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**From the Energy Market Regulatory Authority:**

**BOARD DECISION**

**Decision No:** 20825

**Decision Date:** 11/05/2020

In the Energy Market Regulatory Board meeting dated 11 May 2020, it has been resolved to approve the attached "Procedure Regarding Designation of Label Values and Calculation of the System Marginal Price within the scope of the Balancing Power Market".

**PROCEDURE REGARDING DESIGNATION OF  
LABEL VALUES AND  
CALCULATION OF THE SYSTEM MARGINAL  
PRICE WITHIN THE SCOPE OF THE BALANCING  
POWER MARKET**

Ratified with the Approval of the President dated 11/05/2020 and numbered 20285.

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## **1. Introduction**

This document has been issued in accordance with Article 68 of the Electricity Market Balancing and Settlement Regulation (DUE) and prepared in order to set forth the principles regarding formation of up-regulation (UpReg) and down-regulation (DownReg) instructions to be issued within the scope of Balancing Power Market (BPM), and the rules for determining label values and calculating the system marginal price.

The following are aimed with the implementation of the designation of the instruction label values through clear and transparent rules;

- Ensuring consistency in the practices of the System Operator for giving instructions and of the operators who are responsible for determining the label values of the instructions;
- Informing relevant parties on the matter.

## 2. General principles

Within the scope of the Electricity Market Balancing and Settlement Regulation,

- **label value “0”**: shall be assigned to the instructions given for the purpose of real-time balancing of demand and supply throughout the system;
- **label value “1”**: shall be assigned to the instructions given for the purpose of removing system congestions.

The following shall be considered in designating the instruction label values:

- Each instruction may only have one label value of "0" or "1".
- If an instruction is related to multiple purposes, it shall be assigned an instruction label value regarding the most closely related purpose by the System Operator.
- Load dispatch operators who give the instruction within the scope of this document shall designate label values of the instructions.

### **3. Principles for evaluation of Upreg/Downreg orders and designating label values**

#### **3.1 Principles for evaluation of UpReg/DownReg orders submitted within the scope of BPM**

Up-regulation and down-regulation orders submitted in the Balancing Power Market on a bidding zone basis shall be listed in order of price for each hour. The UpReg/DownReg orders listed in order of price shall be evaluated in a way to ensure operational safety and system integrity, and shall minimize balancing costs, by considering the following:

- Transmission system congestions;
- Technical congestions regarding balancing units within the scope of BPM;
- Criteria for supply reliability and quality of supply;
- Situations where a legal entity engaged in generation activity failed to fulfill an UpReg/DownReg instruction in the past;
- Situations where the foreseeable energy deficit or surplus in the system regarding the relevant day should be eliminated;
- Situations that change according to the updated offers of the balancing units that have performed transactions within the scope of the Intraday Market (IM);
- Status of the units during test, trial and acceptance procedures.

Some of the UpReg/DownReg orders listed in order of price may be excluded from evaluation due to the specified congestions and criteria. The UpReg/DownReg orders that are excluded from evaluation due to the specified congestions and criteria shall not be assigned any instruction label value.

In case necessity for up-regulation arises in real time, said necessity shall primarily be met by terminating the previously given down-regulation instructions labeled "0" or "1", provided that the security criteria are maintained; and in case necessity for down-regulation arises in real time, said necessity shall primarily be met by terminating the previously given up-regulation instructions labeled "0" or "1", provided that the safety criteria are maintained. Notifications regarding the termination of previously given instructions shall be made to the relevant market participants. In view of the foregoing congestions and criteria, in the event the termination of the up-regulation instructions, down-regulation instructions is insufficient or there is no up-regulation/down-regulation instruction to be terminated, the instructions regarding the orders approved as a result of the evaluation made by the System Operator shall be notified to the relevant market participants. The up-regulation and down-regulation instructions given shall be labeled with the value of "0" or "1".

#### **3.2 Principles for designating label values of UpReg/downreg instructions given within the scope of BPM**

##### **3.2.1. Principles for justification of instructions given within the scope of elimination of energy deficit or surplus and label values**

In the following cases, the System Operator shall evaluate the UpReg/DownReg orders listed in order of price within the scope of BPM and the UpReg/DownReg instructions regarding the orders selected to provide the lowest cost possible shall be notified to the relevant market participants:

- Elimination of the foreseeable energy deficit or surplus in the system;

- A generation or consumption facility to be offline in a way to create a continuous supply-demand imbalance in real time;
- It is observed that the secondary frequency control reserve is used in the same direction for a long time.

The principles set forth under 3.1 shall be observed regarding the foregoing instructions given by the System Operator.

Among the activities carried out in accordance with the foregoing matters, all UpReg/DownReg instructions given on the following grounds shall be assigned a label value of "0":

- Ensuring the supply and demand balance;
- Program synchronization of settlement supply draw unit (SSDU);
- National electricity supply security resource management.

If an instruction is related to multiple purposes, the purpose that is most closely related thereto shall be selected.

### **3.2.2. Principles for justification of instructions given within the scope of removal of system congestions and label values**

In order to remove system congestions, the UpReg/DownReg orders submitted within the scope of BPM shall be evaluated by the System Operator and the UpReg/DownReg instructions regarding the orders selected so as to provide the lowest cost possible shall be notified to the relevant market participants. Among the activities carried out to remove system congestions and meet the criteria for supply reliability and quality of supply, all UpReg/DownReg instructions given on the following grounds shall be assigned a label value of "1":

- Transmission Facility Failure;
- Transmission Facility Overloading;
- Transmission Facility Maintenance Program;
- Angular Stability;
- Voltage Stability;
- Additional Reactive Power Support;
- Connection Security of Interconnection Lines;
- Special Protection Systems (SPS) / Special Protection Relays (SPR);
- Regional Electricity Supply Security Resource Management.

If an instruction is related to multiple purposes, the purpose that is most closely related thereto shall be selected.

The volumes of all up-regulation and down-regulation instructions labeled with value "1" and given in order to remove system congestions that occur in real time shall be published by the System Operator via the MMS at the end of the 4<sup>th</sup> hour following the relevant hour.

### **3.2.3. Matters regarding order acceptance in case of emergencies and events of force majeure and instructions**

The System Operator may issue emergency instructions to all market participants within the framework of the maximum capacities that the relevant generation facilities can provide, in order to protect the operational safety of the transmission system in case of an emergency. Emergency instructions shall be considered as an order acceptance for the relevant balancing



unit. Emergency instructions shall not be required to be compatible with the orders submitted within the scope of the balancing power market for the relevant balancing unit. Emergency instructions shall be in the same structure as the UpReg and DownReg instructions in the BPM. Market participants must fulfill an emergency instruction. Market participants shall immediately notify the System Operator, along with the reasons, in case they will not be able to fulfill an emergency instruction.

#### **3.2.4. Matters regarding order formation**

In case of emergencies and there is a necessity to give instructions within the scope of the grounds specified in 3.2.1. and 3.2.2, yet there are no orders to evaluate in the BPM, the System Operator shall issue instruction through the "Order Formation" module. The instructions given within this scope shall be assigned a label value of "0" or "1".

The instructions made through the order formation module shall be given an "Emergency Instruction" labeled "0" or "1", depending on the ground thereof.

Except for emergencies, it is essential to use the order formation module only if there is no order in the BPM or there are insufficient orders to remove the relevant congestion.

## 4. Sample scenarios

Various sample scenarios have been created to illustrate how the rules for evaluating the UpReg/DownReg Orders and designating label values shall be implemented. Sample scenarios cover different situations that may be encountered frequently. In these scenarios, it is explained how to remove system congestions and eliminate energy deficit or surplus, as well as to evaluate the UpReg/DownReg orders submitted within the scope of emergency and order formation module, and determine label values for the relevant day within the scope of the BPM process.

In the scenarios in question, evaluation was made among the UpReg/DownReg orders so as to provide the lowest cost possible, while the orders of some SSDUs were excluded from the scope of evaluation and omitted from the list of UpReg/DownReg orders, which are listed in order of price within the scope of the principles set forth under Section 3.1. Said offers, which were excluded from the scope of evaluation, were not assigned any label value.

### 4.1. Instruction scenarios labeled “0”

In cases where there is a necessity to give instructions due to the grounds set forth under 3.2.1 within the scope of eliminating an energy deficit or surplus, the System Operator shall try to ensure the supply/demand balance at the lowest cost possible with the label value of "0".

“0” label value shall be assigned to UpReg/DownReg instructions given both before and during the day in the course of the BPM process, in order to eliminate an energy deficit or surplus for the relevant day.

Below are sample scenarios regarding issuance of instructions labeled "0" and selection of instruction ground in different scenarios.

#### 4.1.1. Scenario-1 (ensuring supply/demand balance)

<p>In this scenario, the system is not balanced in terms of supply/demand with 800 MW of excess demand. In order to ensure supply/demand balance, a total of 800 MW UpReg instructions labeled "0" were issued to SSDUs "A", "B", "C" and "D", respectively.</p>	System Direction	Price (₺/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	
		PTF+30	D	50 MW	Labeled 0
		PTF+20	C	150 MW	Labeled 0
		PTF+15	B	400 MW	Labeled 0

		PTF+10	A	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	
		PTF-25	U	150 MW	
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	
		PTF-55	R	300 MW	

#### 4.1.2. Scenario-2 (ensuring supply/demand balance)

<p>In this scenario, the system is not balanced in terms of supply/demand with 600 MW of excess supply. In order to ensure supply/demand balance, a total of 600 MW DownReg instructions labeled "0" were issued to SSDUs "Z", "Y", "V" and "U", respectively.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)
	UpReg	PTF+50	G	200 MW
		PTF+45	F	100 MW
		PTF+35	E	10 MW
		PTF+30	D	50 MW
		PTF+20	C	150 MW
		PTF+15	B	400 MW

		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	Labeled 0
		PTF-15	Y	240 MW	Labeled 0
		PTF-20	V	60 MW	Labeled 0
		PTF-25	U	150 MW	Labeled 0
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	
		PTF-55	R	300 MW	

#### 4.1.3. Scenario-3 (SSDU program synchronization)

The System Operator may advance and/or postpone the stepping-in and stepping-out times specified within the scope of hourly final day-ahead generation/consumption schedules (FDGSs) notified by market participants to the BPM, in view of the system conditions and security and supply/demand balance.

##### 4.1.3.1. Advancing the stepping-in time of SSDU

In this scenario, during the transition period from hour "h" to hour "h+1", where total FDGS changes negatively affect the supply/demand balance, SSDU "B", which will be activated at hour "h+1" in accordance with its program, was given an UpReg instruction labeled "0" due to "SSDU Program Synchronization" and it was activated 15 minutes before hour "h+1" by the System Operator, in view of the order of order price and technical criteria of the relevant SSDUs.	System Direction	Price (£/MWh)	SSDU	Hour (h)	Hour (h+1)
	UpReg	PTF+50	G	200 MW	200 MW
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	10 MW
		PTF+30	D	50 MW	50 MW Labeled 0

		PTF+20	C	150 MW	150 MW	Labeled 0
		PTF+15	B	400 MW		Labeled 0
		PTF+10	A	200 MW	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	150 MW	Labeled 0
		PTF-15	Y	240 MW		Labeled 0
		PTF-20	V	60 MW	30 MW	Labeled 0
		PTF-25	U	150 MW		Labeled 0
		PTF-25	T		450 MW	
		PTF-40	S	250 MW		
		PTF-55	R	300 MW		

#### 4.1.3.2. Advancing the stepping-out time of SSDU

<p>In this scenario, during the transition period from hour "h" to hour "h+1", where total FDGS changes negatively affect the supply/demand balance, SSDU "S", which will be deactivated at hour "h+1" in accordance with its program, was given a DownReg instruction labeled "0" due to "SSDU Program Synchronization" and it was deactivated 10 minutes before hour "h+1" by the System Operator, in view of the order of order price and technical criteria of the relevant SSDUs.</p>	System Direction	Price (£/MWh)	SSDU	Hour (h)	Hour (h+1)	
	UpReg	PTF+50	G	200 MW	200 MW	
		PTF+45	F	100 MW		
		PTF+35	E	10 MW	10 MW	
		PTF+30	D	50 MW	50 MW	Labeled 0
		PTF+20	C	150 MW	150 MW	Labeled 0
		PTF+15	B	400 MW		Labeled 0
		PTF+10	A	200 MW	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	150 MW	
		PTF-15	Y	240 MW		
		PTF-20	V	60 MW	30 MW	
		PTF-25	U	150 MW		
		PTF-25	T		450 MW	
		PTF-40	S	250 MW		Labeled 0
		PTF-55	R	300 MW		

### 4.1.3.3. Postponement of the stepping-in time of SSDU

<p>In this scenario, during the transition period from hour "h" to hour "h+1", where total FDGS changes negatively affect the supply/demand balance, SSDU "T", which will be activated at hour "h+1" in accordance with its program, was given a DownReg instruction labeled "0" due to "SSDU Program Synchronization" and it was activated 5 minutes after hour "h+1" by the System Operator in a delayed manner, in view of the order of order price and technical criteria of the relevant SSDUs.</p>	System Direction	Price (£/MWh)	SSDU	Hour (h)	Hour (h+1)	
	UpReg	PTF+50	G	200 MW	200 MW	
		PTF+45	F	100 MW		
		PTF+35	E	10 MW	10 MW	
		PTF+30	D	50 MW	50 MW	Labeled 0
		PTF+20	C	150 MW	150 MW	Labeled 0
		PTF+15	B	400 MW		Labeled 0
		PTF+10	A	200 MW	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	150 MW	
		PTF-15	Y	240 MW		
		PTF-20	V	60 MW	30 MW	
		PTF-25	U	150 MW		
		PTF-25	T		450 MW	Labeled 0
		PTF-40	S	250 MW		
		PTF-55	R	300 MW		

#### 4.1.3.4. Postponement of the stepping-out time of SSDU

<p>In this scenario, during the transition period from hour "h" to hour "h+1", where total FDGS changes negatively affect the supply/demand balance, SSDU "C", which will be deactivated at hour "h+1" in accordance with its program, was given an UpReg instruction labeled "0" due to "SSDU Program Synchronization" and it was deactivated 5 minutes after hour "h+1" by the System Operator in a delayed manner, in view of the order of order price and technical criteria of the relevant SSDUs.</p>	System Direction	Price (£/MWh)	SSDU	Hour (h)	Hour (h+1)	
	UpReg	PTF+50	G	200 MW	200 MW	
		PTF+45	F	100 MW		
		PTF+35	E	10 MW	10 MW	
		PTF+30	D	50 MW	50 MW	
		PTF+20	C		150 MW	Labeled 0
		PTF+15	B	400 MW		
		PTF+10	A	200 MW	200 MW	
	DownReg	PTF-10	Z	150 MW	150 MW	Labeled 0
		PTF-15	Y	240 MW		Labeled 0
		PTF-20	V	60 MW	30 MW	Labeled 0
		PTF-25	U	150 MW		Labeled 0
		PTF-25	T		450 MW	Labeled 0
		PTF-40	S	250 MW		
		PTF-55	R	300 MW	300 MW	



#### 4.1.4. Scenario-4 (national electricity supply security resource management)

<p>In this scenario, SSDUs "U" and "T" with limited resources were given DownReg instructions labeled "0" at hour "h", at which no difficulty is encountered in terms of national electricity supply security, and UpReg instructions labeled "0" equal to the amount of DownReg instructions issued were given to them at hour "h+8", at which difficulty is encountered in terms of national electricity supply security, to be used if there is a risk that the energy demand cannot be met in real time due to primary resource constraint, in view of the order of UpReg/DownReg order price and technical criteria.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	Hour (h+8)	
	UpReg	PTF+50	G	200 MW	200 MW	
		PTF+45	U		150 MW	Labeled 0
		PTF+35	E	10 MW	10 MW	
		PTF+30	T		450 MW	Labeled 0
		PTF+20	C	150 MW	150 MW	
		PTF+15	B	400 MW		
		PTF+10	A	200 MW	200 MW	
	DownReg	PTF-10	Z	150 MW	150 MW	
		PTF-15	Y	240 MW		
		PTF-20	V	60 MW	30 MW	
		PTF-25	U	150 MW		Labeled 0
		PTF-25	T	450 MW		Labeled 0
		PTF-40	S	250 MW	250 MW	
		PTF-55	R	300 MW	300 MW	

## 4.2. Instruction scenarios labeled “1”

In cases where there is a necessity to give instructions in the transmission network due to the grounds specified in 3.2.2, the System Operator shall try to remove the system congestion at the lowest cost possible with an instruction labeled "1".

In case the supply/demand balance is disturbed with the instructions labeled "1" given, the UpReg/DownReg instructions labeled "0" in the amount corresponding to the imbalance that arose shall primarily be terminated. In case the terminated UpReg/DownReg instructions are insufficient or there is no UpReg/DownReg instruction to be terminated, instructions shall be issued with respect to the orders approved by the System Operator in view of the principles and price order set forth under 3.1.

Below are examples regarding issuance of instructions labeled "1" and selection of instruction ground in different scenarios. It is assumed that the instructions labeled "1" given in the relevant scenarios do not disturb the supply/demand balance.

### 4.2.1. Scenario-1 (transmission facility failure)

<p>In this scenario, SSDUs "Z", "Y", "V", "U", "T" and "S" were given DownReg instructions labeled "0" due to energy surplus in order to "ensure the supply/demand balance". SSDUs "C" and "D" were given UpReg instruction labeled "1" due to "Transmission Facility Failure" in order to remove the congestion caused by the failure in the transmission facility. The lower priced orders of participants "A" and "B" were excluded from the scope of evaluation, as they do not have an effect on the said congestion.</p>	System Direction	Price (₺/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	
		PTF+30	D	50 MW	Labeled 1
		PTF+20	C	150 MW	Labeled 1
		PTF+15	B	400 MW	
		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	Labeled 0
		PTF-15	Y	240 MW	Labeled 0

	PTF-20	V	60 MW	Labeled 0
	PTF-25	U	150 MW	Labeled 0
	PTF-25	T	100 MW	
	PTF-40	S	250 MW	
	PTF-55	R	300 MW	

#### 4.2.2. Scenario-2 (transmission facility overloading)

<p>In this scenario, SSDUs "S" and "V" were given DownReg instructions labeled "1" due to "Transmission Facility Overloading" in order to remove the congestion caused by the overload in the transmission facility. The higher priced orders of participants "Z", "Y", "U" and "T" were excluded from the scope of evaluation, as they do not have an effect on the said congestion.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)
	UpReg	PTF+50	G	200 MW
		PTF+45	F	100 MW
		PTF+35	E	10 MW
		PTF+30	D	50 MW
		PTF+20	C	150 MW
		PTF+15	B	400 MW
		PTF+10	A	200 MW

	<b>DownReg</b>	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	Labeled 1
		PTF-25	U	150 MW	
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	Labeled 1
		PTF-55	R	300 MW	

#### 4.2.3. Scenario-3 (transmission system maintenance program)

<p>In this scenario, SSDUs “C” and “E” were given UpReg instructions labeled “1” due to “Transmission System Maintenance Program” in order to remove the congestion in the transmission system caused by exclusion of the transmission facility from service within the scope of the maintenance program. The lower priced orders of participants “A”, “B” and “D” were excluded from the scope of evaluation, as they do not have an effect on said congestion.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	
	<b>UpReg</b>	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	400 MW	Labeled 1
		PTF+30	D	50 MW	
		PTF+20	C	250 MW	Labeled 1
		PTF+15	B	400 MW	
		PTF+10	A	200 MW	

<b>DownReg</b>	PTF-10	Z	150 MW
	PTF-15	Y	240 MW
	PTF-20	V	60 MW
	PTF-25	U	150 MW
	PTF-25	T	450 MW
	PTF-40	S	250 MW
	PTF-55	R	300 MW

#### 4.2.4. Scenario-4 (angular stability)

<p>In this scenario, SSDUs “A”, “C”, “D”, “F” and “G” were given UpReg instructions labeled “0” due to energy deficit, within the scope of ensuring “supply/demand balance”. While ensuring the system supply/demand balance, the lower priced orders of SSDUs “B” and “E” were omitted due to their negative impact on angular stability because of their position within the network topology. On the other side, in order to maintain angular stability, SSDUs “U” and “S” were given DownReg instructions labeled “1” due to “Angular Stability”.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	
	<b>UpReg</b>	PTF+50	<b>G</b>	<b>200 MW</b>	<b>Labeled 0</b>
		PTF+45	<b>F</b>	<b>100 MW</b>	<b>Labeled 0</b>
		PTF+35	E	10 MW	
		PTF+30	<b>D</b>	<b>50 MW</b>	<b>Labeled 0</b>
		PTF+20	<b>C</b>	<b>150 MW</b>	<b>Labeled 0</b>
		PTF+15	B	400 MW	

		PTF+10	A	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	
		PTF-25	U	150 MW	Labeled 1
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	Labeled 1
		PTF-55	R	300 MW	

#### 4.2.5. Scenario-5 (voltage stability)

<p>In this scenario, in order to maintain the voltage stability and prevent the voltage collapse of a zone which does not have sufficient generation resources and majority of whose demand is supplied through the transmission lines, UpReg instructions labeled “1” were issued to SSDUs “C” and “E” in the relevant zone due to “Voltage Stability”.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	
		PTF+45	G	200 MW	
	UpReg	PTF+45	F	100 MW	
		PTF+35	E	100 MW	Labeled 1
		PTF+30	D	50 MW	
		PTF+20	C	150 MW	Labeled 1
		PTF+15	B	400 MW	

		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	Labeled 0
		PTF-15	Y	240 MW	Labeled 0
		PTF-20	V	60 MW	Labeled 0
		PTF-25	U	150 MW	Labeled 0
		PTF-25	T	100 MW	
		PTF-30	S	250 MW	
		PTF-40	R	300 MW	

#### 4.2.6. Scenario-6 (additional reactive power support)

<p>In this scenario, DownReg instruction labeled “1” was issued to participant “U” due to “Additional Reactive Power Support”, in order to receive reactive power support above the capacity that enables the units to output reactive power values at their nominal active power in a generation facility which has an ancillary services agreement in place with TEİAŞ.</p>	System Direction	Price (€/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	
		PTF+30	D	50 MW	
		PTF+20	C	150 MW	Labeled 0
		PTF+15	B	400 MW	Labeled 0

		PTF+10	A	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	
		PTF-25	U	150 MW	Labeled 1
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	
		PTF-55	R	300 MW	

#### 4.2.7. Scenario-7 (interconnection lines connection security)

<p>In this scenario, SSDUs “C” and “G” were given UpReg instructions labeled “1” due to “Interconnection Lines Connection Security” in order to prevent interconnection lines from overloading and approaching the critical threshold.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	160 MW	Labeled 1
		PTF+45	F	100 MW	
		PTF+35	E	400 MW	
		PTF+30	D	50 MW	
		PTF+20	C	440 MW	Labeled 1
		PTF+15	B	400 MW	



		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	
		PTF-25	U	150 MW	
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	
		PTF-55	R	300 MW	

#### 4.2.8. Scenario-8 (SPS/SPR)

<p>In this scenario, SSDU “S”, established in order to ensure N-1 system security or interconnection lines connection security, which was excluded from scope of service as a result of triggering of SPS/SPR, was given a DownReg instnction labeled “1” due to “SPS/SPR”.</p>	System Direction	Price (£/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	
		PTF+30	D	50 MW	Labeled 0
		PTF+20	C	150 MW	Labeled 0

		PTF+15	B	400 MW	Labeled 0
		PTF+10	A	200 MW	Labeled 0
	DownReg	PTF-10	Z	150 MW	
		PTF-15	Y	240 MW	
		PTF-20	V	60 MW	
		PTF-25	U	150 MW	
		PTF-25	T	450 MW	
		PTF-40	S	250 MW	Labeled 1
		PTF-55	R	300 MW	

#### 4.2.9. Scenario-9 (regional supply security resource management)

<p>In this scenario, SSDUs “T” and “R” with limited resources were issued DownReg instructionS labeled “1” at hour “h”, at which no difficulty is encountered in terms of regional electricity supply security, and UpReg instruction labeled “1” equal to the amount of DownReg instruction given to them, at hour “h+10”, at which difficulty is encountered in terms of regional supply security, in order to be used during the hours when regional electricity supply security cannot be ensured due to primary resource constraint, in view of the order of UpReg/DownReg order price and technical criteria.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	Hour (h+10)	
	UpReg	PTF+50	G	200 MW	200 MW	
		PTF+45	R		300 MW	Labeled 1
		PTF+35	E	10 MW	10 MW	
		PTF+30	T		450 MW	Labeled 1
		PTF+20	C	150 MW	150 MW	
		PTF+15	B	400 MW		
		PTF+10	A	200 MW	200 MW	
	DownReg	PTF-10	Z	150 MW	150 MW	
		PTF-15	Y	240 MW		
		PTF-20	V	60 MW	30 MW	
		PTF-25	U	150 MW		
		PTF-25	T	450 MW	450 MW	Labeled 1
		PTF-40	S	250 MW		
		PTF-55	R	300 MW		Labeled 1

### 4.3. Order formation module instruction scenarios

In case there is a necessity to give instructions in the transmission network due to grounds set forth 3.2.1 or 3.2.2, yet there are no orders or there are insufficient orders in the BPM, the System Operator may issue an emergency UpReg/DownReg instruction through the “Order Formation Module”.

The instructions made through the order formation module shall be given an “Emergency Instruction” label, labeled "0" or "1", depending on the ground thereof.

#### 4.3.1. Scenario-1 (Order formation)

<p>In this scenario, SSDUs “C” and “D”, which do not have a DownReg instruction, were given each an “Emergency DownReg Instruction” labeled “0” through the order formation module, in order to “Ensure Supply-Demand Balance”, as it is observed that SFK reserve is used in the same direction for a long time despite all DownReg instructions submitted to the BPM are evaluated, at a period when the country consumption is at minimum level.</p>	System Direction	Price (₺/MWh)	SSDU	Hour (h)	
	UpReg	PTF+50	G	200 MW	
		PTF+45	F	100 MW	
		PTF+35	E	10 MW	
		PTF+30	D	50 MW	
		PTF+20	C	150 MW	
		PTF+15	B	400 MW	
		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	Labeled 0
		PTF-15	Y	240 MW	Labeled 0
		PTF-20	V	60 MW	Labeled 0
		PTF-25	U	150 MW	Labeled 0
		PTF-25	T	100 MW	Labeled 0

	*	C	250 MW	Labeled 0
	*	D	300 MW	Labeled 0
*Shall be settled within the scope of DUY.				

#### 4.3.2. Scenario-2 (order formation)

<p>In this scenario, in order to prevent the transmission congestion caused by exclusion of two 400kV transmission lines located on the same transmission corridor from the scope of service due to adverse weather conditions, SSDUs “C” and “E” were given UpReg instructions labeled “1” due to “Transmission Facility Failure/Overloading”. However, in case the said congestion cannot be removed through the orders issued to SSDUs “C” and “E”, and there is no order in the BPM to remove such congestion, SSDU “P”, which is not a balancing unit, was given an “Emergency UpReg Instruction” labeled “1” through the order formation module, due to “Transmission Facility Failure/Overloading”.</p>	System Direction	Price (₹/MWh)	SSDU	Hour (h)	
		*	P	200 MW	Labeled 1
	UpReg	PTF+45	F	100 MW	
		PTF+35	E	10 MW	Labeled 1
		PTF+30	D	50 MW	
		PTF+20	C	150 MW	Labeled 1
		PTF+15	B	400 MW	
		PTF+10	A	200 MW	
	DownReg	PTF-10	Z	150 MW	Labeled 0

	PTF-15	Y	240 MW	Labeled 0
	PTF-20	V	60 MW	Labeled 0
	PTF-25	U	150 MW	Labeled 0
	PTF-25	T	100 MW	
	PTF-30	S	250 MW	
	PTF-40	R	300 MW	
*Shall be settled within the scope of DUY.				

## 5. Determination of system marginal price in the balancing power market

### 5.1. System marginal price within the scope of the balancing power market (BMP)

System Marginal Price (SMP) within the scope of the Balancing Power Market shall be designated as follows, in accordance with Article 109 of DUY:

The System Marginal Price ( $SMP_{t,u}$ ) determined on a settlement period basis for each bidding zone shall be as follows, depending on the electricity balance of the bidding zone on a settlement period basis:

- (a) When an electricity deficit occurs in the bidding zone "t" at the hour in question, the System Marginal Price shall be equal to the highest order price corresponding to the Net Instruction Volume, which shall be calculated starting from the lowest UpReg order price;
- (b) When an electricity surplus occurs in the bidding zone "t" at the hour in question, the System Marginal Price shall be equal to the low order price corresponding to the Net Instruction Volume, which shall be calculated starting from the highest down-regulation order price;
- (c) When the system is balanced at the hour in question, the System Marginal Price shall be equal to the Day-Ahead Price for the bidding zone "t" and settlement period "u".

An instruction shall not be required for the relevant order price to be considered in the determination of the System Marginal Price.

### 5.2. Net instruction volume

The Net Instruction Volume shall be calculated as follows in accordance with Article 101 of the Electricity Market Balancing and Settlement Regulation (DUY):

If the following applies to the relevant settlement period, an energy deficit has occurred in the relevant price area for this settlement period:

$$\sum_{d=1}^k \sum_{r=1}^m YALM_{d,u,r} > \sum_{d=1}^k \sum_{r=1}^n YATM_{d,u,r}$$

If the following applies to the relevant settlement period, an energy surplus has occurred in the relevant price area for this settlement period:

$$\sum_{d=1}^k \sum_{r=1}^m YALM_{d,u,r} < \sum_{d=1}^k \sum_{r=1}^n YATM_{d,u,r}$$

If the following applies to the relevant settlement period, the system is balanced in the relevant price area for this settlement period:

$$\sum_{d=1}^k \sum_{r=1}^m YALM_{d,u,r} = \sum_{d=1}^k \sum_{r=1}^n YATM_{d,u,r}$$

$$NTH_u = \left| \sum_{d=1}^k \sum_{r=1}^m YALM_{d,u,r} - \sum_{d=1}^k \sum_{r=1}^n YATM_{d,u,r} \right|$$

The expressions used in these formulas shall have the following meanings:

$YALM_{d,u,r}$  refers to the Accepted UpReg Order Amount (MWh) of the order "r", by the balancing unit "d", valid for the settlement period "u", in the relevant price area with label values of 0 or 1, within the scope of the balancing power market;

YATMd,u,r	refers to the Accepted Down-Regulation Order Amount (MWh) of the order “r”, by the balancing unit “d”, valid for the settlement period “u”, in the relevant price area with label values of 0 or 1, within the scope of the balancing power market;
NTH	refers to the Net Instruction Volume (MWh) for the relevant price area;
k	refers to the number of balancing units with accepted orders in the relevant price area with label values of 0 or 1, for the settlement period “u”;
m	refers to the number of accepted UpReg orders in the relevant price area with label values of 0 or 1, for the settlement period “u”, pertaining to the balancing unit “d”;
n	refers to the number of accepted DownReg orders in the relevant price area with label values of 0 or 1, for the settlement period “u”, pertaining to the balancing unit “d”.