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Regulatory and Energy Assistance

CASE STUDY

BALANCING SETTLEMENT PROCESS

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USAID/BiH REAP

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What is Balance Settlement?

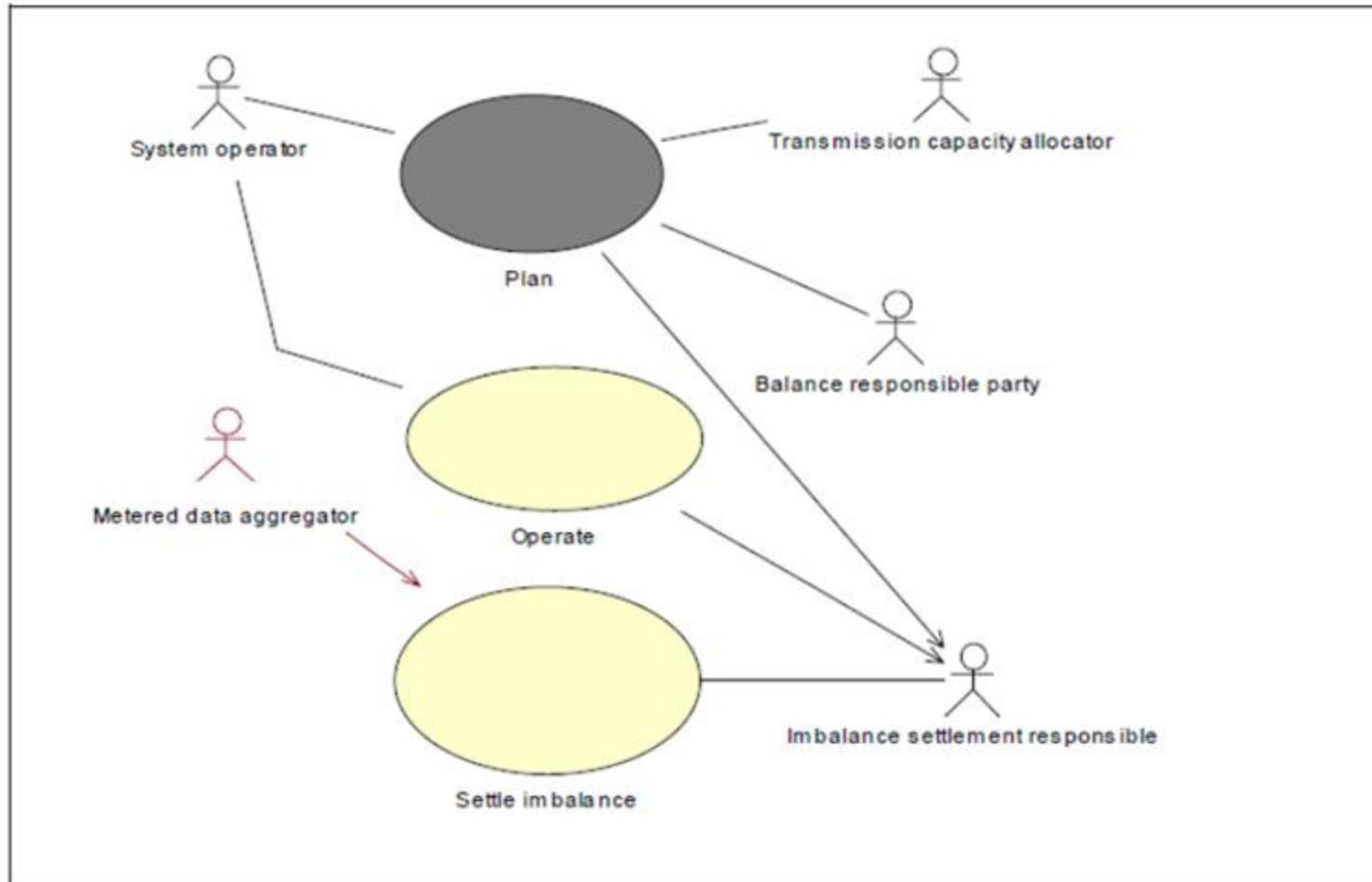
- **Purpose: to settle the imbalances between**
 - the supplier/end user's consumption responsibilities and the actual consumption
 - the power producer's sales responsibilities and actual power production.
- **Balance settling is between the System Operator and the Balance Responsible Parties**
- **The procedure to calculate this balance and the invoicing of any differences is called Balance settlement**

The Balance settlement process consists of three phases (ENTSO-E and NordReg)

- 1. Planning/Scheduling**
- 2. Operating**
- 3. Settling imbalances**

Balance settlement process

(Harmonized Electricity Market Role Model)



Planning/Scheduling phase

**Market participants calculate in advance
consumption, production and trade.**

- **traders**
- **suppliers**
- **generations**

For the planning/scheduling phase it is important to identify

- **Who is the responsible/authorized party to develop the official schedule?**
- **Actors in the market who are obliged to submit scheduling data?**
- **Is the process to submit and accept scheduling data described?**
- **Does the Scheduling validation process exist, who does it, when and how?**

Operation phase

- **Execution of the Schedule determined during the planning phase**
- **The System Operator handles any deviations between production, consumption and unforeseen congestion**
- **The System Operator orders the Balancing Service Provider to activate regulation up and down to keep balance in the system.**

Balancing services settlement

Two options exist :

- **marginal pricing: all balance service providers will receive the same remuneration (equivalent to the price of the highest activated balancing energy bid or offer); and**
- **pay-as-bid: all balance service providers will receive a remuneration equivalent to the price they offered or bid.**

For the Operation phase it is important to identify

- 1. The party responsible for Operation**
- 2. Is the process to submit bids described?**
- 3. Is the process to accept bids and create imbalance prices described?**
- 4. Is the process to order balancing energy providers to engage their balancing energy described?**
- 5. Does the metering system support the balancing market?**
- 6. Do operational rules and other documents determine relationships between balancing market participants?**

Settling imbalances phase

- **Metered data aggregator sends the data to the imbalance settlement responsible party**
- **Imbalance Settlement Responsible Party, along with complementary data received from other sources, carries out the imbalance settlement**

For settling imbalance phase is important to identify if:

- **Imbalance Settlement Responsible Party (ISRP) receive aggregated executed schedules, regulation and metered information?**
- **ISRP calculates imbalances?**
- **ISRP sends imbalance reports and bills (invoices) to the Balance Responsible Parties ?**
- **ISRP makes the final reconciliation and distributes data to relevant actors?**
- **Methodology to allocate imbalances to the eligible customers exists?**

Planning/Scheduling phase-information exchange

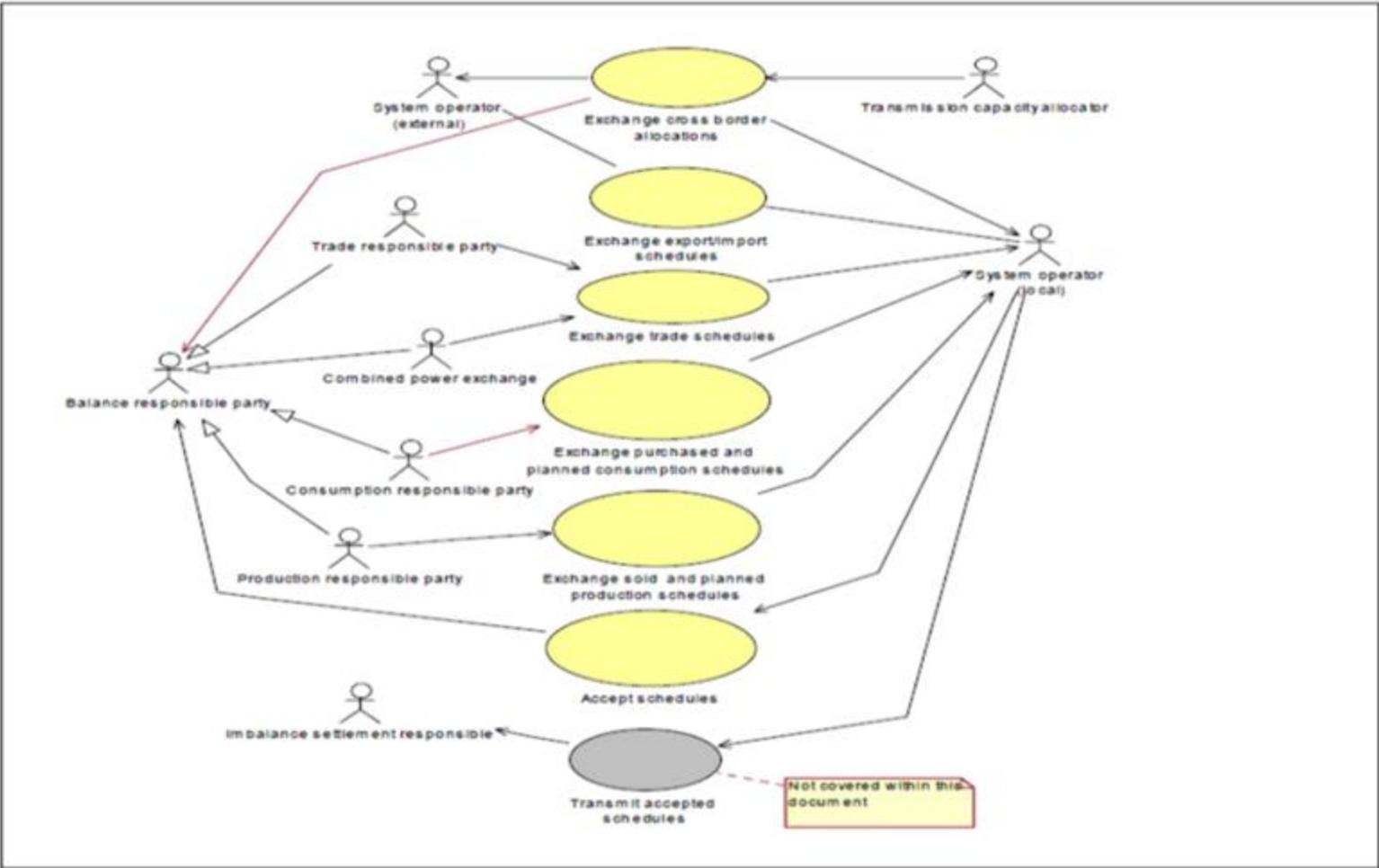


Figure 2: Information exchange during the planning phase

Planning/Scheduling phase – Gap Analysis

Issue	Document	Articles/Item	Responsible Party	Note	
Party responsible/authorized to develop the official systemscheduling for balance settlement	ISO Law	Art. 7	ISO to administer balancing process		
Actors in the market obliged to submit scheduling data as an input for the system scheduling	<ul style="list-style-type: none"> Network Code Market Rules 	Art. 6.4 Chapter V	BRP/Market participants Licensed and registered party	Question: Does any document oblige 10 kV/35 kV customers to send their schedules? To whom?	
Actors send their schedules to BRP <i>(New Market Rules obliges Market participants to submit a schedule to ISO)</i>	Generator	<ul style="list-style-type: none"> Market Rules Contract on Balance responsibility 	<ul style="list-style-type: none"> Art.11 to 14 Art. 4 	Market Participants	
	Trader	<ul style="list-style-type: none"> Market Rules Contract on Balance responsibility 	<ul style="list-style-type: none"> Art. 11 to 14 Art. 4 	Market Participants	<u>Gap</u> : Art. 14 considers eligible customers as the party obligated to submit the schedule but it should be a market supplier. Supply contract should have a provision on scheduling.
	Supplier	<ul style="list-style-type: none"> Market Rules Contract on Balance responsibility 	<ul style="list-style-type: none"> Art. 11 to 14 Art. 4 	Market Participants	<u>Gap</u> : Art. 14 does not see a market supplier as responsible for scheduling. Supply contract should have a provision on scheduling.

Planning/Scheduling phase – Gap Analyses (cont'd)

<p>Is the process to submit and accept scheduling data described? BRP sends schedule to ISO</p>	<ul style="list-style-type: none"> • Market Rules • Network Code 	<ul style="list-style-type: none"> • Chapter VI • Art. 6.4 	<p>BRP</p>	<p><u>Gap:</u> Network Code does not designate who does what but new Draft Market Rules oblige Market participants to send a schedule to ISO. Where does the BRP stand?</p>
<p>Validation process</p>	<ul style="list-style-type: none"> • Network Code 	<ul style="list-style-type: none"> • Art. 6.5. 	<p>ISO and Market participants (generator, trader, supplier)</p>	<p><u>Gap:</u> Since in accordance to the new Draft Market Rules Market participants are obliged to submit a schedule and are supposed to see if the schedule was accepted.</p>

Planning/Scheduling phase - Conclusions

- 1. Market Participants are (in accordance to the ISO Market Rules) Generators, Traders and Suppliers.**
- 2. Market Rules oblige a BRP to submit a schedule to ISO (Important: New Market rules oblige each Market participant-generator, trader and supplier, to submit a schedule to the ISO). Network Code obliges “someone” to submit a schedule.**
- 3. Contract on Balancing obliges Market participants to submit a schedule to BRP/ISO.**
- 4. Supply contract between the Supplier and a customer should have provision that oblige a customer to submit a schedule.**
- 5. ISO checks and approves schedules.**
- 6. Market participants see approved schedule on the ISO platform.**
- 7. All documents consider balancing settlement in the wholesale market only, but not the retail market.**

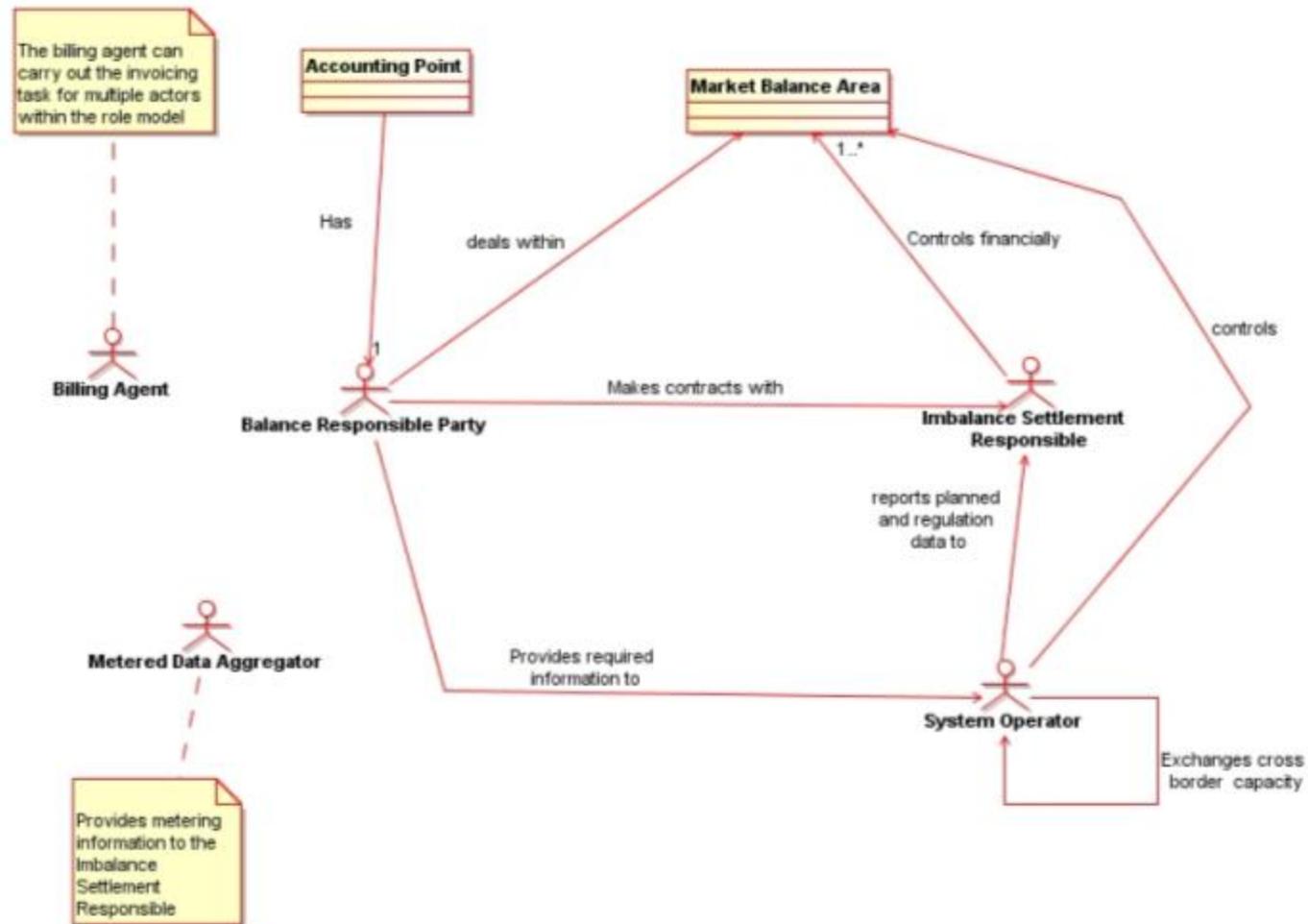
Operational Phase – Gap Analyses

Issue	Document	Articles/Item	Responsible Party	Note
Party responsible for Operation	ISO Law	Art. 2	ISO	
Is the process to submit bids, accept bids and create imbalance prices described?				<u>Gap: No.</u>
Is the process to order balancing energy providers to engage its balancing energy described?				Gap: No. New Market Rules, Art. 23: “Details and form of the document to submit offers for balancing energy as well as rights and obligations of involved parties will be defined in a separate document.”
Do Operational rules and other documents determine relationships between balancing market participants?				

Operational Phase - Conclusions

- **The New Market Rules Art. 7 defines the Balancing Market as consisting of ancillary/system services and balancing energy.**
- **Ancillary services are regulated services.**
- **Market on balancing energy does not exist.**
- **Electric Power Sector in BiH is still in Phase Ia (simple compensation methodology).**

The imbalance settlement phase



The imbalance settlement phase – Gap Analysis

Issue	Document	Articles/Item	Responsible Party	Note
Party responsible for imbalance settlement	ISO Law	Art. 7	ISO administrates balancing process	
Sending/receiving agreed schedules to imbalance settlement responsible party	<ul style="list-style-type: none"> • Network Code • Market Rules 	<ul style="list-style-type: none"> • Art. 6.4 & 6.5 • Chapter V 		<u>Gap</u> : Since ISO is responsible for scheduling and balance settlement, a separate Imbalance Settlement Party does not exist.
Sending/receiving measured values on delivered electricity to imbalance settlement responsible party	<ul style="list-style-type: none"> • Network Code • Market Rules 	<ul style="list-style-type: none"> • Art. 6.4 & 6.5 • Chapter XII 	Licensed and registered party	Same as above. <u>Gap</u> : See Metering process. What about metered values from distribution network for each supplier?

The imbalance settlement phase – Gap Analysis (cont'd)

Issue		Document	Articles/Item	Responsible Party	Note
Imbalance settlement party reconciles and identifies imbalances	Calculate imbalances	<ul style="list-style-type: none"> Network Code Market Rules 	<ul style="list-style-type: none"> Art.6.5.22 Chapter XII (<i>Chapter XIII in the Draft Market Rules</i>) 	<ul style="list-style-type: none"> ISO 	<ul style="list-style-type: none"> Balancing market still in the Ia phase. New Market Rules <i>relates imbalance prices to the energy prices for secondary and tertiary regulation.</i> “ <u>Gap</u>: If there is no load profile data is it possible to have fair and transparent allocation of imbalances to market participants? This is on imbalance settlement
	Reconciliations imbalances			<ul style="list-style-type: none"> ISO BRP Market Participants 	
	Identification and sending invoices			<ul style="list-style-type: none"> ISO BRP 	

The imbalance settlement phase – Conclusion

Key obstacles:

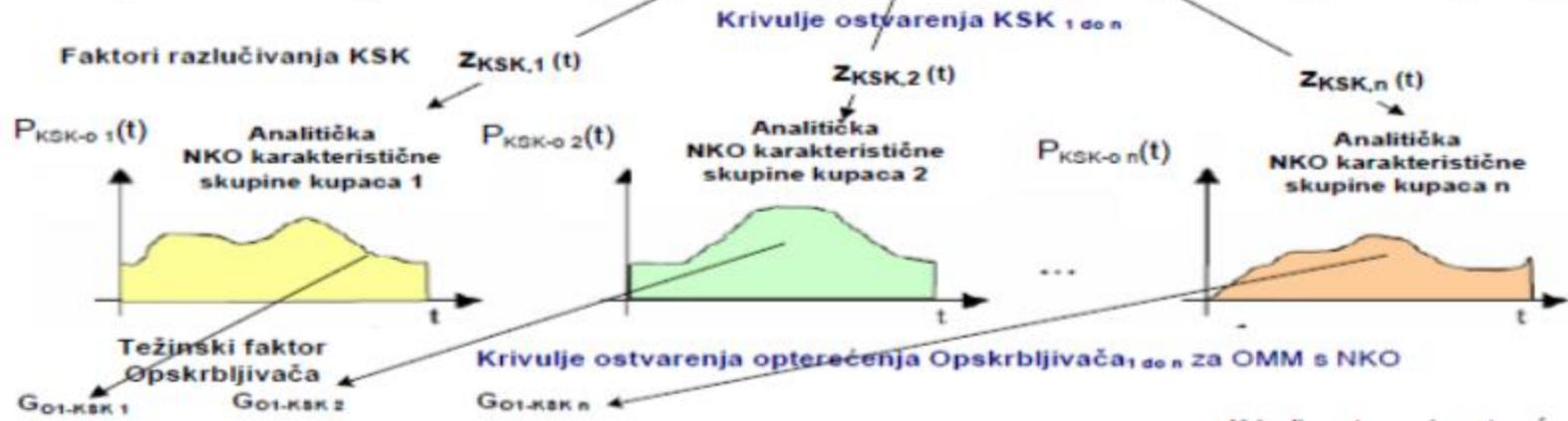
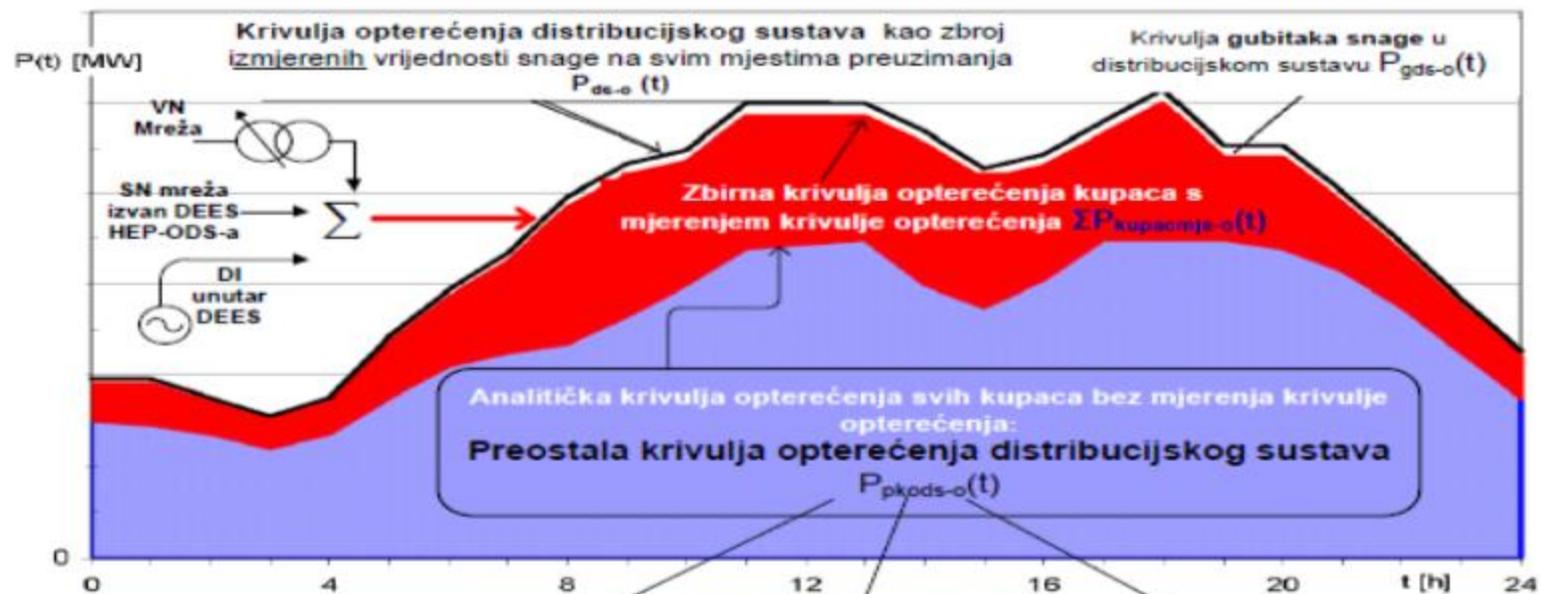
- **absence of the balancing energy market**
- **imperfections in the metering process**
- **missing load profile curves for non - incrementally metered customers, and**
- **method to allocate imbalances to eligible customers in the retail market.**

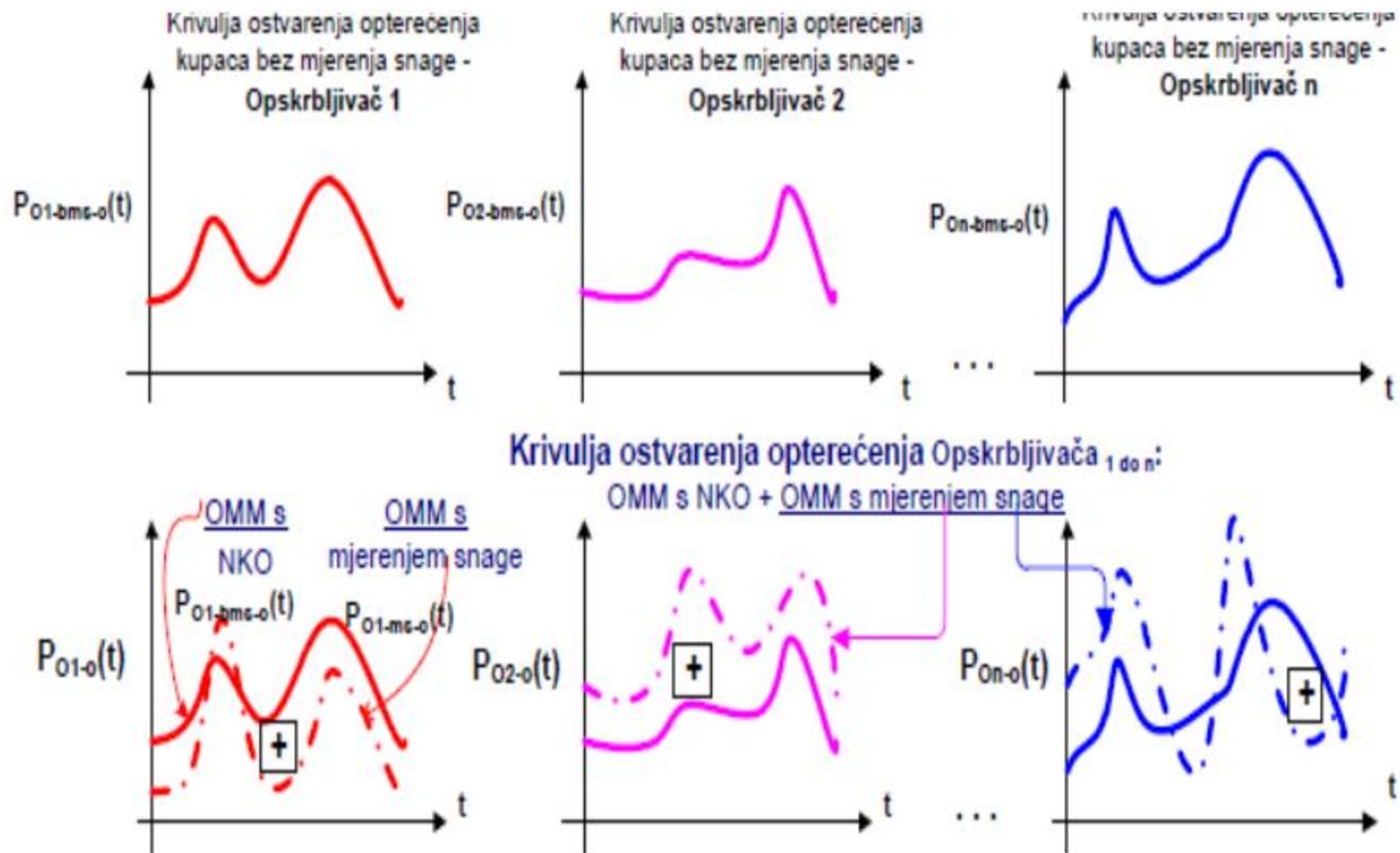
Conclusions

- **Network Code and market Rules consider Balancing settlement for Wholesale market only,**
- **Work is needed to design the retail market and change or update rules to reflect these changes.**
- **It is obvious that market actors roles and relations between them have to be determined and described in the regulations and rules.**

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HVALA!





1. Poduzetništvo P1;
2. Poduzetništvo P2;
3. Poduzetništvo – javna rasvjeta JR0;
4. Kućanstva K0.

(1) Vrijednosti krivulje opterećenja distribucijskog sustava računaju se iz:

$$P_{ds-o}(t) = \sum P_{psm-dsm}(t) + \sum P_{ppds}(t) + \sum P_{pddm}(t)$$

- $\Sigma P_{psm-dsm}(t)$ zbroj izmjerenih vrijednosti snage na svim mjestima preuzimanja električne energije iz prijenosne mreže, po intervalima (za vrijednosti snage kod kojih energija ulazi u distribucijsku mrežu koristi se pozitivni predznak, a kod kojih energija izlazi iz distribucijske mreže koristi se negativni predznak);
- $\Sigma P_{ppds}(t)$ zbroj izmjerenih vrijednosti snage na svim mjestima preuzimanja električne energije iz proizvodnih postrojenja priključenih na distribucijski sustav, po intervalima;
- $\Sigma P_{pddm}(t)$ zbroj izmjerenih vrijednosti snage na svim mjestima preuzimanja električne energije iz druge distribucijske mreže, po intervalima (za vrijednosti snage kod kojih energija ulazi iz druge distribucijske mreže koristi se pozitivni predznak, a kod kojih energija ulazi u drugu distribucijsku mrežu koristi se negativni predznak).

(1) Preostala krivulja opterećenja distribucijskog sustava $P_{pkods-o}(t)$ računa se iz:

$$P_{pkods-o}(t) = P_{ds-o}(t) - P_{gds-o}(t) - \Sigma P_{kupacmjs-o}(t)$$

gdje je:

$\Sigma P_{kupacmjs-o}(t)$ zbroj vrijednosti izmjerenih opterećenja kupaca za koja postoji izmjerena i potvrđena krivulja opterećenja iskazana po intervalima