

DRAFT
FINAL BALANCING AND SETTLEMENT
CODE



I. BRIEF HISTORY OF AVAILABILITY BASED TARIFF (ABT) REGIME

- (i) India is facing a huge power deficit situation, which is retarding the nation's progress. Hence efforts are being made increase the availability of power.
- (ii) Prior to the introduction of Availability Tariff, the regional grids had been operating in a very in disciplined and haphazard manner. There were large deviations in frequency from the rated frequency of 50.0 cycles per second (Hz). Low frequency situations were a result of the total generation available in the grid being less than the total consumer load. The low frequency condition can be mitigated by enhancing generation and/or curtailing consumer load. Further, the high frequency conditions are a result of insufficient backing down of generation when the total consumer load has dropped down significantly during off-peak hours. The earlier tariff mechanisms did not provide any incentive for either backing down generation during off-peak hours or for reducing consumer load / enhancing generation during peak-load hours. Also there was no disincentive for over drawl at low frequency. In fact, it was profitable to go on generating at a high level even when the consumer demand had come down. In other words, the earlier tariff mechanisms encouraged grid indiscipline.
- (iii) Unscheduled interchange charge is a distinctive feature of the ABT mechanism. The UI charges are linked to grid frequency and are payable or receivable by the utilities depending upon their default of deviating from either generation or drawl schedules. This feature in ABT scheme was introduced to bring about not only discipline in the system but to tackle many of the pressing problems of system operations.
- (iv) In order to give adequate economic signal during power shortage conditions, the CERC had directed to link the UI rates to the costliest form of generation, that is, diesel generation. Accordingly the Commission in its first notification prescribed UI rate of 420.00 paise/kWh in case of over-drawls at a frequency below 49.02 Hz.
- (v) Western Regional Electricity Board in its meeting held on 30.4.2002, decided to implement ABT in the Western Region with effect from 1.7.2002 for the first time in the country. Subsequently the same mechanism was adopted in all the other regions of the country and is in operation all over the country.
- (vi) The UI rates then revised to 570 paise/KWH. From 26th April 2007 the frequency based UI rate was revised to Rs. 7.45/kWh and from 7th January 2008 the frequency based UI rate was changed to Rs. 10.00/kWh.
- (vii) If the Availability Based Tariff mechanism is properly deployed, it can help in making available more power into the electricity grids, both short term and long term, enabling the utilities to meet additional consumer load and significantly reduce the quantum of load shedding and improve the grid performance.

II. REGULATORY FRAMEWORK

- (i) 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.
- (ii) 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.
- (iii) 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 specific task assigned to the Sub-Committee was to make recommendations to FOIR on implementation of ABT in intra-State systems. 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 compatible with the inter-State ABT system.
- (iv) The frequency based UI mechanism has been followed by all the regions and as per clause 5.7.1 (b) of NEP notified by central Govt. mandates the appropriate commission to introduce ABT mechanism at state level but it needs to be ensured that the intra state ABT mechanism is compatible with inter-state ABT mechanism.

III. INTRA-STATE ABT IN MAHARASHTRA

- (i) The Inter-State Generating Stations (ISGS) and States (beneficiaries) are currently regulated by the CERC designed Inter-state Availability Based Tariff (ABT) regime. ABT allows for an imbalance pool with a frequency based administered pricing mechanism. Any over-generation by generators and under-drawal by states is considered as contributions to the Unscheduled Interchanges (UI) energy pool while under-generation by generators and over-drawal by states is considered as drawal from the UI energy pool. The rate of such sale or

purchase of UI energy is a pre-determined function of the grid frequency during a defined 15-minute time block.

- (ii) Under the Electricity Act 2003, the MERC has the responsibility for the design and implementation of a power market in the State of Maharashtra. This is a complex task and the development of a full fledged intra-state power market would require, inter-alia, decision making on aspects of power market design and principles, contracts between generators and purchasers; processes for scheduling, monitoring, balancing and settlement; infrastructure and software to implement the same; capability enhancement at MSLDC, distribution licensees, generators and open access customers.
- (iii) Even adapting the ABT mechanism operating at the central sector to the state, and providing for open access transactions, will require the MERC to address existing issues with the ABT as well as certain new issues that become relevant at the state level.
- (iv) One of the objectives of the proposed mechanism was to introduce an environment to facilitate trading in electricity to enable effective utilization of generation resources within the State.
- (v) Further, in terms of provisions of Section 42(2) of the Electricity Act, 2003, the Commission notified the MERC (Terms and Conditions of Distribution Open Access) Regulation, 2005 with vide Clause 11.2 provides that the every person who has been granted open access needs to comply with the provisions of the Balancing and Settlement Code, to the extent made applicable to them.
- (vi) Accordingly, MERC issued an order on Case No. 42 of 2006 on Introduction of Intra-State Availability Based Tariff (ABT) at State Level within Maharashtra and other related issues dated 17th May, 2007 which outlined the key elements in the implementation of the proposed system as given below:
 - Emerging market structure necessitating emergence of various new entities such as market service providers, market participants and market operator;
 - Roles and responsibility of the entities involved;
 - Rules and regulations for their operation, and contractual framework for the market operation under proposed Intra-State ABT regime for Maharashtra;
 - Various design parameters used to establish the framework for the ABT mechanism as well as the framework for the reconciliation and settlement mechanism;
 - Premise and principles for settlement of energy exchange amongst State Pool Participants in the context of the market operations under ABT mechanism;
 - Issue related to 'Governance' in the context of the market operations under State level ABT mechanism;
 - Various implementation requirements that will have to be dealt with appropriately for implementation of ABT mechanism at State level

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- (vii) The order also provides for creation of an institutional mechanism, to address the commercial issues which would arise among the State Participants.
- (viii) In view of the above, MSLDC developed a two pronged strategy for development of 'Energy Accounting' and 'Centralised Pooling Mechanism' for financial settlement of energy exchange between distribution licensees on following basis:
 - a) Plan-1 : Development of Interim Balancing and Settlement Mechanism (IBSM)
 - b) Plan-2 : Development of Final Balancing and Settlement Mechanism (FBSM)

The term IBSM refers to 'centralised pooling mechanism' for settlement of energy exchange (over-drawal or under-drawal) amongst distribution licensees on monthly basis, whereas the term FBSM refers to the Final Balancing and Settlement Mechanism for settlement of energy exchange amongst State Pool participants for each trading period.

- (ix) The Commission had clarified that implementation of IBSM and all other activities related to day ahead scheduling, information exchange by generating companies and distribution licensees with MSLDC etc. as envisaged under the said Order would be implemented with immediate effect.
- (x) However, the FBSM and all related activities would be implemented on completion of the interface metering, availability of the data acquisition infrastructure and development & implementation of the necessary software for undertaking the 15 minute interval time block settlement in line with the provisions of the Commission's order regarding "Intra-State ABT".
- (xi) Accordingly with an objective of governing the functioning of the State Pool Participants in a way that discipline is maintained with regard to the supply and drawal of energy by the State Pool Participants and the reliability and integrity of power system is maintained, the Commission vide this order is notifying the "Balancing and Settlement Code" for the Final Balancing & settlement mechanism.

GLOSSARY OF TERMS

ABT	Availability Based Tariff
BEST	Brihan-Mumbai Electric Supply and Transport Undertaking
BG	Bank Guarantee
CERC	Central Electricity Regulatory Commission
CGS	Central Sector Generating Station
CMD	Common Market Design
CTU	Central Transmission Utility
DISCOM	Distribution Licensee
DOAU	Distribution Open Access Users
GERC	Gujarat Electricity Regulatory Commission
GoI	Government of India
GoM	Government of Maharashtra
G<>T	Generation <> Transmission (Interface Point)
InSABT	Intra State Availability Based Tariff
InSTS	Intra State Transmission System
kV	KiloVolt
kW	KiloWatt
kWh	Kilo Watt Hour
LC	Letter of Credit
MERC	Maharashtra Electricity Regulatory Commission
MOD	Merit Order Dispatch
MoP	Ministry of Power
MPECS	Mula Pravara Electric Co-operative Society Ltd.
MSEB	Maharashtra State Electricity Board
MSEDCL	Maharashtra State Electricity Distribution Company Ltd.
MSETCL	Maharashtra State Electricity Transmission Company Ltd.
MSLDC	Maharashtra State Load Despatch Centre
MSLDC-CD	Maharashtra State Load Despatch Centre Commercial Division
MSLDC-OD	Maharashtra State Load Despatch Centre Operational Division

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MSPC	Maharashtra State Power Committee
MSPGCL	Maharashtra State Power Generation Company Ltd.
MU	Million Unit
MW	Mega Watt
NEP	National Electricity Policy
NTP	National Electricity Tariff Policy
PGCIL	Power Grid Corporation of India Limited
PPA	Power Purchase Agreement
RGPPL	Ratnagiri Gas and Power Private Limited
RINFRA-D	Reliance Infrastructure Ltd – Distribution
RINFRA-T	Reliance Infrastructure Ltd – Transmission
Rs	Rupees
Rs/kWh	Rupees per kilo watt hours
SEM	Special Energy Meters
SERC	State Electricity Regulatory Commission
SGS	State Generation Station
SMP	System Marginal Price
SPP	State Pool Participants
STU	State Transmission Utility
TCR	Transmission Capacity Rights
T <> D	Transmission <> Distribution (Interface Point)
TOAU	Transmission Open Access Users
TPC	Tata Power Company Ltd.
TPC-D	Tata Power Company Ltd – Distribution
TPC-T	Tata Power Company Ltd – Transmission
TPS	Thermal Power Station
TSU	Transmission System Users
UI	Unscheduled Interchange
WRLDC	Western Region Load Despatch Centre
WRPC	Western Region Power Committee

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MAHARASHTRA ELECTRICITY REGULATORY COMMISSION

FINAL BALANCING AND SETTLEMENT CODE (FBSC)

NOTIFICATION

In exercise of the powers conferred by sub-section (1) and clause (zi) of sub-section (2) of section 181 of the Electricity Act, 2003 (36 of 2003) and all powers enabling it in this behalf, the Maharashtra Electricity Regulatory Commission hereby makes the following regulations:—

1. PREAMBLE

- 1.1** The clause 5.7.1(b) of National Electricity Policy (NEP) notified by Central Government mandates the Appropriate Commissions to introduce Availability Based Tariff (ABT) mechanism at State level. The National Tariff Policy (NTP) envisages implementation of the Availability Based Tariff (ABT) at State level by April 2006.
- 1.2** To give effect to the intention of the NEP, the Maharashtra Electricity Regulatory Commission in exercise of the powers vested under clause (zi) of sub-section (2) of Section 181 of Electricity Act 2003 (hereinafter referred to as EA 03), read along with clause (b) of sub-Section (1) of Section 86, Section 66 and MERC (State Grid Code) Regulations, 2006 has determined the mechanism for introduction of availability based tariff regime at State level within Maharashtra.
- 1.3** The Section 86(1)(b) empowers the Commission to regulate electricity purchase and procurement process amongst the distribution licensees, whereas the Section 66 mandates the Commission to promote development of market (including trading).
- 1.4** In exercise of its powers vested as per above provisions of the EA 03, the Commission hereby makes the following regulation, namely:-

2. SHORT TITLE, COMMENCEMENT AND EXTENT

- 2.1** This code may be called as the Maharashtra Electricity Regulatory Commission (Final Balancing and Settlement) Code, 2009.

- 2.2** This code shall apply within the geographical area of the State of Maharashtra and shall apply to state pool participants and open access users in the State of Maharashtra in a manner as specified in this Code.
- 2.3** This code shall come into force from 1st September 2009 or from the date of operationalisation of FBSM, whichever is later.

3. DEFINITIONS

3.1 In these Regulations unless the context otherwise requires:

- (1) "Act" means the Electricity Act, 2003 (36 of 2003);
- (2) "Final Balancing and Settlement Code (FBSC)" means such code as may be specified by the Commission for the governing the operations and behaviour of the Market Participants and State pool participants and to be implemented, administered and enforced by the Maharashtra State Power Committee;
- (3) "CERC" means The Central Electricity Regulatory Commission referred to in subsection (1) of section 76 of the Act;
- (4) "Commission" means the Maharashtra Electricity Regulatory Commission (MERC);
- (5) "Day" means a continuous period starting at 00.00 hours and ending at 24.00 hours;
- (6) "Date/time" means date and time specified in DD-MM-YYYY/ hh:mm:ss format where "DD" represents date (in digits), "MM" represents month (in text), "YYYY" represents year (in digits), "hh" represents hours (in digits), "mm" represents minutes (in digits) and "ss" represents seconds (in digits);
- (7) "Direct Consumer" means Transmission Open Access User, who is also a consumer of a 'Distribution Licensee';
- (8) "Distribution Licensee (Discom)" means a licensee authorised to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply;
- (9) "DOAU" Distribution Open Access User (DOAU) means open access user connected to distribution network of distribution licensee.
- (10) "Emergency Conditions" in the context of grid operations shall include:
 - forced outage (tripping) of single or multiple generating unit(s) of a single generating station OR forced outage (tripping) of single or multiple generating unit(s) of more than one generating stations;
 - forced backing down (more than 50% of its rated output continued for more than two hours) of single or multiple generating unit(s) due to unpredictable technical fault(s) or limitation(s);

- bottleneck in evacuation of power (i.e. conditions which force reduction in generator output) due to any system constraint, outage, failure or limitation in the transmission system, associated switchyard and sub-stations owned by STU or any other transmission licensee involved in intra-state transmission;
- grid disturbance (i.e. partial system blackout in the state/region due to multiple outages of generating stations and/or transmission lines) and grid collapse (i.e. total black out in the state/region);
- abrupt change in grid demand within short period (at least +/-20% change in state demand within a period of 15-minutes) caused due to:
 - i. sudden heavy rains in part(s) of the state/entire state;
 - ii. any act of the God or natural calamity in part(s) of the state/entire state;
 - iii. sudden demand imposed by large consumer(s) through switching-on heavy loads.

SLDC will be responsible to certify/validate the emergency situations and its actual duration based on (i) information available at SLDC from real-time monitoring system (if available) (ii) information available from concerned distribution licensee (records of interconnecting line loading available from sub-station) and (iii) CMRI data analysis;

- (11) "Embedded Consumer" means Distribution Open Access User, who is also a consumer of a 'Distribution Licensee';
- (12) "Grid" means the high voltage backbone system of inter-connected transmission lines, sub-stations and generating plants;
- (13) "Indian Electricity Grid Code (IEGC)" means a document describing the philosophy and the responsibilities for planning and operation of Indian power system specified by the CERC in accordance with sub section 1(h) of section 79 of the Act;
- (14) "Inter-State Generating Station (ISGS)" means a central/other generating station in which two or more states have shares and whose scheduling is to be coordinated by the Regional Load Despatch Centre (RLDC);
- (15) "Inter-State Transmission System (ISTS)" means Transmission System assets which include:
- a. any system for the conveyance of electricity by means of a main transmission line from the territory of one State to another State;
 - b. the conveyance of energy across the territory of an intervening State as well as conveyance within the State which is incidental to such inter-state transmission of energy;
 - c. the transmission of electricity within the territory of State on assets (or facilities) built, owned, operated, maintained or controlled by CTU.
- (16) "Market Operator" means Maharashtra State Power Committee (MSPC) as specified in the order;
- (17) "Market Participants" mean the generating companies, power trading companies, distribution licensees and the open access users and

- consumers operating within electricity market within Maharashtra (i.e. Generators, DISCOMs, traders, OA Users);
- (18) "Market Service Providers" means Transmission Licensees such as MSETCL, TPC-T and RINFRA-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;
- (19) "Month" means a continuous period of one month commencing from 00.00 hours on the first day of the month and ending at 24.00 hours on last day of the month as per the British calendar;
- (20) "Order" means MERC' s order on Case No.42 of 2006 on Introduction of Availability Based Tariff Regime at State Level within Maharashtra and other related issues, dated 17th May, 2007;
- (21) "Schedule" denote the injection schedule in MW (in case of generator) or drawal schedule in MW (in case of consumer) provided by generator/consumer/distribution licensee to the MSLDC (in case of connected to transmission network) or to the distribution licensee (in case of connected to distribution network) in a manner as specified in this Code;
- (22) "MSLDC" means the Maharashtra State Load Despatch Centre (established under subsection (1) of section 31 of the Act) to ensure integrated operations of the power system and co-ordinating supply-demand in the state in real-time;
- (23) "State" means the State of Maharashtra.
- (24) "State Pool Participants" means the Market Participants of Maharashtra Electricity Market who meet the conditions for membership of Pool, subject to fulfilment of qualification criteria or covenants for Pool participation as set out by MERC;
- (25) "State Transmission Utility (STU)" means the Board or the Government company specified as such by the State Government under sub-section (1) of section 39 of the Act. At present MSETCL has been notified to be the 'State Transmission Utility' vide GR dated 17th February, 2005;
- (26) "Time Block" or "TB" means time block of 15-minute each for which special energy meters record specified electrical parameters and quantities with first time block starting and 00.00 hours;
- (27) "TOAU" Transmission Open Access User means a person who has been allotted transmission capacity rights to access an intra-state transmission system pursuant to a Bulk Power Transmission Agreement;
- (28) "UI Rate" or "Unscheduled Interchange Rate" for a time block is the rate as determined by CERC for the Inter-State ABT regime;

(29) "Week" means a continuous period of seven (7) days commencing from 00.00 hours on the Monday and ending at 24.00 hours on following Sunday as per the British calendar;

3.2 All other expressions used herein although not specifically defined herein, but defined in the Electricity Act 2003, shall have the meaning assigned to them in the Electricity Act 2003. The other expressions used herein but not specifically defined in this Code, any other Regulation or in the Electricity Act 2003, but defined under any law passed by the Parliament applicable to Electricity Industry in the State or stated in the tariff order shall have the meaning assigned to them in such law. Subject to the above the expression used herein but not specifically defined in this Code or the Regulation in the Act or any law passed by the Parliament shall have the meaning as is generally assigned in the Electricity Industry.

4. APPLICABILITY OF RULES

4.1 The Final Balancing and Settlement Code as approved by the Commission under this Regulation shall be applicable and binding on all State Pool Participants, Market Participants and Market Service Providers as defined below:

4.1.1 Maharashtra State Power Pool Participants

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

4.1.1.1 Market Participants – The Market Participant shall mean the generating companies, power trading companies, distribution licensees and the Open Access (OA) users and consumers operating within electricity market within Maharashtra. (i.e. Generators, DISCOMs, traders, OA Users);

4.1.1.2 State Pool Participants - This shall refer to the Market Participants of Maharashtra Electricity Market who meet the conditions for membership of Pool, subject to fulfilment of qualification criteria or covenants for Pool participation as set out under the Commission's Order. Currently, it is envisaged that the Distribution Licensees, the Transmission Open Access Users and the Merchant Generators selling Power outside the State (subject to fulfilment of qualification criteria or covenants for Pool participation) operating within electricity market of Maharashtra in accordance with the terms and conditions outlined under the Commission's Order and under this code shall be the State Pool Participants.

4.1.1.3 Market Service Providers – Transmission Licensees such as MSETCL, TPC-T and RINFRA-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;

4.1.1.4 **Market Operator** – Maharashtra State Power Committee (MSPC);

4.2 During the initial phases of market operation, the Transmission Open Access Users (TOAUs) shall be considered eligible for membership of the State Pool subject to the acceptance of the following conditions by the TOAUs:

- (i) The TOAUs shall share the imbalance costs and the UI costs;
- (ii) The TOAUs availing supply from captive sources have to demonstrate that they have contracted for the necessary capacity (MW) and energy with the generators;
- (iii) The TOAUs shall inform the MSLDC-OD regarding their contracts so as to enable the MSLDC-OD draw the appropriate despatch schedule;

4.3 Covenants for State Pool Participation

The State Pool Participants need to follow some covenants in order to fulfil an objective of an effective operationalisation of the market. The list of such covenants is as follows:

- (a) All State Pool Participants have equal and non-discriminatory access to the proposed 'Final Balancing and Settlement' mechanism.
- (b) The State Pool Participants will have to inform the MSPC of all contracts they have entered / will enter into for exchange of energy.
- (c) The MSLDC-OD will have to take all decisions with regard to the despatching of stations after evaluating all possible network parameters / constraints / congestions in the transmission network and in the eventuality of any such network deviation, the instructions by the MSLDC-OD with regard to despatch and drawal shall be binding on all State Pool Participants.
- (d) The State Pool Participants shall operate their equipments / loads in a manner that is consistent with the provisions of the Indian Electricity Grid Code and the State Grid Code.
- (e) The State Pool Participants shall enter into BPTA (Bulk Power transmission agreement) and Connection Agreement with the concerned transmission licensee (MSETCL or TPC-T or RINFRA-T or any other transmission licensee in the state, as case may be), which shall specify the physical and operational requirements for a reliable operation and gain physical access and connection to the intra-State transmission system (InSTS).
- (f) The MSLDC-OD shall publish all such information as required for all other State Pool participants to be aware of the energy exchanges taking place within the pool as well as exigency conditions, if any. Such information

shall include, but not be limited to, scheduling data, Ex-Ante price on a day-ahead basis, frequency of updation of any such information published on the site, etc..

- (g) The State Pool Participants will have to make necessary arrangements for putting up SEM meters, at the points of injection / drawal.

- 4.4** The Final Balancing and Settlement Code 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 Final Balancing and Settlement Code on suo-moto basis or based on recommendations of MSPC.

5. CONTRACTUAL FRAMEWORK FOR MARKET OPERATION

- 5.1** The various regulatory and contractual agreements that would govern the operations of the Maharashtra Electricity Market are:

5.1.1 Final Balancing and Settlement Code: The code will govern the operations and behaviour of the Market Participants and State Pool Participants. The principles and conditions as specified under the code and Commission's order shall be implemented, administered and enforced by the Maharashtra State Power Committee (MSPC).

5.1.2 Power Purchase Agreements: The contractual arrangement through PPAs will have to be put in place amongst generating companies and distribution licensees. The commercial arrangement amongst the distribution licensees and Generators shall be settled bilaterally as per the PPA terms.

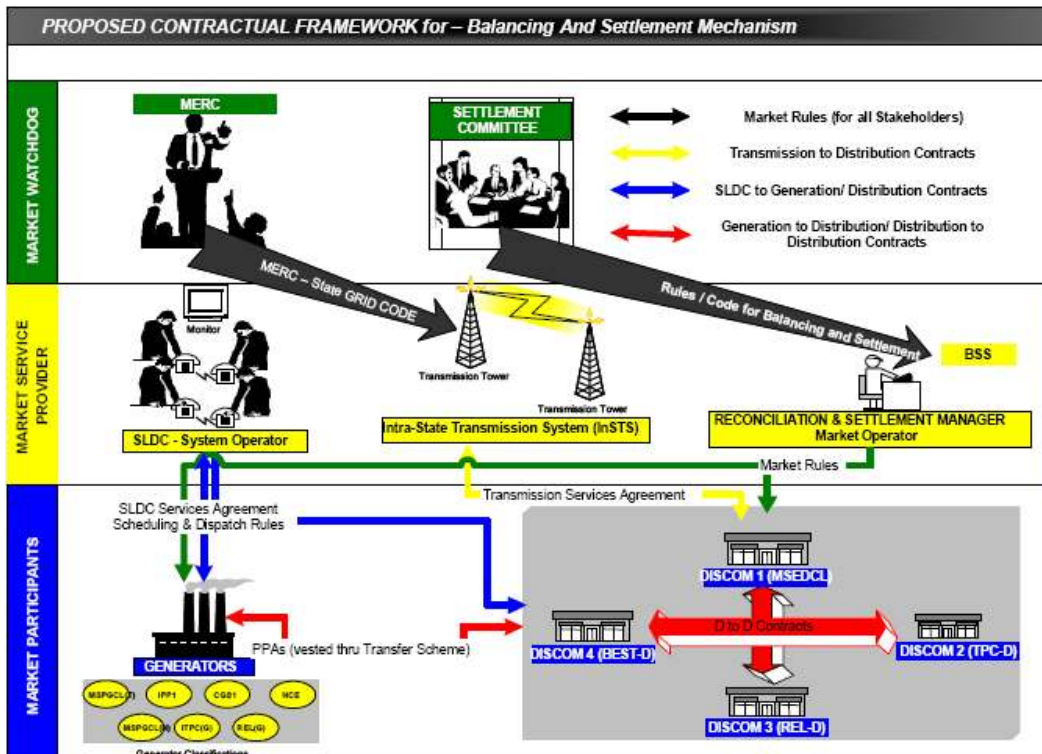
5.1.3 Bulk Power Transmission Agreement: The Transmission Licensees comprising MSETCL, TPC-T, RINFRA-T or any other new transmission licensees in the state are required to provide transmission service to various transmission system users (TSUs) for use of intra-State Transmission system in accordance with provisions of MERC (Transmission Open Access) Regulations 2005 and Commission's Order dated 27th June 2006 (Case 58 of 2005) in the matter of development of transmission pricing framework for the transmission system within Maharashtra. In this regard, the State Pool Participants will have to necessarily enter into a Bulk Power Transmission Agreement (BPTA) and Connection Agreement (CA) with the concerned transmission licensee. The BPTA and CA will describe the terms and conditions to be made binding upon the TSUs of the intra-State transmission system.

5.1.4 State Grid Code: The Code of Technical Interface or the State Grid Code shall be binding upon all constituents of the Maharashtra Electricity Market – the

Market Participants and the Market Service Providers. The operationalisation of the State Power Pool will require certain modifications in the operations/existing practices followed by Market Participants and the Market Service Providers, as stipulated under the State Grid Code, to be in line with requirements of proposed market framework.

5.1.5 Commission's Order: The Market Participants and the State pool participants shall be responsible for payment of transmission charges and losses in accordance with the order related to Transmission Pricing Framework Order (Case 58 of 2005), Transmission Tariff Orders or any other orders which will be issued by the Commission for the relevant period. For the purpose of 'energy balance' under proposed market operations and determination of 'imbalance pool computations' thereof, the energy losses shall be determined for each trading period, separately based on actual injections into system and actual drawal from the system corresponding to each trading period, as elaborated under the Transmission Tariff Order (Case 31 of 2006 and Case 86 of 2006).

5.2 The pictorial representation of the envisaged contractual framework for Intra-State ABT is as given below:



6. ROLES AND RESPONSIBILITIES OF VARIOUS ENTITIES

6.1 The Commission in its Order related to the Introduction of Intra-State ABT in the State of Maharashtra has elaborated the roles and responsibilities of various entities involved in the intra-state ABT mechanism. The order identifies the roles and responsibilities of the entities with relation to the implementation of the FBSM in the state. The brief summary given below identifies the activities to be undertaken by the entities in the scenario where FBSM is implemented.

Sr. No.	Activity	Entity Involved	Role & Responsibility
1.	Scheduling & Despatch Procedure	Generating Companies	To adhere to the procedure outlined in the "Scheduling and Despatch Code" of the State Grid Code as would approved by the Commission and any modifications / amendments thereto and any such order issued by the Commission from time to time. Till the same is approved, the procedure outlined in the Commission's order related to Intra-State ABT shall be adhered to.
		Distribution Licensees / TOAU	To adhere to the procedure outlined in the "Scheduling and Despatch Code" of the State Grid Code as would approved by the Commission and any modifications / amendments thereto and any such order issued by the Commission from time to time. Till the same is approved, the procedure outlined in the Commission's order related to Intra-State ABT shall be adhered to.
		MSLDC – OD	Responsible for optimum Scheduling and Despatch of electricity within a state in accordance with the contract entered into with the licensees or generating companies operating in that State.
2.	IT Infrastructure, Communication and Monitoring Infrastructure	STU	<ul style="list-style-type: none"> • Hardware and software required at sub-station level for Automatic Meter Reading of ABT compliant meters. • Time synchronisation of equipment at each sub-station. • Hardware and software required for data processing at central location i.e SLDC-Kalwa • Communication system through RF/OFC/V-SAT link between various sub stations and SLDC for on-line data transfers.

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Sr. No.	Activity	Entity Involved	Role & Responsibility
			<ul style="list-style-type: none"> • Software and hardware for monitoring at seven transmission zones.
		MSLDC-CD	Development of appropriate Balancing and Settlement System and Software for implementation of the ABT Regime.
		Generating Companies	<ul style="list-style-type: none"> • Adequate IT, communication and monitoring facilities at the generating stations or at the generation control rooms; • Communication facilities to include at least two dedicated telephone lines (with STD facility) for voice communication (along with voice recorder) and another dedicated telephone line (with STD facility) for Fax communication; • Adequate Internet Facilities at the control room for communication of daily generation schedules to MSLDC-OD.
		Distribution Licensees	<ul style="list-style-type: none"> • Adequate IT, communication and monitoring facilities at the distribution control rooms; • Communication facilities to include at least two dedicated telephone lines (with STD facility) for voice communication (along with voice recorder) and another dedicated telephone line (with STD facility) for Fax communication; • Adequate Internet Facilities at the Distribution and control room for communication of daily drawal schedules to MSLDC-OD.
3.	Metering	STU	<ul style="list-style-type: none"> • Adhere to the metering plan approved by the Commission and undertake the installation of ABT compliant meters at interface points (G<>T & T<>D) along with the necessary data collection facilities.
4.	Meter Data Collection	MSLDC-CD	<p>Collection of metering data from all the G<>T and T<>D interface points in the state.</p> <ul style="list-style-type: none"> • Online meter reading data will be received from main meters/check meters/standby meters through RF/OFC/V-Sat communication • In case of communication failure, meters to be read using MRI or suitable remote metering techniques and mailed to

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Sr. No.	Activity	Entity Involved	Role & Responsibility
			MSLDC-CD;
5.	Energy Accounting	MSLDC-CD	<ul style="list-style-type: none"> • Collection of metering data from all the G<>T and T<>D interface points in the state; • Verification and processing of the metering data collected from the G<>T and T<>D interface. • Obtain the REA data for weekly UI charges and CGS scheduled generation. • Preparation of the weekly energy accounting statement.
6.	Weekly Balancing and Settlement Statements	MSLDC-CD	<p>Preparation of the weekly Balancing and Settlement Statement using the following:</p> <ul style="list-style-type: none"> ▪ Metering data from all the G<>T and T<>D interface points in the state; ▪ CGS scheduled generation details and UI charges from REA reports issued by WRPC; ▪ Information from MSLDC-OD relating to DISCOM day ahead load forecasts, inter-state sales and the daily least cost despatch schedule; ▪ Invoice data from Generators supplying details of fixed and variable costs of generation including Fuel Cost Adjustment Charges; ▪ Data relating to approved PPA allocations and MERC approved Transmission Tariffs; <p>Raise Bills on the State Pool Participants which shall be due for payment within the time frame as specified in the subsequent sections of the order and shall be binding on all State Pool Participants</p>
		State Pool Participant	<p>Verify and accept the Weekly Balancing and Settlement Statements prepared by MSLDC-CD, subject to changes, if any.</p> <p>Make necessary payments against the bills raised by the MSLDC-CD based on the weekly settlements statements within time frame;</p>
		MSPC	<p>Review and take on record of energy accounting data and inter-utility billing related information;</p> <p>Ensure settlement of imbalances amongst</p>

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Sr. No.	Activity	Entity Involved	Role & Responsibility
			<p>State Pool Participants in accordance with the Balancing and Settlement Code;</p> <p>Open and maintain a bank account to receive/release payments in respect of settlement amongst State Pool Participants;</p>
7.	Data / Information Archive	MSLDC-CD	<ul style="list-style-type: none"> • The collected data shall be securely stored within the MSLDC-CD and back-ups taken should be held off-site as a contingency against data catastrophe. • The system holding the data shall have appropriate anti-virus and firewalls to ensure that the data cannot be accessed by unauthorised persons. • The MSLDC-CD needs to develop capability to store a repository of data for at least past 18 months of G-T data and T – D data. The data needs to be available for each month once the final balancing and settlement statement has been prepared. • MSLDC – CD will hold a repository of historical data, which will be shared with the stakeholders to whom it relates, for 18 months (18 months T – D Data) for reference of any of the State Pool Participant. In addition to the above any other data required by the State Pool Participants shall be made available against specific request from the State Pool Participant, subject to approval from MSPC.

7. FEATURES OF BALANCING & SETTLEMENT PROCESS

7.1 Scheduling and Despatch Procedure

7.1.1 The procedure for the scheduling and despatch to be followed by the generators and the distribution licensees/state pool participants & shall be in accordance to the procedure outlined in the "Scheduling and Despatch Code" of the State Grid Code as would approved by the Commission and any modifications/amendments thereto and any such order issued by the Commission from time to time. Till the same is approved, the procedure outlined in the Commission's order related to

Intra-State ABT shall be adhered to. MSLDC-OD shall also adhere to the principles outlined in the code referred to above.

7.1.2 As per CERC directives in the suo-moto order dated 7th May 2008,

"As for the approach to be adopted in future, it would be logical and in line with the foregoing for RLDCs to coordinate the scheduling of Ultra Mega power projects, and of other large privately owned power plants (of 1000 MW or larger size) in which States other than the host State have substantial permanent shares (50% or more)."

"...Power Plants not meeting the above criteria regarding plant size and share of other States should be scheduled by the SLDC of the State in which they are located"

Thus, since Maharashtra has majority share in RGPPL generation, the scheduling and accounting of RGPPL will be carried out by MSLDC.

7.2 Trading Period

7.2.1 The trading period denotes the period for accounting of energy exchange amongst the State Pool Participants for the purpose of commercial settlement.

7.2.2 The trading period for the market operations shall be of 15-minute duration starting from 00:00 hours (IST) for a particular day ending with 24:00 hours (IST) on that day. Thus, the first time block of trading period shall commence from 00:00 hours (IST) to 00:15 hours (IST) and so on. Thus, in effect, there shall be 96 trading periods in a particular day.

7.2.3 The price for settlement of energy exchange amongst the State Pool Participants shall be determined for the trading period based on weighted average 'System Marginal Price' prevalent for that time block during the specified trading period. MSLDC-CD shall determine the same based on the price information as submitted by the state pool participants based on their prevailing contracts with the generators (State/Central Sector/Bilateral). These prices for settlement shall be determined with the help of "Balancing and Settlement System" (BSS) software to be run by the MSLDC-CD. The allocation of regional UI charges between the State Pool Participants will also be carried out by this software as per the principles outlined in Clause 7.9

7.3 Settlement Period

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

7.3.1 Weekly Settlement

- (a) For the purposes of settlement of energy exchanges amongst State Pool Participants, the MSLDC-CD 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 principles outlined hereunder. The concept of 'imbalance pool increments / decrements' have been outlined under subsequent paragraphs.
- (b) Based on 'Imbalance Pool Increments' and 'Imbalance Pool Decrements' and the 'Ex-Post Imbalance Pool Price', the 'Imbalance Pool Amount Payable' and 'Imbalance Pool Amount Receivable', in respect of each State Pool Participant corresponding to each trading period shall be determined.
- (c) The aggregate of 'Imbalance Pool Amount Payable' and 'Imbalance Pool Amount Receivable' corresponding to each trading period over the period of one week in respect of each State Pool Participant shall form the basis for 'Net Imbalance Pool Amount Payable' or 'Net Imbalance Pool Amount Receivable' by the respective State Pool Participant.
- (d) For the purposes of the weekly settlement, the 'Week' shall be referred to as calendar week and shall coincide with the weekly settlement period considered for regional UI settlement.

7.3.2 Annual Fixed Cost Settlement

- (a) For the purposes of settlement of capacity exchanges amongst State Pool Participants, the MSLDC-CD shall work out the Fixed Cost Reconciliation (FCR) Pool volume comprising 'FCR Pool Increments' and 'FCR Pool Decrements' by each State Pool Participant corresponding to each trading period in accordance with the principles outlined hereunder.
- (b) The computation of 'FCR Pool Increments' and 'FCR Pool Decrements' shall be based on Available Capacity declarations as provided by the Generating Stations. The Generating Stations shall abide by backing down instructions issued by MSLDC-OD on account of system constraints, grid security aspects etc. For the purpose of Fixed Cost Reconciliation, the generating stations shall be deemed to be available up to its declared capacity, even though it may be backed down for the reasons not attributable to such generating station. Further, it is clarified that during real time operations if required, MSLDC may seek to verify available capacity of the generating station up to 'declared capacity' and issue despatch instructions accordingly. The 'declared capacity' for the purpose of computation of FCR Pool Increments and FCR Pool Decrements shall also include bilaterally contracted capacity.
- (c) 'FCR Pool Volume' shall be based on excess or shortfall in 'loss adjusted drawal' by State Pool Participant corresponding to a particular trading period vis-à-vis 'overall generation capacity' declared to be available to

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State Pool Participant based on 'forecasted availability' furnished by the generators contracted by the concerned State Pool Participant.

- (d) The excess in 'loss adjusted drawal' shall be termed 'decrements' to 'FCR Pool volume' whereas 'shortfall' in 'loss adjusted drawal' shall be termed as 'increments' to 'FCR Pool volume'. Such 'FCR Pool Increments' and 'FCR Pool decrements' shall be tracked for each trading period over the annual settlement period.
- (e) 'FCR Pool Reconciliation' shall take place on annual basis, taking into consideration the aggregate of 12-monthly 'FCR Pools' for each trading period.
- (f) The 'Rate Basis' for determination of FCR pool price for settlement shall be 'overall average per unit fixed cost' of the contributing Pool Participant into 'FCR Pool'.
- (g) The FCR Pool Decrements shall be allocated amongst the parties which have incremented to the pool in the ratio of their Increments and this shall be called the 'FCR Volume Allocation' of the incrementing Pool Participant. FCR Pool value shall be determined as aggregate of product of 'overall average per unit fixed cost' of the contributing FCR Pool Participant and the 'FCR Volume Allocation' of the contributing FCR Pool Participant into the FCR pool.
- (h) For the purpose of determining 'overall average per unit fixed cost' of contributing Pool participant, total fixed cost payable by the Pool Participant for the generating stations contracted by that FCR Pool Participant during the fiscal year under consideration shall be divided by 'total energy units' injected by generating station and to be paid for such FCR Pool Participant during the fiscal year, in accordance with the PPA conditions shall be considered.
- (i) FCR charges to be paid by decrementing utilities to the incrementing utilities by its volume of decrement in proportion to their (incrementing utilities) increments.
- (j) Based on 'FCR Volume Allocation' and 'FCR Pool Decrements' and the 'FCR Pool Price' (to be determined in accordance with the principles outlined above), the 'FCR Pool Amount Payable' and 'FCR Pool Amount Receivable' in respect of each State Pool Participant corresponding to each trading period shall be determined.
- (k) The aggregate of 'FCR Pool Amount Payable' and 'FCR Pool Amount Receivable' corresponding to each trading period over the period of one fiscal year in respect of each State Pool Participant shall form the basis for 'Net FCR Pool Amount Payable' or 'Net FCR Pool Amount Receivable' by the respective State Pool Participant for that fiscal year.

- (l) For the purposes of the annual fixed cost settlement amongst the State Pool Participants, the 'annual period' shall be referred to as the 'fiscal year'.
- (m) An illustration with regards to computation of the FCR Pool Price is enclosed at Annexure- IV.

7.4 Measurement Units 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 decimal component of the energy unit shall be rounded off to nearest integer value.
- (c) The 'Imbalance Pool Amount Payable', the 'Imbalance Pool Amount Receivable', and, '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).
- (d) The decimal component of the Amount shall be rounded off to nearest integer value in Rupee terms.

7.5 Basis for computation of Ex-Ante Imbalance Pool Price

- (a) The Ex-Ante Imbalance Pool price shall be derived for each trading period separately. The Ex-Ante Imbalance Pool price 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-OD on day-ahead basis.
- (b) The State Pool Participants whose loss adjusted target drawal schedule is lower than aggregate of allocated generating capacity available to that State Pool Participant in accordance with the 'target despatch schedule' shall be construed to be contributing (incrementing) into the Imbalance Pool to the extent of the forecasted under-drawal, whereas the State Pool Participants whose loss adjusted target drawal schedule is higher than aggregate of allocated generating capacity available to that State Pool Participant in accordance with the 'target despatch schedule' shall be construed to be drawing (decrementing) from the Imbalance Pool to the extent of the forecasted over-drawal for that trading period. The losses for the purpose of 'loss adjustment' shall be based on average intra-State transmission system losses for previous 52 week period. However, for the first year of operation of the FBSM code, average intra-State

transmission system losses for the previous 12 month periods as per the IBSM process shall be considered.

- (c) The 'Ex-Ante Imbalance Pool Volume' is summation of all 'imbalance pool increments' corresponding to particular trading period which would be equal to the summation of all 'imbalance pool decrements' so that for any trading period the 'imbalance pool volume' shall always be balanced in energy terms.
- (d) The 'Ex-Ante Imbalance Pool Value' is aggregate of product of weighted average variable cost of the marginal stations of the contributing State Pool Participant and the 'imbalance pool increments' by the contributing State Pool Participant into the imbalance pool. For the purpose of determining the marginal station for a particular State Pool Participant, the 'Merit Order Stack' for that State Pool Participant comprising the generating stations to the extent of generation capacities contracted by that State Pool Participant based on their variable cost shall be drawn and the same shall form the basis for determining marginal station in respect of that State Pool Participant.
- (e) The variable cost of each generating station for the purpose of Merit Order Despatch stack and for computation of 'Ex-Ante Imbalance Pool Price' shall be the per unit energy charge outlined in the energy bill for the previous month in respect of each generating station or the latest information available in respect of such generating station, as the case may be. The per unit energy charge in the energy bill shall be in accordance with the energy charge as approved by the appropriate Commission for the intra-state and central generating stations. In addition to the above, the fuel cost adjustment surcharge computed based on the methodology approved by the appropriate Commission shall be included in the variable cost of the generating station for the purpose of Merit Order Despatch Stack. The Variable cost for other bilateral power purchases and purchases through traders shall be in accordance to the PPA entered between the parties.
- (f) The 'Ex-ante Imbalance Pool Price' shall be determined as ratio of 'Ex-ante Imbalance Pool Value' and 'Ex-ante Imbalance Pool Volume' as derived above. The Ex-Ante Imbalance Pool price shall only provide a signal at which imbalance pool settlement amongst the 'State Pool Participants' shall take place if on ex-post basis, the actual energy injection and energy drawal by various market constituents take place exactly in accordance with the forecasted schedule on ex-ante basis. The ex-ante price is intended to provide economic signal however, it is to be noted that the same is dependent on several factors not limited to accuracy of load forecasts provided by market participants, availability forecast of generation stations, availability of latest variable cost information pertaining to generating stations etc.
- (g) As outlined earlier, the overall imbalance pool volume for each trading period comprises summation of 'imbalance pool decrements'. The imbalance pool

decrements include decrements on account of inter-State trade of energy and decrements on account of energy exchange amongst Pool Participants.

- (h) The Ex-Ante Imbalance Pool Prices shall be denominated in Rs per kWh with fractional numbers specified up to two decimal places. The fractional points from third decimal point would be rounded off to nearest integer for second decimal point.
- (i) An illustration with regards to computation of the Ex-Ante Imbalance Pool Price is enclosed at Annexure- II.

7.6 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. The Ex-Post Imbalance Pool Price 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) State Pool Participants whose actual loss adjusted drawal during a trading period is lower than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be contributing (incrementing) into the Imbalance Pool to the extent of their under-drawal, whereas the State Pool Participants whose actual loss adjusted drawal during the trading period is higher than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be drawing (decrementing) from the Imbalance Pool to the extent of their over-drawal. The losses for the purpose of 'loss adjustment' shall be based on actual losses for the trading period computed as difference between actual injections by generating stations and actual drawal by State Pool participants.
- (c) The 'Ex-Post Imbalance Pool Volume' is summation of all 'imbalance pool increments' corresponding to particular trading period which would be equal to the summation of all 'imbalance pool decrements' so that for any trading period the 'imbalance pool volume' shall always be balanced in energy terms.
- (d) The 'Ex-Post Imbalance Pool Value' is the aggregate of product of weighted average variable cost of the marginal stations of the contributing State Pool Participant and the 'imbalance pool increments' by the contributing State Pool Participant into the imbalance pool for a particular trading period. For the purpose of determining the marginal station for a particular State Pool Participant, the 'Merit Order Stack' for that State Pool Participant comprising the generating stations to the extent of generation capacities contracted by that State Pool Participant based on their variable cost shall be drawn and

the same shall form the basis for determining marginal station in respect of that State Pool Participant.

- (e) The variable cost of each generating station for the purpose of Merit Order Stack and for computation of 'Ex-Post Imbalance Pool Price' shall be the per unit energy charge outlined in the energy bill for the instant calendar month corresponding to the settlement period in respect of each generating station. In case of generating stations having billing cycle spread over two calendar months, the latest information as available pertaining to previous billing cycle shall be considered for the purposes. The per unit energy charge in the energy bill shall be in accordance with the energy charge as approved by the Appropriate Commission for the intra-state and central generating stations. In addition to the above, the fuel cost adjustment surcharge computed based on the methodology approved by the appropriate Commission shall be included in the variable cost of the generating station for the purpose of Merit Order Despatch Stack. The Variable cost for other bilateral power purchases and purchases through traders shall be in accordance to the PPA entered between the parties.
- (f) The Ex-Post Imbalance Pool price shall represent the price for settlement of energy exchange amongst the 'Pool Participants' in accordance with the 'Imbalance pool Volume' determined for a particular trading period within a particular 'Settlement Period'.
- (g) The 'Ex-Post Imbalance Pool Price' shall be determined as ratio of 'Ex-post Imbalance Pool Value' and 'Ex-Post Imbalance Pool Volume' as derived above.
- (h) As outlined earlier, the overall imbalance pool volume for each trading period comprises summation of 'imbalance pool decrements'. The imbalance pool decrements include decrements on account of inter-State trade of energy and decrements on account of energy exchange amongst State Pool Participants and un-scheduled interchange (UI) energy, if negative.
- (i) The Ex-post Imbalance Pool prices shall be denominated in Rs per kWh with fractional numbers specified up to two decimal places. The fractional points from third decimal point would be rounded off to nearest integer for second decimal point.
- (j) An illustration with regards to computation of the Ex-Post Imbalance Pool Price is enclosed at Annexure- III.

7.7 Premises for Least Cost Despatch

- (a) The MSLDC-OD shall be responsible to prepare Least Cost Despatch Schedule after taking into account the requirement of the State as a whole.

The process of scheduling and despatch and role/responsibility of the MSLDC-OD shall be in accordance with the procedure outlined under 'Scheduling and Despatch Code' of the State Grid Code, modifications / amendments thereto and any such Order issued by the MERC from time to time. Further, MSLDC-OD 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) The least cost despatch planning shall be based on the 'Merit Order Stack' to be adopted by the MSLDC-OD on day-ahead basis based on the available capacity declaration furnished by the generating stations on a day-ahead basis corresponding to each trading period. During the real time operations, MSLDC-OD may seek to verify available capacity upto 'declared capacity' and issue despatch instructions accordingly. The Least Cost Despatch planning shall be undertaken in accordance with the Merit Order Despatch principles as approved by the Commission.
- (c) During real-time operations, in case of shortfall in 'availability', MSLDC 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.
- (d) The 'Merit Order Stack' shall be based on the energy charge inclusive of fuel cost adjustment charge, if any, of various generating stations. The energy charge of the generating stations shall be based on energy charge as approved by appropriate Commission and shall be included in the variable cost of the generating station for the purpose of Merit Order Despatch Stack. The Variable cost for other bilateral power purchases and purchases through traders shall be in accordance to the PPA entered between the parties.
- (e) The State Pool Participants shall provide details of the approved energy charges and the fuel adjustment surcharge thereon to the MSLDC-OD from time to time at least once during the month and not later than fifth day of the month to enable the MSLDC-OD develop centralized 'Merit Order stack' for the State as a whole.
- (f) For the purpose of Merit Order Stack, the "Must run" generating stations, constrained generating stations such as hydro stations linked to irrigation, bilateral contracts which need to be paid for in entirety irrespective of the actual amount of power consumed by the procurer and inter-state bilateral contracts which are not under the direct control of MSLDC shall be ranked earliest in the Merit Order Stack.

- (g) All generating stations and State Pool Participants (including distribution licensees and TOAUs) would strictly comply with provisions of MERC (State Grid Code) Regulations 2006 including amendments thereof, and shall abide by Scheduling and Despatch instructions issued by MSLDC-OD from time to time.

7.8 Basis for Allocation of Losses

- (a) For the purpose of determination of imbalance pool increments/decrements, the actual drawal by State Pool Participants need 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 including UI energy (if positive) and actual drawal by State Pool Participants including drawal for inter-state trading purposes and UI energy (if negative).
- (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.
- (d) The mechanism for energy accounting and treatment of intra-State transmission system losses have already been elaborated under Commission's Transmission Tariff Order for FY2006-07 (Case 31 of 2006) and Transmission Tariff Order for FY 2007-08 (Case 86 of 2006). The methodology outlined by the Commission in the said order is enclosed at Annexure – I for reference.

7.9 Basis for allocation of regional UI charges amongst State Pool Participants

- (a) In the proposed Intra-State ABT system, the 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 15-minute duration. The UI in respect of RGPPL will be treated as par with the UI from the central sector and payment will be effected by MSLDC. However, the energy charge on the basis of drawl schedule issued by MSLDC will be paid by the beneficiaries to RGPPL as per PPA signed between them.
- (b) Allocation of UI charges amongst the State Pool Participants shall be undertaken on weekly basis corresponding to deviations of State Pool Participants from their schedule for each 'trading period' of 15-minute

duration. For the purpose of determination of 'absolute deviations', deviations of State Pool Participants including in-state generators from their schedule shall be determined on 15-minute basis and the same shall be compared against the UI energy of corresponding 15-minute block duration.

- (c) MSLDC-CD shall develop statement of reconciliation corresponding to each trading period for weekly regional UI charges against the weekly allocation of net UI charges and weekly weighted average scheduled energy charges covered as a part of 'imbalance pool settlement'.
- (d) The un-scheduled interchange (UI) charges at the regional level corresponding to Maharashtra State shall be shared /allocated amongst all the State Pool Participants on the following basis.
 - (i) The weekly statement of regional UI charges as prepared by WRLDC/WRPC, along with the UI in respect of RGPPL, shall form basis for sharing of UI charges (cost or incentive) amongst the State Pool Participants.
 - (ii) The Gross UI charges corresponding to UI energy for each 'trading period' shall be divided into two components viz. a) Cost corresponding to UI energy at weighted average scheduled energy rate of the contributing State Pool Participants based on the CGS stations , in case of a UI liability for the State, or on the State Marginal Price in case of a UI benefit for the State and b) net UI charges is the difference of gross UI charge and cost associated with UI energy as considered in the 'imbalance pool' workings.
 - (iii) The net UI charges shall be allocated to the State Pool Participants in proportion to their deviation from the 'target drawal schedule' or 'target despatch schedule', as the case may be, corresponding to each trading period. For this purpose, of allocation of net UI cost/incentive, the basis for deriving proportionate share shall be 'aggregate deviation' of each State Pool Participant from its 'target schedule'.
 - (iv) Further, 'aggregate deviation' of the in-state generators shall also be captured apart from 'aggregate deviation' of State Pool Participants.
 - (v) Net UI charges shall be divided into two parts (i) Net UI charges-1: corresponding to 'aggregate deviation' of State Pool Participants, and (ii) Net UI charges-2: corresponding to 'aggregate deviations' of in-state generators.
 - (vi) Net UI charges-1 shall be allocated amongst the State Pool Participants which have been responsible for the deviations depending on the incidence of the UI cost/incentive i.e. in case, for a particular trading period, if there exists an incidence of UI cost, the same would be allocated amongst the State Pool Participants who have overdrawn compared to their drawal schedule for that trading period. Alternately,

- for a trading period, if there exists an incidence of UI incentive, the same would be allocated amongst the State Pool Participants who have under-drawn compared to their original drawal schedule for that trading period.
- (vii) Net UI charges-2 shall be allocated only between the Pool Participants whose contracted generators have the same deviation sign (positive or negative) as the Gross UI Cost.
 - (viii) Net UI charges-2 corresponding to in-State generator deviations shall be captured only when in-State generator deviations are in tandem (of same sign) with overall UI implications for the State. (I.e. when (i) State earns UI incentive and in-State generators deviations has facilitated earning of UI incentive AND (ii) State incurs UI cost and if in-State generators has caused UI cost). Under other scenarios, the in-state generator deviations should be netted off against the overall State deviations before allocating the UI cost/incentive amongst the State Pool Participants.
- (e) In addition to the above methodology for allocation of UI charges, the following steps will be followed with respect to settlement of UI on account of RGPPL:
- (i) In case of over drawl from CGS and over-generation by RGPPL – The UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to WRLDC & RGPPL after receipt of the same from the SPP Pool A/c;
 - (ii) In case of over drawl from CGS and under-generation by RGPPL – The UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to WRLDC after recovering from the SPP Pool A/c and RGPPL;
 - (iii) In case of under drawl from CGS and over-generation by RGPPL – UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to SPP Pool A/c after recovery from WRLDC;
 - (iv) In case of under drawl from CGS and under-generation by RGPPL – UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to SPP Pool A/c after recovery of the same from WRLDC and RGPPL.
- (f) An illustration with regards to allocation of the regional UI charges amongst State Pool Participants is enclosed at Annexure- V.

7.10 Accounting of energy during emergency conditions (market suspension)

- (a) In case due to emergency condition or any other reasons including force majeure such as islanded mode of operation, if the Market Operator (MSPC) has notified the operations of markets to be suspended for a specific duration during a particular calendar week (period of reconciliation) then, 'accounting of energy' corresponding to such specified period shall be considered only for the purpose of assessment of transmission losses and 'energy accounts' shall be maintained accordingly.
- (b) However, for the purpose of 'imbalance pool computation', the 'weekly energy account' shall exclude the specified periods of market suspension and the reconciliation of energy exchange and settlement of imbalance pool workings shall be determined excluding the energy exchange, if any, during period of Market suspension. Similarly, for the purpose of 'FCR pool computation', the 'FCR Pool volume' (or annual capacity exchange account) shall exclude the specified periods of market suspension which shall include duration of capacity exchange under standby arrangement. Accordingly, the reconciliation of capacity exchange and settlement of FCR pool workings shall be determined excluding the capacity exchange, if any, during period of Market Suspension.
- (c) For the purpose of transmission loss determination, the 'energy accounts' for the 'specified period of market suspension' shall consider the 'profiled data substitution' methodology, in case requisite information pertaining to metered data is not available for some interface points.
- (d) Further, it is clarified that during such period of 'market suspension' the energy exchange amongst State participants (say, within island formed) will have to be settled by mutual agreement or at system marginal price for the islanded system prevalent at that point in time.

7.11 Applicability of Intra-State ABT regime to Open Access Users

7.11.1 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. For the sake of clarity, the various classifications of OA users for the purposes of ABT regime as defined as under:

- (a) **Transmission Open Access User (TOAU):** means a person who has been allotted transmission capacity rights to access an intra-state transmission system pursuant to a Bulk Power Transmission Agreement. Further, the term 'Direct Consumer' shall mean Transmission Open Access User, who is also a consumer of a 'Distribution Licensee'.

(b) **Distribution Open Access User (DOAU):** This shall refer to open access user connected to distribution network of distribution licensee (typically at 33 kV or below). The term 'Embedded Consumer' shall mean Distribution Open Access User, who is also a consumer of a 'Distribution Licensee'.

7.11.2 Presently within Maharashtra, all TOAU are consumers of a Distribution Licensee and have supply contract with concerned distribution licensee wherein its drawal point is situated and hence are 'Direct Consumers' of the Distribution Licensee. However, in future it is envisaged that a TOAU may not be a 'Direct Consumer of Distribution Licensee' and shall source its entire power requirement from other sources such as Captive generation, trading licensee or other distribution licensee.

7.11.3 Similarly, presently within Maharashtra, all DOAU are consumers of a Distribution Licensee and have supply contract with concerned distribution licensee wherein its drawal point is situated and hence are 'Embedded Consumers'. However, in future it is envisaged that a DOAU may not be an 'Embedded Consumer of Distribution Licensee' and shall source its entire power requirement from other sources such as Captive generation, trading licensee or other distribution licensee.

7.11.4 Presently, as per IEGC 2005 and State Grid Code Regulations, all generators above 50 MW need to be monitored and despatched by MSLDC and subjected to despatch instructions issued by MSLDC. Further, MSLDC is required to monitor the drawal at 440/220/132 kV strategic substations and as per clause 4.8.4 (d), MSLDC is required to monitor operations of all elements at 132 kV and above.

7.11.5 It is not possible for MSLDC to monitor, schedule, and/or despatch any OA transaction involving OA generation below 50 MW at present. In view of the same, for the OA transactions below 50 MW it shall be the responsibility of the Distribution and /or Transmission licensee to whose substation/network such OA generator is connected to provide the data regarding the energy exchange for every 15 minutes time block in the relevant period for the purpose of Energy Account Settlement. The actual data shall be collected by the Substation through MRI downloads and will be forwarded to MSLDC – CD for energy settlement purposes on weekly basis.

7.11.6 However, in case an OA generator is connected to the intra-state system through the network of an existing distribution licensee, but having a contract with a party outside the area of the existing distribution licensee, it shall be the responsibility of MSLDC to ensure that the metered energy drawl for the distribution licensee, in whose area the OA generator is operating, at the T<>D interface is grossed up by an amount equal to the energy generated at the busbar of the OA generator, so as to avoid any undue benefit arising to the

distribution licensee due to the power generated by the OA generator being absorbed locally within the licensee's network.

For example:

Open Access generator 'A' comes up in the area of Distribution Licensee 1, and has a contract with Distribution Licensee 2 for 10 MW. The actual energy drawl for Distribution Licensee 1 as measured at the T<>D interface will not include the power generated by the Open Access generator A, which will be locally absorbed in the area of Distribution Licensee 1. In case Distribution Licensee 1 draws 600 MW as per the T<>D interface metered data, and the generator 'A' produces 10 MW at the generator bus-bar, the total energy consumption by Distribution Licensee 1 will be $600+10 = 610$ MW.

Thus, while doing the energy accounting for the State Pool Participants, MSLDC will have to add the Open Access generation to the actual T<>D draws of the respective Distribution Licensees in order to come up with the correct figure of energy consumption of the Distribution Licensees.,

- 7.11.7 In case of OA users connected at EHV level, the responsibility of installing meters is in that of OA user and the necessary communication and monitoring facilities need to be provided by the transmission licensee to offer visibility at MSLDC to enable them 'monitor, schedule, verify and effect appropriate adjustments to the wheeling schedules'.
- 7.11.8 The Commission has further classified open access transactions in terms of '**full open access transactions**' and '**partial open access transactions**'. The 'full open access transaction' are those where in the open access user (generator/consumer) have contracted for its requirement in entirety and is not dependent on distribution licensee to provide any additional support/service (by way of default service or have any contract demand – CMD with a DISCOM). Such Open Access User is nothing but TOAU or DOAU as the case may be depending on voltage level at which drawal/injection point is connected. Thus, '**full open access User**' is to be treated on par with DISCOM for the purpose of 'State imbalance pool' and subjected to similar set of Balancing and Settlement Code.
- 7.11.9 Further, from system operational point of view in terms of visibility and control at MSLDC (providing schedules and receiving dispatch/curtailment instructions in case of emergency) requirements of 'full open access User' connected at Transmission network (i.e. TOAU) are best handled within system rather than for 'full open access User' connected at Distribution network level (i.e. DOAU).

- 7.11.10 In view of above, at present only the full TOAU are eligible for the membership of the 'Imbalance pool' and settlement of their transactions shall be made in accordance with the 'Balancing and Settlement Code'.
- 7.11.11 The over-drawal by partial TOAU and DOAU beyond their contract demand shall be settled at retail tariff rate of the DISCOMs for temporary supply to such category of consumers to which OA user may belong. For this purpose, settlements on a TOD basis will have to be looked into.
- 7.11.12 MSLDC and distribution licensees shall devise and agree on protocol for energy accounting and providing credit for wheeled energy units on TOD basis upon accounting of appropriate transmission loss and wheeling loss, as applicable for the said purpose of open access transactions. Until such mechanism is put in place, existing mechanism of providing energy credit for wheeled energy transactions shall continue.

8. SETTLEMENT PROCESS FOR FBSM

8.1 Settlement of Imbalance Pool

- (a) The MSLDC-CD shall prepare weekly 'Statement of Imbalance Pool Settlement' corresponding to energy exchange amongst the State Pool Participants for each trading period over the weekly period of each fiscal year under consideration commencing from 1st January 2009 in accordance with the energy account reconciliation rules.
- (b) MSLDC shall present such weekly 'Statement of Imbalance Pool Settlement' to State Pool participants for payment within seven calendar days from the end of the week corresponding to the preceding week.
- (c) The 'Statement of Imbalance Pool Settlement' shall clearly provide for following distinct statements of settlement:
- (i) Settlement of Imbalances (energy exchange) amongst State Pool Participants.
 - (ii) Settlement of Net UI charges amongst the State Pool Participants.
 - (iii) Aggregate net position of settlement amongst the State Pool Participants.
- (d) MSLDC-CD shall raise Bills on the State Pool Participants which shall be due for payment and shall be binding on all State Pool Participants to settle the payment on weekly basis.
- (e) In case of any discrepancy or clarification, concerned State Pool Participant shall bring to the notice of MSLDC-CD such discrepancy with necessary

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corrections/modifications. The MSLDC-CD in turn, shall issue 'Supplementary Bill' to State Pool Participants within seven calendar days from receipt of notification from the concerned State Pool Participant with due modifications/adjustments (credit note/debit note) as may be necessary.

- (f) All bills (whether Interim, Final or supplementary) issued by the MSLDC-CD to State Pool Participants shall be due for payment within seven calendar days from its submission to the State Pool Participants. If the 7th day happens to be MSLDC or Bank holiday, then the payment shall be made on the next working day.
- (g) MSPC shall open and maintain a bank account to receive/release payments in respect of settlement amongst State Pool Participants.
- (h) The State Pool Participants shall make all payments in favour of MSPC on or before due date and MSPC shall in turn release payments to State Pool Participants within three calendar days from receipt of payment from decrementing State Pool Participants. In case, all payment due from decrementing State Pool Participants is not available on due date of payment, MSPC shall release payment (to the extent collected against concerned monthly settlement due and as available on due date) to contributing State Pool Participants in proportion to their entitlement as per weekly 'Statement of Imbalance Pool Settlement'.
- (i) The State Pool Participants shall make the payment through cheque / demand draft or electronic transfer covering all the applicable charges as specified in the monthly 'Statement of Imbalance Pool Settlement' issued by MSLDC-CD.
- (j) The details regarding the mode of payment and other related details shall be communicated to the State Pool Participants by MSPC.

8.2 Settlement of Regional UI Pool Account

- (a) The MSLDC-CD shall prepare Weekly 'Statement of Net UI Charge Settlement' corresponding to allocation of Net UI Charges amongst the State Pool Participants for each trading period over the weekly period of each fiscal year under consideration commencing from April in accordance with the regional UI energy account reconciliation rules.
- (b) The MSLDC-CD shall present such Weekly 'Statement of Net UI charge Settlement' to MSPC for its records within seven calendar days from the end of the week corresponding to the preceding week.
- (c) The MSLDC-CD shall provide to MSPC the weekly Statement of regional UI charges (cost or incentive) payable or receivable, as the case may be,

based on the 'Regional Energy Account' statements furnished by WRLDC/WRPC.

- (d) MSPC shall maintain records of weekly regional UI energy and regional UI charge corresponding to each trading period. MSLDC-CD on behalf of MSPC shall maintain records of weekly allocation of UI energy and allocation of regional UI charges (Gross and Net UI charge) amongst State Pool Participants corresponding to each trading period of the calendar week.
- (e) The regional UI charges comprises charges corresponding to active UI energy and reactive charges; however, for the purpose of this regional UI settlement, MSPC shall consider only active UI charges since under proposed ABT Mechanism allocation of Net UI charges amongst State Pool Participants are based on active UI energy. At present, regional reactive UI charges are to be borne by MSETCL and forms part of its Annual Revenue Requirement and recovered through transmission tariff. Hence, the MSETCL shall make payment to MSPC corresponding to regional reactive UI charges on weekly basis to enable MSPC settle the regional UI bill on weekly basis. However, in the event of the Commission taking a decision to this effect, the regional reactive UI charges may be included under the FBSM process in the future.
- (f) MSPC on behalf of State Pool Participants shall collect on weekly basis and make payment towards settlement of the regional UI charges to WRLDC/WRPC on weekly basis.
- (g) State Pool Participants shall make payment to MSPC on weekly basis in accordance with the rules outlined hereinabove.
- (h) While settlement of regional UI charges as well as settlement of Imbalance pool are to be made on weekly basis, there would be a gap of approx. 2 weeks amongst two settlements on account of time period of preparing imbalance pool settlement, raising of bills and due date for payment. Accordingly, there shall be requirement for the MSPC of funds towards working capital.
- (i) State Pool Participants shall agree to provide fixed sum equivalent to one fortnightly payment (two week regional UI charges) towards funding working capital requirement of MSPC, in advance, based on past twelve weekly average UI charges for the State. The requirement of working capital of MSPC for this purpose shall be reviewed every quarter of the fiscal year and the MSPC shall direct State Pool Participants to provide fixed sum towards working capital.
- (j) The sharing of funds for working capital amongst the State Pool Participants shall be based on share in allocation of UI charges amongst the State Pool Participants in the previous quarter. The decision of MSPC in this regards shall be final and binding on all State Pool Participants.

8.3 Settlement of FCR Pool

- (a) The MSLDC-CD shall prepare Annual 'Statement of FCR Pool Settlement' corresponding to capacity exchange amongst the FCR Pool Participants for each trading period over the monthly period of each fiscal year under consideration commencing from April in accordance with the 'FCR energy account' reconciliation principles.
- (b) The MSLDC shall present such Annual 'Statement of Imbalance Pool Settlement' to State Pool participants for its payment within fifteen calendar days from the end of the fiscal year corresponding to the preceding fiscal year.
- (c) The 'Statement of FCR Pool Settlement' shall clearly provide for following distinct statements of settlement:
 - (i) Settlement of Imbalances (capacity exchange) amongst FCR Pool Participants in accordance with 'FCR Pool Volume', separately for each month of the Fiscal year.
 - (ii) Aggregate net position of settlement amongst the FCR Pool Participants.
- (d) MSLDC-CD shall raise Bills on the FCR Pool Participants which shall be due for payment and shall be binding on all FCR Pool Participants to settle the payment on due date, which shall not be later than fifteen days from date of invoice.
- (e) In case of any discrepancy or clarification, concerned State Pool Participant shall bring to the notice of MSLDC such discrepancy with necessary corrections/modifications. MSLDC-CD in turn, shall issue 'Supplementary Bill' to FCR Pool Participants immediately upon receipt of notification/approval from concerned State Pool Participant with due modifications/adjustments (credit note/debit note) as may be necessary.

8.4 Payment Guarantees

- (a) State Pool Participants shall make payments on or before due date by way of cheque/demand draft to be drawn in favour of MSPC or through electronic transfers whenever the facility is made available.
- (b) Any delay in payment shall attract penal interest charge at the rate of short term SBI PLR (prevailing on the date of preparation of bill) + 4% per annum or part thereof. In no case, delayed payment by Pool Participants shall be permitted beyond the period of three months from the due date of payment, despite any dispute as regards settlement computation. The MSPC shall have right to initiate necessary disciplinary actions against defaulting parties in case of delay beyond period of three months from due date.

- (c) All State Pool Participants shall open, at their own cost, an irrevocable revolving letter of credit (L/C) of nationalized bank in favour of MSPC not later than one month from the issue of this code. The L/C shall cover an amount not exceeding two weeks 'imbalance pool settlements' based on average of previous twelve weekly settlements of that State Pool Participant.
- (d) Any new entrants to the State Pool shall have to open, at their own cost, an irrevocable revolving letter of credit (L/C) of nationalized bank in favour of MSPC. The L/C shall cover an amount not exceeding 20% of the total contra contracted by the party multiplied by the latest system marginal price of the State.
- (e) The LC shall provide un-conditional right of encashment to MSPC in case of non-payment, part-payment or delay in payment beyond the due date of payment by the State Pool Participant. The State Pool Participant shall immediately reinstate the L/C for an amount to the extent that it is encashed.
- (f) All Pool Participants shall submit, at their own cost, a 'Bank Guarantee' (BG) of nationalized bank in favour of MSPC not later than one month from the issue of this order. The BG shall cover an amount not exceeding two months 'imbalance pool settlements' based on average of previous six monthly settlements of that State Pool Participant.
- (g) The BG shall provide un-conditional right to MSPC to invoke, in case of non-payment, part-payment or delay in payment beyond the due date of payment by the State Pool Participant. State Pool Participant shall immediately revise and reinstate the BG to an extent it is invoked.
- (h) Notwithstanding provisioning of payment guarantees as outlined above, the MSPC shall have right to modify/alter any terms and requirement of 'payment guarantee' in parts or full and/or relax such conditions upon recording reasons in writing, for modification/relaxation of such terms/conditions. However, such right to alter/modify can only be exercised upon experience of market operation for one full year and not earlier.

8.5 Payment Default and remedies

- (a) Following events shall constitute events of default by State Pool Participant:
 - (i) Delay in payment (part or full) by any State Pool Participant beyond period of twelve weeks from due date of payment as per weekly 'Statement of settlement' shall constitute an event of default by that State Pool Participant.
 - (ii) Delay in opening/reinstating the L/C by any State Pool Participant beyond the stipulated period shall constitute an event of default by that State Pool Participant.

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- (iii) Delay in opening/reinstating the BG by any State Pool Participant beyond stipulated period shall constitute an event of default by that State Pool Participant.
 - (iv) Non-compliance of any of the terms/conditions/rules outlined under this 'Final Balancing and Settlement Code' by any of the State Pool Participant shall constitute an event of default by that State Pool Participant.
 - (v) Non-compliance of any of the directives issued by MSPC to any of the State Pool Participant, so long as such directives are not inconsistent with any of the provisions of these Final Balancing and Settlement Code and in accordance with the Functions and within the Powers outlined for MSPC, shall constitute an event of default by that State Pool Participant.
- (b) Remedies for Events of default by State Pool Participant:
- (i) MSPC shall have right to discontinue membership of State Pool Participant to MSPC and forfeit its BG, L/C, membership fees, security deposit, if any.
 - (ii) MSPC shall have right to levy penal charges on State Pool Participant, in accordance with its rules for Conduct of Business.
 - (iii) MSPC shall have right to direct the MSLDC to regulate power supply, issue despatch instructions to defaulting State Pool Participant.
 - (iv) Defaulting State Pool Participant shall be liable for penal/disciplinary action to be initiated by the Commission in accordance with extant Rules, Regulations, Grid Codes and relevant Act provisions, as may be applicable.
- (c) Following events shall constitute events of default by MSPC:
- (i) Non-compliance of any of the terms/conditions/rules outlined under this 'Final Balancing and Settlement Code' by MSPC shall constitute an event of default by MSPC.
 - (ii) Non-compliance of any of the directives issued by the Commission to MSPC shall constitute an event of default by MSPC.
 - (iii) If in the opinion of the Commission, there are sufficient reasons/developments to ascertain that in the course of its market operations, MSPC has exceeded any its powers/functions outlined under this 'Final Balancing and Settlement Code' and the Commission's order in this matter, then that shall be construed as event of default by MSPC.
- (d) Remedies for Events of default by MSPC:
- (i) The Commission shall revoke the powers/rights granted to MSPC under this Final Balancing and Settlement Code and the Commission's order in this matter.

- (ii) MSPC shall be liable for penal/disciplinary action to be initiated by the Commission in accordance with extant Rules, Regulations, Grid Codes and relevant Act provisions, as may be applicable.
- (e) Following events shall constitute events of default by MSLDC (CD & OD):
 - (i) Non-compliance of any of the terms/conditions/rules outlined under this 'Final Balancing and Settlement Code' and the Commission's order in this matter, by MSLDC (CD & OD), except due to force majeure events and for reasons solely attributable to MSLDC (CD & OD), shall constitute an event of default by MSLDC (CD & OD).
 - (ii) Non-compliance of any of the directives issued by MSPC to MSLDC (CD & OD), so long as such directives are not inconsistent with any of the provisions of these Final Balancing and Settlement Code and in accordance with the Functions and within the Powers outlined for MSPC in the Commission's order in this matter, shall constitute an event of default by MSLDC (CD & OD).
 - (iii) In-ordinate delay (i.e. beyond period of two weeks from due dates) in furnishing 'Monthly Statements for Imbalance Pool settlement' and 'Weekly Statements for Imbalance Pool Settlement' and 'Annual Statement for FCR Pool settlement' to MSPC or any State Pool Participant, so long as delay is not on account of reasons beyond the reasonable control of MSLDC-CD, shall constitute an event of default by MSLDC-CD.
- (f) Remedies for Events of default by MSLDC (CD & OD):
 - (i) MSPC shall have right to levy penal charges on the MSLDC (CD & OD), in accordance with its conduct of business.
 - (ii) The Commission shall revoke the powers/rights granted to MSLDC under this Final Balancing and Settlement Code and the Commission's order in this matter.
 - (iii) The MSLDC (CD & OD) shall be liable for penal/disciplinary action to be initiated by the Commission in accordance with extant Rules, Regulations, Grid Codes and relevant Act provisions, as may be applicable.

9. GOVERNANCE STRUCTURE FOR IMPLEMENTATION OF ABT MECHANISM AT STATE LEVEL

9.1 The Commission in its order has elaborated key issue of 'Governance' in the context of the market operations under State level ABT mechanism. Specific areas as covered by Commission under its Order 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.

- 9.2** The above mentioned areas are covered under the “MAHARASHTRA STATE POWER COMMITTEE (CONDUCT OF BUSINESS) RULES 2008”. The same shall be applicable for the operation of the Final Balancing and Settlement Mechanism as has been elaborated in the present Code.
- 9.3** The Final Balancing and Settlement Code as approved by the Commission shall be applicable and binding on all State Pool Participants, Market Participants and Market Service Providers. The same 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 Final Balancing and Settlement Code on suo-moto basis or based on recommendations of MSPC.
- 9.4** Any dispute regarding the settlements to be undertaken under the FBSM process shall be resolved in accordance with the provisions under the “MAHARASHTRA STATE POWER COMMITTEE (CONDUCT OF BUSINESS) RULES 2008”.

10. INFRASTRUCTURE REQUIREMENTS

- 10.1** The STU shall undertake the installation of ABT compliant meters at all the G<>T and T<>D interface points in the state of Maharashtra.
- 10.2** In case of new members becoming part of the State Pool, then the responsibility of making necessary arrangements for putting up suitable meters, capable of recording energy flows at 15-minute intervals, at the point of injection/drawal shall belong to the State Pool Participant. However, installation of the above meters will be the responsibility of the STU. Further, the responsibility of the necessary communication link with the nearest sub-station or MSLDC shall be responsibility of the transmission/distribution licensee to whose network the participant is connected.
- 10.3** STU shall be responsible for installation of meters. The major activities include:
- i. Providing ABT compliant meters at interface points
 - ii. Hardware and software required at sub-station level for Automatic Meter Reading of ABT compliant meters.
 - iii. Time synchronisation of equipment at each sub-station
 - iv. Hardware and software required for data processing at central location i.e SLDC-Kalwa

- v. Communication system through V-SAT / RF / OFC link between various sub stations and SLDC for on-line data transfers.
- vi. Software and hardware for monitoring at all transmission zones within the State of Maharashtra.

10.4 Energy Accounting Cell is already established to undertake State-wide energy accounting by the MSDLC-CD. Currently, IBSM is getting implemented by this cell.

10.5 Development, testing and implementation of the Balancing and Settlement software for the purpose of undertaking the Imbalance Pool Settlement shall be the responsibility of the MSLDC-CD. The software should be capable of undertaking the imbalance pool settlement including the weekly settlements, allocation of regional UI charges amongst the State Pool Participants and the Annual Fixed Cost Reconciliation pool settlement. The software may also be capable of accounting for the payments received and made against the settlement process.

10.6 The testing and pilot operations of the Balancing and Settlement software needs to be completed prior to full operationalisation of the Final Balancing and Settlement mechanism and undertaking the commercial settlement of imbalance pool amongst State Pool participants.

10.7 The Software/Hardware should be capable of storing the repository of data regarding the settlements including the G-T data and T – D interface data for a period of at least past 18 months and the data needs to be available for each month once the final balancing and settlement statement has been prepared.

10.8 The collected data shall be securely stored within the MSLDC-CD at the MSETCL and back-ups taken should be held off-site as a contingency against data catastrophe. The system holding the data shall have appropriate anti-virus and firewalls to ensure that the data cannot be accessed by unauthorised persons.

10.9 The MSLDC (CD & OD) along with the state pool participants and the generating stations shall have adequate infrastructure available for communication with the MSLDC and monitoring purposes. Communication facilities to include at least two dedicated telephone lines (with STD facility) for voice communication (along with voice recorder) and another dedicated telephone line (with STD facility) for Fax communication;

11. INFORMATION REQUIREMENTS

11.1 For reliable and accurate market operations, it is important that all requisite information necessary for development of 'energy account reconciliation

statement' and 'financial settlement of imbalances' on weekly basis amongst the Pool Participants is available to the MSLDC-CD on timely basis.

11.2 All State Pool Participants shall be responsible for timely furnishing of the requisite information, documents, contractual information, copies of the energy bills, and access to the metered energy data available in their respective control to the MSLDC-CD from time to time within stipulated time frame. The contractual information required to be furnished by State Pool Participants shall include -

- (i) Power Purchase Agreements amongst Licensees (State Pool Participants) and Generators/Traders (Market Participants);
- (ii) Bilateral Agreements amongst licensees, along with the rates of Power, if any;
- (iii) Bilateral/Purchase Agreements amongst TOAU along with the rates of Power. (OA Generators and OA Users);
- (iv) Wheeling Agreement amongst TOAU (OA generators and OA Users) and Transmission licensee.

11.2.1 PPA and Commercial Information:

- a. All State Pool Participants shall furnish details of capacity/energy contracted by them under power purchase agreements executed by them with generators/traders to the MSLDC-CD to enable it allocate metered injections from generators to State Pool Participants and determine the energy exchange and volume of imbalance amongst the State Pool Participants. The State Pool Participants should be made available copy of such Power purchase agreements entered with the generators to the MSLDC-CD within seven days from the date of executing such agreements.
- b. All State Pool Participants shall also notify to MSLDC-CD from time to time any modification in the existing capacities or any additional capacities contracted by them within a period of seven days from the date the changes are made.
- c. For the purpose of market operations, the contracted capacity shall be considered only after its entry into commercial operation and if despatched by the MSLDC-OD in the normal course of operations in accordance with the Merit Order Despatch principles.
- d. The in-firm generation by the generating station prior to commercial operation shall not be considered for the purpose of determination of 'imbalance' volume.
- e. All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of generating stations, after taking into account MUST run and constrained generating stations.

- f. The details for determining 'per unit variable charge' for the purposes of the Merit Order Stack' shall include computation of energy charge inclusive of fuel cost adjustment charge, if any, of various generating stations as applicable for extant month. The energy charge shall be as approved by Appropriate Commission and FCA computed based on the methodology approved by the Commission.
- g. The State Pool Participants shall furnish the details of the approved energy charges and the fuel adjustment surcharge thereon to the MSLDC-OD from time to time at least once during the month and not later than fifth day of the month to enable the MSLDC-OD develop centralized Merit Order Stack' for the State as a whole. In case of Fuel Adjustment Surcharge (FCA), the State Pool Participants need to submit the details of the preceding month within 3 working days from the end of the month for calculation of Energy Settlement for the current month. In case of non-availability of the data, the previous month FCA will be considered for computation of Energy Settlement.
- h. For the purpose of reconciliation of the Imbalance Pool Settlement on a six monthly basis, to enable the MSLDC-CD to determine the weighted average system marginal cost (WASMC) of contributing State Pool Participants, all State Pool Participants shall furnish details of the per unit variable cost of generating stations contracted by them as per monthly energy bills received by them from the generating companies/traders. This information shall be furnished to the MSLDC-CD within thirty days from expiry of calendar month for the month for which the information relates.

11.2.2 Bilateral Agreements of licensees

- a. All licensees shall furnish details of capacity/energy contracted by them under power purchase agreements executed by them with inter-State traders to the MSLDC-CD to enable it allocate metered injections corresponding to purchase/supply by inter-State trader to State Pool Participants and to determine the energy exchange and volume of imbalance amongst the State Pool Participants.
- b. All State Pool Participants shall also notify to MSLDC from time to time any modification in the existing capacities contracted by them or any additional capacity contracted by them with inter-State trader. The State Pool Participants shall furnish the copy of their power purchase agreement to MSLDC within seven days from date of execution of such agreement and shall notify commencement of power procurement under such agreement.
- c. All licensees (or as applicable) shall furnish details of capacity/energy contracted by them for purpose of inter-State sale with inter-State traders to the MSLDC to enable it allocate metered injections corresponding to purchase/supply by inter-State trader to State Pool Participants and

determine the energy exchange and volume of imbalance amongst the State Pool Participants.

- d. All State Pool Participants shall also notify to MSLDC from time to time any modification in the existing capacities contracted by them or any additional capacity contracted by them with inter-State trader within seven days of effecting such changes.

11.2.3 Bilateral Agreements of OA Users

- a. All OA users (which are State Pool Participants, i.e. full TOAU) shall furnish details of capacity/energy contracted by them under bilateral power purchase agreements executed by them with generators / traders / other licensees to MSLDC to enable it allocate metered injections from generators / traders / licensees to OA Users (which are State Pool Participants, i.e. full TOAU) and determine the energy exchange and volume of imbalance amongst the State Pool Participants.
- b. All OA users (which are State Pool Participants, i.e. full TOAU) shall also notify to MSLDC from time to time any modification in the existing capacities contracted by them or any additional capacity contracted by them. All OA users (which are State Pool Participants, i.e. full TOAU) shall furnish the copy of their power purchase agreement to MSLDC within seven days from date of execution of such agreement and shall notify commencement of power procurement under such agreement.
- c. For the purpose of market operations, the contracted capacity shall be considered only after its entry into commercial operation and if despatched by the MSLDC in the normal course of operations in accordance with Merit Order Despatch principles.
- d. Merchant generators shall be required to have power sale contracts in order to be a part of the settlement process.
- e. The in-firm generation by the generating station prior to commercial operation shall not be considered for the purpose of determination of 'imbalance' value.

11.2.4 Metered injections and metered off-take:

- a. The collection of the metered data shall be by way of MRI backed up manual start- finish readings or suitable remote meter reading, as the case may be. The data will be downloaded using MRI and will be e-mailed to MSLDC-CD.
- b. In case of failure of retrieving data from Main or Check Meters, the data will be collected from the Stand-by meters. The data shall be collected on instruction of MSLDC-CD, by concerned Substation and shall be time stamped to ensure accuracy. The same data will be communicated to MSLDC-CD by the Substation through online data sharing or e-mail or any other approved telecommunication method.

- c. The collected data shall be securely stored within the MSLDC-CD and the back ups taken which are to be held off-site as a contingency against data catastrophe. The system holding the data shall have appropriate anti-virus and firewalls to ensure that the data cannot be accessed by un-authorised persons.
- d. In case of totally or partially missing data is found, the affected interface point shall have its entire weeks data substituted using the Profiled Data Substitution Methodology (PDSM) as outlined in following paragraph.
- e. The collected data once verified as accurate and complete shall form the inputs into the Balancing and Settlements System (BSS), which shall form basis for computation of 'imbalance pool' workings, reconciliation of energy exchange and settlement of 'imbalances' amongst the 'State Pool Participants'.

11.2.5 Development of Balancing and Settlement System (BSS) software:

- a. The appropriate software for implementation of the Balancing & Settlement System (BSS) software is under process by MSLDC-CD.
- b. BSS software should be developed including its testing and pilot operations so that the same could be fully operational to undertake commercial settlement of imbalance pool amongst State Pool participants.

11.2.6 Development of Scheduling and Despatch Procedure and Protocol

- a. In view of principles of Scheduling and despatch outlined under ABT regime (Chapter- 7 – Features of ABT Mechanism of the Commission's order related to Intra-State ABT, Case 42 of 2006), MSLDC shall review the existing procedures relating to scheduling and despatch and develop suitable procedure and protocol, as may be necessary for effective implementation of the ABT regime.
- b. The Scheduling and Despatch Code as approved by the Commission's and the procedure and protocol outlined therein shall form the basis of the scheduling and despatch procedure to be followed under the Intra-State ABT regime.

11.2.7 Obligations to provide information

- a. The MSLDC shall publish all such information as required for all other State Pool Participants to be aware of the energy exchanges taking place within the pool as well as exigency conditions, if any.
- b. All data collected from interface points shall be shared with the stakeholders to whom it relates. The MSLDC-CD will hold a repository of historical data (18 months T - D data). The data shall be available for each week.
- c. As stakeholders gain a better understanding of the implications of their operational actions, their requirements for information will become more

refined. The FBSM and the MSLDC-CD need to be equipped to meet these information requirements as and when they arise.

12. DATA SUBSTITUTION METHODOLOGY

- 12.1** The data substitution shall be required corresponding to some interface points in case MRI data for the trading periods is not available. The energy from the start – finish readings shall be allocated throughout the 15 minute trading periods in the week using 'Profile Method' in a manner that reflects the profile of the majority data that has been collected by MRI.
- 12.2** The 'Profile Method' for data substitution will result in the demand profile after inclusion of the Substitute Data to more closely reflect the actual profile and shall further minimise the imbalances caused by including the Substitute Data.
- 12.3** In case 95% of the available data is successfully collected by MRI, the resultant percentage of data attributable to each of the trading periods should be a close reflection of the profile that would have applied to the substitute data had it been collected via MRI.

13. METHODOLOGY FOR WEEKLY IMBALANCE SETTLEMENT - FBSM

- 13.1** During the initial phase of ABT regime, it is envisaged that the role of the Reconciliation and Settlement Manager (RSM) shall be undertaken by the Commercial Division of Maharashtra State Load Despatch Centre (MSLDC-CD).

As per the order by MERC, it will be the responsibility of the Commercial Division of MSLDC (MSLDC-CD) for maintenance of information pertaining to 'energy accounts'. The 'Energy Accounting Information' shall include metered data covering all interface points between generating station to transmission network of intra-State transmission system (G<>T interface points) and metered data covering all interface points between transmission network of intra-State transmission system (InSTS) to distribution licensee (T<>D interface points). The 'Energy Accounting information' shall also include energy accounting data covering all interface points between transmission network of CTU and STU (PGCIL<>MSETCL interface points), as recorded by Western Regional Energy Account prepared by WRLDC / WRPC.

Under the Final Balancing and Settlement Mechanism, the methodology adopted by MSDLC-CD for the purpose of settlements of the Imbalance Pool is as outlined below:

13.1.1 Collection of data:

To undertake the energy accounting for determining and settling the 'Imbalance Pool' under the FBSS (Final Balancing and Settlement System), MSLDC – CD shall receive the online data from various sources to derive the Energy Input & Energy Drawal within the State.

The sources of Data for the Energy Input into the State is as specified below:

- a) **Inter-state Generation** - REA data for weekly UI charges, Transmission Losses and CGS scheduled generation from the monthly reports of all the Regional Load Dispatch Centre. (i.e. WRLDC, NRLDC, SRLDC, ERLDC, NERLDC) for Interstate Energy input from CGS, UI, Bilateral purchase as well as Open Access Generators at the Maharashtra State Periphery covering all interface points between transmission network of CTU and STU (PGCIL<>MSETCL interface points), as recorded by Western Regional Energy Account prepared by WRLDC / WRPC;
- b) **Intra-State Generation** - Data for Energy input within the State from MSPGCL, REL-G, TPC-G and RGPPL which is recorded at their generation bus bar. MSLDC-CD shall receive the online data directly.
- c) **G<>T Interface Points** – Metered Data from MSETCL, REL-T and TPC-T covering all the interface points between generating stations and transmission network of intra-State transmission system. MSLDC-CD shall receive the online data directly.
- d) The contractual information required to be collected from the State Pool Participants will include -
 - i. Power Purchase Agreements amongst Licensees (State Pool Participants) and Generators/Traders (Market Participants).
 - ii. Bilateral Agreements amongst licensees, if any.
 - iii. Bilateral/Purchase Agreements amongst TOAU (OA Generators and OA Users).
 - iv. Wheeling Agreement amongst TOAU (OA generators and OA Users) and Transmission licensee.The time frame for providing the above mentioned contractual information shall be as prescribed in the preceding section 11.
- e) **T<>D Interface Points** - Data from all the distribution licensees (State Pool Participants) and open access consumers regarding metered data recorded at (T<>D interface points) shall be made available to MSLDC-CD online.

13.1.2 Processing the collected data and settlement of Energy imbalances among the State Pool Participants.

13.1.3 Calculation of Intra-State Transmission Losses:

- a) The calculation of the Intra-State Transmission Losses shall be in line with the methodology prescribed by the Commission in its order regarding Case No. 31 of 2006.
- b) The intra-State transmission system losses for the purposes of imbalance computations will be based on difference of actual injections by generating stations including UI energy (if positive) and actual drawal by State Pool Participants including drawal for inter-state trading purposes and UI energy (if negative).
- c) The Transmission losses is computed for Maharashtra Grid by dividing the total Energy Input (by CGS, Bilateral Traders at the State Periphery and by State Generating utilities at G<>T interface) by Energy Drawal by distribution utilities (as recorded at T<>D interface). Accordingly Transmission losses are calculated for each month based on the above data. The formula for calculation of Transmission losses are as follows:

	[Energy Input to InSTS Power Grid (Ei) - Energy Output to Utilities in InSTS (Eo)]
Transmission Losses =	----- * 100 Energy Input to InSTS Power Grid (Ei)

Where,

Ei = The Energy Input to Intra-State power grid is the Power injected at G<>T interface which includes energy input from various generation sources i.e., MSPGCL, IPP (RGPPL, others if any), NCE, CPP, Small Hydro, Intra-State Open Access, Central Generating Stations, Bilateral Purchase, Regional UI, TPC-G (which includes its RPO and CPP purchase also) and REL-G.

Eo = The Energy output to utilities in Intra-State power grid (Eo) is power drawn at T<>D interface which includes energy drawal by MSEDCL, REL-D, TPCL – D, MPEC and BEST.

13.1.4 Computation of Ex-Ante Imbalance Pool Volume

- a) Based on the Transmission Loss calculated as above, the intra-State transmission system losses will be allocated amongst the State Pool Participants in proportion to the scheduled drawal by each State Pool Participant.
- b) The State Pool Participants whose loss adjusted target drawal schedule is lower than the aggregate of allocated generating capacity available to that

State Pool Participant in accordance with the 'target despatch schedule' shall be construed to be contributing (incrementing) into the Imbalance Pool to the extent of the forecasted under-drawal, whereas the State Pool Participants whose loss adjusted target drawal schedule is higher than the aggregate of allocated generating capacity available to that State Pool Participant in accordance with the 'target despatch schedule' shall be construed to be drawing (decrementing) from the Imbalance Pool to the extent of the forecasted over-drawal for that trading period.

- c) The losses for the purpose of 'loss adjustment' shall be based on average intra-State transmission losses for previous 52 week period. However, for the first year of operation of the FBSM code, system losses for the previous 12 month period shall be considered.
- d) The 'Ex-Ante Imbalance Pool Volume' is calculated which is a summation of all 'imbalance pool increments' corresponding to a particular trading period, which would be equal to the summation of all 'imbalance pool decrements' so that for any trading period the 'imbalance pool volume' will always be balanced in energy terms.
- e) The overall imbalance pool volume for each trading period comprises of the summation of 'imbalance pool decrements'. The imbalance pool decrements include decrements on account of inter-State trade of energy and decrements on account of energy exchange amongst Pool Participants.

13.1.5 Computation of Weighted Average System Marginal Price for Ex-Ante Imbalance Pool

- a) The Weighted Average System Marginal Price shall be determined by MSLDC-CD in line with the methodology as outlined in the Commission's order related to Case No. 42 of 2006 and further clarified under the order related to Case Nos. 36 and 41 of 2006.
- b) For the purpose of determining the marginal station for a particular State Pool Participant, the 'Merit Order Stack' for that State Pool Participant comprising the generating stations to the extent of generation capacities contracted by that State Pool Participant based on their variable cost shall be drawn and the same will form the basis for determining marginal station in respect of that State Pool Participant.
- c) The variable cost of each generating station for the purpose of Merit Order Despatch Stack and for computation of 'Ex-Post Imbalance Pool Price' shall be the per unit energy charge outlined in the energy bill for the previous calendar month in respect of each generating station or the latest information available in respect of each generating station.

- d) All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of generating stations, after taking into account 'MUST RUN' and constrained generating stations.

13.1.6 Calculation of Ex-Ante Imbalance Pool Price and Settlement

- a) The Ex-Ante Imbalance Pool Price shall be derived for each trading period separately. The Ex-Ante Imbalance Pool Price shall be based on overall pool volume and pool value to be determined based on the 'target despatch schedule' by the generators and 'target drawal schedule' by the State Pool Participants.
- b) The 'Ex-Ante Imbalance Pool Value' is calculated as the aggregate product of weighted average variable cost of the marginal stations of the contributing State Pool Participant and the 'imbalance pool increments' by the contributing State Pool Participant into the imbalance pool for a particular trading period.
- c) The weighted average variable cost of marginal stations is derived as per the methodology discussed under 13.1.105 above.
- d) The Ex-Ante Imbalance Pool price shall only provide a signal at which imbalance pool settlement amongst the 'State Pool Participants' shall take place if on an ex-post basis, the actual energy injection and energy drawal by various market constituents take place exactly in accordance with the forecasted schedule on ex-ante basis.
- e) The 'Ex-Ante Imbalance Pool Price' will be determined as ratio of 'Ex-Ante Imbalance Pool Value' and 'Ex-Ante Imbalance Pool Volume' as derived above.
- f) The Ex-Ante Imbalance Pool prices shall be denominated in Rs per kWh with fractional numbers specified up to two decimal places. The fractional points from third decimal point would be rounded off to nearest integer for second decimal point.

13.1.7 Computation of Annual Fixed Cost Settlement

- a) Fixed Cost Reconciliation (FCR) Pool Volume comprising of 'FCR Pool Increments' and 'FCR Pool Decrements' shall be worked out for each trading period for the purpose of settlement of capacity exchanges amongst State Pool Participants.

- b) 'FCR Pool Reconciliation' shall take place on an annual basis, taking into consideration the aggregate of 12-monthly 'FCR Pools' for each trading period.
- c) The computation of 'FCR Pool Increments' and 'FCR Pool Decrements' shall be based on Available Capacity declarations as provided by the Generating Stations. For each trading period, the shortfall between loss adjusted drawal by a State Pool Participant and the overall generation capacity declared to be available to the State Pool Participant by the Generating Stations will be termed as 'increments' to the FCR Pool.
- d) The sum of all such FCR Pool increments and decrements of all the State Pool Participants over the fiscal year will be said to comprise the FCR Pool Volume.
- e) The FCR Pool Decrements shall be allocated amongst the parties which have incremented to the pool in the ratio of their Increments and this shall be called the 'FCR Volume Allocation' of the incrementing Pool Participant. FCR Pool Value will be determined as aggregate of product of 'overall average per unit fixed cost' of the contributing FCR Pool Participant and the 'FCR Volume Allocation' of the contributing FCR Pool Participant into the FCR Pool. The overall average per unit fixed cost is found by dividing the total fixed cost payable by State Pool Participant for the generating stations contracted by the FCR Pool Participant by total energy units injected by the generating station and to be paid for by the FCR Pool Participant during the fiscal year.
- f) FCR Pool Price to be paid by the FCR Pool Participants decrementing to 'FCR Pool' shall be determined as ratio of 'FCR Pool Value' to 'FCR Pool Volume'.
- g) Based on 'FCR Volume Allocation' and 'FCR Pool Decrements' and the 'FCR Pool Price' (to be determined in accordance with the principles described above) the 'FCR Pool Amount Payable' and 'FCR Pool Amount Receivable' in respect of each State Pool Participant corresponding to each trading period shall be determined.

13.1.8 Calculation of Allocation of Regional UI Charges amongst State Pool Participants

- a) The weekly statement of regional UI charges as prepared by WRLDC/WRPC shall form the basis for sharing of UI charges amongst the State Pool Participants. . The UI in respect of RGPPL will be treated as par with the UI from the central sector and payment will be effected by MSLDC. However, the energy charge on the basis of drawl schedule

issued by MSLDC will be paid by the beneficiaries to RGPPL as per PPA signed between them.

- b) Gross UI charges corresponding to UI energy for each trading period shall comprise of 2 components:
1. Cost corresponding to UI energy at weighted average scheduled energy rate of the contributing State Pool Participants based on the CGS stations, in case of a UI liability for the State, or on the State Marginal Price in case of a UI benefit for the State.
 2. Net UI charges, which is the difference between gross UI charge and cost associated with UI energy as considered in the 'Imbalance Pool' workings.

Thus,

Gross UI Cost = Scheduled Energy Cost + Net UI Cost

Where,

Scheduled Energy Cost = Scheduled Energy Rate x UI Energy

- c) The Net UI charges will be allocated amongst the State Pool Participants in proportion to their deviation from the 'target drawal schedule' or 'target despatch schedule' corresponding to each trading period. The basis of deriving proportionate share shall be 'aggregate deviation of each State Pool Participant from its target drawal schedule' and 'aggregate deviation of in-state generators from their target despatch schedule'.
- d) The Net UI charges will be divided into 2 parts:
1. Net UI charges-1 : corresponding to 'aggregate deviation' of State Pool Participants
 2. Net UI charges-2 : corresponding to 'aggregate deviation' of State Generators
- e) Net UI charges-1 will be allocated amongst the State Pool Participants which have been responsible for the deviations. For example, for a particular trading period, if there exists an incidence of UI cost, the same would be allocated amongst the State Pool Participants who have overdrawn compared to their drawal schedule for that trading period. Alternately, for a trading period, if there exists an incidence of UI incentive, the same would be allocated amongst the State Pool Participants who have under-drawn compared to their original drawal schedule for that trading period.

- f) Net UI charges-2 corresponding to in-State generator deviations shall be captured only when in-State generator deviations are in tandem with overall UI implications for the State. For example, when the State earns UI incentive and the in-State generator deviations have facilitated earning of UI incentive then the Net UI charges-2 shall be captured.
- g) Net UI (Unscheduled Interchange) charges-2 shall be allocated only between the Pool Participants whose contracted generators have the same deviation sign (positive or negative) as the Gross UI Cost.
- h) In addition to the above methodology for allocation of UI charges, the following steps will be followed with respect to UI on account of RGPPL:
 - (i) In case of over drawl from CGS and over-generation by RGPPL – The UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to WRLDC & RGPPL after receipt of the same from the SPP Pool A/c;
 - (ii) In case of over drawl from CGS and under-generation by RGPPL – The UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to WRLDC after recovering from the SPP Pool A/c and RGPPL;
 - (iii) In case of under drawl from CGS and over-generation by RGPPL – UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to SPP Pool A/c after recovery from WRLDC;
 - (iv) In case of under drawl from CGS and under-generation by RGPPL – UI charge allocation will be done by aggregating the UI of CGS as well as RGPPL and will be paid to SPP Pool A/c after recovery of the same from WRLDC and RGPPL.

13.1.9 Computation of Ex-Post Imbalance Pool Volume:

- a) Based on Transmission Loss calculated as above, the intra-State transmission system losses will be allocated amongst the State Pool Participants at actual (ex-post) in proportion to the actual drawal by each State Pool Participant.
- b) The State Pool Participants whose actual loss adjusted drawal during a trading period is lower than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be contributing (incrementing) into the Imbalance Pool to the extent of their under-drawal, whereas the State Pool Participants whose actual loss adjusted

drawal during the trading period is higher than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be drawing (decrementing) from the Imbalance Pool to the extent of their over-drawal.

$$\text{Loss Adjusted drawal} = \frac{\text{Energy drawn at T<>D interface}}{(1 - \text{Actual Transmission loss \%})}$$

If Loss Adjusted Drawal < Generation (Contracted generation) injected at G<>T interface

*Then State Pool Participating is **'Incrementing'** to the pool*

If Loss Adjusted Drawal > Generation (Contracted generation) injected at G<>T interface

*Then State Pool Participating is **'Decrementing'** to the pool*

- c) The losses for the purpose of 'loss adjustment' shall be based on actual losses for the trading period computed as difference between actual injections by generating stations and actual drawal by State Pool Participants.
- d) The 'Ex-Post Imbalance Pool Volume' is calculated which is a summation of all 'imbalance pool increments' corresponding to particular 15 min trading period, which would be equal to the summation of all 'imbalance pool decrements' so that for any trading period the 'imbalance pool volume' will always be balanced in energy terms.
- e) The overall imbalance pool volume for each trading period comprises summation of 'imbalance pool decrements'. The imbalance pool decrements include decrements on account of inter-State trade of energy and decrements on account of energy exchange amongst State Pool Participants and un-scheduled interchange (UI) energy, if negative.
- f) The in-firm generation by the generating station prior to commercial operation shall not be considered for the purpose of determination of 'imbalance' value.

13.1.10 Computation of Weighted Average System Marginal Price for Ex-Post Imbalance Pool:

- a) The Weighted Average System Marginal Price shall be determined by MSLDC-CD in line with the methodology as outlined in the Commission's order related to Case No. 42 of 2006 and further clarified under the order related to Case Nos. 36 and 41 of 2006.

- b). For the purpose of determining the marginal station for a particular State Pool Participant, the 'Merit Order Stack' for that State Pool Participant comprising the generating stations to the extent of generation capacities contracted by that State Pool Participant based on their variable cost shall be drawn and the same will form the basis for determining marginal station in respect of that State Pool Participant.
- c). The variable cost of each generating station for the purpose of Merit Order Stack and for computation of 'Ex-Post Imbalance Pool Price' shall be the per unit energy charge outlined in the energy bill for the instant calendar month corresponding to the settlement period in respect of each generating station. In case of generating stations having billing cycle spread over two calendar months, the latest information as available pertaining to previous billing cycle shall be considered for the purposes.
- d). The per unit energy charge in the energy bill shall be in accordance with the heat rate, auxiliary consumption factor, the formula for energy charge as approved by the Appropriate Commission and the delivered cost of fuel for that month in respect of each generating station.
- e). All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of generating stations, after taking into account 'MUST RUN' and constrained generating stations.
- f). The cost of generation upto the technical minimum generating capacity of the generating stations shall have to be borne by the state pool participants who have contracted capacity with those generating stations. Any generation over and above the same shall only be considered for the purpose of computing the Weighted Average System Marginal Price.

13.1.11

Calculation of Imbalance Pool Price and Settlement:

- a) The Ex-Post Imbalance Pool Price shall be derived for each trading period separately. The Ex-Post Imbalance Pool Price 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 'Ex-Post Imbalance Pool Value' is calculated as the aggregate product of weighted average variable cost of the marginal stations of the contributing State Pool Participant and the 'imbalance pool increments' by the contributing State Pool Participant into the imbalance pool for a particular trading period.

- c) The weighted average variable cost of marginal stations is derived as per the methodology discussed under 13.1.10 above.
- d) The Ex-Post Imbalance Pool price will represent the price for settlement of energy exchange amongst the 'Pool Participants' in accordance with the 'Imbalance pool Volume' determined for a particular trading period within a particular 'Settlement Period'.
- e) The 'Ex-Post Imbalance Pool Price' will be determined as ratio of 'Ex-post Imbalance Pool Value' and 'Ex-Post Imbalance Pool Volume' as derived above.
- f) The Ex-post Imbalance Pool prices shall be denominated in Rs per kWh with fractional numbers specified up to two decimal places. The fractional points from third decimal point would be rounded off to nearest integer for second decimal point.
- g) The contributor or incrementor to the pool will be paid the amount based on the Ex-Post imbalance Pool Price determined as above and will be recovered from the other State Pool participants who have over drawn from the pool or decremented the pool.

13.1.12 Based on the above, the following settlement statements shall be prepared:

- i. Settlement of Imbalances (energy exchange) amongst State Pool Participants.
- ii. Aggregate net position of settlement amongst the State Pool Participants.

14. INTERIM BALANCING & SETTLEMENT MECHANISM

14.1 For the actual full fledged implementation of the Final Balancing and Settlement procedure, implementation of certain conditions is mandatory without which the settlements cannot be undertaken as envisaged under the Final Balancing and Settlement Code. Some of these activities include completion of the interface metering, infrastructure for data acquisition of the metering data at MSLDC, software for undertaking imbalance pool settlements, establishment of energy accounting procedures, procedures and protocol for scheduling and despatch, etc. Till these activities are complete the full fledged implementation of the Final Balancing and Settlement Mechanism shall not be possible.

14.2 Till such time that MSPC declares that all the activities necessary for the full fledged implementation of FBSM have been completed, the Interim Balancing

and Settlement Mechanism in line with the provisions of the Commission's Order on Intra-State ABT (Case 42 of 2006) shall be followed.

- 14.3** During the initial phase of ABT regime, it is envisaged that the role of the Reconciliation and Settlement Manager (RSM) shall be undertaken by the Commercial Division of Maharashtra State Load Despatch Centre (MSLDC-CD).
- 14.4** As per the order by MERC, it will be the responsibility of the Commercial Division of MSLDC (MSLDC-CD) for maintenance of information pertaining to 'energy accounts'. The 'Energy Accounting Information' shall include metered data covering all interface points between generating station to transmission network of intra-State transmission system (G<>T interface points) and metered data covering all interface points between transmission network of intra-State transmission system (InSTS) to distribution licensee (T<>D interface points). The 'Energy Accounting information' shall also include energy accounting data covering all interface points between transmission network of CTU and STU (PGCIL<>MSETCL interface points), as recorded by Western Regional Energy Account prepared by WRLDC / WRPC.
- 14.5** However, for the purpose of the settlements under the IBSM, the methodology adopted by MSDLC-CD for the purpose of settlements of the Imbalance Pool is as outlined below:

14.5.1 Collection of data:

To undertake the energy accounting for determining and settling the 'Imbalance Pool' under the IBSS (Interim Balancing and Settlement System), MSLDC – CD shall collect the data from various sources to derive the Energy Input & Energy drawal within the State.

14.5.1.1 The sources of Data for the Energy Input into the State is as specified below:

- a) **Inter-state Generation** - REA data for weekly UI charges, Transmission Losses and CGS scheduled generation from the monthly reports of all the Regional Load Dispatch Centre. (i.e. WRLDC, NRLDC, SRLDC, ERLDC, NERLDC) for Interstate Energy input from CGS, UI, Bilateral purchase as well as Open Access Generators at the Maharashtra State Periphery covering all interface points between transmission network of CTU and STU (PGCIL<>MSETCL interface points), as recorded by Western Regional Energy Account prepared by WRLDC / WRPC;
- b) **G<>T Interface Points** – Metered Data from MSETCL, REL-T and TPC-T covering all the interface points between generating stations and transmission network of intra-State transmission system. The information shall be made available by all the transmission licensees within 15 days from the end of the preceding month in the format prescribed by MSLDC-CD;
- c) The contractual information required to be submitted by the State Pool Participants will include -

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- i. Power Purchase Agreements amongst Licensees (State Pool Participants) and Generators/Traders (Market Participants).
- ii. Bilateral Agreements amongst licensees, if any.
- iii. Bilateral/Purchase Agreements amongst TOAU (OA Generators and OA Users).
- iv. Wheeling Agreement amongst TOAU (OA generators and OA Users) and Transmission licensee.

14.5.1.2 Accordingly, the source of Data related to Energy Drawal within the State and the time frame for submission of the same is as specified below:

- a) Data from MSETCL regarding metered data covering all interface points between transmission network to Distribution Licensees of intra-State transmission system (T<>D interface points) as and when the interface metering is completed shall be 15 days from the end of the preceding month.
- b) Data from all the distribution licensees (State Pool Participants) and open access consumers regarding metered data recorded at (T<>D interface points) shall be made available to MSLDC-CD within the time frame as prescribed below.

However, till the metering infrastructure along with the necessary data processing infrastructure is in place, the data for energy drawal shall be made available to MSLDC-CD by the State Pool Participants. The data provided by the State Pool Participants for the purpose of the settlement shall be based on the following basis:

- i) Energy Drawal by MSEDCL:
The energy Drawal by MSEDCL & MPEC is recorded at T<>D Interface at the 13 EHV O&M circles and accordingly reported to MSLDC. The information should be certified by the licensee and shall be made available to MSLDC-CD in formats specified by MSLDC-CD within 15 days from the end of the preceding month.
- ii) Energy Drawal by BEST:
The energy drawal by BEST shall be based on metering information at interface between TPC-T and BEST. The information should be certified by the licensee and shall be made available to MSLDC-CD in formats specified by MSLDC-CD within 15 days from the end of the preceding month.
- iii) Energy Drawal by REL-D:
The energy drawal by REL-D shall be based on metering information at interface between TPC-T and REL-D as well as REL-T and REL-D

interface. The information should be certified by the licensee and shall be made available to MSLDC-CD in formats specified by MSLDC-CD within 15 days from the end of the preceding month.

- iv) Energy Drawal by TPC-D:
The energy drawal provided by TPC-D is presently not based on metered information at the T<>D interface. It is presently being calculated based on the metered retail sales recorded by TPC-D and adjusted for the distribution losses approved by the Commission to arrive at the estimated energy drawal at T<>D interface. The same process shall be continued till the time the necessary interface metering infrastructure is commissioned.
- v) Energy Drawal by Open Access Users:
The energy drawal by Open Access Users shall be based on metering information at respective interface points. The information should be certified by the licensee and shall be made available to MSLDC-CD in formats specified by MSLDC-CD within 15 days from the end of the preceding month.

Further, any data regarding the inter-utility transactions shall be jointly authenticated by the parties involved.

On commissioning of the interface metering with ABT compliant meters at interface points of various licensees, the information provided by the state pool participants shall be based on the metered data only and no estimated data shall be allowed to be used for the purpose of imbalance settlement.

14.5.2 Verification of data:

- 14.5.2.1 In case of any discrepancies in the data collected from the above specified sources, the same needs to be rectified by MSLDC – CD in consultation with the State Pool Participants.

14.5.3 Processing the collected data and settlement of Energy imbalances among the State Pool Participants

14.5.3.1 Calculation of Intra-State Transmission Losses:

- a) The calculation of the Intra-State Transmission Losses shall be in line with the methodology prescribed by the Commission in its order regarding Case No. 31 of 2006.
- b) The intra-State transmission system losses for the purposes of imbalance computations will be based on difference of actual injections by generating stations including UI energy (if positive) and actual drawal by State Pool

Participants including drawal for inter-state trading purposes and UI energy (if negative).

- c) The Transmission losses is computed for Maharashtra Grid by dividing the total Energy Input (by CGS, Bilateral Traders at the State Periphery and by State Generating utilities at G<>T interface) by Energy Drawal by distribution utilities (as recorded at T<>D interface). Accordingly Transmission losses are calculated for each month based on the above data. The formula for calculation of Transmission losses are as follows:

	[Energy Input to InSTS Power Grid (Ei) - Energy Output to Utilities in InSTS (Eo)]
Transmission Losses =	----- * 100 Energy Input to InSTS Power Grid (Ei)

Where,

Ei = The Energy Input to Intra-State power grid is the Power injected at G<>T interface which includes energy input from various generation sources i.e., MSPGCL, IPP (RGPPL, others if any), NCE, CPP, Small Hydro, Intra-State Open Access, Central Generating Stations, Bilateral Purchase, Regional UI, TPC-G (which includes its RPO and CPP purchase also) and REL-G.

Eo = The Energy output to utilities in Intra-State power grid (Eo) is power drawn at T<>D interface which includes energy drawal by MSEDCL, REL-D, TPCL – D, MPEC and BEST.

14.5.3.2 Computation of Imbalance Pool Volume:

- a) Based on Transmission Loss calculated as above, the intra-State transmission system losses will be allocated amongst the State Pool Participants at actual (ex-post) in proportion to the actual drawal by each State Pool Participant.
- b) The State Pool Participants whose actual loss adjusted drawal during a trading period is lower than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be contributing (incrementing) into the Imbalance Pool to the extent of their under-drawal, whereas the State Pool Participants whose actual loss adjusted drawal during the trading period is higher than aggregate of actual injection of the generating stations contracted by the State Pool Participant in accordance with their contracted capacity shall be construed to be drawing (decrementing) from the Imbalance Pool to the extent of their over-drawal.

Loss Adjusted drawal = Energy drawn at T<>D interface

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(1 – Actual Transmission loss %)

*If Loss Adjusted Drawal < Generation (Contracted generation)
injected at G<>T interface*

*Then State Pool Participating is **'Incrementing'** to the pool*

*If Loss Adjusted Drawal > Generation (Contracted generation)
injected at G<>T interface*

*Then State Pool Participating is **'Decrementing'** to the pool*

- c) The losses for the purpose of 'loss adjustment' shall be based on actual losses for the trading period computed as difference between actual injections by generating stations and actual drawal by State Pool Participants.
- d) The 'Ex-Post Imbalance Pool Volume' is calculated which is a summation of all 'imbalance pool increments' corresponding to particular trading period i.e. for a month, which would be equal to the summation of all 'imbalance pool decrements' so that for any trading period the 'imbalance pool volume' will always be balanced in energy terms.
- e) The overall imbalance pool volume for each trading period comprises summation of 'imbalance pool decrements'. The imbalance pool decrements include decrements on account of inter-State trade of energy and decrements on account of energy exchange amongst State Pool Participants and un-scheduled interchange (UI) energy, if positive.
- f) The in-firm generation by the generating station prior to commercial operation shall not be considered for the purpose of determination of 'imbalance' volume.
- g) In case of sharing of TPC-G's generation capacity, the sharing proportion approved by the Commission in the relevant orders shall be used.

14.5.3.3 Computation of Weighted Average System Marginal Price:

- a) The Weighted Average System Marginal Price shall be determined by MSLDC-CD in line with the methodology as outlined in the Commission's order related to Case No. 42 of 2006 and further clarified under the order related to Case Nos. 36 and 41 of 2006.
- b) For the purpose of determining the marginal station for a particular State Pool Participant, the 'Merit Order Stack' for that State Pool Participant comprising the generating stations to the extent of generation capacities contracted by that State Pool Participant based on their variable cost shall

- be drawn and the same will form the basis for determining marginal station in respect of that State Pool Participant.
- c) The variable cost of each generating station for the purpose of Merit Order Stack and for computation of 'Ex-Post Imbalance Pool Price' shall be the per unit energy charge outlined in the energy bill for the instant calendar month corresponding to the settlement period in respect of each generating station. In case of generating stations having billing cycle spread over two calendar months, the latest information as available pertaining to previous billing cycle shall be considered for the purposes.
 - d) The per unit energy charge in the energy bill shall be as approved by the Appropriate Commission and the delivered cost of fuel for that month in respect of each generating station.
 - e) All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of generating stations, after taking into account 'MUST RUN' and constrained generating stations.
 - f) The cost of generation upto the technical minimum generating capacity of the generating stations shall have to be borne by the state pool participants who have contracted capacity with those generating stations. Any generation over and above the same shall only be considered for the purpose of computing the Weighted Average System Marginal Price.

14.5.3.4 Calculation of Imbalance Pool Price and Settlement:

- a) The Ex-Post Imbalance Pool Price shall be derived for each trading period separately. The Ex-Post Imbalance Pool Price 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 'Ex-Post Imbalance Pool Value' is calculated as the aggregate product of weighted average variable cost of the marginal stations of the contributing State Pool Participant and the 'imbalance pool increments' by the contributing State Pool Participant into the imbalance pool for a particular trading period.
- c) The weighted average variable cost of marginal stations is derived as per the methodology discussed under 13.1.10 above.
- d) The Ex-Post Imbalance Pool price will represent the price for settlement of energy exchange amongst the 'Pool Participants' in accordance with the 'Imbalance pool Volume' determined for a particular trading period within a particular 'Settlement Period'.
- e) The 'Ex-Post Imbalance Pool Price' will be determined as ratio of 'Ex-post Imbalance Pool Value' and 'Ex-Post Imbalance Pool Volume' as derived above.

- f) The Ex-post Imbalance Pool prices shall be denominated in Rs per kWh with fractional numbers specified up to two decimal places. The fractional points from third decimal point would be rounded off to nearest integer for second decimal point.
- g) The contributor or incrementor to the pool will be paid the amount based on the Ex-Post imbalance Pool Price determined as above and will be recovered from the other State Pool participants who have over drawn from the pool or decremented the pool.

14.5.4 Based on the above, the following settlement statements shall be prepared:

- i) Settlement of Imbalances (energy exchange) amongst State Pool Participants.
- ii) Aggregate net position of settlement amongst the State Pool Participants.

15. SPECIAL CONDITIONS

15.1 Applicability of Imbalance Pool Settlement to Merchant Power Plants (MPP)

15.1.1 Presently in the order issued by the Commission with regards to the Implementation of the ABT within the State, the generators are not included as the State Pool Participants and hence not subjected to Imbalance Pool Settlements. Hence, in actual operations, if the generator deviates from his scheduled generation, the generator is not penalised and the regional UI implication is passed on to the State Pool Participants. Hence, to calculate the implication on account of deviations by the generators selling power outside the state, the merchant power plants are proposed to be subjected to imbalance pool settlements.

15.1.2 In order to include them in the imbalance pool settlements, the MPP's shall need to have power sale contracts prepared. They will also need to adhere to the procedures prescribed to be followed by the state pool participants with regards to scheduling and despatch procedures and making available the necessary metering and commercial information to MSLDC-CD for undertaking the imbalance settlements under the IBSM.

15.1.3 Applicability of UI charges to Merchant Generator

- The actual generation by a generator shall be within a range of $\pm 5\%$ during some time block but overall deviation during a day should be within $\pm 1\%$ against its scheduled generation.
- Case of intra-state sale – The penalties or rates for under-generation or over-generation should be mentioned in the contract between the generator and the consumer/licensee.
- Case of inter-state sale – In case of over-generation, the generator shall be compensated at the lowest variable cost of the State owned generating stations. Further, in case of under-generation, the generator shall be liable to pay at state SMP applicable for the relevant time-block.

15.2 Applicability of Intra-State Transmission and Distribution Losses on Inter-State sale of power

15.2.1 Any transaction of inter-state sale of power involving the State Pool Participant shall be subject to the intra-state transmission and distribution losses, as applicable.

15.3 Treatment of In-firm power for the purpose of "Imbalance Volume" computations

15.3.1 The in-firm generation by the generating station prior to commercial operation shall not be considered for the purpose of determination of 'imbalance' value.

ANNEXURE – I

**Computation of the Intra-State Transmission Losses
(As per Case No. 31 of 2006)**

1. Transmission loss for Intra-State Transmission System = $(E_I - E_O) \times 100 / E_I$

Where, E_I = Total Energy Input to the Intra-State Transmission System at all generation to transmission (G<>T) and transmission to distribution (T<>D) interface points (typically at 400kV, 220kV, 132kV, 66kV) for each calendar month

E_O = Total Energy Output from the Intra-State Transmission System at all transmission to distribution (T<>D) interface points (typically at 132kV, 66kV, 33kV & 11kV) for each calendar month

2. $E_I = E_{MSPGCL(I)} + E_{CGS(I)} + E_{IPPs(I)} + E_{CPPs(I)} + E_{TPC-G(I)} + E_{REL-G(I)} + E_{EHT-TOA(I)} + E_{UI(I)}$

Where,

- $E_{MSPGCL(I)}$ = Gross energy import to InSTS from Thermal and Hydel station of MSPGCL at 400kV, 220kV, 132kV, 66 kV interface points
- $E_{CGS(I)}$ = Net energy import to the InSTS from all CGS and interstate interface points. This information is supplied on a weekly basis from the REA.
- $E_{UI(I)}$ = Net energy import to the InSTS on account of UI energy. This information is supplied on a weekly basis from the REA.
- $E_{IPPs(I)}$ = Gross energy import to InSTS from Independent Power Producers (RGPP or future IPPs)
- $E_{CPPs(I)}$ = Gross energy import to InSTS from Captive Power Plants at 220kV & 132kV
- $E_{TPC-G(I)}$ = Gross energy import to InSTS from TPC-Generation
- $E_{REL-G(I)}$ = Gross energy import to InSTS from REL-Generation
- $E_{EHT-TOA(I)}$ = Gross energy import to InSTS from Conventional and Non-conventional Transmission OA Users at 132kV

3. $E_O = E_{MSEDCL-LV(E)} + E_{MSEDCL-EHT(E)} + E_{TPC-D-LV(E)} + E_{TPC-D-EHT(E)} + E_{REL-D-LV(E)} + E_{REL-DEHT(E)} + E_{BEST-D-LV(E)} + E_{BEST-D-EHT(E)} + E_{EHT-TOA(E)}$

Where,

- $E_{MSEDCL-LV(E)}$ = Gross Energy supplied to MSEDCL at 33kV and 11kV LV side of power transformers (energy measured at Grid sub-station premises)
- $E_{MSEDCL-EHT(E)}$ = Gross Energy Supplied to MSEDCL at 220kV, 132kV and 66kV interface points to direct EHT consumers (energy measured in Grid sub-station premises)
- $E_{TPC-D-LV(E)}$ = Gross Energy supplied to TPC-D at 33kV and 11kV LV side of power transformers (energy measured at Grid sub-station premises)
- $E_{TPC-D-EHT(E)}$ = Gross Energy Supplied to TPC-D at 220kV, 132kV and 66kV interface points to direct EHT consumers (energy measured in Grid sub-station premises)

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$E_{\text{REL-D-LV (E)}}$	=	Gross Energy supplied to REL-D at 33kV and 11kV LV side of power transformers (energy measured at Grid sub-station premises)
$E_{\text{REL-D-EHT(E)}}$	=	Gross Energy Supplied to REL-D at 220kV, 132kV and 66kV interface points to direct EHT consumers (energy measured in Grid sub-station premises)
$E_{\text{BEST-D-LV (E)}}$	=	Gross Energy supplied to BEST-D at 33kV and 11kV LV side of power transformers (energy measured at Grid sub-station premises)
$E_{\text{BEST-D-EHT(E)}}$	=	Gross Energy Supplied to BEST-D at 220kV, 132kV and 66kV interface points to direct EHT consumers (energy measured in Grid sub-station premises)
$E_{\text{EHT-TOA(E)}}$	=	Gross Energy Supplied from InSTST to Transmission Open Access Users at 220kV and 132kV

ANNEXURE – II

Calculation of Ex-Ante Imbalance Price

The following example explains the calculation of Ex-Ante Imbalance Price. Figures used are for illustrative purpose only.

Step 1: Calculation of proposed entitlement for each Discom based on Availability Forecasts and Contracted Capacities.

- The Discoms send in their Load Forecast schedules to SLDC for each trading period on a day-ahead basis. The table below shows the Load Forecast schedules for a particular time period.

Discoms	Load Forecast (kWh)
MSEDCL	485,600.00
BEST	14,000.00
TPC-D	30,000.00
REL-D	30,000.00
Total	499,600.00

- The generators give their day ahead schedules for each trading period and based on the contracted capacity as per PPA and the capacity availability schedules, the entitlements for each Discom is calculated.
- The table below shows the entitlements for each Discom for the same trading period.

Discoms	MSPGCL (kWh)	TPC_G (kWh)	REL_G (kWh)	Central Sector (kWh)	Interstate BPI (kWh)	Intrastate OA (kWh)	Wind & others (kWh)	Total (KWh)
MSEDCL	280,000	0	0	117,336.15	25,412.26	50,000	15,856.24	488,604.65
BEST	0	5,000	0	0	5,054.97	4,000	0	14,054.97
TPC-D	0	21,712.47	0	0	3,000	6,000	0	30,712.47
REL-D	0	5,000	12,684.99	0	10,000	8,710.36	0	36,395.35
Total	280,000	31,712.47	12,684.99	117,336.15	43,467.23	68,710.36	15,856.24	569,767.44

- Thus we can see that the total Availability is 569,767.44 kWh while the Discoms had an initial Load Forecast of 499,600.00 kWh, which means there is a surplus of 70,167.44 kWh.

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- After this the Discoms and Generators are allowed to revise their forecasts and finally the Target Despatch Schedules and Target Drawal Schedules are finalised by SLDC.

Step 2: Calculation of Discom-wise Ex-Ante Imbalance Pool Increments.

- For calculating the Ex-Ante Imbalance Pool Increments/Decrements, the Target Dispatch Schedule of the generators and the Target Drawal Schedule of the State Pool Participants needs to be known.
- The table below shows the Target Despatch Schedule (at G<>T Interface) finalized by MSLDC-OD for a particular time-period 00:00 to 00:15

Discoms	MSPGCL (kWh)	TPC_G (kWh)	REL_G (kWh)	Central Sector (kWh)	Interstate BPI (kWh)	Intrastate OA (kWh)	Wind & others (kWh)	Total (KWh)
MSEDCL	280,000	0	0	117,336.15	25,412.26	50,000	15,856.24	488,604.65
BEST	0	5,000	0	0	5,054.97	4,000	0	14,054.97
TPC-D	0	21,712.47	0	0	3,000	6,000	0	30,712.47
REL-D	0	5,000	12,684.99	0	10,000	8,710.36	0	36,395.35
Total	280,000	31,712.47	12,684.99	117,336.15	43,467.23	68,710.36	15,856.24	569,767.44

- The Loss Adjusted Drawal Schedule for the State Pool Participants needs to be found out, taking the loss value as the average intra-state transmission loss for the past 52 weeks. The table below shows the Loss Adjusted Drawal Schedule for a particular time-period 00:00 to 00:15 calculated with an average transmission loss value of 5.4%

Discoms	Total Drawal Schedule (kWh)
MSEDCL	490,486.26
BEST	14,799.15
TPC-D	30,655.39
REL-D	33,826.64
Total	569,767.44

- The difference between the Target Despatch Schedule and the Target Drawal Schedule gives the value of the Ex-Ante Imbalance Pool Increments/Decrements of each of the State Pool Participants.

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Discoms	Total Target Despatch Schedule at G<>T Interface (kWh)	Total Loss Adjusted Target Drawal Schedule (kWh)	Ex-Ante Imbalance Pool Increments/Decrements (kWh)
MSEDCL	488,604.65	490,486.26	(1,881.61)
BEST	14,054.97	14,799.15	(744.18)
TPC-D	30,712.47	30,655.39	57.08
REL-D	36,395.35	33,826.64	2,568.71
Total	569,767.44	569,767.44	0.00

Step 3: Identifying the Marginal Stations of the contributing State Pool Participants

- The Ex-Ante Imbalance Pool Volume is the summation of Imbalance Pool Increments of the contributing State Pool Participants corresponding to a particular trading period. In the above example we can see that TPC-D and REL-D are the contributing Pool Participants since they are incrementing into the Imbalance Pool.
- The weighted average variable cost of the marginal stations of the contributing State Pool Participants is calculated. The marginal stations are the ones which are supplying (imbalance) energy to the contributing State Pool Participants.
- Ex-Ante Imbalance Pool Value is the aggregate of the product of weighted average variable cost of the marginal stations of the contributing State Pool Participants and the Imbalance Pool Increments by the contributing State Pool Participant into the imbalance pool.
- The table below shows the calculation of weighted average variable cost for REL-D for illustration purposes:

Generators	Variable Cost (Sorted in Descending Order) (Rs/kWh)	Contracted Energy as per Target Despatch Schedule by REL-D (kWh)	Imbalance Energy of REL-D (kWh)	Weighted Cost (Rs)
Source A	6.00	1,000	1,000	6,000
Source B	5.00	2,000	1,568.71	7,843.55
Source C	2.10	2,000	0	0
Source D	2.00	10,000	0	0
Source E	1.90	10,000	0	0
Source F	1.80	10,000	0	0
Weighted Average Variable Cost of REL-D (Rs/kWh)				5.39

Step 4: Calculating the Ex-Ante Imbalance Pool Price

- Ex-Ante Imbalance Pool Price is the ratio of Ex-Ante Imbalance Pool Value and the Ex-Ante Imbalance Pool Volume.
- The table below shows the calculation of Ex-Ante Pool Value and Pool Price.

State Pool Participants	Imbalance Pool Increments (kWh)	Ex Ante Imbalance Pool Volume (kWh)	Weighted Avg Variable Cost of Marginal Stations (Rs/kWh)	Ex-Ante Imbalance Pool Value (Rs)	Ex-Ante Imbalance Pool Price (Rs/kWh)
MSEDCL	0.00	2,625.79	0.00	0.00	5.37
BEST	0.00		0.00	0.00	
TPC-D	57.08		4.35	248.29	
REL-D	2,568.71		5.39	13,845.36	
Total	2,625.79	-	-	14,093.65	

- This Ex-Ante Imbalance Price only provides a signal at which imbalance settlements amongst the State Pool Participants shall take place at an ex-post basis, if the actual energy injection and energy drawal by various market constituents take place exactly in accordance with the forecasted schedule. Thus, this price is only to provide an economic indication.
- Therefore, in this example, the **Ex-Ante Imbalance Pool Price is Rs 5.37 per kWh**

ANNEXURE – III

Calculation of Ex-Post Imbalance Price

The following example explains the calculation of **Ex-Post Imbalance Price**. Figures used are for illustrative purpose only.

Step 1: Calculation of Discom-wise Ex-Post Imbalance Pool Increments.

- For calculating the Ex-Post Imbalance Pool Increments/Decrements, the Actual Injection of the generators and the Actual Drawal of the State Pool Participants needs to be known.
- The table below shows the Actual Injection by contracted generators for a particular time-period 00:00 to 00:15

	MSPGCL (kWh)	TPC_G (kWh)	REL_G (kWh)	Central Sector Scheduled Injection (kWh)	UI Energy (kWh)	Interstate BPI (kWh)	Intrastate OA (kWh)	Wind & others (kWh)	Total (kWh)
Energy Input to InSTS Grid	300,000	31,000	15,000	117,336.16	43,478.26	40,000	62,000	13,000	621,814.42

- The Loss Adjusted Actual Drawal by the State Pool Participants needs to be found out by taking into account actual losses in the State Transmission system.

Discoms	Total Injection at G<>T Interface (kWh)	Total Drawal at T<>D Interface (kWh)	Losses (kWh)	Loss Apportionment (kWh)	Losses Adjusted Total Drawal at G<>T Interface (kWh)
MSEDCL	621,814.42	424,000.00	86,814.42	68,802.45	492,802.45
BEST		45,000.00		7,302.15	52,302.15
TPC-D		26,000.00		4,219.02	30,219.02
REL-D		40,000.00		6,490.80	46,490.80
Total	-	535,000	-	86,814.42	621,814.42

- The difference between the Energy Injection and the actual loss adjusted drawal gives the value of Imbalance Pool Increments of each of the State Pool Participants

Discoms/UI	Total Injected Energy at G<>T Interface (kWh)	Total Loss Adjusted Actual Drawal at G<>T Interface (kWh)	Ex-Post Imbalance Pool Increments/Decrements (kWh)
MSEDCL	492,923.32	492,802.45	120.87
BEST	29,227.38	52,302.15	(23,074.77)
TPC-D	27,511.24	30,219.02	(2,707.78)
REL-D	28,674.22	46,490.80	(17,816.58)
UI Energy	43,478.26	0.00	43,478.26
Total	621,814.42	621,814.42	0.00

Step 2: Identifying the Marginal Stations of the contributing State Pool Participants

- The Ex-Post Imbalance Pool Volume is the summation of Imbalance Pool Increments of the contributing State Pool Participants corresponding to a particular trading period. In the above example we can see that MSEDCL is the contributing Pool Participant since they are incrementing into the Imbalance Pool.
- The weighted average variable cost of the marginal stations of the contributing State Pool Participants is calculated. The marginal stations are the ones which are supplying (imbalance) energy to the contributing State Pool Participants.
- Ex-Post Imbalance Pool Value is the sum of aggregate of the product of weighted average variable cost of the marginal stations of the contributing State Pool Participants and the Imbalance Pool Increments by the contributing State Pool Participant into the imbalance pool and the Scheduled Energy Cost (UI Energy Cost).

Therefore,

Ex-Post Imbalance Pool Value = (Price of Imbalance Energy Increments into the Pool x Sum of Energy Increments into the Pool) + UI Energy Cost into the Pool

- The table below shows the calculation of weighted average variable cost for MSEDCL for illustration purposes:

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Generators	Variable Cost (Sorted in Descending Order) (Rs/kWh)	Contracted Energy as per Target Despatch Schedule by MSEDCL (kWh)	Imbalance Energy of MSEDCL (kWh)	Weighted Cost (Rs)
Source A	6.20	500.00	120.87	725.22
Source B	5.10	1,000.00	0.00	0.00
Source C	2.30	1,000.00	0.00	0.00
Source D	2.00	10,000.00	0.00	0.00
Source E	1.85	40,000.00	0.00	0.00
Source F	1.80	50,000.00	0.00	0.00
Weighted Average Marginal Price of MSEDCL (Rs/kWh)				6.20

Step 3: Calculating the Ex-Post Imbalance Pool Price

- Ex-Post Imbalance Pool Price is the ratio of Ex-Post Imbalance Pool Value and the Ex-Post Imbalance Pool Volume.
- The table below shows the calculation of Ex-Post Pool Value and Pool Price.

Contributing State Pool Participants	Imbalance Pool Increments (kWh)	Ex Post Imbalance Pool Volume (kWh)	Weighted Avg. Variable Cost of Marginal Stations (Rs/kWh)	Ex-Post Imbalance Pool Value (Rs)	Ex-Post Imbalance Pool Price (Rs/KWh)
MSEDCL	120.87	43,599.13	6.20	748.78	2.47
BEST	0.00		0.00	0.00	
TPC-D	0.00		0.00	0.00	
REL-D	0.00		0.00	0.00	
UI	43,478.26		2.46	107,101.45	
Total	43,599.13	-	-	107,850.23	-

- The value of 2.46 assigned to UI Energy under the column 'Weighted Avg Variable Cost of Marginal Stations' is the Weighted Average Variable Cost of Central Generating Stations contracted by the State Pool Participants who are incrementing into the imbalance pool, which, according to the above table, is MSEDCL.

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- Therefore, in this example, the **Ex-Post Imbalance Pool Price is Rs 2.47 per kWh**

An Illustration of the Imbalance Settlement is shown below

**Energy Balancing and Settlement for Maharashtra
(As per MERC Case 31,42/2006)
Illustration for Ex-Post Imbalance**

All energies in kWh and charges in Rs.

Sr. No.	Particulars	MSEDCL	BEST	TPC-D	REL-D	UI Energy	Pool Volume
1	Total Energy Drawal	424,000	45,000	26,000	40,000		535,000
2	Loss Adusted Energy by InSTS loss	492,802	52,302	30,219	46,491		621,814
3	Contracted Energy Total	492,924	29,227	27,511	28,674	43,478	621,814
4	Pool Imbalance	122	-23,075	-2,708	-17,817	43,478	0.0000
5	Imbalance Rate Rs/kWh	6.20	2.47	2.47	2.47	2.46	-
6	Pool Value Rs	756	-56,995	-6,689	-44,008	106,956	0.0000

1. (-) figures indicate payable to the pool and (+) figures indicate receivable from the pool.

ANNEXURE – IV

Calculation of Annual Fixed Cost Settlement

The following example explains the calculation of **Annual Fixed Cost Settlement**. Numbers used are for illustrative purposes only.

Step 1: Calculate FCR Pool Increments

For each trading period, the shortfall in 'loss adjusted drawal' by a State Pool Participant and the overall generation capacity declared to be available to the State Pool Participant by the generators shall be termed as 'increments' to the Fixed Cost Reconciliation (FCR) Pool and the excess in 'loss adjusted drawal' by a State Pool Participant and the overall generation capacity declared to be available to the State Pool Participant by the generators shall be termed 'decrements' to 'FCR Pool volume'.

- For example, the table below shows the FCR Pool increments/decrements for a particular time period 00:00 to 00:15.

State Pool Participants	Total Entitlement of Entity (kWh)	Total Loss Adjusted Drawal (kWh)	Increments/Decrements to FCR Pool (kWh)
MSEDCL	488,604.65	498,728.33	(10,123.68)
BEST	14,054.97	19,809.30	(5,754.33)
TPC-D	30,712.47	18,644.05	12,068.42
REL-D	36,395.35	30,296.58	6,098.77
Total	569,767.44	567,478.26	2,289.18

The FCR Pool Volume will comprise of the Increments and Decrements over the annual settlement period.

Step 2: Calculate FCR Pool Value and Pool Price

- FCR Pool value will be determined as aggregate of product of 'overall average per unit fixed cost' of the contributing Pool Participant and the FCR Pool increments by the contributing FCR Pool Participant into the FCR Pool.
- The overall average per unit fixed cost is found by dividing the total fixed cost payable by State Pool Participant for the generating stations contracted by the FCR Pool Participant by total energy units injected by the generating station and to be paid for by the FCR Pool Participant during the fiscal year.

The overall average per unit fixed cost will be worked out for each State Pool Participant at the end of the year.

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- For example, if total fixed cost payable annually by TPC-D for all the generating stations contracted by it is Rs 14,97,60,00,000 and if total energy units injected by these generating stations over the year is 13,37,14,28,571 KWh, then

Overall average per unit fixed cost = $14,97,60,00,000 / 13,37,14,28,571$

⇒ Overall average per unit fixed cost = Rs 1.12 per KWh

The FCR Pool Decrements shall be allocated amongst the parties which have incremented to the pool and this shall be called the 'FCR Volume Allocation'.

For eg, FCR Volume Allocation for TPC-D = Total FCR Pool Decrements x (FCR Increments by TPC-D / Total FCR Increments)

The FCR Pool Value shall be the sum of the product of FCR Volume Allocation and the average per unit fixed cost of the Incrementing participants.

Finally, FCR Pool Price will be the ratio between FCR Pool Value and sum of FCR Pool Decrements in order to allocate the FCR Pool Value between the decrementing participants.

State Pool Participants	Increments /Decrements to FCR Pool (kWh)	FCR Volume Allocation	Avg Per Unit Fixed Cost (Rs/kWh)	FCR Pool Value (Rs)	FCR Pool Price (Rs/kWh)	Amount Payable/ Receivable (Rs)
MSEDCL	(10,123.68)	-	-	-	1.11	(11,202.58)
BEST	(5,754.33)	-	-	-		(6,367.58)
TPC-D	12,068.42	10,547.72	1.12	11,813.45		11,813.45
REL-D	6,098.77	5,330.29	1.08	5,756.71		5,756.71
Total	2,289.18			17,570.16		0.00

Step 3: FCR Pool Amount Payable and FCR Pool Amount Receivable

- For each trading period, FCR Pool Amount Payable will be calculated for the FCR Pool Participants who have decremented to the FCR Pool and FCR Pool Amount Receivable will be calculated for the FCR Pool Participants who have incremented to the FCR Pool, and the aggregate of the 'FCR Pool Amount Payable' and 'FCR Pool Amount Receivable' over the period of one fiscal year for each State Pool Participant shall form the basis for 'Net FCR Pool Amount Payable' and 'Net FCR Pool Amount Receivable' by the respective State Pool Participant for that fiscal year.

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An illustration of the FCR settlement is shown below -

FCR Balancing and Settlement for Maharashtra (As per MERC Case 31,42/2006)

Illustration

All energies in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	RInfra-D	BEST	MSEDCL	Pool Volume
A	Total Energy Drawal	75,560	286,482	141,784	2,303,556	2,807,382
B	Loss Adusted Energy					
	<i>by InSTS loss 5.69%</i>	18,644	30,297	19,809	498,728	567,478
	Declared Genaration	30,712	36,395	14,055	488,605	569,767
	FCR Volume	12,068	6,099	-5,754	-10,124	
	FCR Volume Allocation	10,548	5,330			
	FCR Rate	1.12	1.08	1.11	1.11	
	FCR Pool	11,813	5,757	-6,368	-11,203	0.0000

ANNEXURE – V

Calculation of Allocation of Regional UI Charges amongst State Pool Participants

The following section explains the **Allocation of Regional UI charges amongst State Pool Participants**. Numbers used are for illustrative purposes only.

The terms Gross UI, Net UI-I and Net UI-II will have the following meanings:

Gross UI = Actual (state drawal) – Schedule (state drawal)

Net UI = Gross UI – Scheduled Energy

Net UI-I = Actual (discom drawal) – Schedule (discom drawal)

Net UI-II = Actual (SGS injection) – Schedule (SGS injection)

Therefore,

Gross UI +ve: Overdrawal

Gross UI –ve: Underdrawal

Net UI-I +ve: Overdrawal

Net UI-I –ve: Underdrawal

Net UI-II +ve: Oversupply

Net UI-II –ve: Undersupply

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The total possible scenarios are outlined as below:

Scenario No.	Gross UI	Net UI	Net UI-I	Net UI-II
1	+	+	+	+
2	+	+	+	-
3	+	+	-	+
4	+	+	-	-
5	+	-	+	+
6	+	-	+	-
7	+	-	-	+
8	+	-	-	-
9	-	+	+	+
10	-	+	+	-
11	-	+	-	+
12	-	+	-	-
13	-	-	+	+
14	-	-	+	-
15	-	-	-	+
16	-	-	-	-

When Gross UI Cost is positive it means the state has a liability to pay UI charges and when Gross UI Cost is negative it means the state is to receive UI incentives.

The settlements of all the above 16 scenarios have been covered in the following pages, with detailed **step-by-step calculations** shown for **Scenario 2**.

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Scenario 1

Gross UI	Net UI	Net UI-I	Net UI-II
+	+	+	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	560,254		636,236
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adjusted SDrawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
						<small>CS WASMC</small>	
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	5,500	360,000		406,000
8	CS UI Charges	Gross UI 220,000	Pool UI 90,322			Net UI charges 129,678	
9	Net UI - I Allocation	3,078 (5,091)	3,069 (5,077)	-958 -	72,243 (119,509)		Discom UI
	Net UI - II Allocation	288 0	815 0	500 0	10,000 0		InSGS UI
	Net UI Charges	-5,091	-5,077	0	-119,509		
	Pool Charges	-11,357	-20,315	-2,795	-185,533	220,000	0
	<small>2.46 CS WASMC - Assumed</small>				<small>UI Freq Rate</small>	<small>6.00</small>	

Comments:

- All the SPPs have decremented the imbalance pool and hence the ex-post imbalance price is equal to the Central Sector WASMC which is Rs 2.46
- Net UI-II is not applicable in this scenario since the state has a positive UI liability whereas the in-state generators have over generated.
- Net UI-I is allocated between the SPPs which have overdrawn compared to their schedules.

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Scenario 2

Gross UI	Net UI	Net UI-I	Net UI-II
+	+	+	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	560,254		636,236
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adusted S/Drawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	4,500	340,000		385,000
8	CS UI Charges	Gross UI 220,000	Pool UI 90,322			Net UI charges 129,678	
9	Net UI - I Allocation	3,078 (4,490)	3,069 (4,477)	-958 -	72,243 (105,392)	114360	Discom UI
	Net UI - II Allocation	288 0	815 0	-500 -729	-10,000 -14,589	15318	InSGS UI
	Net UI Charges	-4,490	-4,477	-729	-119,981		-129,678
	Pool Charges	-10,755	-19,716	-3,525	-186,005	220,000	0

UI Freq Rate 6.00

Comments:

- Compared to Scenario 1, in this scenario the in-state generators have under generated and hence Net UI-II will be applicable and this charge gets distributed between the SPPs whose contracted in-state generation has been less than the scheduled generation.

CALCULATIONS

Step 1: Calculation of Net UI Cost

- The Gross UI charges for a particular 15 minute trading period will be known from the weekly statement of regional UI charges as prepared by WRLDC/WRPC

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- Let us assume that for the trading period 00:00 - 00:15 , the UI Rate was Rs 6.00 per Kwh.
- The Gross UI Cost for this period = Rs 220,000
Gross UI Cost = UI Rate x UI Energy,
 - UI Energy = 220,000 / 6.00
 - UI Energy = 36,666.67 kWh**
- Scheduled Energy Cost = Scheduled Energy Rate x UI Energy, where

Scheduled Energy Rate is the Weighted Average Variable Price (WAVP) of CGS Stations allocated to the Discoms incrementing to the Imbalance Pool

For the trading period 00:00 to 00:15, the table below shows the total energy injected and the total energy draws by the 4 Discoms:

Discoms	Total Injected Energy at G<>T Interface (KWh)	Total Loss Adjusted Actual Drawal at G<>T Interface (KWh)	Ex-Post Imbalance Pool Increments/Decrements (Kwh)
MSEDCL	605,694	632,496	(26,803)
BEST	9,407	10,542	(1,135)
TPC-D	31,190	33,733	(2,543)
REL-D	30,710	36,896	(6,186)

Since none of the SPPs are incrementing to the Imbalance Pool, the Scheduled Energy Rate will be the Weighted Average Variable Price (WAVP) of CGS Stations, which is assumed to be **2.463 Rs/kWh** for illustration purposes.

Scheduled Energy Cost = Scheduled Energy Rate x UI Energy

- Scheduled Energy Cost = 2.463 x 36,666.67 = Rs 90,322

Therefore, Net UI Cost = Gross UI Cost – Scheduled Energy Cost

- Net UI Cost = 220,000 – 90,322
- Net UI Cost = Rs 129,678**

The Net UI Cost is allocated between the Discoms in this Part, whereas the Scheduled Energy Cost is allocated between the Discoms during the computation of Ex-Post Imbalance Price.

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Step 2: Calculate Aggregate Deviation of all State Generating Stations contracted by the individual SPPs

SGS	Target Despatch Schedule of SGS at G<>T Interface (kWh)	Actual Injection by SGS at G<>T Interface (kWh)	Deviation (kWh)
MSEDCL	350,000	340,000	(10,000)
BEST	5,000	4,500	(500)
TPC-D	21,712	22,000	288
REL-D	17,685	18,500	815
Aggregate Deviation of SGS			(10,500)

Step 3: Calculate Aggregate Deviation of all Discoms

Discoms	Loss Adjusted Target Drawal Schedule at G<>T Interface (kWh)	Losses Adjusted Actual Total Drawal at G<>T Interface (kWh)	Deviation KWh)
MSEDCL	560,254	632,496	72,243
BEST	11,500	10,542	(958)
TPC-D	30,655	33,733	3,078
REL-D	33,827	36,896	3,069
Aggregate Deviation			78,390

Step 4: Calculate Discom share and SGS share out of Total Deviation

	Deviation (kWh)	Total Deviation (kWh)	% Share
SGS	10,500	88,890	11.812
Discoms	78,390		88.188

Step 5: Calculate Net UI due to in-state generators (**Net UI charges-2**) and apportion it between the Discoms

- Net UI charges-2 is to be calculated only when the SGS deviations are in tandem with overall UI implications for the State. In this case the State has to pay the UI charges and the State Generators have undersupplied. Thus, Net UI charges-2 will be applicable in this case.
- Net UI Due to SGS = SGS % share in deviation x Net UI Cost
 - Net UI Due to SGS = 11.812 % x Rs 129,678
 - **Net UI Due to SGS = Rs 15,318**
- This charge is distributed only between the Discoms whose contracted generators have the same deviation sign (positive or negative) as the Gross UI Cost. The allocation is done on the basis of ratios of drawal by the applicable Discoms. In this case, since the generators contracted by BEST and MSEDCL have under-generated, Net UI Charges-2 is allocated amongst them.

Discoms	Losses Adjusted Actual Total Drawal at G<>T Interface (kWh)	Ratio of Drawals (%)	Net UI Due to SGS (Net UI charges-2) (Rs)	Allocation of Net UI charges-2 (Rs)
MSEDCL	632,496	98.361	15,318	14,589
BEST	10,542	1.639		729
Total	643,038	100.00	-	15,318

Step 6: Calculate Net UI due to Discoms (**Net UI charges-1**) and apportion it between the Discoms

- Net UI due to Discoms = Discom % share in deviation x Net UI Cost
 - Net UI Due to Discoms = 88.188% x Rs 129,678
 - **Net UI Due to Discoms = Rs 114,360**
- This charge is distributed only among the Discoms which have the same deviation sign (positive or negative) as the Gross UI Cost.
- For the applicable Discoms, the percentage deviation needs to be calculated.
Percentage Deviation of Discom = Deviation of Discom / Total Deviation of Discoms for which UI is applicable.
- Net UI Due to Discoms through any Discom = Net UI Due to Discoms x Percentage Deviation of that Discom

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Discoms	Deviation From Drawal Schedule (kWh)	Total Deviation of Applicable Discoms (kWh)	Percentage Deviation (%)	Net UI Due to Discoms (Net UI charges-1) (Rs)	Allocation of Net UI charges-1 (Rs)
MSEDCL	72,243	78,390	92.158	114,360	105,392
BEST	(958)		-		-
TPC-D	3,078		3.927		4,490
REL-D	3,069		3.915		4,477
Total	78,390	-	100.00	-	114,360

Thus, the final Net UI Cost Allocation Table will be:

Particulars (in Rs)	MSEDCL	BEST	TPC-D	REL-D
Net UI Cost Due to Discom (Net UI Charges -1)	105,392	-	4,490	4,477
Net UI Cost Due to SGS (Net UI Charges - 2)	14,589	729	-	-
Total Net UI Cost Payable For Each Discom	119,981	729	4,490	4,477

Scenario 3

Gross UI	Net UI	Net UI-I	Net UI-II
+	+	-	+

This scenario is not possible since it is not possible to have the SPPs under-drawing and the state generators under-generating at the same time while the state gets a UI cost penalty.

Scenario 4

Gross UI	Net UI	Net UI-I	Net UI-II
+	+	-	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	34,655	37,827	11,500	660,254		744,236
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adjusted Sr Drawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	20,712	17,685	5,000	350,000		393,397
7	In-state Actual Injection	21,000	18,500	4,500	340,000		384,000
8	CS UI Charges	Gross UI 220,000	Pool UI 90,322			Net UI charges 129,678	
9	Net UI - I Allocation	-922	-931	-958	-27,757	0	Discom UI
	Net UI - II Allocation	288	815	-500	-10,000	129,678	InSGS UI
	Net UI Charges	0	0	-6,175	-123,503	-129,678	
	Pool Charges	-6,265	-15,238	-8,970	-189,526	220,000	0

UI Freq Rate 6.00

Comments:

- In this scenario, all the SPPs have decremented the imbalance pool but on the other hand they have all under-drawn compared to their scheduled drawals. In such a case, they are paying to the imbalance pool at a rate equal to the Central Sector WASC but Net UI-I is not being allotted to any of them since they have all under-drawn compared to the scheduled drawals.

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Scenario 4(1)

Gross UI	Net UI	Net UI-I	Net UI-II
+	+	-	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	34,655	37,827	11,500	660,254		744,236
1	Actual Energy Drawl	32,000	35,000	8,000	600,000		675,000
	Loss Adjusted S:Drawl	33,833	37,005	8,458	634,370		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,643	-6,295	949	-28,677	36,667	0
4	Imbalance Rate Rs/kWh	2.55	2.55	6.00	2.55	2.46	-
5	Pool Value Rs Lacs	-6,747	-16,069	5,692	-73,198	90,322	0
6	In-state Scheduled Gen.	20,712	17,685	5,000	350,000		393,397
7	In-state Actual Injection	21,000	18,500	4,500	340,000		384,000
8	CS UI	Gross UI	Pool UI			Net UI charges	
	Charges	220,000	90,322			129,678	
9	Net UI - I	-822	-822	-3,042	-25,883		Discom UI
	Allocation	-	-	-	-	0	
	Net UI - II	288	815	-500	-10,000		InSGS UI
	Allocation	0	0	-6,175	-123,503	129678	
	Net UI Charges	0	0	-6,175	-123,503		-129,678
	Pool Charges	-6,747	-16,069	-483	-196,700	220,000	0

UI Freq Rate 6.00

Comments:

- In this scenario BEST has incremented the pool by a small amount of 949 kWh and because the marginal price of its generating stations is 6.00 Rs/kWh, the ex-post imbalance price to be paid by the decrementing SPPs turns out to be slightly higher than the Central Sector WASC of 2.46 Rs/kWh

Scenario 5

Gross UI	Net UI	Net UI-I	Net UI-II
+	-	+	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	560,254		636,236
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adjusted Sr Drawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	5,500	360,000		406,000
8	CS UI Charges	Gross UI 36,667	Pool UI 90,322			Net UI charges -53,656	
9	Net UI - I Allocation	3,078 2,107	3,069 2,101	-958	72,243 49,448	-53,656	Discom UI
	Net UI - II Allocation	288 -	815 -	500 -	10,000 -	0	InSGS UI
	Net UI Charges	2,107	2,101	0	49,448		
	Pool Charges	-4,158	-13,138	-2,795	-16,575	36,667	0

UI Freq Rate 1.00

Comments:

- In this case, the UI Freq rate is lower than the Central Sector WASC, which leads to a negative Net UI Cost even though the Gross UI Cost is positive.
- The decrementing parties to the imbalance pool are now paying at a higher rate of 2.46 Rs/kWh while the actual UI Freq Rate at that time was 1.00 Rs/kWh. This extra amount in the pool is paid back to the SPPs through Net UI-I.
- The SPPs which have over-drawn as compared to their schedules have been given the Net UI-I benefit. On the other hand, BEST, which has under-drawn compared to its scheduled drawal has not been given this benefit. The end result is that the SPPs which have paid a higher amount due to a larger quantum level of decrements to the pool have now got their net payments lessened by a small amount.

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Scenario 6

Gross UI	Net UI	Net UI-I	Net UI-II
+	-	+	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	560,254		636,236
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adusted SiDrawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	5,500	340,000		386,000
8	CS UI Charges	Gross UI 73,333	Pool UI 90,322			Net UI charges -16,989	
9	Net UI - I Allocation	3,078 592	3,069 590	-958	72,243 13,885	-15,067	Discom UI
	Net UI - II Allocation	288	815	500	-10,000 1,922	-1,922	InSGS UI
	Net UI Charges	592	590	0	15,807		
	Pool Charges	-5,674	-14,648	-2,795	-50,216	73,333	0

UI Freq Rate 2.00

Comments:

- In this scenario again, extra payment made to the pool by the decrementing parties is distributed through the Net UI allocation mechanism. Apart from the Net UI-I allocation, the SPP whose contracted in-state generation has under-generated compared to the schedules is also given the UI benefit since the frequency rate was already low. Thus credit has not been given for over-generation in this case.

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Scenario 7

Gross UI	Net UI	Net UI-I	Net UI-II
+	-	-	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	650,000		725,982
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adjusted S/Drawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	5,500	360,000		406,000
8	CS UI	Gross UI	Pool UI			Net UI charges	
	Charges	73,333	90,322			-16,989	
9	Net UI - I Allocation	3,078	3,069	-958	-17,504		Discom UI
		8,507	8,482			-16,989	
	Net UI - II Allocation	288	815	500	10,000		InSGS UI
	Net UI Charges	8,507	8,482	0	0		
	Pool Charges	2,241	-6,756	-2,795	-66,024	73,333	0

UI Freq Rate 2.00

Comments:

- Similar to the earlier scenario, credit has not been given for over-generation when the grid frequency is already good.

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Scenario 8

Gross UI	Net UI	Net UI-I	Net UI-II
+	-	-	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	30,655	33,827	11,500	650,000		725,982
1	Actual Energy Drawl	32,000	35,000	10,000	600,000		677,000
	Loss Adjusted S Drawl	33,733	36,896	10,542	632,496		713,667
2	Actual Injection	31,190	30,710	9,407	605,694	36,667	713,667
3	Pool Imbalance	-2,543	-6,186	-1,135	-26,803	36,667	0
4	Imbalance Rate Rs/kWh	2.46	2.46	2.46	2.46	2.46	-
5	Pool Value Rs Lacs	-6,265	-15,238	-2,795	-66,024	90,322	0
6	In-state Scheduled Gen.	21,712	17,685	5,000	350,000		394,397
7	In-state Actual Injection	22,000	18,500	5,500	340,000		386,000
8	CS UI Charges	73,333	90,322			Net UI charges -16,989	
9	Net UI - I Allocation	3,078 3,238	3,069 3,229	-958	-17,504	-6,467	Discom UI
	Net UI - II Allocation	288	815	500	-10,000 10,522	-10,522	InSGS UI
	Net UI Charges	3,238	3,229	0	10,522		
	Pool Charges	-3,027	-12,009	-2,795	-55,502	73,333	0

UI Freq Rate 2.00

Comments:

- Similar to the previous 2 scenarios.

Scenario 9

Gross UI	Net UI	Net UI-I	Net UI-II
-	+	+	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	26,000	8,500	600,000		666,155
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adusted Sr Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	8.19	8.19	2.46	-
5	Pool Value Rs Lacs	4,501	15,690	-205	-17,527	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	350,000		396,000
8	CS UI Charges	Gross UI -1,000	Pool UI -2,460			Net UI charges 1,460	
9	Net UI - I Allocation	-216 (21)	2,296	932 -	7,833	21	Discom UI
	Net UI - II Allocation	2,288 -225	815 -80	1,500 -148	10,000 -985	1439	InSGS UI
	Net UI Charges	-247	-80	-148	-985	1,460	
	Pool Charges	4,254	15,610	-353	-18,512	-1,000	0

UI Freq Rate 1.00

Comments:

- In this scenario, since the cost being associated with the UI Energy in the imbalance pool workings is higher than the actual UI Freq Rate of that period, the decremting parties are paying a lower price to the imbalance pool (if the cost associated with the -1000 units of UI Energy was taken as 1.00 Rs/kWh, the ex-post imbalance price to be paid by the decremting parties would be greater than the current 8.19 Rs/kWh).
- This deficit in the imbalance pool is being recovered through Net UI-I and Net UI-II.
- For Net UI-I, TPC-D is allocated the NET UI-I cost since it is the only SPP which has under-drawn. It appears that TPC-D has to pay a penalty in spite of having under-drawn but it could also be said that the costlier power of TPC-D was not utilized fully by it at a time when the frequency was good.
- For Net UI-II, the cost is paid by all the SPPs whose contracted in-state generators have over generated compared to the schedules since the frequency was good at the time.

Final Balancing & Settlement Code

Scenario 10

Gross UI	Net UI	Net UI-I	Net UI-II
-	+	+	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	26,000	8,500	600,000		666,155
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adjusted S Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	8.19	8.19	2.46	-
5	Pool Value Rs Lacs	4,501	15,690	-205	-17,527	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	330,000		376,000
8	CS UI Charges	Gross UI -1,000	Pool UI -2,460			Net UI charges 1,460	
9	Net UI - I Allocation	-216 (1,460)	2,296	932 -	7,833	1460	Discom UI
	Net UI - II Allocation	2,288 0	815 0	1,500 0	-10,000 0	0	InSGS UI
	Net UI Charges	-1,460	0	0	0	1,460	
	Pool Charges	3,041	15,690	-205	-17,527	-1,000	0

UI Freq Rate 1.00

Comments:

- This is similar to the previous scenario with the exception that the overall in-state generator deviation has been negative. This has resulted in no allocation of Net UI-II and the entire Net UI charge is being allocated through Net UI-I to the SPP which has under-drawn compared to its schedule.

Final Balancing & Settlement Code

Scenario 11

Gross UI	Net UI	Net UI-I	Net UI-II
-	+	-	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	28,000	9,000	610,000		678,655
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adusted StDrawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	<i>Imbalance Rate Rs/kWh</i>	6.00	6.50	8.19	8.19	2.46	-
5	<i>Pool Value Rs Lacs</i>	4,501	15,690	-205	-17,527	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	350,000		396,000
8	CS UI Charges	Gross UI -1,000	Pool UI -2,460			Net UI charges 1,460	
9	Net UI - I Allocation	-216 (19)	296	432 -	-2,167 (186)	205	Discom UI
	Net UI - II Allocation	2,288 -197	815 -70	1,500 -129	10,000 -860	1255	InSGS UI
	Net UI Charges	-215	-70	-129	-1,046	1,460	
	Pool Charges	4,286	15,620	-334	-18,572	-1,000	0

UI Freq Rate 1.00

Comments:

- Similar to Scenario 9

Final Balancing & Settlement Code

Scenario 12

Gross UI	Net UI	Net UI-I	Net UI-II
-	+	-	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	28,000	9,000	610,000		678,655
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adjusted Sr Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	8.19	8.19	2.46	-
5	Pool Value Rs Lacs	4,501	15,690	-205	-17,527	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	330,000		376,000
8	CS UI Charges	Gross UI -1,000	Pool UI -2,460			Net UI charges 1,460	
9	Net UI - I Allocation	-216 (132)	296	432 -	-2,167 (1,328)	1460	Discom UI
	Net UI - II Allocation	2,288 0	815 0	1,500 0	-10,000 0	0	InSGS UI
	Net UI Charges	-132	0	0	-1,328	1,460	
	Pool Charges	4,369	15,690	-205	-18,854	-1,000	0

UI Freq Rate 1.00

Comments:

- Similar to Scenario 10

Final Balancing & Settlement Code

Scenario 13

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	+	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	31,655	26,000	8,500	600,000		666,155
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adjusted S Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	8.19	8.19	2.46	-
5	Pool Value Rs Lacs	4,501	15,690	-205	-17,527	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	350,000		396,000
8	CS UI	Gross UI	Pool UI			Net UI charges	
	Charges	-6,500	-2,460			-4,040	
9	Net UI - I	-216	2,296	932	7,833		Discom UI
	Allocation	59		-		-59	
	Net UI - II	2,288	815	1,500	10,000		InSGS UI
	Allocation	624	222	409	2,726	-3981	
	Net UI Charges	682	222	409	2,726	-4,040	
	Pool Charges	5,183	15,913	204	-14,800	-6,500	0

UI Freq Rate 6.50

Comments:

- In this scenario, the UI benefit of -1000 kWh has been assigned the Central Sector WASMC of 2.46 Rs/kWh and the decrementing parties have to pay at an imbalance rate of 8.19 Rs/kWh to the pool.

Final Balancing & Settlement Code

Scenario 13 (1)

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	+	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	31,655	26,000	8,500	600,000		666,155
1	Actual Energy Drawl	30,000	29,000	9,000	578,000		646,000
	Loss Adjusted S Drawl	31,440	30,392	9,432	605,737		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	318	-25	-43	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	60.33	60.33	2.46	-
5	Pool Value Rs Lacs	4,501	2,066	-1,507	-2,600	-2,460	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	350,000		396,000
8	CS UI	Gross UI	Pool UI			Net UI charges	
	Charges	-6,500	-2,460			-4,040	
9	Net UI - I	-216	4,392	932	5,737		Discom UI
	Allocation	59				-59	
	Net UI - II	2,288	815	1,500	10,000		InSGS UI
	Allocation	624	222	409	2,726	-3981	
	Net UI Charges	682	222	409	2,726	-4,040	
	Pool Charges	5,183	2,289	-1,099	126	-6,500	0

UI Freq Rate 6.50

Comments:

- Everything else in the previous Scenario being kept constant, if the decrement value of BEST and MSEDCL are reduced to very small values, the imbalance price rises to very high values.

Final Balancing & Settlement Code

Scenario 13 (2)

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	+	+

Illustration for Settlement

Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS_UI	Pool Volume
	Scheduled Drawal	31,655	26,000	8,500	600,000		666,155
1	Actual Energy Drawl	30,000	29,000	9,000	578,000		646,000
	Loss Adjusted S:Drawl	31,440	30,392	9,432	605,737		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	318	-25	-43	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	6.15	6.15	6.15	-
5	Pool Value Rs Lacs	4,501	2,066	-154	-265	-6,149	0
6	In-state Scheduled Gen.	18,712	17,685	5,000	340,000		381,397
7	In-state Actual Injection	21,000	18,500	6,500	350,000		396,000
8	CS UI	Gross UI	Pool UI			Net UI charges	
	Charges	-6,500	-6,149			-351	
9	Net UI - I Allocation	-216 (5)	4,392	932	5,737		Discom UI
	Net UI - II Allocation	2,288 54	815 19	1,500 36	10,000 237	-5 -346	InSGS UI
	Net UI Charges	49	19	36	237	-341	
	Pool Charges	4,550	2,086	-118	-28	-6,490	0

UI Freq Rate 6.50

Comments:

- This is similar to Scenario 13 (1), with the exception that the UI Energy has been assigned the imbalance price. The purpose of showing this Scenario is to suggest that when the Gross UI Cost is negative, the Scheduled Energy rate for UI should be taken as the imbalance price. A rationale behind this would be that it is the excess energy of the state which is being sold outside, and the cost of this energy should be calculated at the state marginal price.

Scenario 14

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	+	-

This scenario is not possible

Final Balancing & Settlement Code

Scenario 15

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	-	+

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	29,827	8,500	610,000		679,982
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adjusted S Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	6.38	6.38	6.38	-
5	Pool Value Rs Lacs	4,501	15,690	-159	-13,650	-6,381	0
6	In-state Scheduled Gen.	20,712	17,685	5,000	350,000		393,397
7	In-state Actual Injection	21,000	18,500	4,500	350,000		394,000
8	CS UI Charges	Gross UI -6,500	Pool UI -6,381			Net UI charges -119	
9	Net UI - I Allocation	-216 5	-1,531 36	932 -	-2,167 51		Discom UI -92
	Net UI - II Allocation	288 7	815 19	-500	0		InSGS UI -26
	Net UI Charges	12	55	0	51		-119
	Pool Charges	4,513	15,746	-159	-13,599	-6,500	0

UI Freq Rate 6.50

Comments:

- In this scenario, Net UI-II is allocated since the overall in-state generation has been more than scheduled. The Net UI-I benefit has been passed on to the SPPs which have under-drawn compared to their schedules.

Final Balancing & Settlement Code

Scenario 16

Gross UI	Net UI	Net UI-I	Net UI-II
-	-	-	-

Illustration for Settlement

Central Energy Pool: Constituentwise Energy Drawl, Generation Allocations and Pool Charges:

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	REL-D	BEST	MSEDCL	CS UI	Pool Volume
	Scheduled Drawal	31,655	29,827	8,500	625,000		694,982
1	Actual Energy Drawl	30,000	27,000	9,000	580,000		646,000
	Loss Adjusted S:Drawl	31,440	28,296	9,432	607,833		677,000
2	Actual Injection	32,190	30,710	9,407	605,694	-1,000	677,000
3	Pool Imbalance	750	2,414	-25	-2,139	-1,000	0
4	Imbalance Rate Rs/kWh	6.00	6.50	6.38	6.38	6.38	-
5	Pool Value Rs Lacs	4,501	15,690	-159	-13,650	-6,381	0
6	In-state Scheduled Gen.	20,712	17,685	5,000	350,000		393,397
7	In-state Actual Injection	21,000	18,500	4,500	340,000		384,000
8	CS UI Charges	Gross UI -6,500	Pool UI -6,381			Net UI charges -119	
9	Net UI - I Allocation	-216 1	-1,531 10	932 -	-17,167 108		Discom UI
	Net UI - II Allocation	288 0	815 0	-500	-10,000		InSGS UI
	Net UI Charges	1	10	0	108	-119	
	Pool Charges	4,502	15,700	-159	-13,543	-6,500	0

UI Freq Rate 6.50

Comments:

- In this scenario, Net UI-II is not allotted to any of the SPPs since the overall in-state generation has been less than scheduled and the State has received UI benefits. The Net UI Charge has been allocated through Net UI-I to the SPPs which have under-drawn compared to their schedules.