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CIRCULAR

PROVIDING FOR OPERATION OF COMPETITIVE ELECTRICITY GENERATION MARKET

Pursuant to Decree No. 95/2012 / ND-CP dated 12 November, 2012 of the Government defining functions, tasks, powers and organizational structure of the Ministry of Industry and Trade;

Pursuant to the Electricity Law dated 3 December 2004; the Law amending and supplementing a number of articles of the Electricity Law dated 20 November, 2012;

Pursuant to Decision No. 63/2013/QĐ-TTg dated 08 November 2013 of the Prime Minister providing for the roadmap, conditions and structure of electricity industry to form and develop levels of electricity market in Vietnam;

At the request of the Director of Electricity Regulatory Authority of Vietnam;

The Ministry of Industry and Trade issues the Circular providing for the operation of competitive electricity generation market.

Chapter I

GENERAL PROVISIONS

Article 1. Scope of regulation

This Circular provides for the operation of competitive electricity generation market (hereafter referred to as electricity market) and the responsibilities of Units participating in electricity market.

Article 2. Subjects of application

This Circular applies to the following Units participating in electricity market:

1. Single wholesaling Units .
2. Electricity generating Units
3. Electricity system and market operating Unit
4. Electricity transmitting Units.
5. Power metering data managing Units.

6. Vietnam Electricity

Article 3. Interpretation of terms

In this Circular, the terms below are construed as follows:

1. Price quotation is the quotation of power sale in the electricity market of each generating set. This quotation is submitted by the price offering Units to the electricity system and market operating Unit under the form of price quotation specified in this Circular.
2. Scheduling price quotation is the one accepted by the electricity system and market operating Unit for next hour and day scheduling.
3. Payment list is the calculation table of payments to the power plant directly participating in the electricity market. This list is made by the electricity system and market operating Unit for each transaction day and for each payment cycle.
4. Intervention in the electricity market is the act to change the normal operational mode of the electricity market which the electricity system and market operating Unit must apply to deal with circumstances specified in Clause 1, Article 59 of this Circular.
5. Transaction cycle is the period of one hour from the first minute of each hour.
6. Payment cycle is the one to prepare invoices and vouchers for transactions in the electricity marketing the period of one month, from the 1st date of each month.
7. Announced capacity is the available highest capacity of the generating set announced as per the schedule of electricity market by the price offering Units or the electricity system and market operating Unit and the electricity generating Units signing the auxiliary services announced as per the electricity market operation schedule.
8. Dispatched capacity is the one of the generating set actually mobilized by the electricity system and market operating Unit in the transaction cycle.
9. Mobilized capacity for next hour is the capacity of the generating set planned for mobilization for the first hour in the mobilization schedule for next hour.
10. Mobilized capacity for next hour is the capacity of the generating set planned for mobilization for the first hour in the mobilization schedule for next hour as per the constrained scheduling result.
11. Increasingly generated capacity is the difference of capacity between the dispatching capacity and the capacity arranged in the market price calculation schedule of the generating set.
12. Paid capacity is the capacity of generating set included in the hourly capacity schedule and is paid the market capacity price.
13. Auxiliary services mean the frequency adjustment, rotation standby, quick start standby, cold standby, operation to be generated due to constrained security of electricity system, voltage adjustment and black start

14. Increasingly generated power is the power generated by the generating set thanks to mobilization corresponding to the increasingly generated capacity.

15. Price offering Units mean the ones directly submitting the price quotation in the electricity market, including the electricity generating Units or power plants that register direct price offer and representative Units of price offer for group of ladder hydropower plants.

16. Single wholesaling Unit is the single electricity buying Units in the electricity market, having function to buy all power through the electricity market and under electricity sale contract.

17. Electricity generating Unit is the Units owning one or many power plants participating in the electricity market and signing the electricity sale contract for such power plants with the single wholesaling Units .

18. Electricity generating Units indirectly doing transaction are the electricity generating Units having power plant but not entitled to direct price offer in the electricity market.

19. Electricity generating Units directly doing transaction are the electricity generating Units having power plant entitled to direct price offer in the electricity market.

20. Power metering data managing Unit is the one providing, installing, managing the operation of system collecting, processing and storing the power metering data and network of communication line in service of electricity market.

21. Electricity transmitting Unit is the electricity Units licensed for electricity activities in the field of electricity transmission, responsible for managing and operating the national transmission grid.

22. Electricity system and market operating Unit is the Unit directing and controlling the process of electricity generation, transmission and distribution in the national electricity system and operating the transaction of electricity market.

23. Market capacity price is the price for one Units of active capacity determined for each transaction cycle to be applied for calculating the payment of capacity to the electricity generating Units in the electricity market.

24. Price floor of quotation is the lowest price which the price offering Units is entitled to offer for one generating set in the price quotation for next day.

25. Market power price is the price for one Units of power determined for each transaction cycle to be applied for calculating the payment of power to the electricity generating Units in the electricity market.

26. Full electricity market price is the total electricity market price and market capacity price of each transaction cycle.

27. Price ceiling of quotation is the highest price which the price offering Units is entitled to offer for one generating set in the price quotation for next day.

28. Electricity market price ceiling is the highest market power price determined for each year.

29. Water value is the marginal price to expect the calculation for the water amount reserved in reservoirs when used to generate power in lieu of electrothermal in the future as converted to a power Units.

30. Performance degradation coefficient is the performance degradation index of the generating set as per operational time.
31. Monthly or annual average load factor is the is the ratio between the total power generated in 01 year or 01 month and the product of the total installed capacity with the total calculation hour of annual or monthly load factor.
32. Information system of electricity market is the system of equipment and database for management and exchange of information on electricity market which the electricity system and market operating Unit manages.
33. Electricity sale contract is the written agreement on electricity sale between the single wholesaling Units and the electricity generating Units or trading of electricity with foreign countries.
34. Electricity sale contract for difference is the electricity sale contract signed between the single wholesaling Units with the electricity generating Units with directly doing transaction under the form issued by the Ministry of Industry and Trade.
35. Constrained scheduling is the collocation of mobilization of generating Units by the least-cost method of electricity purchase taking into account the technical constraint in the electrical system.
36. Unconstrained scheduling is the collocation of mobilization of generating Units by the least-cost method of electricity purchase not taking into account the technical constraint in the electrical system.
37. Capacity schedule is the schedule prepared by the electricity system and market operating Unit after operation to determine the amount of paid capacity in each transaction cycle.
38. Mobilization schedule for next hour is the Estimated schedule of generating sets for electricity generation and supply of auxiliary services to the next transaction cycle and three consecutive cycles set by the electricity system and market operating Unit.
39. Mobilization schedule for next day is the Estimated schedule of generating sets for electricity generation and supply of auxiliary services to the next transaction cycle and three consecutive cycles set by the electricity system and market operating Unit.
40. Market electricity price calculation schedule is the one set by the electricity system and market operating Unit after the current transaction day to determine the market power price for each transaction cycle.
41. Electricity market simulation model is a system of softwares simulating the mobilization of generating sets and calculating the market power price which the electricity system and market operating Unit uses for weekly, monthly and annual operational plan.
42. Water value calculation model is a system of sotwares optimizing the hydrothermal power to calculate the water value which the electricity system and market operating Unit uses for weekly, monthly and annual operational plan.
43. Limited water level is the lowest upstream water level of reservoir at the end of each month in a year or at the end of week in a month which the electricity system and market operating Unit calculates and announces under the Procedures for short and medium-term assessment of electricity system security issued by the Electricity Regulatory Authority on the implementation of Regulation on power transmission system issued by the Ministry of Industry and Trade.

44. Optimal water level is the upstream water level of reservoir at the end of each month or week, ensuring the use of water for the most effective electrical generation and meeting the constrained requirement calculated and announced by the electricity system and market operating Unit.

45. Year N is the current year of electricity market operation by solar calendar.

46. Day D is the current transaction day.

47. Transaction day is the day when there are electricity transaction activities, from 1:00 AM to 12:00 PM everyday.

48. BOT power plant is the plant invested in the form of Build - Operate - Transfer through contracts between investors and the competent state authorities.

9. Best new power plant is the thermal power plant just put into operation with the lowest electrical generation price calculated for the next year and the price of electricity sale contract is agreed based on the price bracket of electrical generation for the standard power plant issued by the Ministry of Industry and Trade. The best power plant is selected annually for use in calculating the market capacity price.

50. Multi-objective strategic hydropower plants are the big power plants playing an important role on economy, society, national defense and security. These power plants are built and operated by the state exclusively.

51. Group of ladder hydropower plants is the set of hydropower plants in which the amount of water discharged from the reservoir of the upper ladder hydropower plants makes up all or most of the amount of water to the reservoir of the lower hydropower plants and there is no reservoir with regulation capability of more than 01 week between these two reservoirs.

52. Scheduling software is the software system which the electricity system and market operating Unit uses for the mobilization scheduling for next day and hour to the generating sets in the electricity market.

53. System load is the total power output of the whole electrical system converted at the terminals of generating sets and the imported power output in a transaction cycle minus the output of power plants with installed capacity less than or equal to 30 MW not participating in the electricity market and the output of ladder hydropower plants in the same river under the ownership of one electricity generating Units with the installed capacity less than or equal to 60 MW (meeting the standard to apply the avoided cost tariff).

54. Metered output is the power of power plant which can be metered at the metering location.

55. Hourly contract output is the power output allocated for each transaction cycle and paid under the electricity sale contract for difference.

56. Yearly contract output is the yearly committed power output in the electricity sale contract for difference.

57. Monthly contract output is the power output allocated from the yearly contract output for each month.

58. Yearly planned output is the power output of power plant Estimated to be mobilized for the next year.

59. Monthly planned output is the power output of power plant Estimated to be mobilized for the months in a year.
60. Heat rate is the amount of lost thermal energy of the generating set or power plant to produce one Units of power.
61. Constrained generation payment is the payment received by the electricity generating Units for the increasingly generated power.
62. Participants of electricity market are Units participating in the transaction activities or providing services in the electricity market specified in Article 2 of this Circular.
63. Month M is the current month of electricity market operation calculated by solar month.
64. Capacity shortage is a situation when the total announced capacity of all electricity generating Units is less than the load demand of forecasting system in a transaction cycle.
65. Confidential information is secret information as stipulated by law or agreed by the parties.
66. Market information is the entire database and information related to the activities of electricity market.
67. End time of price offering is the time after which the electricity generating Units are not permitted to change the price quotation for next day, except for special cases stipulated in this Circular. In the electricity market, the end time of price offering is 11:30 PM of day D-1.
68. Mobilization order is the result of arrangement of capacity range in the price quotation as per the principle of price from low to high taking into account the constraint of electrical system.
69. Excessive capacity is a situation when the total capacity offered at ceiling price of the electricity generating Units directly doing transaction and the capacity Estimated to be mobilized of the power plants owned by electricity generating Units indirectly doing transaction. The electricity system and market operating Unit shall announce it in the transaction cycle greater than the load of forecasting system.
70. Total hours of yearly load factor calculation is the total hours of the entire year N for the generating sets which have been put into commercial operation from year N-1 and earlier or the total hours from the time of commercial operation of the generating set by the end of year for the generating sets put into commercial operation in year N minus the repair time of generating set under the approved plan in year N.
71. Total hours of monthly load factor calculation is the total hours of the entire month M for the generating sets which have been put into commercial operation from year M-1 and earlier or the total hours from the time of commercial operation of the generating set by the end of month for the generating sets put into commercial operation in month M minus the repair time of generating set under the approved plan in month M.
72. Slow-started generating set is a generating set incapable of starting and connected with power grid in a time of less than 30 minutes.
73. Week T is the current week of electricity market operation.

74. Metering location is the location where the power metering system is placed to determine the delivered power output for payment of electricity market between the electricity generating Units and the single wholesaling Units under the provisions in Circular No. 27/2009/TT-BCT dated 27 September 2009 stipulating the power metering in the competitive electricity generation market and under the electricity sale contract between the electricity generating Units and the single wholesaling Units .

Chapter II

REGISTRATION FOR PARTICIPATION IN ELECTRICITY MARKET

Article 4. Responsibility for participation in electricity market

1. The power plant having electricity operation license in the field of electricity generation with the installed capacity of greater than 30 MW connected to the national electrical system, except for power plant specified in Clause 3 of this Article, must participate in the electricity market within 06 months for the hydropower plants and 12 months for thermalpower plant from the day of commercial operation of power plant.

2. The power plants having the installed capacity up to 30 MW connected to the grid with voltage of 110 Kv or higher, except for the power plants specified in Clause 3 of this Article have the right to opt for participation in electricity market. In case of option for participation in electricity market, such power plants must meet the following requirements:

a) Preparing infrastructure under the provisions in Clause 5 of this Article;

b) Completing and submitting dossier of registration of electricity market as stipulated in Clause 2 and 3, Article 5 and Clause 1, Article 6 of this Circular;

c) Complying with the requirements for the electricity generating Units participating in electricity market under the provisions of this Circular and the relevant legal normative documents.

3. The power plants which do not participate in the electricity market include:

a) BOT power plants;

b) Power plants using non-hydroelectric recycling energy;

c) Power plants in the industrial parks only sell a part of output onto the national electricity system without determining their long-term electricity sale plan.

4. Before 01 November of year N-1, the electricity system and market operating Unit must report to the Electricity Regulatory Authority on the list of electricity generating Units directly and indirectly doing transaction and the electricity generating Units not participating in the electricity market under the provisions in Clause 3 of this Article in year N for announcement to the participants of electricity market.

5. The power plants participating in electricity market must invest and complete the equipment system to connect it to the electricity market information system, SCADA/EMS system and the power metering system to meet the operational requirements of electricity market.

6. Where the power plants have met all conditions but not participated in the electricity market as stipulated in Clause 1 of this Article:

a) Before 25th date of each month, such power plants must send report to the Electricity Regulatory Authority and the electricity system and market operating Unit, the single wholesaling Units on investment and completion progress of items to meet the operational requirements of electricity market;

b) The electricity system and market operating Unit must continue to schedule and announce the capacity mobilization chart for the power plant;

c) The power plants have been temporarily paid the whole actual output generated in the payment cycle at the price equal to 90% of that of electricity sale contract signed between the two parties. The difference of electricity payment (10% remaining) is settled in the payment cycle of the first month when the plants directly participate in price offering in the electricity market.

Article 5. Dossier of registration for participation in electricity market

1. Before 02 (two) months from the deadline to participate in the electricity market under the provisions in Clause 1, Article 4 of this Circular, the electricity generating Units must complete their dossiers of registration for participation in electricity market for each power plant.

2. Dossier of registration for participation in electricity market include:

a) Registration for participation in electricity market specifying name, address of the electricity generating Units and the power plant;

b) A copy of electricity operation License in the field of electricity generation.

c) Document of acceptance for putting the system into operation as stipulated in Clause 5, Article 4 of this Circular;

d) Other necessary information as provided for in the Procedures for registration for participation in electricity market issued by the Electricity Regulatory Authority.

3. Number of dossier: 02 (two) sets.

Article 6. Approving dossier of registration for participation in electricity market

1. The electricity generating Units must submit dossier of registration for participation in electricity market for each power plant to the Electricity Regulatory Authority directly or by post.

2. The Electricity Regulatory Authority shall receive dossiers, check their completeness and guide the completion of dossier (if directly submitted) or within 02 working days after receipt of dossier (if receiving dossier by post).

3. Within 02 working days after receipt of complete dossier, the Electricity Regulatory Authority shall send a set of dossier to the electricity system and market operating Unit.

4. Within 05 working days after receipt of dossier of registration for participation in electricity market, the electricity system and market operating Unit shall give feedback in writing to the Electricity Regulatory Authority on the confirmation of capability and moment to participate in the electricity market of the power plant.

5. Within 05 working days after receipt of document from the electricity system and market operating Unit, the Electricity Regulatory Authority shall verify the dossiers:

a) If the dossier is valid, the Electricity Regulatory Authority shall issue a decision on approving the electricity market directly or by post to the electricity generating Units and notify the electricity system and market operating Unit;

b) If the dossier is invalid:

- The Electricity Regulatory Authority shall send the electricity generating Units the document stating the invalidity of dossier and request the electricity generating Units to explain and complete their dossiers;

- Within 05 working days after the electricity generating Units receives the written request, the electricity generating Units shall send the Electricity Regulatory Authority the written explanation and completed dossier;

- Within 03 working days after receiving the written explanation and the completed dossier of the electricity generating Units, the Electricity Regulatory Authority shall verify the dossiers under the provisions in this Clause.

Article 7. Information on participants of electricity market

1. The electricity transmitting Units, the single wholesaling Units and the power metering data managing Units must register the general information on their Units to the electricity system and market operating Unit.

2. The electricity system and market operating Unit shall store the registered information and update changes of registered information of the electricity market participants.

3. The electricity market participants must inform the electricity system and market operating Unit upon changes of registered information.

4. The electricity system and market operating Unit shall announce the registered information of electricity market participants and the changed registered information.

Article 8. Suspending and restoring the right to participate in electricity market of power plant

1. The power plant whose right to participate in electricity market is suspended in the following cases:

a) Failing to completely comply with the provisions specified in Clause 5, Article 4 of this Circular;

b) Having one of the acts of violation as follows:

- Failing to provide information or provide correct information for the operational plan for electricity market and mobilization schedule of generating sets in the electricity system;

- Failing to provide information or provide correct information for the settlement of dispute and handling of violation in the competitive electricity market under regulations of law.

- Making direct or indirect agreement with other Units in limiting or controlling the offering capacity in the market in the order to increase the spot price of market electricity and affect the security of electricity supply;
- Making agreement with other electricity generating Units in price offering for mobilization scheduling;
- Making agreement with the electricity system and market operating Unit in price offering for improper mobilization scheduling;
- Other acts of violation causing serious consequences for ensuring the security of electricity supply or finance to other Units in the electricity market.

2. The Electricity Regulatory Authority has the right to suspend the right to participate in the electricity market of any power plant having acts of violation specified in Clause 1 of this Article. The order and procedures for suspension are specified in Article 113 of this Circular.

3. During the time the power plant whose right to participate in the electricity market is suspended:

a) The electricity generating Units or the power plant must not offer price directly in the electricity market but must comply with other provisions of this Circular;

b) The electricity system and market operating Unit must set up the schedule and announce the capacity mobilization chart for the plants whose right to participate in the electricity market is suspended. Such plants shall be paid all actual output generated in the payment cycle at the price equal to 90% of that of electricity sale contract signed between the two parties. The difference of electricity payment (10% remainder) is settled in the payment cycle of the first month when the plants is restored its right to participate in the electricity market.

4. The suspended plant whose right to participate in the electricity market is restored when meeting the following conditions:

a) When the time limit for suspending the right to participate in the electricity market;

b) Having completed the obligations specified in the decision on suspending the right to participate in the electricity market;

5. When having met the conditions specified in Clause 4 of this Article, the power plant must send document to request the restoration of its right to participate in the electricity market and also send evidencing documents to the electricity system and market operating Unit which shall verify them and report to the Electricity Regulatory Authority on permitting the power plant to participate in the electricity market.

6. Where the time limit for suspending the right to participate in the electricity market is over but the power plant has not met all conditions specified under Point b, Clause 4 of this Article, the electricity system and market operating Unit shall report to the Electricity Regulatory Authority for consideration and handling.

Article 9. Terminating the participation in electricity market

1. The power plant shall terminate its participation in electricity market in the following cases:

a) At the request of the electricity generating Units owning the power plant in the following cases:

- The power plant of the electricity generating Units has fully stopped its operation;
 - The power plant of the electricity generating Units fails to maintain and is unable to restore its installed capacity greater than 30 MW within 01 year.
- b) The electricity operation license in the field of electric generation of the power plant is revoked or expired.
2. In cases specified under Point a, Clause 1 of this Article, the electricity generating Units owning the power plant must submit dossier to request the termination of participation in electricity market to the electricity system and market operating Unit and the Electricity Regulatory Authority for consideration within 30 days before the time of termination of participation in electricity market.
3. The electricity system and market operating Unit must update dossiers and store registration information and announce information on termination of participation in electricity market.
4. Where the power plant commits acts of violation before the time of termination of participation in electricity market, the electricity generating Units owning such power plant must continue the implementation of regulations on verification and handling of violation as stipulated in this Circular.

Chapter III

PRINCIPLES OF ELECTRICITY MARKET OPERATION

Article 10. Limit of offered price

1. The offered price of generating sets in the electricity market is limited from the price floor of quotation to price ceiling of quotation.
2. The price ceiling of quotation of the thermoelectric Units is determined annually and adjusted monthly and calculated based on the following factors:
 - a) Heat rate of generating set;
 - b) Performance degradation coefficient as per the operational time of generating set;
 - c) Price of fuel;
 - d) Coefficient of auxiliary expenses;
 - dd) Price varying under electricity sale contract.
3. Price floor of thermoelectric set is 01 dong/kWh.
4. Limit of offered price of generating sets is specified in Article 10 of this Circular.

Article 11. Water value

1. The water value is used for setting the operational plan for the next year, month and week and is the input data to determine the limit of offered price of the generating set in the electricity market.

2. The electricity system and market operating Unit shall calculate and announce the water value as per the electricity market operation schedule specified in Annex 1 of this Circular.

Article 12. Full market price

The full market price for the transaction cycle is calculated by the sum of 02 (two) components as follows:

1. Price of market power
2. Price of market capacity.

Article 13. Price of market power

1. The price of market power is calculated by the electricity system and market operating Unit after the operational time based on the unconstrained scheduling method.
2. The price of market power must not exceed the market price ceiling which is calculated by the electricity system and market operating Unit and approved by the Electricity Regulatory Authority annually.
3. The determination of price of market power is specified in Article 67 and 69 of this Circular.

Article 14. Price of market capacity

1. The price of market capacity for each transaction cycle is calculated by the electricity system and market operating Unit during the operational planning for next year and there is no change in the applied year.
2. The price of market capacity is calculated on the principle of ensuring that the best new power plant recovers its variable and fixed costs sufficiently.
3. The determination of price of market capacity is specified in Article 25 and 26 of this Circular.

Article 15. Electricity sale contract for difference

1. The electricity generating Units directly doing transaction and the single wholesaling Units are responsible for signing the electricity sale contract for difference under the form issued by the Ministry of Industry and Trade.
2. The yearly contract output is calculated by the electricity system and market operating Unit based on the yearly planned output and the ratio of paid output at the contract price specified in Clause 5 of this Article. The annual planned output is calculated by the electricity system and market operating Unit during the operational planning for next year as stipulated in Clause 2, Article 27 of this Circular.
3. The monthly contract output is determined by the electricity system and market operating Unit during the operational planning for next year based on the allocation of yearly contract output in the months specified in Article 28 of this Circular.
4. The hourly contract output is determined by the electricity system and market operating Unit during the operational planning for next month based on the allocation of monthly contract output at the hours in months specified in Article 37 of this Circular.

5. The Electricity Regulatory Authority shall determine and announce the percentage of paid output at the contract price of the electricity generating Units each year depending on each technology model on the following principles:

a) Ensuring the harmonization of objectives:

- Encouraging the effective competition in the electricity market;

- Stabilizing revenues of the electricity generating Units;

- Stabilizing the average price of electricity generation in accordance with regulation capabilities on setting the electricity retailing quotation.

b) The percentage of power output paid at the contract price is specified separately for different types of hydro and thermal power. This percentage must not higher than 95% and lower than 60%.

Article 16. Principle of payment in electricity market.

1. The electricity generating Units directly doing transaction is paid at the electricity market price and under the electricity sale contract for difference.

2. The payment at market price is applied only to the electricity generating Units directly doing transaction and is calculated based on the following factors:

a) Price of market power;

b) Price of market capacity;

c) Power output and mobilized capacity.

3. The payment for the electricity generating Units directly doing transaction is done as stipulated in Chapter VI of this Circular.

4. The electricity generating Units indirectly doing transaction is paid under the provisions in the electricity sale contract.

Chapter IV

OPERATIONAL PLAN OF ELECTRICITY MARKET

Section 1: OPERATIONAL PLAN FOR NEXT YEAR

Article 17. Operational plan for next year

1. The electricity system and market operating Unit shall make the operational plan for electricity market for next year, including the following contents:

a) Choosing the best new power plant;

b) Calculating the price of market capacity;

- c) Calculating the water value and the optimal water level of reservoirs;
- d) Calculating the limit of price in quotation of the thermoelectric set;
- dd) Determining the plan of market price ceiling;
- e) Taking charge and coordinating with the single wholesaling Units to calculate the planned output, yearly contract output and allocate the annual contract output to the months in a year of the electricity generating Units directly doing transaction.

2. The electricity system and market operating Unit shall use the electricity market simulation model to calculate the contents specified under Points a, b, c, d and dd, Clause 1 of this Article. The input parameters used in the market simulation of the thermoelectric sets are variable cost of the generating set and are specified in Clause 3 of this Article. The hydrological features and specifications of hydropower plants.

3. The variable cost of the thermoelectric set is determined as follows :

- a) Where the value of heat rate is determined, the variable cost of generating set is determined as follows:

$$VC = (1 + f) \times P_{m} \times HR$$

In which:

VC: Variable cost of thermoelectric set (dong/kWh);

f: Coefficient of additional cost is calculated by the percentage of total start cost, fuel-secondary material cost and variable maintenance and operation cost for generation compared with main material cost; *P_m*: Price of main material cost of the thermoelectric set (dong/kCal or dong/BTU);

HR: Heat rate of thermoelectric set (BTU/kWh or kCal/kWh);

- Fuel price (*P_m*) is the Estimated fuel price for year N provided by the single wholesaling Units for the electricity system and market operating Unit.

The fuel price of year N is the fuel price announced by the competent authorities for year N or in the long-term primary fuel sale contract. Where there are both two prices mentioned above, the fuel price announced by the competent authorities for year N is used. Where there is no both two prices mentioned above, the fuel price of year N is calculated by the average of actual fuel price used for payment of the last 12 months before the time of operational planning for year N;

- The heat rate of thermoelectric set (HR) is determined by the heat rate agreed in the contract or in dossier of negotiation of electricity sale contract provided by the single wholesaling Units and adjusted by the coefficient of performance degradation. Where the heat rate in the contract is the average heat rate of life of contract, it is not necessary to adjust it as per the coefficient of performance degradation. If in the contract or in dossier of negotiation of electricity sale contract, there is only a characteristic curve of capacity loss at the load levels, the heat rate of the generating sets is determined at the load level corresponding to the average power output generated in many years of the power plant specified in the electricity sale contract.

Where the thermoelectric set has no data of heat rate in the contract or in dossier of negotiation of electricity sale contract, the heat rate of such power plant is determined by the heat rate of standard power plant of the same group with the technology of electrical generation and installed capacity. The electricity system and market operating Unit calculates the heat rate of standard power plant.

- The coefficient of performance degradation of the thermoelectric set is determined by the heat rate in the contract or in dossier of negotiation of electricity sale contract provided by the single wholesaling Units .

Where the thermal power plant has no data of coefficient of performance degradation in the contract or in dossier of negotiation of electricity sale contract, apply the coefficient of performance degradation of standard power plant of the same group with such power plant which the electricity system and market operating Unit has determined;

- Coefficient of additional cost (f) of the thermoelectric set which the single wholesaling Units has determined and provided for the electricity system and market operating Unit based on the data in the electricity sale contract or dossier of negotiation of electricity sale contract. Where the coefficient of additional cost of the thermoelectric set is not included in the contract or dossier of negotiation of electricity sale contract, the the coefficient of additional cost of such thermoelectric set is determined according to the Regulation on method of setting of price of electrical generation; order and procedures for verifying the electricity sale contract which the Ministry of Industry and Trade has issued;

b) Where there is no data of heat rate in the contract or in dossier of negotiation of electricity sale contract and no standard power plant of the same group, the variable cost of the generating set is determined by the variable price in the contract with update of factors affectin the variable price of year N by the method agreed in the contract.

4. The electricity system and market operating Unit must request the Vietnam Electricity to appraise and the Electricity Regulatory Authority to approve the operational plan for next year as per the electricity market operation schedule specified in Annex 1 of this Circular. The submitted dossier includes the calculation result, input data and calculation explanation.

5. Where the price of coal and gas for electrical generation changes largely compared with the time of approving the operational plan for next year, the Electricity Regulatory Authority shall review and request the electricity system and market operating Unit to update the data and re-calculate the operational plan for the remaining months in the year and submit to the Vietnam Electricity for appraisal and to the Electricity Regulatory Authority for approval.

Article 18. Classification of power plant

1. The power plants in the electricity market is classified as follows:

- a) Multi-objective strategic hydropower plants;
- b) Group of ladder hydropower plants;
- c) Group of hydropower plants having reservoir with regulation capability of more than 01 week;
- d) Group of hydropower plants having reservoir with regulation capability from 02 days to 01 week;
- dd) Group of hydropower plants having reservoir with regulation capability of less than 01 week;

2. Every year, the electricity system and market operating Unit must update the list of hydropower plants specified in Clause 1 of this Article.

3. Based on the proposal of the Vietnam Electricity, the Electricity Regulatory Authority shall make a list of multi-objective strategic hydropower plants for the Ministry of Industry and Trade to submit it to the Prime Minister for approval.

Article 19. Load forecasting for the operational planning for next year

The electricity system and market operating Unit must forecast the load for the operational planning for next year by the method specified in the Regulation on power transmission system issued by the Ministry of Industry and Trade. The data of load forecasting for the planning of operation for next year include:

1. The total demand for load of national electricity system and load of the North, Central and South for the entire year and each month in a year.

2. The load chart of typical days of the North, Central and South and the whole of national electricity system of months in a year.

3. Maximum and minimum capacity of load of national electricity system in each month.

Article 20. Auxiliary services for operational plan for next year

1. The electricity system and market operating Unit must determine the demand for auxiliary services for next year under the provisions in the Regulation on power transmission system issued by the Ministry of Industry and Trade.

2. The electricity system and market operating Unit must choose the power plant to provide the auxiliary services. The power plant chosen shall provide the auxiliary services and be paid as stipulated by the Ministry of Industry and Trade.

Article 21. Classification of generating set with base load for next year, intermediate load and peak load

1. The electricity system and market operating Unit shall classify the generating set with base load, intermediate load and peak load under the provisions in the Procedures for classification of generating set and calculate the price ceiling of quotation of the thermal power plant issued by the Electricity Regulatory Authority.

2. The electricity system and market operating Unit shall use the electricity market simulation model to determine the annual average load factor of generating sets.

3. Based on the annual average load factor from the simulation result, the generating sets are classified into 03 (three) groups as follows:

a) Group of generating set with base load includes the generating set with annual average load factor greater or equal to 60%;

b) Group of generating set with intermediate load includes the generating set with annual average load factor greater than 25% and less than 60%;

c) Group of generating set with peak load includes the generating set with annual average load factor less than or equal to 25%;

Article 22. Determining the limit of offered price of generating set

1. In case of determination of value of heat rate:

a) The price ceiling of quotation of thermoelectric set is determined by the following formula:

$$P_{\text{P}} = (1 + K_{\text{DC}}) \times (1 + f) \times P_{\text{NL}} \times \text{HR}$$

In which:

P_{P} : Price ceiling of quotation of thermoelectric set (dong/kWh);

f : Coefficient of additional cost is calculated by the percentage of total start cost, fuel-secondary material cost and variable maintenance and operation cost for generation compared with main material cost;

K_{DC} : Adjustment coefficient of price ceiling as per the classification result of thermoelectric set. For the thermoelectric set with base load $K_{\text{DC}} = 2\%$; thermoelectric set with intermediate load $K_{\text{DC}} = 5\%$; $K_{\text{DC}} = 5\%$; the thermoelectric set with peak load $K_{\text{DC}} = 20\%$.

P_{NL} : Price of main fuel of thermoelectric set (dong/kCal or dong/BTU);

HR : Heat rate at the average load of thermoelectric set (BTU/kWh or kCal/kWh);

b) The parameters on coefficient of additional cost (f), fuel price (P_{NL}) and heat rate (HR) of the thermoelectric set are determined as stipulated under Point a, Clause 3, Article 17 of this Circular.

2. Where there is no data of heat rate in the contract or dossier of dossier of negotiation of electricity sale contract and there is no standard power plant of the same group :

a) The price ceiling of quotation of thermoelectric set is determined by the following formula:

$$P_{\text{P}} = (1 + K_{\text{DC}}) \times P_{\text{SD}}$$

In which:

P_{P} : Price ceiling of thermoelectric set (dong/kWh);

K_{DC} : Adjustment coefficient of price ceiling as per the classification result of thermoelectric set. For the thermoelectric set with base load $K_{\text{DC}} = 2\%$; thermoelectric set with intermediate load $K_{\text{DC}} = 5\%$; $K_{\text{DC}} = 5\%$; the thermoelectric set with peak load $K_{\text{DC}} = 20\%$.



P_{sd} : Variable price for year N under the electricity sale contract for difference of the power plant (dong/kWh).

b) Variable price used to calculate the price ceiling is the estimated variable price for year N provided by the single wholesaling Units for the electricity system and market operating Unit.

3. Price floor of thermoelectric sets specified in Clause 3, Article 10 of this Circular.

4. The electricity system and market operating Unit must announce the approved limit of price offering of thermoelectric sets according to the electricity market operation schedule specified in Annex 1 of this Circular.

Article 23. Determining the market price ceiling

1. The electricity system and market operating Unit shall calculate the plans of market price ceiling, including at least 03 (three) plans.

2. The market price ceiling for year N is determined by the principle:

a) No less than the variable cost of thermoelectric sets with base load and intermediate load with direct offered price in the electricity market;

b) No greater than 115% of price ceiling of highest quotation in thermoelectric sets with base load or intermediate load with direct offered price in the electricity market;

Article 24. Choosing the best new power plant

1. The best new power plant for year N is the power plant participating in the electricity market and meeting the following criteria:

a) Beginning commercial operation and generating power with the whole installed capacity in year N-1;

b) Being power plant with base load, classified by the criteria specified in Clause 3, Article 21 of this Circular;

c) Using thermal coal technology or combined cycle gas turbine technology;

d) Having the average cost of full electric generation for 01 kWh as the lowest cost.

2. The single wholesaling Units shall make a list of power plants which meet the criteria under Point a and c, Clause 1 of this Article and provide data of electricity sale contract of such power plants to the electricity system and market operating Unit to determine the best new power plant. The data include:

a) Variable price for year N;

b) Fixed price for year N;

c) Agreed power output for calculation of contract price

3. Where there is no power plant meeting the criteria specified under Point a, b and c, Clause 1 of this Article, the electricity system and market operating Unit shall use the list of new plants chosen for year N-1 and request the single wholesaling Units to update and re-provide data specified in Clause 2 of this Article for calculating and choosing the best new power plant for year N.

4. The electricity system and market operating Unit shall calculate the average cost of full electric generation for 01 kWh for the power plants which have met the criteria specified under Point a, b and c, Clause 1 of this Article by the following formula:

$$P_{TPTB} = \frac{P_{cl}^{CD} \times Q_{tftd}^{CD}}{Q_{mp}^N} + P_{bd}^{CD}$$

P_{TPTB} : Average cost of full electric generation for 01 kWh in year N of the power plant (dong/kWh);

P_{cl}^{CD} : Fixed price for year N under the electricity sale contract for difference of the power plant(dong/kWh);

P_{bd}^{CD} : Variable price for year N under the electricity sale contract for difference of the power plant(dong/kWh);

Q_{tftd}^{CD} : Agreed power output to calculate contract price for year N of power plant (kWh);

Q_{mp}^N : Estimated power output in year N of the power plant determined from the electricity market simulation model by the method of constrained scheduling (kWh).

5. The list of best new power plants arranged in the order of average cost of full electric generation for 01 kWh from low to high. The best new power plant chosen for year N is the power plant with the average cost of full electric generation for 01 kWh as the lowest according to the calculation result in Clause 4 of this Article.

Article 25. Principles to determine the market capacity price

1. Ensuring the best new power plant shall recover adequate cost of electric generation upon participation in electricity market.

2. Not applying the market capacity price for night off-peak hours, in which the night off-peak hours are the hours from 00:00 AM to 04:00 AM and from 22:00 PM to 24:00 PM.

3. The market capacity price is proportional to the forecast load of the national electricity system for transaction cycle.

Article 26. Order of determining the market capacity price

The electricity system and market operating Unit shall determine the market capacity in the following order:

1. Determining the annual Deficient cost of the best new power plant

a) Determining the Estimated revenue in the market of the best new power plant in year N by the following formula:

$$R_{TTD} = \sum_{i=1}^I Q_{BNE}^i \times SMP_i$$

In which:

R_{TTD} : Estimated revenue from the market power price of the best new power plant in year N(dong);

i: Transaction cycle i in year N;

I: Total transaction cycles in year N;

SMP_i: Estimated price of market power of transaction cycle i in year N determined from the electricity market simulation model by the method of unconstrained scheduling (dong/kWh);

Q_{BNE}^i : Estimated output at metering location of the best new power plant at the transaction cycle i in year N determined from the electricity market simulation model by the method of constrained scheduling (kWh);

Q_{BNE}^i :

b) Determining the total annual cost of electric generation of the best new power plant by the following formula:

$$TC_{BNE} = P_{BNE} \times \sum_{i=1}^I Q_{BNE}^i$$

In which:

TC_{BNE} : Annual cost of electric generation of the best new power plant in year N (dong);

P_{BNE} : Average cost of full electric generation for 01 kWh of the best new power plant determined in Clause 4, Article 24 of this Circular (dong/kWh);

Q_{HNE}^i : Estimated output at the metering location of the best new power plant at the transaction cycle i in year N determined from the electricity market simulation model by the method of constrained scheduling;

i: Transaction cycle i in year N;

I: Total transaction cycles in year N.

c) Annual Deficient cost of the best new power plant determined by the following method:

$$AS = TC_{HNE} - R_{TTD}$$

In which:

AS: Deficient cost of the best new power plant in year N (dong);

TC_{HNE} : Total annual cost of electric generation of the best new power plant in year N determined under Point b of this Clause (dong);

R_{TTD} : Estimated revenue from the market power price of the best new power plant in year N determined under Point a of this Clause (dong).

d) In case of calculating the annual Deficient cost with negative value by the plan of lowest market price ceiling, the electricity system and market operating Unit shall report to the Electricity Regulatory Authority to choose the next best new power plant in the list of new power plants specified in Article 24 of this Circular and re-calculate or review the list of power plants participating in the electricity market to determine the price ceiling rationally.

2. Determining the monthly Deficient cost

Deficient cost of the best new power plant is determined by allocating the yearly Deficient cost into the month in year N by the following formula:

$$MS = AS \times \frac{P_{max}^t}{\sum_{t=1}^{12} P_{max}^t}$$

In which:

t: Month t in year N;

MS: Deficient cost of month t of the best new power plant (dong);

AS: Yearly Deficient cost of the best new power plant in year N (dong);

P^t : Peak load capacity in month t (MW).

3. Determinating the market capacity price for transaction cycle

a) Determining the average available capacity in a year of the best new power plant by the following formula:

$$Q_{BNE} = \frac{\sum_i Q_{BNE}^i}{I}$$

In which:

Q_{BNE} : Average available capacity in year N of the best new power plant (kW);

I: Total transaction cycles in year N, except for night off-peak hours;

i: Transaction cycle in which the best new power plant is estimated to be mobilized, except for night off-peak hours;

Q_{BNE}^i : Estimated mobilized capacity of the best new power plant in transaction cycle i of year N as per the electricity market simulation model by the method of constrained scheduling converted to the metering location (kW).

b) Determining the market capacity price for each transaction cycle in the next year by the following formula:

$$CAN_i^t = MS^t \times \frac{(D_i^t - D_{-}^t)}{Q_{BNE} \times \sum_i (D_i^t - D_{-}^t)}$$

In which:

I: Total transaction cycles in month t, except for night off-peak hours;

i: Transaction cycle i in month t, except for night off-peak hours;

CAN_i^t : Price of market capacity of transaction cycle i (dong/kW);

Q_{BNE} : Average available capacity in year N of the best new power plant (kW);

MS: Deficient cost of month t of the best new power plant (dong);

D_i^t : Load of forecasting system of transaction cycle i as per the load chart of forecastin typical day of month t is specified in Article 19 of this Circular (MW);

D_{min}^t : Minimum load of forecasting system for month t (MW).

Article 27. Determining the total yearly contract output

The total yearly contract output of the power plant is determined by the following steps:

1. Operational planning of electric system for next year by the method of constrained scheduling. The input parameters used in the plan for operation of electric system for next year is the full value of the thermal power plants, the hydrological features and specifications of the power plant.

2. Calculating the total yearly planned output of the power plant by the following formula:

$$AGO = EGO \quad \text{if} \quad a \times GO \leq EGO \leq b \times GO$$

$$AGO = a \times GO \quad \text{if} \quad EGO < a \times GO$$

$$AGO = b \times GO \quad \text{if} \quad EGO > b \times GO$$

In which:

AGO : Total planned output of year N of the power plant (kWh);

EGO : Estimated output of year N of the power plant determined from the plan for operation of electric system for the next year converted to the metering location (kWh);

GO : Average power output generated in many years of the power plant specified in the electricity sale contract (kWh);

a, b : Adjustment coefficient of yearly output is determined according to the Regulation on method for price preparation, order and procedures for verification of electricity sale contract which the Ministry of Industry and Trade has issued.

3. Calculating the total yearly contract output of the power plant by the following method:

$$Q_c = a \times AGO$$

In which:

Q_c : Total contract output of year N (kWh);

AGO : Planned output of year N of the power plant (kWh);

Q: Output percentage paid at contract price applicable to year N (%). This output percentage is specified in Clause 5 of this Circular.

Article 28. Determining monthly contract output

The monthly contract output of thermal power plant and hydroelectric plant having reservoir with regulation capability of more than 01 week is determined during the the operational planning of electricity market for next year, including the following steps:

1. Using the electricity market simulation model specified in Clause 2, Article 17 of this Circular by the method of constrained scheduling to determine the estimated output of each month of power plant.

2. Determining the monthly contract output by the following formula:

$$Q_c^t = Q_c \times \frac{Q_{it}^t}{\sum_{i=1}^{12} Q_{it}^t}$$

In which:

Q_c^t : Contract output of month t of power plant (kWh);

Q: Total yearly output of power plant (kWh);

Q_{it}^t : Estimated output in month t of power plant determined from the electricity market simulation model by the method of constrained scheduling (kWh).

Article 29. Responsibility to determine and sign the output of yearly and monthly contract

1. The electricity system and market operating Unit is responsible for:

a) Calculating the output of yearly and monthly contract of the electricity generating Units as stipulated in Article 27 and 28 of this Circular;

b) Sending the calculation result of yearly and monthly contract to the single wholesaling Units and the electricity generating Units directly doing transaction for verification before 15 November of each year.

2. The single wholesaling Units are responsible for:

a) Providing data for the electricity system and market operating Unit to calculate the output of yearly and monthly contract;

b) Verifying and coordinating with the electricity system and market operating Unit to handle the discrepancies in the calculation result of yearly and monthly contract;

c) Supplementing appendix and amendments of contract appendix on output of yearly and monthly contract into the electricity sale contract for difference as per the calculation result.

3. The electricity generating Units directly doing transaction are responsible for:

a) Providing data for the electricity system and market operating Unit and the single wholesaling Units to calculate the output of yearly and monthly contract;

b) Verifying and coordinating with the electricity system and market operating Unit to handle the discrepancies in the calculation result of yearly and monthly contract;

c) Supplementing appendix and amendments of contract appendix on output of yearly and monthly contract into the electricity sale contract for difference as per the calculation result.

Article 30. Determining the estimated average electrical generation price for year N

1. The electricity system and market operating Unit shall calculate the estimated average electrical generation price for year N and the extent of change of estimated average electrical generation price compared with year N-1.

2. The yearly average electrical generation price for year N:

$$P_{PDTB} = \frac{P_{TTTB} \times \left(Q_{\square}^{CFD} - \sum_j Q_c^j \right) + \sum_{j=1}^J (P_c^j \times Q_c^j) + C_{BOT} + C_{SMHP} + C_{DVPT}}{Q_{HT}}$$

In which:

j: Power plant j of the single electricity generating Units directly doing transaction;

J: Total power plants of electricity generating Units directly doing transaction;

P_{PDTB} : Average electrical generation price of the entire system (dong/kWh);

P_{TTTB} : Average full market price of year N specified in Clause 4 of this Article (dong/kWh);

Q_{HT} : Total power output in year N of the entire system (kWh);

Q_{\square}^{CFD} : Total power output in year N of the electricity generating Units directly doing transaction (kWh);

Q_c^j : Total power output in the electricity sale contract for difference in year N of the power plant j (kWh);

P_c^j : Price of electricity sale contract for difference in year N of power plant j (kWh);

C_{BOT} : Total cost of power purchase from the BOT power plants (dong);

C_{SMP} : Total cost of power purchase from the multi-objective strategic hydropower plants (dong);

C_{DVPT} : Total cost of auxiliary services in year N (dong).

3. The electricity system and market operating Unit shall gather information on the costs of BOT power plants, the multi-objective strategic hydropower plants and the power plants providing the auxiliary services from the Vietnam Electricity to calculate the yearly average electrical generation price as stipulated in Clause 2 of this Article.

4. The average full market price is determined by the following formula:

$$P_{TTTB} = \frac{\sum_{i=1}^I (SMP^i \times Q_{\square}^i + CAN^i \times 1.1 \times Q_{\square}^i)}{\sum_{i=1}^I Q_{\square}^i}$$

In which:

i: Transaction cycle i in year N;

I: Total transaction cycle in year N;

P_{TTTB} : Average full market price of year N (dong/kWh);

Q_{\square}^i : Estimated output generated into market of all power plants participating in the market in the transaction cycle i determined from the constrained electricity market simulation model (kWh);

SMP^i : Estimated price of market power of transaction cycle i determined from the unconstrained electricity market simulation model (dong/kWh);

CAN^i : Price of market capacity of transaction cycle i (dong/kW).

Article 31. Publicizing the plan for operation of electricity market for next year

1. After the plan for operation of electricity market for next year is approved under the provisions in Article 17 of this Circular, the electricity system and market operating Unit shall announce on its website the information on the input data and the results of operational plan of electricity market for next year to the members of electricity market.

2. The information on the plan for operation of electricity market for next year is announced, including:

a) - Giá điện năng thị trường dự kiến Estimated market power price;

- Result of selection of best new power plant;

- Hourly price of market capacity;

- Price ceiling of market power price;

- Classification of thermoelectric sets;

- Yearly contract output and output allocated into months of power plants.

b) Input parameters for calculating the plan for yearly operation of electricity market:

- Forecast load of the North, Central and South and for the entire national electricity system;

- Hydroelectrical data of reservoirs used for calculating and simulating the electricity market;

- Progress to put new power plants into operation;

- Technical parameters about transmission grid;

- Chart of estimated electricity import and export;

- Yearly maintenance and repair schedule of power plants, transmission grid and major gas supply sources.

3. The information on the plan for operation of electricity market for next year is only provided for the electricity generating units directly doing transaction owning the power plants directly related to such information, including :

a) Estimated power output in electricity market simulation of the power plant;

b) Water value of hydropower plant;

c) Data about variable price of thermal power plant are used in simulation calculation.

Section 2: OPERATIONAL PLAN FOR NEXT MONTH

Article 32. Forecast load for operational plan for next month

The electricity system and market operating Unit shall forecast the load for operational plan for next month by the method specified in Regulation on power transmission system issued by the Ministry of Industry and Trade. The data of forecast load for operation plan for next month include:

1. The total demand for load of national electricity system and load of the North, Central and South for the entire year and each week in a month.
2. The load chart of typical days of the North, Central and South and the whole of national electricity system of weeks in a month.

Article 33. Calculating water value

The electricity system and market operating Unit shall calculate the water value for weeks in next month. The result of calculation of water value shall be used for operational plan for next month, including

1. Estimated output of multi-objective strategic hydropower plants.
2. Water value of hydropower plant in the groups of ladder hydropower plants.
3. Water value of hydropower plants having reservoir with regulation capability of more than 01 week.
4. Optial water level of each week in a month of hydropower plants having reservoir with regulation capability of more than 01 week.

Article 34. Classifying the generating set with base, intermediate and peak load

1. The electricity system and market operating Unit shall classify generating set with base, intermediate and peak load in next month according to the Procedures for classifying the generating set and calculate the price ceiling of monthly quotation of thermoelectric power plants issued by the Electricity Regulatory Authority.
2. The electricity system and market operating Unit shall use the market simulation model to determine the monthly average load factor of generating sets in next month.
3. Based on the monthly average load factor from the simulation result, the generating sets are classified into following 03 (three) groups:
 - a) Group of generating sets with base load includes the generating Units with average load factor greater or equal to 70%;
 - b) Group of generating sets with intermediate load includes the generating Units with average load factor greater than 25% and less than 70%;
 - c) Group of generating sets with peak load includes the generating Units with average load factor less than or equal to 25%;

Article 35. Adjusting the price ceiling of quotation of thermoelectric set

1. The electricity system and market operating Unit shall calculate and adjust the price ceiling of quotation of thermoelectric sets in next month by the method specified in d 22 of this Circular base on:

a) Fuel price of next month in case the price ceiling of quotation is specified in Clause 1, Article 22 of this Circular.

The fuel price of next month is the fuel price announced by the competent authorities and applied for next month. In case there is data of fuel price announced by the competent authorities, the fuel price of next month is the one as per the payment documents of the last month before the time to set up the plan for next month. The single wholesaling Units shall update information on fuel price of thermal power plants in next month and provide it for the electricity system and market operating Unit and notify the electricity generating Units.

b) The variable price of thermal power plants in case the price ceiling of quotation is specified in Clause 2, Article 22 of this Circular.

The single wholesaling Units shall update the changes of variable price of thermal power plants and provide them for the electricity system and market operating Unit;

c) The result of classification of thermoelectric set for next month as stipulated in Article 34 of this Circular.

2. The electricity system and market operating Unit shall announce the price ceiling of quotation of thermoelectric set in next month according to the electricity market operation schedule specified in Annex 1 of this Circular.

Article 36. Adjusting the monthly contract output

1. The monthly contract output may be adjusted in case the schedule of maintenance and repair of plant in month M is changed compared with the yearly operational plan as required by the electricity system and market operating Unit to ensure the security of electricity system, not due to causes of plant. The adjustment of monthly contract output in this case is based on the following principles: Transfer of Qc between months corresponding to the time of repair in the order to ensure the total Qc of months in year with adjustment remains unchanged.

In case the plant whose maintenance and repair schedule is changed in months at the end of year, the Qc output corresponding to the repair time of this month to the following year.

2. Where the actual hydrological situation of hydropower plant is so different compared with the hydrological forecast applied in calculating and planning the yearly operation, the power plants shall coordinate and make confirmation with the electricity system and market operating Unit and the single wholesaling Units and make report to the Electricity Regulatory Authority for review and adjustment for next month.

Article 37. Determining the hourly contract output

The electricity system and market operating Unit shall determine the hourly contract output in next month for the power plant as per the following steps:

1. Using the market simulation model as stipulated in Clause 2, Article 17 of this Circular to determine the estimated hourly output in a month of the power plant by the method of constrained scheduling

2. Determining the hourly contract output by the following formula:

$$Q_c^i = Q_c^t \times \frac{Q_E^i}{\sum_{i=1}^I Q_E^i}$$

In which:

i: ith transaction cycle in a month;

I: Total cycles in a month;

Q_c^i : Contract output of power plant in transaction cycle i(kWh);

Q_E^i : Output with estimated generation of power plant in transaction cycle i determined from the electricity market simulation model by the method of constrained scheduling (kWh). ;

Q_c^t : Monthly contract output of the power plant is determined under the provisions of Article 28 of this Circular (kWh).

3. Where the contract output of the power plant in transaction cycle i is greater than the greatest generated output of the power plant, the contract output in such transaction cycle shall be adjusted by the greatest generated output of the power plant.

4. Where the contract output of thermal power plant in transaction cycle i is greater than 0 MW and less than the lowest stable generated capacity (Pmin) of the power plant, the contract output in such transaction cycle shall be adjusted by the lowest stable generated capacity of the power plant. The lowest stable generated capacity (Pmin) of the power plant is determined by the lowest stable generated capacity of 01 (one) generating set of the power plant with mobilized scheduling in the electricity market simulation model of such cycle.

Where the contract output of hydropower plants is less than the lowest stable generated capacity, it can be adjusted by 0 MW or equal to the lowest stable generated capacity.

5. The electricity system and market operating Unit shall allocate the differential total output due to the adjustment of hourly contract output under the provisions in Clause 3 and 4 of this Article at other hours in a month on the principle of ensuring the monthly contract output remains unchanged and complying with the provisions in the Procedures for operational plan for next week, month and year which the Electricity Regulatory Authority issues.

6. The electricity system and market operating Unit shall send the result of calculation of hourly contract output in a month to the single wholesaling Units and the electricity generating Units directly doing transaction as per the electricity market operation schedule specified in Annex 1 of this Circular.

7. The single wholesaling Units and the electricity generating Units directly doing transaction shall sign for confirmation of monthly contract output adjusted according to Article 36 of this Circular and the hourly contract output as per the result of calculation of the electricity system and market operating Unit.

Section 3: OPERATIONAL PLAN FOR NEXT WEEK

Article 38. Water value for next week

1. The electricity system and market operating Unit shall update the forecast load data, hydrological data and relevant data to calculate the water value for next week.

2. The electricity system and market operating Unit shall update information and re-calculate the water value for next week and announce the following results:

- a) Water value and hourly estimated output of multi-objective strategic hydropower plants;
- b) Water value of groups of ladder hydropower plants and hydropower plants having reservoir with regulation capability of more than 1 week;
- c) Hourly estimated output of hydropower plants having reservoir with regulation capability of less than 2 days;
- d) Weekly limited water level of reservoirs with regulation capability of more than 01 week under the provisions in the Procedures for short and medium-term assessment of electricity system security issued by the Electricity Regulatory Authority on the implementation of Regulation on power transmission system issued by the Ministry of Industry and Trade.

Article 39. Determining the contract output of hydropower plants having reservoir with regulation capability from 02 to 01 week

1. The electricity system and market operating Unit shall calculate and announce the weekly contract output and allocate it to each transaction cycle in a week of the hydropower plants having reservoir with regulation capability from 02 days to 01 week under the provisions in the Procedures for operational plan for next week, month and year which the Electricity Regulatory Authority issues.

2. The electricity system and market operating Unit shall send the weekly contract output of the hydropower plants having reservoir with regulation capability from 02 days to 01 week to the single wholesaling Units and the electricity generating Units that shall sign for confirmation of weekly contract output of the power plant as a basis for electricity payment.

Article 40. Limit of offered price of hydropower plant

1. The limit of offered price of hydropower plant having reservoir with regulation capability of more than 01 week is determined based on the water value for next week of such power plant is announced under the provisions in Clause 2, Article 28 of this Circular, specifically as follows:

- a) Price floor of quotation is equal to 0 dong/kWh ;
- b) Price ceiling of quotation is equal to the highest value of:
 - Water value of such power plant;
 - Average price of price ceilings of quotation of thermoelectric sets participating in the electricity market in the monthly operational plan;

c) Every month, the electricity system and market operating Unit shall announce the average price of the price ceilings of quotation of thermoelectric sets for next month for hydropower plants having the same schedule of announcing price ceiling of quotation of thermoelectric sets in next month.

2. The limit of offered price of thermal power plant having reservoir with regulation capacity from 02 days to 01 week is determined as follows:

a) Price floor of quotation is equal to 0 dong//kWh;

b) Price ceiling of quotation is equal to the highest value:

- Highest water level of hydropower plants participating in electricity market;

- Average price of price ceiling of quotation of thermal power plants participating in electricity market;

c) Every week, the electricity system and market operating Unit shall announce the highest water value of hydropower plants participating in electricity market next week for the hydropower plants having reservoir with regulation capability from 02 days to 01 week.

3. Where the reservoir of hydropower plant violates the weekly limited water level, the price ceiling of quotation of such hydropower plant is applied to the next week is equal to the variable cost of the most expensive diesel oil-operated thermoelectric set in the electricity system. When ensuring no violation of weekly limited water level, the plant shall continue to apply the price ceiling under the provisions in Clause 1 or 2 of this Article from the Tuesday. Every month, the electricity system and market operating Unit shall announce the price of the most expensive diesel oil-operated thermoelectric set in the electricity system.

4. Where the hydropower plant is located in the region with power backup lower than 5% announced according to the Procedures for short and medium-term assessment of electricity system security issued by the Electricity Regulatory Authority guiding the implementation of Regulation on power transmission system issued by the Ministry of Industry and Trade, the price ceiling of quotation of hydropower plants in this region of assessment week is equal to the variable cost of the most expensive diesel oil-operated thermoelectric set in the electricity system. When the power backup of region is equal to or higher than 5% , the plants in such region shall continue to apply the weekly price ceiling under the provisions in Clause 1 and 2 of this Article.

5. The hydropower plants participating in electricity market shall offer price must meet the following requirements:

a) Complying the provisions on price ceiling of quotation and price floor of quotation in Clause 1, 2, 3 and 4 of this Article;

b) Constrained requirements on need of use of downstream water and other hydrological constraints.

Chapter V

OPERATION OF ELECTRICITY MARKET

Section: OPERATION OF ELECTRICITY MARKET FOR NEXT DAY

Article 41. Information for operation of electricity market for next day

Before 10:00 am of day D-1, The electricity system and market operating Unit shall determine, calculate and announce the following information:

1. Chart of load forecasting of day D of the entire national electricity system and the North, Central and South.
2. Estimated output in each transaction cycle of next day of multi-objective strategic hydropower plants, BOT power plants and other power plants not directly offering price in the electricity market.
3. Total estimated gas output of next day of gas thermal power plants using the same gas source.
4. Estimated imported and exported power output in each transaction cycle of day D.
5. The results of assessment of short-term system security for day D as per the provisions in the Regulation on power transmission system issued by the Ministry of Industry and Trade.
6. Estimated output of hydropower plants having reservoir with regulation capability of less than 02 days in each transaction cycle of next day.
7. Estimated output of hydropower plants violating the weekly limited water level which the electricity system and market operating Unit calculates and sets the mobilization schedule in each transaction cycle of next day.

Article 42. Price quotation

1. The price quotation is specified in Annex 3 of this Circular and must comply with the following principles:
 - a) Having a maximum of 05 (five) pairs of offered price (dong/kWh) and capacity (MW) for the set for each transaction cycle of day D ;
 - b) Capacity in the price quotation is the capacity at the terminal of generator;
 - c) Offered capacity of succeeding price band must be lower than the capacity of preceding price band. The minimum offering step is 03 (three) MW;
 - d) Having information on the technical parameters of the set, including:
 - The announced capacity of the set for day D;
 - The lowest stable generated capacity of the set;
 - The speed of increase and decrease of maximum capacity of the set;
 - The technical constraint upon simultaneous operation of generating sets.
 - dd) The announced capacity of the set in the quotation of day D is not lower than the announced capacity in day D-2 under the Procedures for short and medium-term assessment of electricity system security issued by the Electricity Regulatory Authority on the implementation of Regulation on power transmission system issued by the Ministry of Industry and Trade except for case of stop of set for unplanned repair (which must

be approved) or unforeseen technical incidents. The plant shall update the announced capacity upon decrease in available capacity;

e) In normal condition, the first price capacity band in the quotation of thermoelectric sets must be equal to the lowest stable generated capacity of the set. The last price capacity band must be equal to the announced capacity. For thermal power plants which may update the hourly quotation with capacity lower than the lowest stable generated capacity during the start and stop of set.

g) Hydropower plants may offer the first capacity bands in each hour by 0 (zero) MW. For hydropower plants with regulation capability over 02 days, the last price capacity band must be equal to the announced capacity;

h) Unit of offered price is dong/kWh with the smallest decimal as 0.1;

i) Offered price is between the price floor and price ceiling of the set and shall not decrease in the direction of increase of offered capacity.

2. Modification of price quotation

a) The price offering Units may modify and submit the price quotation for next day or for the remaining transaction cycles in day D to the electricity system and market operating Unit at least 45 minutes before transaction cycle with modified price quotation;

b) The modified price quotation whose offered price must not be changed compared with the price quotation for next day of such price offering Units;

c) The modified price quotation whose capacity must not be changed at capacity levels lower than or equal to the announced capacity for next hour except in case of violation of technical requirements of price quotation;

d) The modified price quotation with increased capacity is only used as scheduling quotation for next hour in case of warning of shortage of capacity;

dd) The electricity system and market operating Unit shall check the validity of the modified price quotations and use them as the scheduling price quotation for mobilization scheduling of next hour and calculation of electricity market price.

Article 43. Price offer of group of ladder hydropower plants

1. The group of ladder hydropower plants shall offer price as per a price quotation for the whole group and comply with the limit of offered price specified in Article 40 of this Circular.

2. The power plants in the group of ladder hydropower plants shall agree and uniformly appoint the representative price offering Units. Such Units shall submit the written registration together with the written agreement between power plants in the group to the electricity system and market operating Unit.

3. Where the representative price offering Unit is not registered for the group of ladder hydropower plants, the electricity system and market operating Unit shall announce the mobilization chart to the plants of such group based on the result of calculation of water value of such group.

4. The representative price offering Unit must comply with regulations on price offering for all power plants in the group of ladder hydropower plants.

5. Where the hydropower plant in the group of ladder hydropower plants proposes self price offering, based on such proposal and the optimal constraints of water use of the entire group, the Electricity Regulatory Authority shall consider and decide the price offering of such hydropower plant.

6. The water value of group of ladder hydropower plants is the water value of the largest reservoir in such group. The electricity system and market operating Unit shall determine the reservoir used to calculate the water value for the group of ladder hydropower plants together with classification of hydropower plants specified in Article 18 of this Circular.

7. Where there is multi-objective strategic hydropower plant in the group of ladder hydropower plants:

a) The electricity system and market operating Unit shall announce the hourly generated output in next week of each power plant in the group of ladder hydropower plants under the provisions in Clause 2, Article 28 of this Circular;

b) When the announced output of multi-objective strategic hydropower plant in the group is adjusted under the provisions in Article 54 of this Circular, the electricity system and market operating Unit must adjust the announced output of hydropower plants in the lower ladder accordingly.

Article 44. Price offer of other hydropower plants

1. The other hydropower plants having reservoirs with regulation capability from 02 days or more make their price offer in the market and comply with the limit of offered price specified in Article 40 of this Circular.

2. The other hydropower plants having reservoirs with regulation capability of less than 02 days must submit the price quotation of day D to the electricity system and market operating Unit. The quotation of such plants is specified as follows:

a) The offered price is 0 dong/kWh for all price bands;

b) The offered capacity is equal to the estimated generation capacity of generating set in the transaction cycle.

Article 45. Submission of price quotation

1. Before 11:30 am of day D-1, the price offering Units must submit the price quotation of day D.

2. The price offering Units shall submit their price quotation through the market information system. In case of failure to use the market information system due to incidents, the price offering price shall reach an agreement with the electricity system and market operating Unit on other modes for submission of price quotation in the priority order as follows:

a) By email to the address specified by the electricity system and market operating Unit;

b) By fax to the number specified by the electricity system and market operating Unit;

c) Submitting the quotation directly at the head office of the electricity system and market operating Unit.

Article 46. Checking the validity of price quotation

1. Before 11:00 of day D-1, the electricity system and market operating Unit shall check the validity of the price quotation which it has received from the price offering Units under the provisions of Article 42 of this Circular. Where the price offering Unit sends many price quotations, only the last one shall be reviewed.
2. Where the price quotation is not valid, the electricity system and market operating Unit shall inform the Units submitting such price quotation and request such Units to re-submit the last price quotation before the end time of price offering.
3. After receiving the notification from the electricity system and market operating Unit of the invalid price quotation, the price offering Units shall modify and re-submit the price quotation before the end time of price offering.

Article 47. Scheduling price quotation

1. After the end time of price offering, the electricity system and market operating Unit shall check the validity of the last price quotation it has received under the provisions in Article 42 of this Circular. The last valid price quotation shall be used as the scheduling price quotation for mobilization scheduling for next day.
2. Where the electricity system and market operating Unit does not receive the price quotation or the last price quotation of the price offering Unit is not valid, the electricity system and market operating Unit shall use the default price quotation of such electricity generating Units as the scheduling price quotation.
3. The default price quotation of power plants is determined as follows:
 - a) For thermal power plants, the default price quotation is the last valid price quotation. In case the last valid price quotation is not consistent with the actual state of operation of the set, the default price quotation is the one corresponding to the present state and fuel used in the set of default price quotation applied to such month of the set. The price offering Units shall prepare the set of default price quotation applied to next month of the thermoelectric set corresponding to the state of operation and fuel of the set and submit it to the electricity system and market operating Unit before the 25th date of each month.
 - b) For the hydropower plants and group of ladder hydropower plants, the default price quotation is the quotation with offered price equal to the corresponding price ceiling of the hydropower plant specified in Article 40 of this Circular.

Article 48. Data used for mobilization scheduling for next day

The electricity system and market operating Unit must use the following data to set up the mobilization scheduling for next day:

1. Daily load chart of the entire national electricity system and each region of the North, Central and South
2. Scheduling price quotations of price offering Units
3. Estimated output in each transaction cycle of next day of power plants specified in Clause 2, Article 41, Clause 7, Article 43 and Point b, Clause 2, Article 44 of this Circular.
4. Imported and exported power output specified in Article 62 and 63 of this Circular.

5. Capacity of generating sets of power plants providing the auxiliary services.
6. Requirements on spinning backup capacity and frequency modulation.
7. Schedule of maintenance and repair of transmission grid and generating sets which the electricity system and market operating Unit has approved.
8. Testing schedule of generating set.
9. Mobilization chart of power plants whose right to participate in the electricity market is suspended under the provisions of Clause 3, Article 8 of this Circular.
10. The results of assessment of short-term system security for day D under the provisions in the Regulation on power transmission system issued by the Ministry of Industry and Trade.
11. Updated information about the availability of the transmission grid and the generating sets from the SCADA system or provided by the electricity transmitting Units or electricity generating Units.

Article 49. Mobilization scheduling for next day

The electricity system and market operating Unit shall set up the mobilization scheduling for next day. The schedule for next day includes:

1. Unconstrained mobilization schedule, including:
 - a) Estimated price of market power in each transaction cycle of next day;
 - b) Mobilization order of generating sets in each transaction cycles of next day.
2. Constrained mobilization schedule, including:
 - a) Estimated mobilization chart of each set in each transaction cycle of next day, marginal price of each region in each transaction cycle of next day.
 - b) Estimated schedule of stop, start and state of grid connection of each set in next day;
 - c) Estimated mode of operation and wiring diagram of electricity system in each transaction cycle of next day.
 - d) Warning information (if any).
3. Setup of mobilization schedule in case of excessive capacity

The electricity system and market operating Unit shall calculate the reduction in capacity towards the lowest stable generated capacity or stop and change of restarting time of generating sets in case of excessive capacity under the following principles:

- a) Reduction in capacity of generating sets with price of electricity sale contract in the order from high to low;

- b) Stop of generating sets with price of electricity sale contract (Pc) in the order from high to low;
- c) Stop of generating sets with starting cost from low to high;
- d) Upon restart in the order of generating sets having price of electricity sale contract (Pc) in the order from low to high;
- dd) Calculation of stopping time of generating sets to meet the requirements of the system and limit of up and down operation of generating sets with multi times.

Article 50. Announcement of mobilization schedule for next day

Before 16:00 pm everyday, the electricity system and market operating Unit shall announce information in mobilization schedule for next day, specifically as follows:

1. Estimated mobilization capacity includes the spinning backup capacity and frequency modulation of generating sets in each transaction cycle of next day. The marginal price of each region in each transaction cycle of next day.
2. Estimated market power price for each transaction cycle of next day.
3. List of generating sets expected to increasingly or decreasingly generate capacity in each transaction cycle of next day.
4. Information on warning of shortage of capacity in next day (if any), including:
 - a) Estimated transaction cycles with shortage of capacity;
 - b) Amount of insufficient capacity;
 - c) Violation of constraints of system security
5. Information on warning of excessive capacity (if any) in next day, including:
 - a) Estimated transaction cycles with excessive capacity;
 - b) Generating sets whose electricity generation is expected to be stopped.

Article 51. Grid connection of generating set

1. For slowly-started generating set, the electricity generating Units shall prepare everything for grid connection of such generating set as per the mobilization schedule for next day which the electricity system and market operating Unit has announced. Where the start time of generating set is greater than 24 hours, the electricity generating Units shall connect the grid of such generating set based on the results of assessment of short-term system security which the electricity system and market operating Unit has announced.
2. For the generating set without slow start, the electricity generating Units shall prepare everything for grid connection of such generating set as per the mobilization schedule for next day which the electricity system and market operating Unit has announced.

3. During the grid connection of thermoelectric sets, the electricity generating Units shall update the hourly capacity into the hourly quotation 60 minutes in advance before transaction cycle for the operation and calculation of payment.

Article 52. Handling in case of warning of capacity shortage

1. The electricity system and market operating Unit may change the announced capacity of multi-objective strategic hydropower plants under the provisions in Clause 2, Article 54 of this Circular.

2. The electricity system and market operating Unit shall use the quotation of increased capacity as the scheduling quotation for mobilization scheduling for next hour and calculation of electricity market price.

Section 2: OPERATION OF ELECTRICITY MARKET FOR NEXT HOUR

Article 53. Data of mobilization scheduling for next hour

The electricity system and market operating Unit shall use the following data for mobilization scheduling for next hour

1. The load chart of entire national electricity system and the North, Central and South forecasting the next 3 hours and 03 following hours.

2. The grid connection plan of slowly-started generating sets as per the announced mobilization schedule for next day.

3. The scheduling quotations of the price offering Units with updating of hourly quotation of slowly-started generating sets during grid connection, hourly quotation of generating sets during the stop of generating set due to incident or reduced capacity due to unforeseen technical incident, the hourly quotation of generating sets announcing the increased capacity in case of current source shortage of electricity system. The Units may update the hourly quotation at least 45 minutes prior to transaction cycle.

4. Announced output of multi-objective strategic hydropower plant.

5. Spinning backup capacity and frequency modulation, quick start backup, cold backup and operation to be generated due to the constrained security of electricity system for next hour.

6. Availability of transmission grid and generating sets from SCADA system or provided by the electricity transmitting Units and the electricity generating Units.

7. Other constraints of system security.

8. Testing schedule of generating set.

9. Capacity announced as per the mobilization schedule for next day of power plants which do not offer price directly in the electricity market.

10. Imported power output .

Article 54. Adjustment of announced output of multi-objective strategic hydropower plant

1. Before mobilization scheduling for next hour, the electricity system and market operating Unit may adjust the hourly output of the multi-objective strategic hydropower plant announced under the provisions in Clause 2, Article 41 of this Circular in the following cases:

- a) Unexpected changes in hydrology;
- b) Warning of capacity shortage as per the mobilization schedule for next day;
- c) Decision of competent state authorities on regulation of reservoir of multi-objective strategic hydropower plant for the purpose of flood control and irrigation.

2. Scope of adjustment of hourly output of multi-objective strategic hydropower plant in the cases specified under Point a and b, Clause 1 of this Article is $\pm 5\%$ of total installed capacity of multi-objective strategic hydropower plants in the electricity system excluding the capacity for frequency modulation and spinning backup.

Article 55. Mobilization scheduling for next hour

1. The electricity system and market operating Unit shall set up the mobilization schedule for next hour for generating sets by the method of constrained and unconstrained scheduling.

2. Mobilization scheduling for next hour in case of capacity shortage

a) The electricity system and market operating Unit sets up the mobilization schedule of generating sets in the order as follows:

- As per the scheduling price quotation;
- Multi-objective strategic hydropower plants as per the adjusted capacity;
- Generating sets providing the quick and cold start backup services as per the mobilization schedule for next day;
- Generating sets providing the generation operation services due to the constrained security of electricity system;
- Spinning backup capacity;
- Reduction in frequency modulation backup capacity to the permissible lowest level.

b) The electricity system and market operating Unit shall check and determine the expected capacity shedding to ensure the system security.

3. Mobilization scheduling for next hour in case of excessive capacity

The electricity system and market operating Unit shall adjust the mobilization scheduling for next hour through the methods in the order as follows

a) Stopping the generating sets voluntarily stopping their electrical generation;

b) Gradually reducing the generated capacity of slowly-started generating sets to the lowest stable generated capacity;

c) Reducing to a minimum of generated capacity of generating set providing the spinning backup services;

d) Reducing to a minimum of generated capacity of generating set providing the frequency modulation services ;

dd) Stopping the slowly-started generating sets in the order as follow:

- Having the shortest start time;

- Having the price of electricity sale contract (Pc) from high to low;

- Having start cost from low to high. The start cost shall be negotiated by the single wholesaling Units with the electricity system and market operating Unit.

- Having the lowest capacity level sufficiently to deal with the excessive capacity.

Article 56. Announcement of mobilization schedule for next hour

The electricity system and market operating Unit shall announce the mobilization schedule for next hour 15 minutes prior to the transaction cycle, including the following contents:

1. Forecast load for next hour of the entire national electricity system and in the North, Central and South.
2. Mobilization schedule of generating sets, marginal cost in the North, Central and South in next hour and 03 consecutive hours scheduled under the provisions in Article 55 of this Circular.
3. Handling measures of the electricity system and market operating Unit in case of capacity excess or shortage.
4. Information about adjustment of announced capacity of multi-objective strategic hydropower plants under the provisions in Article 54 of this Circular.
5. Estimated schedule of load shedding (if any).

Section 3: REAL TIME OPERATION

Article 57. Dispatching real time electricity system

1. The electricity system and market operating Unit shall operate the electricity system in real time based on the announced mobilization schedule for next hour and comply with the provisions on operation of real time electricity system in the Regulation on power transmission system issued by the Ministry of Industry and Trade.

2. The electricity generating Units must comply with the dispatching order of the electricity system and market operating Unit.

3. The electricity generating Units owning the hydropower plants must comply with the provisions on weekly limited water level specified in Article 38 of this Circular.

Article 58. Handling in case of violation of weekly limited water level of hydropower plants

1. The electricity system and market operating Unit shall warn of violation of weekly limited water level of plants. The plants must adjust the offered price in the next days to ensure no further violation of weekly limited water level.

2. Where the reservoir of power plant commits the weekly limited water level for 02 consecutive weeks, from 12:00 pm of Monday of the next week, the quotation of such power plant shall not be used for mobilization scheduling. The electricity system and market operating Unit shall intervene in the mobilization schedule of such power plants based on the result of calculation of water value to ensure the requirements on security of electricity system and bring the water level of reservoir to the weekly limited water level.

Where the water level of reservoir is completely violated due to the mobilization on the basis of price quotation of the power plant, not due to mobilization to ensure the requirements on security of electricity system, within the time of being intervened, such plants shall be paid by 90% of the price of electricity sale contract but not exceeding 02 weeks from the time of intervention.

Where the water level of reservoir is violated due to mobilization to ensure the security of electricity system, such plants are paid at the price of electricity sale contract during the time of intervention.

3. After 02 week from the intervention of the electricity system and market operating Unit, the water level of reservoir still violates the weekly limited water level due to hydrological conditions or mobilization of power plant to ensure the requirements on security of electricity system, the electricity system and market operating Unit may continue its intervention in the mobilization schedule of power plants. During this time, the power plant is paid at the price of electricity sale contract.

4. When ensuring no violation of weekly limited water level, the hydropower plant may continue its participation in the price offering in the next week.

5. Before 10:00 am of Mondays, the electricity system and market operating Unit must announce the mobilization scheduling from Tuesdays to the electricity generating Units and the single wholesaling Units in the following cases:

a) The power plants violates its water level of reservoir and the power plants whose mobilization schedule is intervened;

b) The water level of power plant is back to the weekly limited water level and such power plant may offer its price again.

6. Before 10:00 am of day D-1, based on the hydrological condition and water level of reservoir of such hydropower plant, the electricity system and market operating Unit shall calculate and announce the output expected to be mobilized hourly in next day of power plant with intervention in mobilization schedule on the following principles:

a) Ensuring the security of power supply and constraints on requirement for downstream water use and other technical constraints.

b) Ensuring the minimization of power purchase costs for the entire system.

Article 59. Intervention in electricity system

1. The electricity system and market operating Unit may intervene in the electricity market in the following cases:

- a) The system is operating in emergency mode specified in Regulation on power transmission system issued by the Ministry of Industry and Trade.
- b) Failing to present the mobilization schedule for next hour 15 minutes prior to operational time.

2. In case of intervention in electricity market, the electricity system and market operating Unit shall mobilize the generating sets to ensure the objectives in the order as follows:

- a) Ensuring the balance of generated capacity and load;
- b) Meeting the requirements on frequency modulation backup;
- c) Meeting the requirements on spinning backup;
- d) Meeting the requirements on voltage quality;

3. Announcing information on electricity market

a) When intervening in the electricity market, the electricity system and market operating Unit must announce the following contents:

- The reasons for intervention in electricity market;
- Transaction cycles with expected intervention in the electricity market.

b) Within 24 hours after after the end of intervention in electricity market, the electricity system and market operating Unit shall announce the following contents:

- The reasons for intervention in the electricity market;
- The transaction cycles with intervention in the electricity market;
- The measures which the electricity system and market operating Unit applies for intervention in the electricity market;

Article 60. Stop of electricity market

1. The electricity market stop operation upon occurrence of one of the following cases:

- a) Due to disaster emergency situations or protection of national security;
- b) The electricity system and market operating Unit requires the stop of electricity market in one of the following cases:

- The electricity system is operating in an extreme emergency mode specified in the Regulation on power transmission system issued by the Ministry of Industry and Trade.

- Failure to ensure the operation of electricity market safely and continuously.

c) Other cases as required by the competent authorities.

2. The Electricity Regulatory Authority shall consider and decide the stop of electricity market in cases specified under Point a and b, Clause 1 of this Article and notify the electricity system and market operating Unit.

3. The electricity system and market operating Unit shall inform the participants of electricity market of the decision on stopping the electricity market of the Electricity Regulatory Authority.

4. Operation of electricity system during the time of stopping the electricity market

a) The electricity system and market operating Unit must dispatch and operate the electricity system by the following principles:

- Ensuring the system operates safely, stably and reliably with the lowest cost of power purchase for the entire system;

- Ensuring the implementation of agreements on output in electricity import and export contracts and electricity sale contracts of BOT power plants and electricity sale contracts with output commitment of other power plants;

b) The electricity generating Units, electricity transmitting Units and other relevant Units must comply with the dispatching order of the electricity system and market operating Unit.

Article 61. Restoration of electricity market

1. The electricity market whose operation is restore when ensuring the following conditions:

a) The causes leadin to the stop of electricity market have been remedied;

b) The electricity system and market operating Unit has confirmed the capability of re-operation of electricity market.

2. The Electricity Regulatory Authority shall consider and decide the restoration of electricity market and inform the electricity system and market operating Unit.

3. The electricity system and market operating Unit shall inform the participants of electricity market of decision on restoration of electricity market of the Electricity Regulatory Authority.

Section 4: ELECTRICITY IMPORT AND EXPORT IN OPERATION OF ELECTRICITY MARKET

Article 62. Handling of exported power in mobilization schedule

1. Before 10:00 am of day D-1, the electricity system and market operating Unit shall announce the estimated exported power output in each transaction cycle of day D.

2. The exported power output is calculated as load at the export point and is used to calculate the forecast load of system for mobilization scheduling of next days and hours.

Article 63. Handling of imported power in mobilization scheduling

1. Before 10:00 am of day D-1, the electricity system and market operating Unit shall announce the estimated imported power output in each transaction cycle of day D.

2. The imported power output in mobilization scheduling is calculated as the source to be generated with the chart announced in advance in next day.

Article 64. Payment for imported and exported power

The imported power is paid under the electricity sale contract signed between the parties.

Chapter VI

CALCULATION OF PRICE OF MARKET POWER AND PAYMENT IN ELECTRICITY MARKET

Section 1: POWER METERING DATA

Article 65. Supply of metering data

1. Before 15:00 pm of day D+1, the power metering data managing Units shall provide the electricity system and market operating Unit and the single wholesaling Units with the power metering data of each transaction cycle of day D.

2. Before the eighth working day after the end of payment cycle, the power metering data managing Units shall provide the electricity system and market operating Unit with the power metering data in the payment cycle specified in Regulation on power metering in the competitive electricity generation market issued by the Ministry of Industry and Trade.

Article 66. Storage of metering data

The electricity system and market operating Unit shall store the power metering data and relevant dossiers for a period of at least 05 years.

Section 2: CALCULATION OF POWER PRICE OF MARKET POWER

Article 67. Determining the price of market electricity

1. After transaction day D, the electricity system and market operating Unit shall set up the market electricity price calculation schedule for each transaction cycle of day D in the order as follows:

a) Calculating the system load in transaction cycle by converting the metering output to the terminal of generating sets;

b) Setting the market electricity price calculation schedule by the method of unconstrained scheduling in the order as follows:

- Making the fixed arrangement under the base of load chart of electricity system the output actually generated of electricity generating Units indirectly doing transactions of electricity market, imported power, BOT power plants, tested generating sets, power plants in industrial parks selling only part of output into the national electricity system and generating sets separated from electricity market;

- Arranging capacity bands in the scheduling price quotation of the electricity generating Units directly doing transactions.

2. The price of market power is equal to the offered price of the last capacity band scheduled to meet the system load in the market electricity price calculation schedule. In case the offered price of the last capacity band in the price calculation schedule of market power is higher than the market price ceiling, the price of market power is calculated by the market price ceiling.

3. Before 9:00 am of day D+2, the electricity system and market operating Unit shall announce the price of market power of each transaction cycle in day D.

Article 68. Determining the paid capacity

1. The principles to determine the paid capacity for each transaction cycle:

a) The generating sets participating in electricity generation in each cycle in the market are scheduled to receive the price of market capacity for such cycle except the slowly-started generating sets stopped for backup or due to breakdown;

b) The paid capacity of generating set is at least equal to the power output of such generating set at the metering location;

c) Where the total capacity of generating sets with equal offered price, the capacity receiving the price of market capacity at such price band is evenly divided to the generating sets.

2. After transaction day D, the electricity system and market operating Unit shall set the capacity schedule for each transaction cycle of day Article in the order as follows:

a) Calculating the adjusted load in transaction cycle is the system load plus the following components:

- Spinning backup capacity for transaction cycle;

- Frequency modulation capacity for transaction cycle;

- Component of encouraging capacity and capacity of generating sets with increased generation are calculated by 3% of total generated output of electricity generating Units directly doing transaction of electricity market in the transaction cycle.

b) Implementation of capacity scheduling by the method of unconstrained scheduling to meet the adjusted load determined under Point a of this Clause in the order as follows:

- Making the fixed arrangement under the base of load chart of electricity system the output actually generated of electricity generating Units indirectly doing transactions of electricity market, imported power, BOT power plants, tested generating sets, power plants in industrial parks selling only part of output into the national electricity system and generating sets separated from electricity market;

- Making the fixed arrangement under the base of load chart of electricity system the frequency modulation capacity, spinning backup and increasingly generated capacity of generating sets;

- Making arrangement of capacity bands in the scheduling price quotation of electricity generating Units except for slowly-started generating sets which have stopped their operation for backup or stopped due to breakdown.

3. Amount of paid capacity of generating set in transaction cycle is calculated by the amount of capacity of such generating set arranged in the capacity schedule.

4. Before 9:00 am of day D+2, the electricity system and market operating Unit shall announce the amount of paid capacity of each generating set in transaction cycles of day D.

Article 69. Determining the price of market power and paid capacity upon intervention in electricity market

1. In case the market intervention time is less than 24 hours:

a) The electricity system and market operating Unit shall use the valid price quotation to determine the price of market power specified in Article 67 and the paid capacity specified in Article 58 of this Circular;

b) Where the generating set does not have its valid price quotation, the electricity system and market operating Unit shall use the price floor for the hourly contract output and the price ceiling of quotation for the output outside contract for setting the market electricity price calculation schedule and capacity schedule for such transaction cycle.

2. Where the market intervention time is greater or equal to 24 hours, the electricity system and market operating Unit shall not calculate the price of market power and the paid capacity for the period of market intervention.

Section 3: MAKING PAYMENT TO THE ELECTRICITY GENERATING UNITS DIRECTLY DOING TRANSACTION

Article 70. Power output for payment in electricity market

1. The electricity system and market operating Unit shall calculate the components of power output of the power plant in the transaction cycle for payment in electricity market, including:

a) Output of power paid at the offered price for thermal power plants having their offered price higher than the market price ceiling (Q_{bp});

b) Power output increasingly generated (Q_{con});

c) Power output generated for difference compared with the output mobilized by the dispatching order (Q_{du});

d) Output of power payment at the price of market power (Q_{smp}).

2. The power output generated for difference compared with the output mobilized by the dispatching order (Q_{du}) of the power plant in transaction cycle is determined in the order as follows:

a) Determining the output mobilized by the dispatching order

The output mobilized by the dispatching order is the output at the terminal of generator is calculated based on the dispatching order of mobilized generating set of the electricity system and market operating Unit and based on the capacity by the dispatching order and the speed of load increasing and reduction of the generating set. The output mobilized by the dispatching order is determined by the following formular:

$$Qdd_i = [Pdd_i^0 t_i^1 + \sum_{j=1}^J (Pdd_i^{j-1} + Pdd_i^j) \cdot (t_i^j - t_i^{j-1}) / 2 + \sum_{j=1}^{J-1} Pdd_i^j \cdot (t_i^{j+1} - t_i^j) + Pdd_i^J \cdot (60 - t_i^J)] / 60$$

In which:

i: ith transaction cycle;

J: Number of times of changed dispatching order in transaction cycle i;

t_i^j : jth moment in transaction cycle i when the electricity system and market operating Unit has its dispatching order for change of capacity of the generating set (minute);

t_i^j : Moment when the generating set reaches the capacity level of which the electricity system and market operating Unit issues the dispatching order at the moment t_i^j (minute);

Qdd_i : Output mobilized by the dispatching order at the terminal of generator determined for transaction cycle i;

Pdd_i^{j-1} : Capacity dispatched by the electricity system and market operating Unit for the generating set at the moment t_i^{j-1} ;

Pdd_i^j : Capacity the generating set reaches at the moment t_i^j

The period from the moment of dispatching order t_i^j capacity Pdd_i^{j-1} to the moment t_i^j when the generating set reaches capacity Pdd_i^j is determined as follows:

$$t_i^j - t_i^{j-1} = \frac{Pdd_i^j - Pdd_i^{j-1}}{a}$$

In which:

a: Speed of load increasing and reduction of the generating set registered in the scheduling price quotation (MW/minute).

The speed of load increasing and reduction of the generating set registered in the scheduling price quotation must be consistent with the speed of load increasing and reduction announced in the electricity sale contract. In case the electricity sale contracts do not have the speed of load increasing and reduction or the speed of load increasing and reduction in the contract has difference compared with reality. The electricity generating Units shall determine such data according to the testing result or aggregation from the operational reality of the generating set and sign the contract annex on such technical features with the single wholesaling Units as a basis for payment;

b) The electricity system and market operating Unit shall calculate and convert the output mobilized by dispatching order (Q_{ddj}) to the metering location;

c) Power output generated for difference compared with the output mobilized by the dispatching order is determined by the following formula:

$$Q_{du_i} = Q_{mq_i} - Q_{dd_{i(OM)}}$$

In which:

Q_{du_i} : Power output generated for difference compared with the output mobilized by the dispatching order converted to the metering location for transaction cycle i;

Q_{mq_i} : Metered power output of the power plant in transaction cycle i (kWh);

$Q_{dd_{i(OM)}}$: Output mobilized by dispatching order converted to the metering location for transaction cycle i.

d) In case of start or stop of thermoelectric set (not due to breakdown), such output Q_{du} is equal to 0 ($Q_{du} = 0$). If such generating set is technically constrained and affect the generated capacity of other generating sets of the plant, such affected generating sets whose output Q_{du} shall not be counted ($Q_{du} = 0$).

dd) In order to increase the accuracy in determining the component Q_{du} , the meters at terminal of generating set and the meters installed at the self-used metering location of the generating set (if any) are used with priority to determine the amount of actual generation at the terminal of generating sets for comparison with the compliance with dispatching order as per the management system of dispatching order (DIM);

e) The permissible dispatching power error for generating sets with their installed capacity of less than 100 MW is 5% and 3 % for generating sets with their installed capacity from 100 MW or more but not less than

1.5 MW in any case. In case the output Q_{du}_i is within the permissible error limit, such output is equal to 0 ($Q_{du}_i = 0$).

3. Output of power paid at the offered price for thermal power plant with the offered price greater than the market price ceiling in transaction cycle determined as follows:

a) Determining the generating sets with the offered price higher than the price ceiling scheduled to calculate the market price for transaction cycle i and metering location of such generating set;

b) Calculating the output of power paid at the offered price at each metering location determined at Point a of this Clause by the following formular:

$$Q_{bp}_i^j = \min \{ Q_{mq}_i^j - Q_{du}_i^j - Q_{bb}_i^j, Q_{gb}_i^j \} \text{ if } Q_{mq}_i^j - Q_{du}_i^j \geq Q_{bb}_i^j \text{ and } Q_{du}_i^j \geq 0$$

$$Q_{bp}_i^j = \min \{ Q_{mq}_i^j - Q_{bb}_i^j, Q_{gb}_i^j \} \text{ if } Q_{mq}_i^j \geq Q_{bb}_i^j \text{ and } Q_{du}_i^j < 0$$

$$Q_{bp}_i^j = 0 \text{ if } Q_{mq}_i^j < Q_{bb}_i^j$$

In which:

i: ith transaction cycle;

j: jth metering point of thermal power plant, determined under Point a of this Clause;

$Q_{bp}_i^j$: Output of power paid at the offered price at metering location j in transaction cycle i (kWh);

$Q_{mq}_i^j$: Metered power output at the metering location j trong transaction cycle i (kWh);

$Q_{bb}_i^j$: Output of power in proportion to the capacity with the offered price lower than or equal to the market price ceiling in transaction cycle i of generating sets connected to the metering location j and converted to such metering location (kWh);

$Q_{gb}_i^j$: Output of power in proportion to the capacity with the offered price higher the market price ceiling and arranged in the schedule of market price calculation in transaction cycle i of generating sets connected to the metering location j and converted to such metering location (kWh);

Qdu_i^j : Power output generated for difference compared with the output mobilized by the dispatching order of generating sets connected to the metering location j and converted to such metering location (kWh).

c) Calculating the output of power paid at the offered price for the power plant by the following formula:

$$Qbp_i = \sum_{j=1}^J Qbp_i^j$$

In which:

j: jth metering point of thermal power plant, determined under Point a of this Clause;

J: Total of metering points of power plant having generating set with the offered price higher than the market price ceiling and scheduled for calculation of market price;

Qbp_i : Output of power paid at the offered price of power plant in transaction cycle i (kWh);

Qbp_i^j : Output of power paid at the offered price at the metering location j in transaction cycle i (kWh).

4. Output of power increasingly generated of the power plant in transaction cycle determined in the order as follows:

a) Calculating the power output increasingly generated in transaction cycle at the terminal of generating set by the following formular:

If $Qdu > 0$:

$$Qcon .dc_i^E = \min(Qmq .dc_i^E, [\sum_{j=1}^J (Pdd_i^{j-1} + Pdd_i^j) .(t_i^j - t_i^{j-1}) / 2 - \sum_{j=1}^J P_i^{lim} .(t_i^j - t_i^{j-1})] / 60 + [\sum_{j=1}^{J-1} Pdd_i^j .(t_i^{j+1} - t_i^j) - \sum_{j=1}^{J-1} P_i^{lim} .(t_i^{j+1} - t_i^j)] / 60 + [Pdd_i^J .(60 - t_i^J) - P_i^{lim} .(60 - t_i^J)] / 60)$$

If $Qdu \leq 0$:

$$Qcon .dc_i^E = \min(Qmq .dc_i^E, \max([\sum_{j=1}^J (Pdd_i^{j-1} + Pdd_i^j) .(t_i^j - t_i^{j-1}) / 2 - \sum_{j=1}^J P_i^{lim} .(t_i^j - t_i^{j-1})] / 60 + [\sum_{j=1}^{J-1} Pdd_i^j .(t_i^{j+1} - t_i^j) - \sum_{j=1}^{J-1} P_i^{lim} .(t_i^{j+1} - t_i^j)] / 60 + [Pdd_i^J .(60 - t_i^J) - P_i^{lim} .(60 - t_i^J)] / 60 + Qdu_{i(DC)}, 0))$$

In which:

$Q_{condc}_i^E$: Power out increasingly generated of generating set counted at the terminal in transaction cycle i (kWh);

$Q_{mqdc}_i^E$: Paid and metered output of generating set g in transaction cycle i converted to the terminal of generating set (kWh);

i: ith transaction cycle;

J: Number of times of changed dispatching order in transaction cycle i;

t_i^j : jth moment in transaction cycle i where the electricity system and market operating Unit issues the dispatching order to change capacity of generating set due to constraint (minute). If at this moment but the capacity of generating set is lower than $P_i^{u\#}$ then t_i^j is determined as the moment when the generating set reaches the capacity $P_i^{u\#}$;

t_i^j : Moment when the generating set reaches the capacity dispatched by the electricity system and market operating Unit at the moment t_i^j (minute); If at this moment but the capacity of generating set is lower than $P_i^{u\#}$ then t_i^j is determined as the moment when the generating set reaches the capacity $P_i^{u\#}$;

$P_i^{u\#}$: Capacity of generating set arranged in the market electricity price calculation schedule in transaction cycle i (kW);

Pdd_i^{j-1} : Capacity dispatched by the electricity system and market operating Unit among the generating set at the moment t_i^{j-1} . If this capacity is less than $P_i^{u\#}$ then such capacity is calculated by $P_i^{u\#}$;

Pdd_i^j : Capacity reached by the generating set at the moment t_i^j ;

$Q_{du}(DC)$: Power output generated for difference compared with the output mobilized by the dispatching order converted to the terminal of generator (Qdu);

The period from the moment of dispatching order t_i^{j-1} capacity Pdd_i^{j-1} to the moment t_i^j when the generating set reaches the capacity Pdd_i^j is determined as follows:

$$t_i^j - t_i^{j-1} = \frac{Pdd_i^j - Pdd_i^{j-1}}{a}$$

In which:

a: Speed of load increasing and reduction of the generating set registered in the scheduling price quotation (MW/minute).

b) Determining the power output increasingly generated in transaction cycle of the generating

set, $Qcon_i^E$, by converting the output $Qcondc_i^E$ from the terminal of generating set to the metering location. In case of start or stop of thermoelectric set (not due to breakdown), then $Qcon_i^E$ is equal to 0;

c) Calculation of power output increasingly generated of the power plant in transaction cycle i by the following formula:

$$Qcon_i = \sum_{g=1}^G Qcon_i^g$$

In which:

$Qcon_i$: Total output increasingly generated of the power plant in transaction cycle i (kWh) ;

g: Generating set with increased generation of the power plant in transaction cycle i;

G: Total generating set with increased generation of the power plant in transaction cycle i;

$Qcon_i^g$: Output increasingly generated of generating set g in transaction cycle i (kWh).

5. The output of power paid at the price of market power of the power plant in transaction cycle i is determined by the following formula:

a) In case of power output generated for difference compared with the output mobilized by dispatching order

($Qdu_i > 0$):

$$Qsmp_i = Qmq_i - Qbp_i - Qcon_i - Qdu_i$$

b) In case of power output generated for difference compared with the output mobilized by the negative dispatching order ($Q_{du}_i <$)

$$Q_{smp}_i = Q_{mq}_i - Q_{bp}_i - Q_{con}_i$$

In which:

Q_{smp}_i : Output of power paid at the price of market power of the power plant in transaction cycle i (kWh);

Q_{mq}_i : Metered power output of the power plant in transaction cycle i (kWh);

Q_{bp}_i : Power output is paid at the offered price in transaction cycle i for thermal power plants having their offered price higher than the market price ceiling (kWh);

Q_{con}_i : Power output increasingly generated of power plant in transaction cycle i (kWh);

Q_{du}_i : Power output generated for difference compared with the output mobilized by the dispatching order in transaction cycle i.

Article 71. Adjusting the power output for payment in electricity market

1. The components of power output for payment in the market is adjusted in the following cases:

a) If in transition cycle i, the metered power output of the power plant is less than or equal to the hourly contract power output ($Q_{mq}_i \leq Q_c^i$);

b) If in transaction cycle i, the metered power output of the power plant is greater than the hourly contract output of the power plant ($Q_{mq}_i > Q_c^i$) and the power output paid at the price of market power of power plant is less than the output of hourly contract ($Q_{smp}_i <$).

2. The electricity system and market operating Unit shall calculate and re-adjust the components of power output for payment in the market in transaction cycles specified in Clause 1, Article 68 of this Circular, based on the following output components:

a) The hourly contract power output of power plant in transaction cycle i (Q_c^i) is determined under the provisions in Article 37 of this Circular;

b) The power output paid at the market power price (Q_{smpi}) of the power plant in transaction cycle i is determined under the provisions in Clause 5, Article 68 of this Circular;

c) Metered power output of power plant in transition cycle i (Q_{mq_i}).

3. Principles of adjustment

a) In the case specified under Point a, Clause 1 of this Article, the power output increasingly generated (Q_{coni}) and the power output paid at the offered price for the power plants having their offered price higher than the market price ceiling (Q_{bpi}) adjusted in such transaction cycle is equal to 0 ($Q_{coni} = 0$; $Q_{bpi} = 0$);

b) In the case specified under Point b, Clause 1 of this Article, the power output for payment in electricity market is adjusted on the principle of ensuring no change of metered power output in such transaction cycle and under the provisions in the Procedures for scheduling and mobilizing the generating sets, real-time operation and calculate the payment in the electricity market which the Electricity Regulatory Authority has issued.

Article 72. Payment of market power

1. The electricity system and market operating Unit shall calculate the total of payment of market power of power plant in transaction cycle by the following method:

$$R_g = R_{smp} + R_{bp} + R_{con} + R_{du}$$

In which:

R_g : Total payments of market power in the payment cycle (dong);

R_{smp} : Payment for output to be paid at the price of market power in the payment cycle (dong);

R_{bp} : Payment for output to be paid at the offered price for thermal power plants having their offered price higher than the market price ceiling in the payment (dong);

R_{con} : Payment for the power output increasingly generated in the payment cycle (dong);

R_{du} : Payment for the power out generated for difference compared with the output mobilized by the the dispatching order in payment cycle (dong).

2. The payment for the output to be paid at the price of market power of power plant in transaction cycle determined in the order as follows:

a) Calculation for each transaction cycle by the following formula:

$$R_{smp_i} = Q_{smp_i} \times SMP_i$$

In which:

R_{smp_i} : Payment for the output to be paid at the price of market power of power plant of transaction cycle i in payment cycle (dong);

SMP_i : Price of market power of transaction cycle i in the payment cycle (dong/kWh);

Q_{smp_i} : Power out to be paid at the price of market power of transaction cycle i in payment cycle (kWh)

b) Calculation of payment cycle by the following method:

$$R_{smp} = \sum_{i=1}^I R_{smp_i}$$

In which:

R_{smp} : Payment for the output to be paid at the price of market power in the payment cycle (dong);

i: ith transaction cycle in the payment cycle;

I: Total transaction cycles of payment cycle;

R_{smp_i} : Payment for the output to be paid at the price of market power of power plant of transaction cycle i (dong).

3. The payment for the output to be paid at the offered price for thermal power plants having their offered price higher than the market price ceiling in payment cycle determined in the order as follows:

a) Calculation for each transaction cycle by the following method:

$$R_{bp_i} = \sum_{j=1}^J (Q_{bp_i^j} \times P_{b_i^j}) - \left(\sum_{j=1}^J Q_{bp_i^j} - Q_{bp_i} \right) \times P_{b_i}^{max}$$

In which:

R_{bp_i} : Payment for power with higher offered price than the price ceiling of power plant in transaction cycle i (dong);

j: jth price band in the quotation of generating sets of thermal power plants having their offered price higher than the market price ceiling and arranged in the schedule of market power price calculation;

J: Total price bands in price quotation of thermal power plants having their offered price higher than the market price ceiling;

Pb_i^j : Offered price corresponding to price band i in quotation of generating sets of thermal power plant g in transaction cycle i (dong/kWh);

Pb_i^{max} : Highest offered price in price bands arranged in the schedule of market power price calculation of thermal power plant in transaction cycle i (dong/kWh);

Qbp_i^j : Total capacity offered at the price Pb_i^j in the quotation of thermal power plant mobilized in transaction cycle i and converted to the metering location (kWh);

Qbp_i : Total power output with offered price higher than the market price ceiling of thermal power plant in transaction cycle i (kWh).

b) Calculation for payment cycle by the following formula:

$$Rbp = \sum_{i=1}^I Rbp_i$$

In which:

Rbp : Payment for power offered at the price higher than the price ceiling of power plant in payment cycle (dong);

i: Transaction cycle i in which the power plants are mobilized with their offered price higher than the price ceiling;

I: Total transaction cycles in which the power plants are mobilized with their offered price higher than the price ceiling;

Rbp_i : Payment for power offered at the price higher than the price ceiling of power plant in transaction cycle i (dong).

4. The payment for the power output increasingly generated of power plant in transaction cycle determined in the order as following:

a) Calculation for each transaction cycle by the following formula:

$$Rcon_i = \sum_{g=1}^G (Qcon_i^g \times Pcon_i^g)$$

In which:

Rcon_i : Payment for power output increasingly generated in transaction cycle i (dong);

g: Generating set with increased generation of power plant in transaction cycle i;

G: Total generating sets with increased generation of power plant in transaction cycle i;

Qcon_g^F : Power increasingly generated of generating set g in transaction cycle i (kWh);

Pcon_g^F : The highest offered price corresponding to the capacity band increasingly generated of generating set g in transaction cycle i (dong/kWh). For hydropower plants, if such offered price is higher than the price ceiling of electricity market, the price ceiling of electricity market shall be taken.

b) Calculation for payment cycle by the following formula:

$$\mathbf{Rcon} = \sum_{i=1}^I \mathbf{Rcon}_i$$

In which:

Rcon: Payment for power output increasingly generated in payment cycle (dong);

i: th transaction cycle of payment cycle in which the power plant must have additional power generation by the dispatching order;

I: Total transaction cycles of payment cycle in which the power plant must have additional power generation by the dispatching order;

Rconi : Payment for power output increasingly generated in transaction cycle i (dong).

5. Where the hydropower plants are mobilized for generation due to constrained conditions with their offered price higher than the market price ceiling or their capacity is mobilized with price band higher than the market price ceiling, such plants shall be paid for the corresponding generated output in that cycle at the market price ceiling.

6. The payment for power output generated for difference compared with the output mobilized by the dispatching order of the power plant in transaction cycle.

a) Calculation for each transaction cycle by the following formula:

- In case of power output increasingly generated compared with the dispatching order:

$$Rdu_i = \sum_{g=1}^G (Qdu_i^g \times P_{bmin}_i)$$

In which:

Rdu_i : Payment for power output generated for difference compared with the dispatching order in transaction cycle i (dong);

g: Generating set with increased generation compared with the dispatching order of power plant in transaction cycle i;

G: Total generating sets with increased generation compared with the dispatching order of power plant in transaction cycle i;

Qdu_i^g : Power increasingly generated compared with the dispatching order of generating set g in transaction cycle i (kWh);

P_{bmin}_i : The lowest offered price of all generating sets in transaction cycle i (dong/kWh)

- In case of power output decreasingly generated compared with dispatching order:

$$Rdu_i = \sum_{g=1}^G |Qdu_i^g| \times (SMP_i - P_{bp_{i,max}})$$

In which:

Rdu_i : Payment for power output generated for difference compared with dispatching order in transaction cycle i (dong);

g: Generating set with decreasing generation compared with the dispatching order of power plant in transaction cycle i;

G: Total generating sets with decreasing generation compared with the dispatching order of power plant in transaction cycle i;

Qdu_i^g : Power decreasingly generated compared with the dispatching order of generating set g in transaction cycle i (kWh);

SMP_i: Price of market power in transaction cycle i (dong/kWh);

P_{bp_{i,max}}: Power price of the most expensive generating set paid in transaction cycle i;

b) Calculation for payment cycle by the following formula:

$$Rdu = \sum_{i=1}^I Rdu_i$$

In which:

Rdu: Payment for power output generated for difference compared with the dispatching order in payment cycle (dong);

i: ith transaction cycle of payment cycle in which the thermal power plant has generated for difference compared with dispatching order;

I: Total transaction cycle of payment cycle in which the thermal power plant has generated for difference compared with dispatching order;

Rdu_i: Payment for power output generated for difference compared with the output mobilized by the dispatching order in transaction cycle i (dong)..

Article 73. Payment of market capacity

The electricity system and market operating Unit shall calculate the payment of market power for the power plant in transaction cycle in the order as follows:

1. Calculation for each transaction cycle by the following formula:

$$Rcan_i = CAN_i \times \sum_{g=1}^G Qcan_i^g$$

In which:

Rcan_i: Capacity payment for power plant in transaction cycle i (dong);

g: Generating set of power plant is paid at the capacity price;

G: Total generating sets of power plant paid at the capacity price;

CAN_i: Price of market capacity in transaction cycle i (dong/kW);

Qcan_i^g: Amount of paid capacity of generating set g in transaction cycle i converted to the metering location (kW).

2. Calculation for each transaction cycle by the following formula:

$$R_{can} = \sum_{i=1}^I R_{can_i}$$

In which:

R_{can}: Capacity payment for power plant in payment cycle (dong);

i: ith transaction cycle in payment cycle;

I: Total transaction cycles in payment cycle;

R_{can_i} : Capacity payment for the power plant in transaction cycle i (dong).

Article 74. Payment under electricity sale contract for difference

Based on the price of market power and market capacity which the electricity system and market operating Unit announces, the electricity generating Units shall calculate the payment under the electricity sale contract for difference in payment cycle in the order as follows:

Calculation for each transaction cycle by the following formula:

$$R_{c_i} = (P_c - SMP_i - CAN_i) \times Q_{c_i}$$

In which:

R_{c_i}: Payment for difference in transaction cycle i (dong);

Q_{c_i}: Power output paid at contract price in transaction cycle i (kWh);

P_c: Price of electricity sale contract for difference (dong/kWh). For hydropower plants, such contract price does not include the tax of water resources and forest environment fees;

SMP_i: Price of market power in transaction cycle i (dong/kWh);

CAN_i: Price of market capacity in transaction cycle i (dong/kWh).

Calculation for each transaction cycle by the following formula:

$$R_c = \sum_{i=1}^I R_{c_i}$$

In which:

Rc: Other payment for difference in payment cycle (dong);

i: ith transaction cycle of payment cycle;

I: Total transaction cycles of payment cycle;

Rc_i: Other payment for difference in transaction cycle i (dong).

Article 75. Payment upon intervention in electricity market

1. Where the time for market intervention is less than 24 hours, the electricity generating Units shall receive the payments specified in Article 72, 73 and 74 at the price of market power and the amount of paid capacity specified in Article 69 of this Circular.

2. Where the time for market intervention is less than 24 hours, the electricity generating Units shall be paid at the contract price for all metered power output.

Article 76. Payment upon stop of electricity market

During stop of electricity market, the electricity generating Units shall be paid at the contract price for all metered power output.

Section 4: PAYMENT OF AUXILIARY SERVICES AND OTHER PAYMENTS

Article 77. Payment for spinning backup services and frequency modulation services

The electricity system and market operating Unit shall calculate the payment to the electricity generating Units providing the spinning backup services and frequency modulation services as stipulated by the Ministry of Industry and Trade.

Article 78. Payment for quick start backup services, cold backup services, generation operation services due to the constrained security of electricity system, voltage adjustment and black start services

The Units providing the quick start backup services, cold backup services, generation operation services due to the constrained security of electricity system, voltage adjustment and black start services shall be paid under the auxiliary services supply contract in the form issued by the Ministry of Industry and Trade.

Article 79. Payment for hydropower plants having reservoir with regulation capability of less than 02 days

1. Calculating and paying revenues of each transaction cycle for hydropower plants having reservoir with regulation capability of less than 02 days by the following formula:

$$Rg_i = Pc \times (Q_{hc_i} \times \alpha) + (CAN_i + SMP_i) \times (Q_{hc_i} \times (1 - \alpha)) + Rdu_i$$

In which:

R_g : Payment for hydropower plants having reservoir with regulation capability of less than 02 days in transaction cycle i (dong);

P_c : Price of electricity sale contract (dong/kWh);

Q_{hc_i} : Power output adjusted in transaction cycle i (kWh) is determined as follows:

- If $Q_{du_i} > 0$, $Q_{hc_i} = Q_{m_i} - Q_{du_i}$;

- If $Q_{du_i} \leq 0$, $Q_{hc_i} = Q_{m_i}$.

Q_{m_i} : Power output at the metering location in transaction cycle i (kWh);

Q_{du_i} : Power output generated for difference compared with the dispatching order (kWh) in transaction cycle i .

R_{du} : Payment for power output generated for difference compared with the the output mobilized by the dispatching order in transaction cycle i (dong);

SMP_i : Price of market power in transaction cycle i (dong/kWh);

CAN_i : Price of market capacity in transaction cycle i (dong/kWh);

α : Percentage of power output paid at contract price for hydropower plants having reservoirs with regulation capability of less than 02 days.

The electricity generating Units shall calculate the payment at the price of electricity sale contract ($P_c \times Q_{hc_i} \times \alpha$). The electricity system and market operating Unit shall calculate the remaining payments.

2. Payment made for payment cycle by the following formula:

$$R_g = \sum_{i=1}^I R_{g_i}$$

In which:

R_g : Payment for plant having reservoir with regulation capability of less than 02 days (dong);

i : i^{th} transaction cycle of payment cycle;

I : Total transaction cycles of payment cycle;

R_g : Payment for power plant having reservoir with regulation capability of less than 02 days in transaction cycle i (dong);

Article 80. Other payments

1. The electricity generating Units having generating sets or receiving reactive capacity in the mode of synchronous compensation running shall be paid for the active power amount receiving from power grid under the provisions in electricity sale contract.

2. Where the monthly power metering output provided by the power metering data managing Units under the provisions in Clause 2, Article 65 has a difference compared with the total metered power of days in month provided by the power metering data managing Units under the provisions in Clause 1, Article 65 of this Circular. The difference of power shall be paid at the price of electricity sale contract signed between the single wholesaling Units and the electricity generating Units.

3. The thermoelectric sets are required to stop operating as stipulated under Point dd, Clause 3, Article 55 of this Circular or must stop 01 boiler to reduce capacity as stipulated under Point b, Clause 3, Article 55 of this Circular shall be paid the start cost as agreed between the single wholesaling Units and the electricity generating Units. The electricity system and market operating Unit must confirm such events for generating sets which the electricity generating Units as a basis for payment of start cost for the single wholesaling Units .

4. Where the generating sets are constrained to decrease their capacity due to violation of limit of thermal grid related to direct transmission of capacity of power plant to the system but the cause is not due to the fault of power plant leading to the failure to ensure their hourly contract output, then the hourly contract output in constrained cycles must be generated with reduced capacity applied to the payment in electricity market of the plant adjusted by the output actually generated of the plant in such transaction cycle. The electricity generating Units and the single wholesaling Units shall modify and supplement the annex of monthly contract output as a basis for payment. Where the generating sets must be re-started, they shall be paid the start cost as agreed between the single wholesaling Units and the electricity generating Units.

5. Where the generating sets are constrained to decrease their capacity or stop operation for repair or maintenance of line directly connected to power plant or the related lines leading to the power cut of line directly connected to power plant leading to the failure to ensure the hourly contract output, the hourly contract output in relevant cycles applied for payment in electricity market of the power plant adjusted by the output actually generated of the power plant in such transaction cycle. The electricity generating Units and the single wholesaling Units shall modify or supplement the annex of monthly contract output as a basis for payment. Where the generating sets must be re-started, they shall be paid the start cost as agreed between the single wholesaling Units and the electricity generating Units.

6. Where the power plants have the testing generating sets, such power plants shall be separated from the electricity market in the testing running cycles. The total generated output of power plant to the grid in cycles with testing paid under the provisions in the electricity sale contract signed with the single wholesaling Units corresponding to the configuration of generating sets and type of fuel used.

7. Where the gas turbine power plants must stop their operation and re-start as required by the electricity system and market operating Unit for the reason of system security during the time the available single cycle generating sets operate with mixed fuel or not main fuel, such plants shall be paid the start cost as agreed between the electricity generating Units and single wholesaling Units .

8. Where the gas turbine power plants sharing the same heat recovery steam have the moment of operation of single cycle, operation with mixed fuel or not main fuel as required by the electricity system and market operating Unit to ensure the security of electricity system, such transaction cycles are paid at the price of power in the electricity sale contract signed with the single wholesaling Units corresponding to the configuration of generating set upon operation with single cycle or operation with mixed fuel or not main fuel.

9. Where the gas turbine power plants temporarily and indirectly participating in electricity market at the request of the electricity system and market operating Unit to ensure the security of electricity system, the total power output of power plant in relevant transaction cycles shall be paid at the price of electricity sale contract. During the time of temporary and indirect participation in electricity market, if such plants must stop and re-start at the request of the electricity system and market operating Unit, such plants shall be paid the start cost as agreed between the single wholesaling Units and the electricity generating Units

10. Where the generating sets have an approved plan for stop of operation but still have to generate their capacity at the request of the electricity system and market operating Unit to ensure the security of electricity system, such power plant shall be separated totally from the electricity market during the time of capacity generation at the request of the electricity system and market operating Unit. The total generated capacity of the plant to the grid during such period of time shall be paid at the electricity price specified in the electricity sale contract signed with the single wholesaling Units .

11. Where the power plants with generating sets separated from grid for independent generation at the request of the electricity system and market operating Unit, the total power output of such plants in relevant transaction cycles shall be paid at the electricity price specified in the electricity sale contract signed with the single wholesaling Units .

12. Where the power plants with generating sets separated from the national electricity system and connected to the power grid purchased from foreign country, the total power output of such power plants in transaction days shall be paid at the electricity price specified in the electricity sale contract signed with the single wholesaling Units .

13. Where the hydroelectric generating sets must generate their capacity greater than the announced capacity in the quotation of next days at the request of the electricity system and market operating Unit because of security of electricity system, the total generated output of the power plants to the grid during such period of time shall be paid at the electricity price specified in the electricity sale contract signed with the single wholesaling Units .

14. Where the hydropower plants participate in adjusting level 1 frequency at the request of the electricity system and market operating Unit, the total generated output of such plants in relevant cycles shall be paid as per the mechanism of hydropower plants having reservoirs with regulation capability of less than 02 days, not taking in account the power output generated for difference compared with dispatching order ($Q_{du}=0$). The hydropower plants of the same group with the ladder hydropower plants (if any) of the plants participating in level 1 frequency modulation shall be paid as per the mechanism of hydropower plants having reservoirs with regulation capability of less than 02 days, taking in account the power output generated for difference compared with dispatching order.

Section 5: ORDER AND PAYMENT PROCEDURES

Article 81. Data for calculation and payment for electricity market

Before 9:00 am of day D+2, the electricity system and market operating Unit shall aggregate and provide the single wholesaling Units and the electricity generating Units with data for calculation and payment for each power plant under the provisions specified in Annex 6 of this Circular.

Article 82. Electricity market payment list for transaction days

1. Before day D+4, the electricity system and market operating Unit shall prepare and send the single wholesaling Units and the electricity generating Units the preliminary electricity market payment list for transaction day D via the website of electricity market under the form specified in Annex 4 of this Circular.
2. Before day D+6, the electricity generating Units directly doing transactions and the single wholesaling Units shall confirm the electricity market payment list under regulations on the website of electricity market and inform the electricity system and market operating Unit of errors in the preliminary electricity market payment list (if any).
3. On day D+6, the electricity system and market operating Unit shall prepare and send the single wholesaling Units and the electricity generating Units the complete electricity market payment list for day D via the website of electricity market under the form specified in Annex 4 of this Circular. The electricity generating Units shall issue the daily payment list and file it in dossier for payment for payment cycle.

Article 83. Electricity market payment list for payment cycle

1. The electricity system and market operating Unit shall aggregate the payment data for all transaction days in the payment cycle and verify and compare it with the summary record of power output provided by the power metering managing Units.
2. Within 10 working days from the last transaction day of the payment cycle, the electricity system and market operating Unit shall prepare and issue the electricity market payment list for payment cycle.
3. The electricity system and market operating Unit shall prepare and issue the electricity market payment list of the payment cycle to the single wholesaling Units and the electricity generating Units.
4. The electricity market payment list for the payment cycle consists of a summary under the form specified in Annex 5 of this Circular and a written confirmation of meter readings and power output

Article 84. Dossier of power dossier

1. The electricity generating Units directly doing transaction shall prepare and send the payment voucher of electricity market to the single wholesaling Units based on the electricity market payment list for the payment cycle.
2. The electricity generating Units shall prepare and send the payment voucher of contract to the single wholesaling Units under the provisions in the electricity sale contract signed between the single wholesaling Units and the electricity generating Units.
3. Before the 20th date of every month, the electricity generating Units directly doing transaction shall prepare and send the payment voucher to the single wholesaling Units . Such voucher consists of payments of electricity market and contract in the payment cycle.

Article 85. Dossier payment for auxiliary services supply contract

The electricity generating Units shall prepare the dossier of payment for auxiliary services under the auxiliary services supply contract between the electricity generating Units and the electricity system and market operating Unit.

Article 86. Voucher modification

1. In case of errors of voucher, the electricity generating Units or the single wholesaling Units has the right to request the handling under the relevant current regulations within 01 month from the issue date. The parties concerned shall coordinate to determine and agree upon the modified payments.

2. The electricity generating Units shall supplement the modified payments to the voucher of the next payment cycle.

Article 87. Payment

1. The single wholesaling Units and the electricity system and market operating Unit shall make payment as per the voucher of the electricity generating Units. The time limit for payment is based on the provisions in the electricity sale contract signed between the two parties.

2. The electricity generating Units and the single wholesaling Units shall agree upon the payment mode in the electricity market in accordance with the provisions in this Circular and other relevant provisions.

3. Where on the 20th date of every month, if the electricity generating Units has not received the electricity market payment list but the cause is not from the fault of the electricity generating Units, such Units has the right to prepare and send the temporary dossier and payment voucher based on the generated power output and the price of electricity sale contract. After the electricity market payment list is issued, the difference between the value of temporary and the value of settlement shall be offset in the next month.

Article 88. Handling of errors in payment

In case of surplus or deficit payment compared with the vouchers, the Units concerned shall handle such errors under the provisions specified in the electricity sale contract or the auxiliary service supply contract.

Chapter VII

SOFTWARE FOR OPERATION OF ELECTRICITY MARKET

Article 89. Software for operation of electricity market

1. The softwares for operation of electricity market consist of:

a) Market simulation model;

b) Water value calculating model;

c) Software for mobilization and dispatching scheduling;

d) Software for calculation and payment;

dd) Other softwares for operation of electricity market.

2. The electricity system and market operating Unit shall develop and operate the softwares in service of electricity market.

Article 90. Requirements for software for operation of electricity market

1. Ensuring the accuracy, reliability, security and meeting the standards developed by the electricity system and market operating Unit.
2. Having all accompanied technical instructions and operational procedures.

Article 91. Development of softwares for operation of electricity market

1. The softwares for operation of electricity market must be developed to support the calculation and transactions specified in this Circular and the operational procedures of electricity market.
2. The electricity system and market operating Unit is responsible for
 - a) Developing standards for the softwares for the operation of electricity market;
 - b) Assessing and checking the response capability of software for standards specified under Point a of this Clause before application;
 - c) Announcing the list, algorithms and procedures for using the softwares for the operation of electricity market;

Article 92. Software auditing

1. The softwares for electricity market must be audited in the following cases:
 - a) Before the official operation of electricity market;
 - b) Before putting the new softwares into use;
 - c) After adjustment or upgrading affecting the calculation;
 - d) Periodical audit.
2. The electricity system and market operating Unit shall recommend a qualified independent auditing Units to carry out the audit and report to the Electricity Regulatory Authority before implementation.
3. The electricity system and market operating Unit shall announce the auditing result to the participants of electricity market.

Chapter VIII

ELECTRICITY MARKET INFORMATION SYSTEM AND REGULATIONS ON INFORMATION ANNOUNCEMENT

Section 1: ELECTRICITY MARKET INFORMATION SYSTEM

Article 93. Structure of electricity market information system

The electricity market information system consists of the following basic components:

1. System of hardwares and softwares for management and exchange of information about electricity market.
2. System of database and storage
3. Web portal in service of electricity market, including the intranet and public websites.

Article 94. Management and operation of electricity market information system

1. The electricity system and market operating Unit shall develop, manage and operate the electricity market information system.
2. The participants of electricity market shall purchase equipment within their management to meet the technical requirements stipulated by the electricity system and market operating Unit to ensure the connection with the electricity market information system.
3. The power metering data managing Units shall develop, manage and operate the transmission network connected between the electricity market information system of the electricity system and market operating Unit and the equipment of participants of electricity market.
4. The electricity system and market operating Unit only operates or changes the existing electricity market information system after complete acceptance and with the approval of the Electricity Regulatory Authority.
5. The electricity system and market operating Unit shall equip with backup equipment for the electricity market information system to ensure the collection, transmission and announcement of electricity market in case the electricity market information system has problems or does not work.

Section 2: MANAGEMENT AND ANNOUNCEMENT OF ELECTRICITY MARKET INFORMATION

Supply and announcement of electricity market information

1. The electricity generating Units, the single wholesaling Units, the electricity transmitting Units and the power metering data managing Units shall provide the electricity system and market operating Unit with information and data for planning the operation, mobilization scheduling, calculation and payment under the provisions in this Circular via the website of electricity market information system.
2. The electricity system and market operating Unit shall provide and announce information, data and reports on operation of electricity market to the participants of electricity market under the provisions in this Circular via the website of the electricity market information system.
3. The extent of information access right is defined according to the functions of units and specified in the Procedures for operational management of information technology system operating the electricity market and announcement of electricity market information issued by the Electricity Regulatory Authority.
4. The electricity system and market operating Unit shall publicly announce on public websites the following information:
 - a) Information about participants of electricity market;
 - b) Data of system load;

c) Statistical data of market price;

d) Other information specified in the Procedures for operational management of information technology system operating the electricity market and announcement of electricity market information issued by the Electricity Regulatory Authority.

Article 96. Responsibility for ensuring the accuracy of electricity market information

1. Members participating in electricity market must ensure the accuracy and accuracy of electricity market information at the time of supply.

2. In case of detection of information inaccurately and incompletely provided or announced, the members participating in electricity market shall modify and re-supply correct information to the concerned units.

Article 97. Electricity market information security

1. The electricity system and market operating Unit must not disclose information provided by the participants of electricity market, including:

a) Information about electricity sale contract;

b) Price quotation of the electricity generating Units before the end of transaction day;

c) Other information beyond authority

2. The participants of electricity market must not disclose information beyond the scope of authority given to provide and announce information.

Article 98. Cases of immunity from information security

1. Provision of information at the request of the Electricity Regulatory Authority or the competent authorities under regulation of law.

2. The information self summarized or analyzed from information announced in the electricity market, not provided improperly from other participants of electricity market specified in Article 97 of this Circular.

Article 99. Storage of electricity market information

The electricity system and market operating Unit is responsible for storing all activities of information exchange to be done via the electricity market information system. The duration of storage of information is at least 05 years.

Section 3: REPORT ON ELECTRICITY MARKET OPERATION

Article 100. Announcement of information about operation of electricity market

The electricity system and market operating Unit shall periodically prepare and announce the information about operation of electricity market specified in the Procedure for operation of electricity market information system issued by the Electricity Regulatory Authority as follows:

1. Before 15:00 pm of every day, preparing and announcing the electricity market operation report of the previous day.
2. Before 16:00 pm of Tuesdays of every week, preparing and announcing the electricity market operation report of the previous week.
3. Before the 10th date of every month, preparing and announcing the electricity market operation report of the previous month.
4. Before the 31st date of January of every year, preparing and announcing the electricity market operation report of the previous year.

Article 101. Regulation on electricity market operation report

1. Before the 10th date of every month, the electricity system and market operating Unit shall send the Electricity Regulatory Authority the electricity system and market operating report of the previous month under the form specified by the Electricity Regulatory Authority.
2. Before the 31st date of January of every year, the electricity system and market operating Unit shall send the Electricity Regulatory Authority the electricity system and market operating report of the previous year under the form specified by the Electricity Regulatory Authority.
3. Within 24 hours from the termination of intervention in electricity market, the electricity system and market operating Unit shall report to the Electricity Regulatory Authority on the intervention in electricity market.
4. The electricity system and market operating Unit shall make unplanned reports on the electricity system and market operation as required by the Electricity Regulatory Authority.

Article 102. Audit of data and compliance in electricity market

1. Periodical audit

Before the 31st date of March of every year, the electricity system and market operating Unit shall implement and complete the audit of data and compliance in electricity market of the previous year. The yearly auditing contents include:

a) Audit of data and calculation process of the electricity system and market operating Unit in the electricity market:

- Data for calculation process in electricity market;
- Steps of calculation;
- Result of calculation;

b) Audit of compliance of the electricity system and market operating Unit for the order and procedures specified in this Circular.

2. Unplanned audit

The Electricity Regulatory Authority has the right to require the electricity system and market operating Unit to organize the implementation of unplanned audit as per the specific contents and scope of audit in the following cases:

- a) Upon detection of unusual signs in operation of electricity market;
 - b) As requested in writing of the participants of electricity market in which the contents and plausible reasons to request the unplanned audit.
3. The electricity system and market operating Unit is responsible for recommending a qualified independent auditing unit to carry out the auditing contents of electricity market to be submitted to the Electricity Regulatory Authority for approval.
4. The participants of electricity market must fully cooperate with one another during the audit of electricity market;
5. Audit expenses
- a) To be paid by the electricity system and market operating Unit in cases of audit specified in Clause 1 and Point a, Clause 2 of this Article;
 - b) To be paid the unit requesting audit in cases of audit specified under Point b, Clause 2 of this Article.
6. Within 10 days after the end of audit, the electricity system and market operating Unit shall send the auditing report to the Electricity Regulatory Authority and the related units.

Chapter IX

DISPUTE SETTLEMENT AND VIOLATION HANDLING

Section 1 : DISPUTE SETTLEMENT

Article 103. Order for dispute settlement in electricity market

1. The disputes arising in the electricity market shall be settled as per the Regulation on order and procedures for dispute settlement in the electricity market issued by the Ministry of Industry and Trade.
2. Before carrying out the dispute settlement under the provisions in Clause 1 of this Article, within 60 days from the time of arising dispute in electricity market, the parties must conduct the negotiation to settle their dispute in one of the following forms:
 - a) Negotiation;
 - b) Reconciliation.

Article 104. Responsibilities of parties in self-settlement of dispute

1. Reaching an agreement on the form of self-settlement of dispute, time and location of negotiation.

2. Fully, honestly and accurately providing the necessary information and documents related to the contents under dispute.

3. Providing legal evidence to protect legal rights and interests.

4. Participating in the negotiation with the spirit of goodwill and cooperation.

5. During the process of self-settlement of dispute, if the dispute is detected to have signs of violating regulations on electricity market, the detecting party shall notify the other party in order to stop their self-settlement of dispute and report to the Electricity Regulatory Authority.

Article 105. Notification of dispute and negotiation preparation

1. When there is any dispute, the requester shall notify in writing the requestee of the dispute and request the dispute settlement and send 01 (one) copy to the Electricity Regulatory Authority for report.

2. Within 15 days from the receipt of notification, the parties must agree upon the form of dispute settlement, contents to be settled, time and location of negotiation. In case of choice of form of reconciliation through intermediary, the parties must agree upon choosing the intermediary. The parties may agree upon the change of intermediary before the estimated time of reconciliation agreed.

Article 106. Organization of self-settlement of dispute

1. Negotiation

The parties shall discuss and agree upon the contents to be settled.

2. Reconciliation

a) The parties may invite experts or request the Electricity Regulatory Authority to appoint its official to be the intermediary and agree upon the responsibility of intermediary;

b) The parties shall provide the intermediary with the contents of dispute, information and document related to the dispute and requirements for settlement of each party.

c) The parties may agree with the settlement plan of the intermediary; request the intermediary to modify or supplement such settlement plan or agree by themselves with the new settlement plan.

Article 107. Record of self-settlement of dispute

1. After the end of self-settlement of dispute or the end of time limit for self-settlement of dispute, the disputing parties shall make a record of self-settlement of dispute including the following contents:

a) Time and location for self-settlement of dispute;

b) Name and address of parties involved in self-settlement of dispute;

c) Summary of dispute contents;

d) Requirements of the parties;

dd) Contents agreed by the parties;

e) Contents the parties fail to agree upon and reasons for failure

2. Within 05 days from the date of record of self-settlement of dispute, the parties shall send the Electricity Regulatory Authority 01 (one) for report.

Article 108. Dispute settlement at the Electricity Regulatory Authority

1. The parties have their right to refer the case to the Electricity Regulatory Authority for settlement in the following cases:

a) Upon the end of time limit for self-settlement of dispute specified in Clause 2, Article 103 of this Circular but the dispute cannot be settled or the self-settlement of dispute cannot be held because one party does not participate in the self-settlement of dispute.

b) One party does not adhere to the contents agreed in the Record of the self-settlement of dispute.

2. After receiving the valid dossier for dispute settlement under regulations, the Electricity Regulatory Authority shall settle it in the order and procedures specified in the Regulation on order and procedures for dispute settlement in the electricity market which the Ministry of Industry and Trade has issued.

Section 2 : VIOLATION HANDLING

Article 109. Violation detection and report

1. The acts of violation in the electricity market detected must be reported to the Electricity Regulatory Authority in writing.

2. The contents of report include:

a) Date of report;

b) Name, address of organization or individual making report;

c) Name, address of organization or individual committing acts with violating signs;

d) Description of acts with violating signs;

dd) Time and location of occurrence of acts with violating signs;

e) Reasons for detecting acts with violating signs (if any).

Article 110. Verification of acts of violation

1. Within 05 days from the date of receipt of case concerning acts with violating signs, the Electricity Regulatory Authority shall handle the case and shall inform in writing to the reporting organization or individual in case of failure to handle.

2. After handling the case, the Electricity Regulatory Authority shall verify the acts with violating signs. During the verification, the Electricity Regulatory Authority has the right to:

- a) Require the unit with violating signs and the units concerned to provide information and documents necessary for the verification;
- b) Require the unit with violating signs to explain;
- c) Hold an expertise and gather opinions from specialist or agencies or units concerned.
- d) Convene the unit with violating signs and the units affected due to violating acts for opinions about the way of settlement and remedy of violating acts.

3. During the verification, the Electricity Regulatory Authority must maintaining the confidentiality of the information and materials provided under the regulations on information security specified in this Circular and other legal regulations related to the confidentiality of the information.

Article 111. Making record of administrative violation

1. Within 60 working days from the date of verification, the Electricity Regulatory Authority shall terminate the verification and make record of administrative violation for violating acts of regulation on operation of electricity market. If the case has complicated details, the verification time may be extended but not exceeding 30 working days from the end date of verification.

2. The record of administrative violation is made under regulation on sanctioning of administrative violation in the field of electricity.

3. If the result of verification indicates that the reported acts do not violate the regulations on operation of electricity market, the Electricity Regulatory Authority shall stop its verification and notify the reporting organization or individual as well as the verified organization or individual.

Article 112. Forms of handling of violation

1. The violating unit must undergo one of the form or degree of sanction for each violating act specified in Article 14 of Decree No. 134/2013/ND-CP dated 17 October 2013 stipulating the sanction of administrative violation in the field of electricity, safety of hydroelectric dam, thrifty and effective use of energy.

2. For the power plants with violating acts specified in Clause 1, Article 8 of this Circular, in addition to the sanction of administrative violation specified in Clause 1 of this Article, their right to participate in electricity market shall be suspended.

Article 113. Order and procedures for suspending the right to participate in electricity market

1. Where the power plants commit violating acts specified in Clause 1, Article 8 of this Circular, within 05 (five) days from the date of issuing Decision on sanction of administrative violation or from the date of issuing the written conclusion on violating acts causing serious consequences on security of power supply or finance to other units in the electricity market, the Electricity Regulatory Authority shall review and issue a decision on suspending the right to participate in electricity market to the power plants committing the violating acts and send it to the violating power plant and the electricity system and market operating Unit.

2. The effective duration of the decision on suspending the right to participate in the electricity market to the power plants committing the violating acts is more than 01 (one) year.

3. Within 01 from the date of receiving the Decision on suspending the right to participate in the electricity market, the electricity system and market operating Unit shall announce such suspension to the violating power plant.

4. If the time limit specified in Clause 2 of this Article is over, such power plant has not remedied its violation, the Electricity Regulatory Authority has the right to extend such suspension.

Chapter X

IMPLEMENTATION

Article 114. Responsibility of the Electricity Regulatory Authority

1. Disseminating, inspecting and monitoring the implementation of this Circular.
2. Providing instructions or requesting the Ministry leadership to provide instructions on implementation of new contents or problems arising during the implementation of this Circular.

Article 115. Responsibility of Vietnam Electricity

The Vietnam Electricity shall direct the electricity system and market operating Unit and the related units:

1. Reviewing and modifying the technical procedures to be submitted to the Electricity Regulatory Authority for issuance after 30 days from the date of issue:

- a) Procedures for planning operation of next year, month and week;
- b) Procedures for choosing the best new power plant and calculating the price of market capacity;
- c) Procedures for electricity market simulation;
- d) Procedures for calculation of water value;
- dd) Procedures for classifying the generating set and calculating the price ceiling of quotation of thermal power plants;
- e) Procedures for mobilization scheduling of generating sets, real-time operation and calculation and payment in electricity market;
- g) Procedures for management and operation of information technology system;
- h) Procedures for coordinated comparison and review of payment data between the electricity system and market operating Unit, the electricity generating Units and the single wholesaling Units;
- i) Procedures for registration of participation in electricity market;
- k) Procedures for optimal use of gas fuel resources for mobilization schedule of next days;

- 1) Procedures for coordinated confirmation of events for payments in the electricity market.
2. Investing, building, installing and upgrading the electricity market information System and the softwares in service of electricity market in accordance with requirements specified in this Circular.

Article 116. Responsibility of related units

1. The units participating in the electricity market must improve the information equipment in accordance with the electricity market information System under the provisions specified in this Circular.
2. The electricity generating Units participating in the electricity market must sign the electricity sale contracts under the form issued by the Ministry of Industry and Trade for application to the electricity market.

Article 117. Effect

1. This Circular takes effect on 18 November 2014. The Circular No. 03/2013/TT-BCT dated 08 February 2013 issued by the Minister of Industry and Trade on operation of competitive electric generation market and the guiding documents issued by the Ministry of Industry and Trade in order to implement Circular No. 03/2013/TT-BCT dated 08 February 2013 issued by the Minister of Industry and Trade on operation of competitive electric generation market shall be invalidated from the effective date of this Circular.

Any problem arising during the implementation should be promptly reported to the Electricity Regulatory Authority for submission to the Ministry of Industry and Trade for admendment or supplement accordingly.

The related units must carry out the instructions under the provisions specified in Clause 2, Article 114 to the time of issuance of amended or supplemented Circular.

**FOR THE MINISTER
DEPUTY MINISTER**

Cao Quoc Hung