



USAID
OD AMERIČKOG NARODA

**Asistencija regulativi i reformi
energetskog sektora**

Ancillary Services and Balancing in the Wholesale Market of Bosnia- Herzegovina

**Presentation by KEMA Consulting GmbH
for BiH REAP**

**Bosnia and Herzegovina (BiH) Regulatory and Energy Assistance Project (REAP)
USAID Contract No. EPP-I-00-03-00004-00, Task Order 5
Implemented by Advanced Engineering Associates International, Inc.**

This presentation is made possible by support from the American People sponsored by the United States Agency for International Development (USAID). The contents are the sole responsibility of the author/s and do not necessarily reflect the views of USAID or the United States Government.



USAID
OD AMERIČKOG NARODA

**Asistencija regulativi i reformi
energetskog sektora**

Possible options for reform of the present arrangements



Observations and issues

- **Key issues**
 - Non-provision of reserves due to absence of market value orientated remuneration and ineffective / absent penalty scheme
 - No means for downward regulation beyond secondary control
 - Lack of meter values for settlement of EP's imbalances
- **Other relevant issues**
 - Sub-optimal allocation of ancillary services obligations to EPs
 - Unnecessarilly high burden on consumers
- **Issues out of scope**
 - Water management for Caplina
 - Supply tariff regulation at entity level



Requirements for future framework

- **Essential requirements**
 - **Ensure that ISO has access to sufficient volumes of ancillary services at all times**
 - **Provide incentives to provide ancillary services**
 - **Penalize non-availability / non-delivery**
 - **Incent reduction of imbalances**
- **Additional objectives**
 - **Facilitate optimal allocation of ancillary services obligation (economic efficiency)**
 - **Expand range of balancing services to increase operational flexibility**
 - **Limit cost to consumers**



Areas to be considered

- A. Procurement of reserves**
- B. Real time balancing**
- C. Metering and imbalance settlement**

- D. Others**
 - i. Financial settlement**



Procurement of reserves – three options

- 1. Continue regulated procurement with increased penalties**
 - **SERC to set reserve obligations on each producer (similar to today)**
 - **Producers receive regulated payment for ancillary services (as today)**
 - **Failure to nominate ancillary services subject to ,high‘ penalties**

- 2. Regulated obligations with daily adjustment mechanism**
 - **SERC to set reserve obligations on each producer (similar to today)**
 - **Producers must either provide sufficient reserves or bear additional cost of sourcing outstanding volumes from other producers (free market pricing)**

- 3. Tenders for ancillary services**
 - **ISO procures reserves through open tenders (free market pricing)**

- **In addition, may consider in all cases:**
 - **Consider variation of reserve allocations over time (incl. peak/off-peak etc.)**
 - **Consider additional imports by ISO**
 - **Apply penalties for non-delivery in real time**



Procurement of reserves – Option 1: Regulated procurement + penalties

Advantages	Drawbacks
<ul style="list-style-type: none">• Similar to status quo, i.e. limited need for change• Regulated remuneration limits costs to consumers• Penalties should increase incentives to fulfil contractual obligations	<ul style="list-style-type: none">• Risk of insufficient incentives<ul style="list-style-type: none">• Remuneration does not reflect (opportunity) costs (=> <i>may require very high penalties to avoid non-delivery in critical situations</i>)• Penalties returned to EPs (ISO as non-profit organization)• Does not promote economic efficiency• No instrument for ISO to procure outstanding volumes• Incompatible with FG / NC BAL



Procurement of reserves – Option 2: Regulated obligation + adjustment **mechanism**

Advantages	Drawbacks
<ul style="list-style-type: none">• Benefits of 2^{ry} market<ul style="list-style-type: none">• Incentives on EPs to provide contracted (as well as additional) volumes• EP's incented to either fulfil or transfer reserve obligations (=> promote economic efficiency)• Regulated remuneration limits costs to consumers• Similar to status quo, i.e. limited change of current arrangements	<ul style="list-style-type: none">• Initial distribution of reserve obligations<ul style="list-style-type: none">• May not be economically efficient• May not necessarily consider technical constraints of individual producers• Distressed buyer may be exposed to risk of excessive prices• Incompatible with FG / NC BAL



Procurement of reserves – Option 3: Tenders for ancillary services

Advantages	Drawbacks
<ul style="list-style-type: none">• Market-based allocation and remuneration of reserve obligations<ul style="list-style-type: none">• Creates strong incentives on EPs to offer and provide contracted volumes• Promotes economic distribution to individual parties (EP's)• May facilitate further optimization and cost reductions when combined with shorter contract durations• Principally compatible with FG / NC BAL	<ul style="list-style-type: none">• May lead to substantially higher cost for consumers (risk of market power?)• Fundamentally different approach than today, requires establishment of market mechanism• Difficult to estimate cost of ancillary services in advance (=> tariff setting)



Real time balancing - Tertiary reserves (I)

- Consider 5 possible options:
 1. Transition to market-based pricing of balancing energy
 2. Introduce daily balancing market for contracted reserves and additional volumes
 3. Consider mandatory bidding
 4. Introduce separate product for downward regulation
 5. Use tertiary control also for compensation of limited deviations
- Please note that these options may be combined, i.e. they are not mutually exclusive



Real time balancing - Tertiary reserves (II)

I. Transition to market-based pricing of balancing energy

- Currently used regulated fixed price (equivalent to 3x variable cost of most expensive plant) may be above/ below actual energy value and cost of provision
- Meant to discourage EPs to rely on balancing energy for balancing of own imbalances
- Alternatively, consider partial transition to market-based pricing:
- Option A:
 - May not fully reflect the cost of ancillary service provision by EPs in BiH
 - Use of price index (e.g. linked to foreign power exchange)
- Option B:
 - Allow for competitive bidding by EPs, but with defined spread between upward / downward balancing energy
 - Expect EPs to set their prices close to production costs and/or market values of ancillary services



Real time balancing - Tertiary reserves (II)

2. Introduce daily balancing market for contracted reserves and additional volumes

- Combine bids from contracted reserves and additional daily offers (standard in other countries)
- Combines certainty of advance contracting of reserves (reliability) with scope for optimizing use of balancing resources in real time (economic efficiency)
- May help to reduce cost of balancing, especially in combination with free pricing of uncontracted reserves

3. Consider mandatory bidding

- Obligation on market participants to make balancing energy offers, subject to technical capability and availability (similar to other European countries)
- Refers not only to contracted reserves, but also to other BSPs' / generators' residual reserves available in the short run
- May refer to total residual reserves or part of it



Real time balancing - Tertiary reserves (III)

4. Introduce bids for downward regulation

- Currently, only downward secondary control may be used for balancing in situations of excessive power in the system
- New downward tertiary control would correspond to European practice and help prevent secondary control from exhaustion

5. Use tertiary control also for compensation of limited deviations

- Currently, secondary control is used for balancing in all situations of small to medium size imbalances
- Remove current limitation of tertiary control for imbalances $>50\text{MW}$ and use it also for smaller imbalances
- Should be used to relieve secondary control



Real time balancing - Secondary reserves (I)

- **Do not see need for principal changes to activation mechanism (i.e. continue parallel activation of all secondary reserves on portfolio basis)**
- **Need for effective monitoring**
- **Recommend clear separation between:**
 - **Balancing energy delivered from secondary control (net volumes)**
 - **BRP imbalances**
- **Consider 2 options for settlement of balancing energy (see below)**
 - 1. Modify rules for in-kind compensation of balancing energy**
 - 2. Financial settlement of balancing energy**



Real time balancing - Secondary reserves (II)

1. Modified in-kind compensation with tendering of residual volumes

- Compensation of balancing energy in kind on weekly basis (similar to today)
- Modification of physical volumes, e.g.:
 - ‚Scaling‘ of delivered volumes (e.g. $1.x / 0.y$ for balancing energy delivered / received)
 - Use of different products, e.g. peak load (base load) for upward (downward) regulation
 - Separate compensation of different tariff periods
- Difference in energy offset through selling/buying corresponding volumes through public tender (operated by ISO)
- Resulting net costs or revenues offset through imbalance settlement

2. Financial settlement of balancing energy

- Direct financial settlement of (net) volumes delivered in each hour
- May consider same approaches for pricing as outlined for tertiary control above
- Resulting costs or revenues to be offset through imbalance settlement



Real time balancing - Secondary reserves (III)

- Comparison of the two alternatives does not provide for a clear favourite

Criteria	Option 1: Modified compensation programs	Option 2: Financial settlement
Degree of change required (compared to current arrangements)	Medium	High
Incentives to fulfill contractual obligations	Medium / High	Medium / High
Availability of sufficient reserves to ISO	N/A	N/A
Economic efficiency	N/A	N/A
Limitation of cost to consumers	Low (increasing costs)	Low (increasing costs)
Compatibility with Framework Guidelines / Network Code on Balancing	Low	Medium
Other effects	-	-



Metering and imbalance settlement

- **Determination of hourly imbalances**
 - Transco should be obliged to provide hourly metering values for all relevant metering points (i.e. production, distribution/consumption and cross-border) to ISO and other relevant parties (e.g. BRPs, DSOs)
- **Imbalance settlement**
 - Suggest replacing current compensation in kind by financial settlement of hourly imbalances
 - Requires determination of hourly imbalances (net of secondary control – see above)
 - Price of imbalances to be linked to price of balancing energy activated from tertiary (and secondary) reserves



Others – financial settlement

- **We assume that the ISO will remain responsible for all settlement calculations and the determination of amounts due**
- **Conversely, we can imagine two approaches for financial settlement :**
 - 1. Option 1: ISO as settlement agent**
 - **Bilateral payments between market participants (BSPs, BRPs etc.)**
 - **Effectively continuation of present arrangements**
 - 2. Option 2: ISO as central counterparty**
 - **Payments between BSPs / BRPs and the ISO**
 - **Similar to common practice in other European countries**
- **In our view, both approaches are compatible with the different models and approaches presented above**



Contact details

Christian Hewicker

Service Line Leader Markets & Regulation
DNV KEMA Energy & Sustainability

KEMA Consulting GmbH
Kurt-Schumacher-Str. 8
53113 Bonn

Telefon: +49 228 44690-56
Fax: +49 228 4469099
E-mail: christian.hewicker@dnvkema.com

Holger Ziegler

Consultant
DNV KEMA Energy & Sustainability

KEMA Consulting GmbH
Kurt-Schumacher-Str. 8
53113 Bonn

Telefon: +49 228 44690-70
Fax: +49 228 4469099
E-mail: holger.ziegler@dnvkema.com

Bozidar Radovic

Senior Consultant
DNV KEMA Energy & Sustainability

KEMA Consulting GmbH
Kurt-Schumacher-Str. 8
53113 Bonn

Telefon: +49 228 44690-00
Fax: +49 228 4469099
E-mail: Bozidar.Radovic@dnvkema.com