Survey of Capacity Support Mechanisms in the Energy Community

8th Athens Forum

Athens, June 22-23 2006

Background

The 7th Athens Forum in Belgrade, 24-25 November 2005, mandated the CEER (SEE WG) to present a Survey on the existing Capacity Support Mechanisms in the Energy Community.

Draft Questionnaire for the Survey

- approval by WG was distributed for completion–28.2.06

Received data

- Until 13.3.06

Preliminary Draft Report

- 1st draft report –sent for comments to WG members on 23rd March 2006, comments received until 10.4.06, 2nd Draft Report (22.5.06)

Final Report (7.6.06)

The Working Group wishes to express its appreciation to the World Bank for the valuable input and comments provided, especially on market structure and capacity adequacy issues.

Questionnaire

Main issues regarding capacity support mechanisms:

1. Existence of mechanism(s) supporting new capacity

- Basic reasons for new capacity support mechanism(s)
- Signaling of need for new capacity investments

2. Description of the mechanism(s)

- Centralized / Decentralized
- Planning Period
- Commitment Period
- Participants
- Type of Payments (Explicit, Implicit..)
- Determination of Price (Central, Auction, Market)
- Penalties
- Market Power Mitigation
- Mechanism implementation Cost

Questionnaire (2)

3. Other forms of capacity support

- **Secured Contracts**
- **Captive market**
- **Guaranteed Income**

4. Other related information

- ***Distortions/ problems that have been noticed due to the implementation of the chosen capacity support mechanism***

Participants

- As of 7 May 2006, answers were received by:

1. **Romania**
2. **Bosnia & Herzegovina**
3. **Serbia**
4. **Montenegro**
5. **UNMIK**
6. **FYROM**
7. **Turkey**
8. **Hungary**
9. **Austria**
10. **Italy**
11. **Greece**

Electricity Market Structures in Energy Community

The SEE region is characterized by a number of national electricity markets in various stages of development

Low Market Integration due to

- Technical reasons (availability of interconnection capacity)
- Market reasons (market structure/credit risk/information on opportunities to trade) and
- Energy policy considerations (energy self sufficiency)

Wholesale Market structure varies from day ahead pool type arrangements to bilateral contracts and integrated generator/suppliers

Electricity Market Structures in Energy Community (2)

Very little free market wholesale activity within most of SEE

- Romania and Bulgaria: have broken up generator sector to allow some national competition in generation
- Albania, Croatia and Montenegro: integrated generation and supply companies (no wholesale market)
- FYROM: the soon to be privatized distribution company (supplier) will have to buy from wholesale supplier attached to TSO.
- Serbia: Genco sells to wholesale supplier who resell to discos
- UNMIK: KEK generation company sells to KEK public supplier

In most cases, the retail market for large eligible industrial consumers is more open than wholesale market since eligible customers can import directly or sign contracts with traders or generating companies

Investment Requirements

Various studies (most recently GIS by World Bank) have identified the need for considerable investments in the SEE in generation capacity until 2020.

How to provide appropriate incentives to prospective private investors and financing institutions to commit funds for such long term projects?

Planning Dynamics for new investments

- **Monopoly regime**: capacity market administered by vertically integrated company through central planning process (by engineering related criterion, type and size of new generating capacity and associated transmission facilities required)
- **Competitive electricity market**: timing and type of new generating investments is driven by expectations of market prices, generating plant operating costs and resulting profit margins, while opportunities of cross border trade play a significant role depending on the availability of interconnection capacity

Capacity Support Mechanisms

Major concern: Will long term reliability be fully sustained solely by competitive prices, with no other incentives?

- Processes to enable market based mechanisms to provide the necessary signals to spur investments in needed generating capacity and transmission infrastructure, are neither fully developed nor mature.
- Periods of capacity shortages and/or high prices
- Government or regulatory intervention to regulate tariffs or introduce market caps to keep electricity cost at an affordable level

Generators want to lock in long term contracts (capital intensity of generation, financing bankable).

Retail Suppliers want to minimize their risk by matching the portfolio of generation contracts to retail contracts in a competitive retail market (where most end users do not wish to enter into long term supply contracts)

Capacity Support Mechanisms (2)

Energy-only markets may be sufficient to ensure, by outage coordination and no price caps, that in the short term existing plant is available when needed **BUT** In the long term it is questionable whether new investments can be attracted even if coupled with a range of derivative contracts based upon the energy-only price

"**Development" Incentives** provided through a centralized procurement market, whereby the Single Buyer or the TSO or a central agent responsible for system reliability, provides incentives by a competitive tender for additional tranches of new capacity as and when needed **BUT** agent intervention is not consistent with the objective to establish a sustainable competitive market and tender rounds may raise problems for existing generators who will face a wealth loss associated with the consequential reduction on SMP.

Capacity Support Mechanisms (3)

The addition of a capacity support mechanism as a market based measure to control the supply of the separate "product" generation capacity installed and/or available provides for a reliable electricity service.

In earlier market designs, customers paid for capacity as an adder to the DAM price, calculated on the basis of its reliability value. Capacity payments were funded through uplift.

Alternative method: capacity obligation on suppliers equal to a multiple of their peak load at some future specified time period, to be covered under the form of the purchase of a new commodity such as a "capacity ticket" backed by firm capacity or in a simpler form of an obligation to secure contracts with generators for power which generators are committed to deliver should they be called upon to do so. Suppliers that fail their obligation pay penalties set high enough to encourage their conformity.

Capacity Support Mechanisms (4)

An essential issue to consider in establishing a **capacity market** is the disconnection between the capacity and energy markets. A measure to account for such disconnection in the case of **capacity contracts** is to require contracted generators to be available to produce energy at a strike price (or purchase it and provide it to their counterparty at that price). In such a case, the contract relates to an option with the capacity payment reflected at the call option premium and the energy price at the strike price.

Other important issues to be considered:

- Role of pricing including tariffs structure i.e time of use or interruptible tariffs, and demand response
- Affordability issue
- Availability of appropriate metering systems

Capacity Support Mechanisms in the Energy Community

- **Italy and Greece**: implemented a capacity support mechanism, currently running the transitional phases of their respective mechanisms (Italy still has not finalized its permanent scheme)
- **Romania and UNMIK**: planning process

The rest of the participants to the Survey haven't planned or implemented any kind of capacity mechanism, excluding the renewable energy sources support mechanisms. Main reasons:

- Existence of adequate generation capacity (currently and as foreseen in the coming years) (In Austria interconnection capacities in conjunction with hydro resources adequate to cover the future expected demand)
- Existence of PPAs providing adequate financial support to the generators ((Hungary, FYROM, Turkey)
- Decisions regarding capacity expansion are (still) taken centrally (Serbia, Bosnia-Herzegovina and Montenegro)
- Trust in the energy-only market model

Capacity Support Mechanism – Italy

In October 2003, after the black-out of June 2003, Act n.290 empowered the Italian Government to take measures in order to guarantee the adequacy of the national electricity system in the medium term.

- The capacity remuneration system's architecture shall be designed by the TSO according to the criteria and conditions set by the Regulatory Authority.
- In March 2005, the Regulatory Authority published a consultation document which proposed that a **centralized capacity market** should be established where the TSO would be required to buy a prescribed volume of reliability contracts from generators on behalf of the demand side.
- The reliability contract to be auctioned would consist of a combination of a financial call option with a high strike price and an explicit penalty for non-delivery.
- Since **such scheme was rejected by the majority of generators**, the Authority will soon publish another scheme taking into account the main remarks of generators.

Capacity Support Mechanism – Italy (2)

Pending the above capacity remuneration system, the Legislative Decree n. 379/03 provides for **a transitory mechanism** based on the following principles:

- At the beginning of each year, the TSO defines and discloses the days of the year in which there could be insufficient capacity resources to meet demand and the reserve margin ("Highly Critical Days" and "Medium Critical Days");
- A capacity payment is paid ex-post only to "dispatchable" production units which were actually available to produce in the days above; the generator receives a payment calculated ex-ante according to a published formula.
- The Regulatory Authority must set:
  - the capacity payment taking into account the budget already approved to cover the costs for providing reserve and balancing services;
  - the criteria to calculate the availability of capacity which is theoretically entitled to collect the capacity payment.
  - The Authority has designed the specific features of the transitory capacity payment which **came into force in April 2004**.

Capacity Support Mechanism – Greece

The Greek Capacity Assurance Mechanism aims to:

- ensure long-term capacity availability,
- reduce the generators' business risks, by guaranteeing part of their fixed costs, and
- smooth price fluctuation in the wholesale market, because of the reduction of the short term risk of the generators.

Principles of the mechanism:

- Each unit issues **Capacity Availability Tickets** (CATs – "promises for future capacity availability") for the total of its net capacity. The generators are obliged to deposit their CATs to the CAT Register in order to be able to participate in the day ahead market (DAM).
- **Capacity Availability Contracts** (CACs) are concluded between the generators who issued the CATs and the suppliers. Each CAC is supplementary to each CAT, is transferable and does not contain any financial agreement, though generators and suppliers may freely conclude private financial deals concerning the CACs.
- Each supplier has **Capacity Adequacy Obligations**, corresponding to the averaging of the peak loads of the supplier's customers, as measured for a specific number of hours, "Hours of Increased Probability for Load Failure", increased by the appropriate reserve margin.

Capacity Support Mechanism – Greece (2)

Principles of the mechanism (continued):

- The suppliers cover their capacity obligations by presenting sufficient guarantees, calculated as the sum of the **real available capacity** that corresponds to each CAC that has been deposited by the supplier at the CAC Depository, as estimated by the TSO based on the performance of the unit the previous 3 years.
- In case the suppliers do not cover their obligations, they are charged with a **Deficiency Penalty**, which value should be also considered as the cap of the price the suppliers are willing to pay for the CACs.

When capacity shortage is foreseen and is not expected to be covered by IPP initiatives, the TSO can proceed to a tender for the pre-purchase of CACs, corresponding to new generating units.

- The CACs pre-purchase is done on behalf of the future suppliers and customers, to whom the CACs should be transferred as soon as possible via an auction, aiming to guarantee the minimum required income for the new units - for the part of the capacity contracted by the TSO -, facilitating their financing.
- There is no provision that the TSO enters a contract to buy the energy to be produced by the new units (**not a PPA**). The generator's income is derived from its participation in the day ahead market. If the income minus its fuel and operation costs is lower than the guarantee given by the TSO, the difference is paid to the generator.

Customers

Suppliers

Capacity Obligations
(based on their loads during specific hours with tight reserves)

Conclude CACs

Cover the **remaining fixed cost**

Cover the operational cost and **part of the fixed cost**

Participate in the Capacity Assurance Mechanism

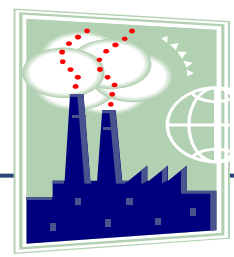
Participate in the DAM

Issue CATs
(for **Net Capacity** of Unit)

Deficiency Charge
for the part of Obligations not covered by CACs

Cover Obligations
according to Available Capacity Values (UCAP) of corresponding CACs

CfDs
(reducing risk of both parties)



Generation Unit

European Energy Regulators

Capacity Support Mechanism – Greece (3)

During the Transitional period, until January 2008, and due to the possible difficulty in the conclusion of CACs between suppliers and generators, the following alternative mechanism is offered:

- Producers may conclude CACs with the TSO.
- The Capacity Obligations of suppliers can be covered by the above CACs, upon conclusion of a “Contract for Participation in the Transitional Capacity Assurance Mechanism” between the suppliers and the TSO.
- A regulatory defined uplift is charged to all participating suppliers, according to their customers’ peak loads, and is received by all participating generators depending on their unit availability.
- The value of the uplift has been set at **35.000 €/MW**, based on the costs of unit installation and of keeping units at the highest levels of operational availability.

Capacity Support Mechanism – Romania

In Romania a Capacity Mechanism will be put in place in order to ensure the existence of an adequate capacity margin in order to meet security of supply, as well as wider regulatory and energy policy, objectives.

- The Capacity Mechanism introduces **Capacity Contracts based on options**, guaranteeing a steady stream of income known in advance, instead of the volatile income from the spot market. These contracts are specifically targeted for generators with high variable costs.
- The TSO holds auctions in order to procure the required amount of capacity. The generators that are awarded these Capacity Contracts receive the **Closing Capacity Price**, a result of the auction, for every MW of capacity contracted by the TSO and in return are obliged to offer their contracted quantity to the DAM, at prices ranging between contract-defined floor and strike prices.
- The amount paid to the generators is reduced by the **penalties** charged to the generators for not having available their committed capacity or for not generating when called. Their values are based on a percentage of the market clearing price of the DAM, subject to a minimum penalty, as determined by the Competent Authority.

Capacity Support Mechanism – UNMIK

The urgent need for new generating capacity, lead UNMIK to decide the implementation of a capacity mechanism, similar to the one previously described for Greece. The main differences of the two mechanisms are:

- In UNMIK, the suppliers must cover ex-ante their capacity obligations with the corresponding amount of CACs for each hour, while in Greece they need to cover their demand, ex-ante and/or ex-post, for specific hours of each year (the most critical) determined ex-post.
- In Greece, each unit issues CATs for its net capacity and for the next five years, with each CAT characterized by a value related to the unforced capacity of the unit. On the other hand, in UNMIK, each unit is awarded CACs by the TSO on an hourly basis, based on its expected availability for the next day.

In this sense the UNMIK approach, which seems to price capacity every hour of the year rather than just in the critical peak periods, is more complex and would seem to introduce multiple segmented capacity markets for various periods. This probably reflects the severe capacity constraints in the UNMIK market in comparison with the Greek market.

Capacity Support Mechanisms - Comparison

Greece's and UNMIK's capacity support mechanisms are based on the bilateral trading of Capacity Contracts between generators and suppliers.

Romania's and Italy's (originally proposed) mechanisms involve the conclusion of Capacity Contracts with embedded call options, concluded between the generators and the TSO.

The main difference between the Greece/UNMIK and the Romania/Italy mechanisms concerns the participation of the suppliers.

- In Greece/UNMIK, the suppliers have capacity obligations which they must fulfil or be penalized. They are free to choose how to cover their obligations and whether to conclude additional contracts (i.e. options, contracts for differences etc).
- In Romania/Italy, the TSO acts on behalf of the suppliers, procuring the necessary capacity through auctions.

Results

	Romania	UNMIK	Hungary	Serbia	Bosnia - Herzegovina	Turkey	FYROM	Austria	Montenegro	Greece	Italy
Capacity Support Mechanism in place	No (under planning)	No (under planning)	No	No	No	No	No	No	No	Yes	Yes
Secured Contracts (PPAs)	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No

Table 1 General information regarding capacity support mechanisms

Results (2)

	UNMIK	Romania	Italy	Greece
Market Description	Capacity Market	Capacity Contracts	Capacity Payments	Capacity Market
Type of Transactions	Bilateral Contracts	Single Buyer (TSO Auctions)	Capacity Payments	Bilateral Contracts
Basic Participants & their Role	**Producers:** awarded CACs on an hourly basis **Suppliers:** are imposed capacity obligations which can be covered by buying CACs or by paying a Penalty. **Market Operator**: administrator	**Producers:** conclude Capacity Contracts with the TSO, after an Auction **Suppliers** do not take part in the mechanism. **TSO** recovers the cost from the consumers.	**Producers** receive by the TSO an ex-post capacity payment **TSO** calculates the capacity payment upon the criteria established by the Regulator.	**Producers:** issue CACs **Suppliers:** are imposed capacity obligations which can be covered by concluding CACs or by paying a Penalty. **TSO**: administrator
Requirement for Unit Availability	Only in order to be nominated for CACs	For the duration of the Capacity Contract.	During the 'Highly Critical' or 'Medium Critical' days	At all times
Penalty Values	(for **Suppliers**) For not covering their capacity obligations **(for Producers)** for not having available the committed capacity.	(for **Producers**) For not having available the committed capacity or for not generating when called. .	None	**(for Suppliers)** For not covering their capacity obligations **(for Producers)** For not having available the committed capacity.

Table 2 Specific Information regarding some capacity support mechanisms

Council of European Energy Regulators

Conclusions

As there is no experience as yet on the actual implementation of any capacity support mechanism in the Energy Community, conclusions can not be drawn on the actual efficiency of any of the proposed capacity support mechanisms.

An issue to be considered is the ease of transition from the existing markets to a market model that links the energy and capacity markets e.g. through conclusion of capacity contracts with embedded call contracts.

Given that the new market may be introduced after an energy-only market (based on bilateral contracts or a gross pool with financial contracts) has been established, these contracts will have to be 'grandfathered' into the new market.

It is proposed the CEER WG SEE with the support of the World Bank analyses the subject further, in particular explores the possibility and the requirements of establishing a regional capacity support mechanism and the transitory issues involved.

Thank You for Your Attention !