the



Commission had extensively dealt with the functionwise segregation of ARR of licensees. Further, the Commission is currently seized with modification to existing licence conditions of these licensees to bring the same in line with provisions outlined under EA 2003 and the Commission's licensing Regulations.

(ii) Multiple Licensees and multiple business operations

16. Thus, while licensees could continue to undertake generation and distribution activities simultaneously, their deviations from schedule at generation to transmission (G-T) interface for supply/despatch of generating stations and at transmission to distribution (T-D) interfaces for energy drawal will have to be monitored and accounted separately. Development of ABT mechanism at State level will have to specifically take into consideration above aspect so that responsibility of load-generation balancing amongst various State participants can be addressed appropriately.

17. The current status of metering at various interface points and the metering plan will have to be taken into account while devising appropriate ABT mechanism at State level. In fact, as metering plan evolves and as sophisticated systems for energy accounting and settlement are put in place, complex ABT mechanism and structures can be introduced and the same can be extended to more State participants without any implementation hurdle.

(iii) Scheduling and Despatch – Existing Process

18. At present, State Load Despatch Centre (SLDC) operated by MSETCL (Kalwa and Ambazari) caters to the requirements of system operation pertaining to MSPGL and MSEDCL alone. However, SLDC does not receive any demand forecast from MSEDCL at this stage and only receives availability forecasts from generating stations of MSPGCL on day ahead basis. Due to significant demand-supply gap (around 4500 MW) currently prevalent in Maharashtra, SLDC had to resort to planned load shedding across Maharashtra. The Commission approved principles and protocol for load shedding for MSEDCL from time to time and SLDC is required to devise appropriate scheme for catering to daily demand in a planned way.

19. The generating stations of TPC are scheduled and despatched by TPC's load despatch centre at Trombay. TPC-LDC co-ordinates with SLDC on daily basis, however, it does not submit any generation schedule to SLDC, instead it only furnishes availability details of its generating stations to SLDC. Besides, other distribution licensees such as REL and BEST do not submit any demand forecast to TPC-LDC or SLDC.

20. Thus, a significant process change is involved not only in terms of demand forecasting by all distribution licensees on daily basis, but also in terms of furnishing such information to SLDC on daily basis. Significant capacity building initiatives in terms of resources and infrastructure will have to be undertaken at SLDC in order to



cater to such huge data handling and process related requirements. Development of ABT mechanism at State level will have to take into consideration above aspects while introducing any ABT mechanism and the phase-wise approach is most suitable for adoption under the circumstances.

(iv) Centralised or Decentralised Despatch

21. In order to ensure merit order despatch of generating stations within State, all generating stations within State should be available at command and control of the SLDC and the information pertaining to their daily availability should be available with SLDC.

22. The environmental restrictions, constraints on thermal loading of generating stations, limitations of ramp-up and ramp-down rates, etc., will also have to be taken into account while scheduling and despatching various thermal generating stations within State. Further, the Commission under its recent Order in case of ARR & Tariff Petition of MSPGCL for FY 2006-07 has highlighted need for judicious use of precious hydro resource and devised an innovative hydro pricing scheme linked to system marginal prices for generation during peak hours and off-peak hours.

23. Thus, centralised merit order despatch can cater to various aspects while striving to optimize overall cost of power system operations within State. ABT mechanism at State level will have to be devised suitably.

(v) Standby Support and Islanding Operations for Mumbai Licensees

24. Currently, two characteristic features of Mumbai power system operations are standby support provided by MSEDCL system in return for standby charges, and islanding operations in the event of emergency in western regional system or system failure in other parts of MSETCL system. The operations of power system and rules for balancing during period of islanded operation will have to be put in place to address these specific requirements.

E] APPLICABILITY OF ABT TO STATE PARTICIPANTS

25. The most important design parameters in the intra-State ABT mechanism are the participants or the market players to whom the intra-State ABT will be extended and the mechanism for determination of rate for settlement of energy transactions amongst various state participants. Chapter-5 of the Discussion Paper elaborates on the likely reasons for which intra-State ABT might be extended to any participant and the risks and issues associated with extending the intra-State ABT system to that particular participant. Various State participants covered are (a) State Generating Stations (b) Renewable Energy generators (c) Captive Power Plants (d) Open Access Users, and (e) Distribution Licensees



(i) State Generating Stations

26. As regards State generating stations, whether owned by public or private Companies, there are two critical aspects of Availability based Tariff (ABT) that need to be addressed, i.e., (a) linking recovery of fixed costs or capacity charges to the availability of generating station (b) applying 'Un-scheduled interchanges' regime to such generating stations.

27. The Commission had recently issued Tariff Orders in case of various Generating Companies (Order for MSPGCL (Case 48 of 2005) issued during Sep 2006) and generating stations of licensees [Order dated October 3, 2006 (Case 12 and 56 of 2005) in case of TPC, and Order dated October 3, 2006 (Case 25 and 53 of 2005) in case of REL]. Under the said Tariff Orders, the Commission has already approved station wise fixed costs for various generating stations and approved recovery mechanism linked to normative availability of 80% in accordance with the Tariff Regulations notified by the Commission. Under the said Order, the Commission has also approved the incentive mechanism and recovery thereof corresponding to approved target availability for each generating station.

28. Further, in case of Hydro Generating Stations, the Commission has introduced an innovative Hydro Pricing scheme linked to system marginal cost based on generation during peak hours and non-peak hours in order to provide appropriate economical signal for judicious utilization of scarce hydro resource.

29. Thus, first part of the ABT Mechanism at State level has been suitably extended in case of State Generating Stations. However, as far as extending second part of ABT mechanism, i.e., applicability of UI mechanism to State Generating stations is concerned; there are several critical aspects such as objectives that are likely to be achieved and key considerations in extending the UI mechanism to SGS need to be taken into account.

30. Based on detailed analysis as elaborated under Chapter-5 of Discussion Paper, it is preferable that UI mechanism should not be introduced for State Generators at this stage. However, ABT mechanism at State level involving fixed cost recovery linked to availability should be extended to State Generating Stations with immediate effect.

(ii) Renewable Energy Generators

31. MERC (State Grid Code) Regulations 2006 as well as Indian Electricity Grid Code (IEGC 2005) has stipulated that all generating units with Capacity of 50 MW and above shall be subjected to scheduling and despatch regime as stipulated under the Grid Codes and shall be subjected to the despatch instructions issued by RLDC/SLDC, as the case may be, from the point of view of system security. In case of renewable energy generators, unit size of each RE generator ranges from 350 kW (in case of wind) to 6-8 MW (in case of biomass power projects).



32. Further, Renewable energy based generation because of its very nature, is infirm generation and it may not be amenable to scheduling on timeblock to timeblock on day ahead basis. In fact, it needs to be despatched at all times as and when available in order to maximize generation and optimize utilization of renewable energy generation assets. Some renewable energy generation such as biomass based power plants can be subjected to scheduling and despatch regime, however, availability of necessary communication and metering infrastructure is essential for such implementation. Further, benefit of extending scheduling and despatch regime to such small capacity (< 10 MW) generating station need to be first ascertained, as most of these projects present a dispersed generation connected at distribution level (33 kV or below) thereby limiting their visibility at SLDC for meaningful command and control operations.

33. Hence, it is preferable that UI mechanism should not be extended to Renewable Energy Generators at this stage.

(iii) Captive Power Plants

34. The National Tariff Policy stipulates that harnessing of surplus captive power should be encouraged and option of extending frequency linked UI mechanism for such purposes should be explored. In fact, the Commission had issued an Order on September 8, 2004 (Case 55 & 56 of 2003) in the matter of power purchase and other dispensation in respect of fossil fuel based captive power plants. Under the said Order, the Commission had stipulated a tariff rate linked to frequency linked UI rate for procurement on firm and non-firm basis with floor rate (1/3rd of UI rate at 49 Hz) and ceiling rate (2/3rd of UI rate at 49 Hz). Subsequently, the Commission through its Order dated August 11, 2006 (Case 47 of 2005) revised the ceiling rate for purchase of power from fossil fuel based CPPs to be equivalent to UI charge at 49 Hz.

35. Further, it needs to be noted that the payment for such procurement was linked to actual energy injected by CPP and not scheduled energy, and the entire procurement was treated as Un-scheduled Interchange to be procured at stipulated rates. However, it is understood that no commercial transaction has taken place based on above arrangement till date. This may be on account of un-certainty surrounding the UI rate or lack of interest of CPP generators to above frequency linked UI arrangement.

36. Subsequently, the Commission instituted a mechanism in the city of Pune to tap about 90 MW of liquid fuel based captive capacity to curtail load shedding in the city of Pune, for payment of Reliability Surcharge by consumers. The Commission has developed this scheme through transparent regulatory process and issued Order dated May 16, 2006 (Case 1 of 2006), which has facilitated bringing surplus Captive Power capacity into the grid.



37. Thus, it is noted that CPP industry would respond to innovative mechanisms provided clarity on commercial settlement mechanisms and regulatory certainty is rendered to such schemes. Hence, it is suggested that ABT regime including UI mechanism should not be extended to Captive Power Plants at this stage.

(iv) Open Access Users (Transmission and Distribution)

38. It is important to understand and address the complexities of Open Access (OA) transactions before applying ABT mechanism to OA Users. It would be worthwhile to understand the distinctive requirement of Open Access Users and their classifications mainly from the perspective of technical feasibility and constraints in subjecting the OA Users to scheduling and despatching regime as per ABT requirements, similar to any other Distribution licensee. The Commission has already classified Open Access Users such as Transmission Open Access Users (TOAU) and Distribution Open Access Users (DOAU) under two separate Regulations, namely, MERC (Transmission Open Access) Regulations 2005 and MERC (Distribution Open Access) Regulations 2005.

39. It is worthwhile to clearly define various classifications of OA users for the purposes of ABT regime such as (a) Full Transmission Open Access User (b) Partial Transmission Open Access User – Direct Consumer (c) Full Distribution Open Access User (d) Partial Distribution Open Access User – Embedded Consumer.

40. In order to bring OA transactions under ABT regime, some of the key aspects that need to be considered are (i) Provisioning of default service to open access consumers (ii) Visibility and control of open access load/consumer at SLDC level (iii) Prioritisation sequence in case of curtailment (iv) Requirement of energy banking facility for open access transactions.

41. Based on detailed analysis of above issues as presented under Chapter-5 of Discussion Paper, it is suggested that during initial phase of ABT regime, only *full* TOAUs may be treated on par with distribution licensees and subjected to Balancing and Settlement Code for settlement of their overdrawal and underdrawal.

(v) Distribution Licensees

42. The introduction of an intra-State ABT to DISCOMs can serve the purpose of improving the performance of DISCOMs as far as load management is concerned which is one of the objectives of introducing ABT mechanism. It is assumed that the implementation of intra-State ABT will provide incentive for better load management discipline among DISCOMs. The downside of such an implementation has to be looked at, which is the disproportionate ability of DISCOMs to respond to variability in load as compared to generators.

43. The main issues that need to be considered while devising ABT scheme from implementation perspective include (a) **Monitoring capability** - Infrastructure required



to monitor real time drawal vis-à-vis their schedule is not available to DISCOMs. (b) **Response capability** – Even if the DISCOMs were able to monitor their load, there is a basic issue of controllability. The demand varies according to various factors such as weather, consumer patterns, etc. These are not exactly predictable. If the demand is in excess of schedule and such excess is within acceptable limits, it would be imprudent to levy a heavy penalty on the DISCOMs.

44. Accordingly, options for introducing ABT mechanism to DISCOMs are as under:

Option-1: Flow through of UI Mechanism as an Option

A feasible option would be to go by the UI pass-through mechanism. As per this mechanism, the UI incidence on the State will be shared by the DISCOMs which are causing it on a pro-rata basis. Hence, for example, if the State has a net positive UI earning in a time block, then the DISCOMs which are underdrawing in that particular time-block would share the gains from inter-State UI earnings in proportion of their under-drawal. The same would also be true for overdrawal conditions. This mechanism would serve as an incentive to DISCOMs to better manage their load and would also avoid the situation of one Discom earning UI at the cost of others.

Option-2: Deviations priced at System Marginal Price

Another option would be to monitor the deviations of DISCOMs from their scheduled energy and price such deviations (overdrawal/underdrawal) at system marginal price. The overdrawing DISCOM shall pay/contribute to State UI pool to the extent of their overdrawal at the System Marginal Price prevalent for that time-block whereas the under-drawing DISCOM shall receive from State UI Pool a sum equivalent to their underdrawal at the System Marginal Price prevalent for that time-block. Such pricing shall ensure cost-based recovery of the over-drawal/underdrawl rather than frequency linked pre-determined pricing. For the purpose of System Marginal Price, SLDC shall adopt State-wide Merit Order despatch principles and the variable cost of the generating stations as approved by the Commission shall form the basis for determination of System Marginal Price.

Option-3: Combination of above two mechanisms

A hybrid option can be devised based on combination of above two mechanisms, i.e., State level UI Pool will comprise DISCOM deviations from the Schedule as well as the integration of the State's component of the regional UI Pool into the State UI Pool. The DISCOMs' deviations from the schedule would be settled at system marginal price. In addition, the State's share of regional UI component shall be pass through to the DISCOMs in proportion to their deviations from the schedule. However, reconciliation of the energy accounts and reconciliation of each Pool participant's deviations from the schedule for each time block would be a challenge. An elaborate energy accounting and



reconciliation system will have to be developed to be able to handle the settlement mechanism based on this hybrid mechanism.

45. Based on detailed analysis presented under Chapter-5, it is inferred that having a full fledged ABT with a frequency linked price for DISCOMs would be inequitable from a risk and return perspective. There are basic issues regarding monitoring and controllability of DISCOM load vis-à-vis generator injections. It is therefore suggested that as far as DISCOMs are concerned, a hybrid mechanism based on system marginal price and flow through of UI can be adopted. In this mechanism, over-drawal/under-drawal of the DISCOMs is settled at system marginal price and in addition, the UI gains or losses incidence on the State are shared by the DISCOMs on a pro-rata basis. If there is no UI incidence on the State, there is no UI implication for any DISCOM even if one DISCOM is overdrawing and another is underdrawing.

F] MARKET STRUCTURE FOR INTRODUCTION OF ABT MECHANISM AT STATE LEVEL

46. Chapter-6 of the Discussion Paper elaborates on emerging market structure, various entities, their roles and responsibility, rules for their operation, and contractual framework for the market operation under proposed Balancing and Settlement mechanism for Maharashtra.

47. The Maharashtra State Power Pool shall comprise a tiered structure for market operations comprising various entities such as Market Participants, State Pool Participants, Market Service Providers and Market Watchdog as elaborated in the following paragraphs.

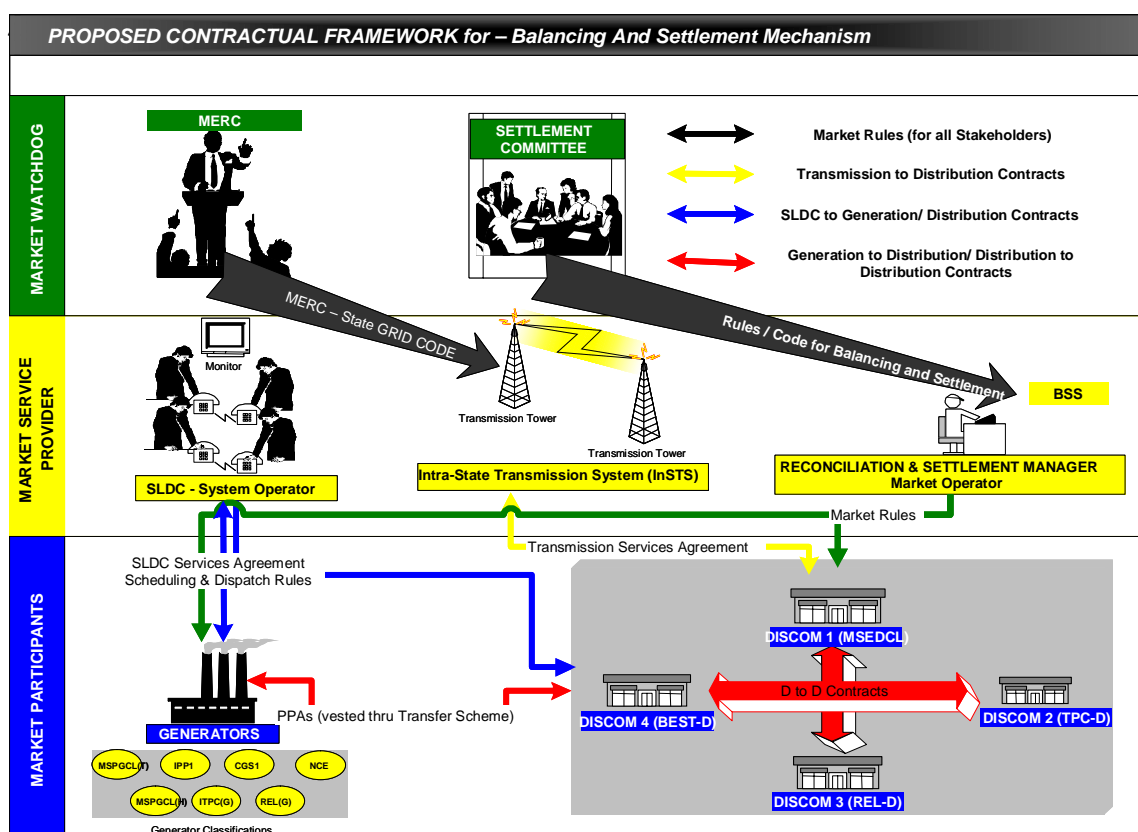
- **Market Participants** – The Market Participant shall mean the generating companies, power trading companies, DISCOMs, open access users and consumers operating within electricity market in Maharashtra.
- **State Pool Participants** - This refer to the Market Participants of Maharashtra electricity market who meet the conditions for membership of Pool, subject to fulfillment of qualification criteria or covenants for Pool participation as set out under the Balancing and Settlement Code. Currently, it is envisaged that the DISCOMs and the Transmission open access users (subject to fulfillment of certain qualification criteria or covenants for Pool participation) and operating within electricity market of Maharashtra in accordance with the terms and conditions outlined under the Balancing Settlement Code shall be the State Pool Participants.
- **Market Service Providers** – Transmission Licensees such as MSETCL, TPC-T and REL-T in their role as intra-State transmission system service providers,

MSLDC-OD (Operations Division of Maharashtra - State Load Despatch Centre) in its role as State Load Despatch Centre responsible for scheduling and despatch across State, MSLDC-CD (Commercial Division of Maharashtra State Load Despatch Centre) to undertake State-wide energy accounting of energy flows and reconciliation of various energy transactions amongst various State Pool Participants.

- **Market Watchdog** – MSPC (Maharashtra State Power Committee as Market Operator) and MERC (Regulator)

(i) Contractual Framework for system operations under ABT regime

48. Figure below illustrates the schematic of the contractual framework of the proposed Balancing and Settlement Mechanism between the various Maharashtra State Pool Participants:



50. Various regulatory and contractual agreements that would govern the operations of the State Participants and Market Participants under ABT regime shall include but not limited to following (a) Maharashtra Balancing and Settlement Code to be formulated by the Commission (b) Power Purchase Agreements (c) Bulk Power Transmission



Agreements and Connection Agreements (d) SLDC Services Agreement, in future (e) MERC (State Grid Code) Regulations 2006 (f) Various Orders of the Commission – such as Tariff Order for various licensees (MSEDCL, MSETCL, TPC, REL) and generating companies (MSPGCL) for FY2006-07, Transmission Pricing Framework Order, Transmission Tariff Order for FY2006-07 and Order for approval of SLDC Budget for FY2006-07 etc.

(ii) Roles and Responsibilities of Various Entities

51. Chapter-6 of the Discussion Paper has covered in detail the roles and responsibilities of each sector entity under ABT regime, viz., (i) Generating Companies (ii) Distribution Licensees (iii) State Transmission Utility and transmission licensees (iv) State Load Despatch Centre (v) Maharashtra State Power Committee (v) Reconciliation and Settlement Manager. During the initial phase of ABT regime, it is envisaged that the role of the RSM shall be undertaken by the Commercial Division of Maharashtra State Load Despatch Centre (MSLDC-CD).

G] SALIENT FEATURES OF PROPOSED ABT MECHANISM AT STATE LEVEL

52. Chapter-7 of the Discussion Paper deals with the various design parameters used to establish the framework for the ABT mechanism as well as the framework for the reconciliation and settlement mechanism. The various design parameters that have been considered for the development of the State level ABT Mechanism framework are: (a) Scheduling period (b) Trading period (c) Settlement period (d) Measurement unit for State Imbalance pool (e) Treatment of reactive energy drawal and injection (f) Basis for ex-ante and ex-post pool prices (g) Basis for least cost despatch (h) Basis for allocation of losses (i) Basis for allocation of Regional UI charges among State Pool Participants

(i) Scheduling Period

- (a) The scheduling period shall comprise of 48 time blocks, each of 30-minute duration starting from 00:00 hours (IST) ending with 24:00 hours (IST). The detailed scheduling process for distribution licensees and generating companies have been elaborated under Chapter-7 of the Discussion Paper.

(ii) Trading Period

- (a) The trading period denotes the period for accounting of energy exchange amongst the State Pool Participants for the purpose of commercial settlement. In view of existing metering infrastructure and capability to measure energy exchange at T<>D interface points, the trading period for the purpose of market operation shall be of 30 minute duration.
- (b) The price for settlement of energy exchange amongst the State Pool Participants shall be determined separately for each trading period based on weighted average System



Marginal Price prevalent for that time block. These prices for settlement shall be determined with the help of a Balancing and Settlement System (BSS) software, to be run by the Reconciliation and Settlement Manager (RSM).

(iii) Settlement Period

The commercial settlement for the imbalances amongst the State Pool Participants will be of two tiers as follows:

Monthly Settlement

- (a) For the purposes of settlement of energy exchanges amongst State Pool Participants, the RSM shall work out the Imbalance Pool Increments and Imbalance Pool Decrements by each State Pool Participant corresponding to each trading period in accordance with the Balancing and Settlement Code. The principles for the same are outlined in detail under Chapter-7 and Chapter-9 of the Discussion Paper.

Annual Fixed Cost Settlement

- (a) For the purposes of settlement of capacity exchanges amongst State Pool Participants, the RSM shall work out the Fixed Cost Reconciliation (FCR) Pool Increments and FCR Pool Decrements by each State Pool Participant corresponding to each trading period in accordance with the Balancing and Settlement Code. The principles for same are outlined in detail under Chapter-7 and Chapter-9 of the Discussion Paper.

(iv) Measurement Unit for Imbalance Pool

- (a) The Imbalance Pool Increments, the Imbalance Pool Decrements, and the FCR Pool Increments and the FCR Pool Decrements shall be accounted in terms of electrical energy units. The measurement unit for the Imbalance Pool and the FCR Pool shall be kilowatt hours (kWh).
- (b) The Imbalance Pool Amount Payable, the Imbalance Pool Amount Receivable, FCR Pool Amount Payable, and the 'FCR Pool Amount Receivable' shall be accounted in terms of Indian Rupees (INR). The measurement unit for the 'Imbalance Pool Amount' and the 'FCR Pool Amount' shall be Indian Rupees (INR).

(v) Treatment of Reactive Energy Drawal and Injections

- (a) The generating companies and the State Pool Participants shall be responsible for injection of reactive energy and drawal of reactive energy in accordance with the State Grid Code for the safe, reliable and steady operations of the grid.
- (b) The energy exchange amongst the State Pool Participants shall be settled commercially only in terms of the active energy component. Further, reactive energy drawal (kVAR) by the State Pool Participants shall be accounted and monitored. The



same shall be dealt with in accordance with the mechanism outlined under the Commission's Order for Transmission Pricing Framework (Case 58 of 2005).

(vi) Basis for computation of Ex-ante Imbalance Pool Price

- (a) The Ex-Ante Imbalance Pool price shall be derived for each trading period separately, and shall be based on overall pool volume and pool value to be determined based on the target despatch schedule for the generators and target drawal schedule for the State Pool Participants to be finalised by MSLDC on day-ahead basis.
- (b) The basis for computation of ex-ante imbalance pool volume, ex-ante imbalance pool value and ex-ante imbalance pool price for settlement has been elaborated under Chapter-7 of the Discussion Paper.

(vii) Basis for computation of Ex-Post Imbalance Pool Price (Settlement Price)

- (a) The Ex-Post Imbalance Pool Price shall be derived for each trading period separately, and shall be based on overall pool volume and pool value to be determined based on the actual injection by the generators and actual drawal by the State Pool Participants.
- (b) The basis for computation of ex-post imbalance pool volume, ex-post imbalance pool value and ex-post imbalance pool price for settlement has been elaborated under Chapter-7 of the Discussion Paper.

(viii) Basis for Least Cost Despatch

- (a) The MSLDC shall be responsible for preparation of the Least Cost Despatch Schedule after taking into account the requirement of the State as a whole. Further, MSLDC shall determine the target despatch schedules and target drawal schedules by undertaking load-generation balancing and adopting MOD principles at reference frequency of 50 Hz.
- (b) During real-time operations, SLDC may seek to verify available capacity upto declared capacity and issue despatch instructions accordingly.
- (c) During real-time operations, in case of shortfall in availability, SLDC shall take into account the available contracted capacity to each Distribution Licensee (or State Pool Participant) before issuing drawal/curtailment instructions for respective Distribution licensee. The load curtailment as may be necessary, shall be applicable on all distribution licensees uniformly in proportion to their available contracted capacity and shall be applicable for shortfall beyond their available contracted capacity.



(ix) Basis for Allocation of Losses

- (a) For the purpose of determination of imbalance pool increments/decrements, the actual drawal by State Pool Participants needs to be corrected to derive loss adjusted drawal by each State Pool Participant to a common reference point (ex-bus) for comparison.
- (b) The intra-State transmission system losses for the purposes of imbalance computations shall be based on difference of actual injections by generating stations and actual drawal by State Pool Participants.
- (c) The intra-State transmission system losses shall be allocated amongst the State Pool Participants at actual (ex-post) in proportion to the actual drawal by each State Pool Participant. The mechanism for energy accounting and treatment of intra-State transmission system losses have already been elaborated under Commission's Transmission Tariff Order for FY 2006-07 (Case 31 of 2006).

(x) Basis for allocation of regional UI charges amongst State Pool Participants

- (a) Settlement of regional UI charges shall be on **weekly** basis in accordance with Regional Energy Accounts finalised by WRLDC and the claim raised by WRLDC/WRPC for the State shall be settled by MSPC on behalf of State Pool Participants corresponding to deviations for each 30 minute duration.
- (b) However, allocation of UI charges amongst the State Pool Participants shall be in accordance with parameters and principles outlined under Chapter-7 of Discussion Paper and shall be undertaken on **monthly** basis corresponding to deviations of State Pool Participants from their schedule for each trading period of 30-minute duration.
- (c) The RSM (whose role will be undertaken by the Commercial Division of MSLDC) shall develop statement of reconciliation corresponding to each trading period for weekly regional UI charges against the monthly allocation of net UI charges and monthly weighted average scheduled energy charges covered as a part of imbalance pool settlement.

H] IMPLEMENTATION CHALLENGES

53. Chapter-8 of the Discussion Paper deals with various implementation challenges that will have to be dealt with appropriately for implementation of ABT mechanism at State level. This Chapter elaborates on specific requirements arising out of proposed ABT mechanism to be adopted at State level in terms of energy metering, energy accounting, information requirement for market operation, obligation of parties to furnish requisite information. Specific implementation challenge areas covered under this Chapter are (a) Energy Accounting (b) Accounting of energy during emergency



conditions (Market Suspension) (c) Metering Requirements (d) Information Requirements (e) Obligations to provide information

I] SETTLEMENT PROCESS AND RULES

54. Chapter-9 of the Discussion Paper deals with premise and rule for settlement of energy exchange amongst State Pool Participants in the context of the market operations under ABT mechanism. The principles outlined under this Chapter specifically strives to address rules pertaining to settlement of imbalance energy exchange amongst State Pool participants, rule for settlement regional UI pool account, rule for settlement of inter-State trade of energy pool account and rule for settlement of fixed cost reconciliation pool amongst State Pool Participants.

55. This Chapter also elaborates on specific requirements for fail-safe market operations such as payment guarantees, events of defaults by State Pool Participants, Market Operations (MSPC) and Market Service providers (MSETCL, MSLDC-OD, MSLDC-CD etc.) and remedies thereof. Specific aspects covered under this Chapter are (a) Billing and Payment (b) Settlement of Regional UI Pool account (c) Settlement of FCR Pool account (d) Settlement of inter-State trade Pool account (D-trade) (e) Payment Guarantees (f) Payment Default and Remedies.

J] GOVERNANCE STRUCTURE

56. Chapter-10 of the Discussion Paper deals with the critical aspect of Governance in the context of the market operations under State level ABT mechanism. Specific areas covered under this Chapter are (a) Objective of Governance under State level ABT mechanism (b) Constitution of Maharashtra State Power Committee (c) Functions of Maharashtra State Power Committee (d) Powers of Maharashtra State Power Committee.

(i) Objective of Governance Structure under ABT Regime

57. As a part of the proposed ABT mechanism at State level, an institutional arrangement needs to be created to address commercial issues, which may arise between the trading partners. A Maharashtra State Power Committee (MSPC) is recommended for this purpose. The main objectives of this institutional arrangement shall be to:- (a) Develop and provide a platform for better governance of a market oriented trading mechanism (b) Provide a framework for efficient reconciliation and settlement of differences between the trading partners (c) Recording of commercial arrangement and accounting of energy exchange amongst parties (d) Bring transparency in operation and improve upon the system and procedures of market operation under ABT regime.



(ii) Constitution of Maharashtra State Power Committee

58. The Maharashtra State Power Committee shall consist of following members (i) Chief Executive of MSEDCL (ii) Chief Executive of TPC-D (iii) Chief Executive of REL-D (iv) Chief Executive of BEST-D (v) Head Executive of MSLDC

59. The Chairman of the Maharashtra State Power Committee can be appointed from amongst the Chief Executives of the Distribution Licensees on a rotational basis, with the MD of MSEDCL being appointed as first Chairman of MSPC. The tenure of the Chairman shall not exceed a period of one year and the appointment shall be ex-officio.

60. Head Executive of MSLDC shall be ex-officio Member – Secretary of the MSPC and the Administrative Division of MSLDC shall provide secretarial and administrative assistance to MSPC to undertake its various activities. MSPC shall further address institutional requirements of this arrangement suitably, as may be necessary.

61. Other functions, key activities and the Powers of MSPC have been outlined in detailed under Chapter-10 of the Discussion Paper

(iii) Review mechanism for Balancing and Settlement Code

62. The Balancing and Settlement Code once approved by the Commission shall be applicable and binding on all State Pool Participants, Market Participants and Market Service Providers. It shall continue to be in force until reviewed and revised by the Commission upon undertaking due regulatory process. The Commission may initiate the regulatory process for modification to Balancing and Settlement Code on suo-moto basis or based on recommendations of MSPC.