Survey of Capacity Support Mechanisms in the Energy Community

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Background

At the 7th Athens Forum (Belgrade, 24-25 November 2005) the SEE WG was mandated to present a Survey on the existing Capacity Support Mechanisms in the Energy Community. The contracting parties to the Energy Community Treaty, Turkey and EU Member States covered by this report will be hereafter referred to as "participants to the survey". RAE presented the draft TOR (Questionnaire) for the survey at the 14th SEE WG meeting (Milan, 16th February 2006) and the WG agreed to submit by 24 February 2006 comments to the draft presented. Thereafter, on 28 February, RAE distributed the final Questionnaire to be filled in by the national Regulators by 13th March 2006. On the basis of the replies received a preliminary draft report of the Survey was circulated to the WG on 23 March 2006, and a first discussion among the WG members took place in the 15th SEE WG meeting in Dubrovnik. Following the comments received for this 1st Draft Report until 10.4.06, the 2nd Draft Report was elaborated and sent on 9th May to the WG members for discussion and final approval at the 16th SEE WG meeting (Budapest, 16th May 2006) with a view to submit it for approval in the GA meeting on 7 June 2006.

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

1 The Draft TOR - Questionnaire

The draft TOR for the Survey on the existing Capacity Support Mechanisms in the Energy Community is reproduced in the ANNEX. It covers the following main issues regarding capacity support mechanisms:

- Existence of mechanism(s) supporting new capacity
  - Basic reasons for new capacity support mechanism(s)
  - Signaling of need for new capacity investments
- Description of the capacity support mechanism(s)
  - Centralized / Decentralized
  - Planning Period
  - Commitment Period
  - Participants
  - Type of Payments (Explicit, Implicit.)
  - Determination of Price (Central, Auction, Market)
  - Penalties
  - Power Mitigation
  - Mechanism Cost
- Existence of other forms of capacity support
  - Secured Contracts
  - Captive market
  - Guaranteed Income
- Other important related information
  - Presentation of distortions/ problems that have been noticed due to the implementation of the chosen capacity support mechanism

2 Electricity Market Structures in Energy Community

The region of South East Europe is characterized by a number of national electricity markets in various stages of development. Market integration is currently low both for technical reasons i.e. regarding availability of interconnection capacity, market reasons, i.e. market structure/credit risk/information on opportunities to trade, and energy policy considerations, i.e. energy self sufficiency. Under the Energy Community Treaty a medium to long term regional reform plan is set for both electricity and gas markets in SEE with primary objective the creation of a regionally integrated energy market with a view to its subsequent integration into the IEM of the EU.

Table 1 presents the existing wholesale market structures and the eligibility threshold in the Energy Community. As noted, market structure varies from day ahead pool-type arrangements to bilateral contracts and integrated generator/suppliers. With the exception of Italy, wholesale markets have only recently commenced functioning in other participants to the survey.

Table 1 Electricity Market Structure and Eligibility Threshold

	Wholesale market structure	Eligibility threshold
Albania	Integrated genco-disco (supplier) Wholesale supplier within ATSO Tendering process for import	Regulated Supplier integrated with Genco; 100GWh/year = 1 eligible consumer
Bosnia and Herzegovina	Three integrated gencos-suppliers Must fulfill their local load first, tenders for export and imports; Trade between companies inside the Federation at regulated prices;	January 2007: 10GWh January 2008: 1GWh January 2009:all customers except households January 2015: all electricity customers
Bulgaria	Gencos sell to NEK (wholesale supplier) or directly to eligible consumers; Discos (suppliers) must buy from NEK Wholesale suppliers Eligible consumers can contract directly with traders or Gencos	Now: 20 GWh (40 sites) 9 GWh in July 2006 (100 sites) January 2007: all commercial July 2007: all consumers
Croatia	Integrated genco-supplier	Now: 20 GWh 9 GWh in June 2006 (200 sites) July 2007: commercial July 2008: all consumers
FYROM	Gencos sell to Wholesale supplier who resell to disco (supplier)	Now: 20 GWH and connected to high voltage Threshold shall be reduced in 2007
Montenegro	Integrated genco-supplier	One third of needs for Large industries (Aluminum Smelter, Steel Factory and Trains) is imported directly by them from Traders at
Romania	Open wholesale market represents approximately 60% of total volume 40% of contracts between Gencos and suppliers are regulated	Now: industrial and large commercial; 2007: all consumers
Serbia	Gencos sell to wholesale supplier for tariff customers who resells to discos (as holders of the license for retail supply for tariff customers) based on annual contracts. Eligible customers can contract directly with traders or gencos (only for the part that is not already contracted for tariff customers)	25 GWh per year at all metering points of one customer
UNMIK	Integrated genco-supplier	Eligibility threshold To be defined

Table 1 cont. Electricity Market Structure and Eligibility Threshold

	Wholesale market structure	Eligibility threshold
EC		
Austria	100% open wholesale market	100% open switching ratio: 20-50% large industrial users 20-50% commercial less than 5% for small commercial/households
Hungary	Wholesale market dominated by PPAs; Some virtual auctions of capacity ; Gencos sell to MVM who resell to suppliers	All industrial and commercial switching ratio: 20-50% large industrial users 20-50% commercial less than 5% for small commercial/households
Italy	Suppliers for the regulated market must buy from the Acquirente Unico	All industrial and commercial More than 50% large industrial users 20-50% commercial less than 5% for small commercial/households
Greece	Organized daily wholesale market (Interconnected System only)	As of July 1st 2004, all non household customers except all customets in the non-interconnected islands (70% market open)– Energy imported by suppliers other than PPC and by self-supplying consumers in 2004, amounted to 2,33 % of the total energy consumption on the Interconnected Transmission System.
Slovenia	100% open wholesale market but only one seller	All industrial and commercial 5-20% for large industrial Less than 5% for others

Source: SEETEC Balkans Study of the Obstacles to Trade and compatibility of market rules, Vol.1 Main Report, March 2006

According to the above table, the following information can be highlighted.

There is very little free market wholesale activity within most of the SEE participants to the survey since the distribution companies (suppliers) are either still integrated with the generation company or are not eligible, meaning that suppliers are obliged to buy from a wholesale supplier, usually attached to the TSO, at regulated prices or there are still integrated generation-supply businesses.

Only Romania and partially Bulgaria have broken the generation sector to allow for some amount of national competition in generation.

In Albania, Croatia and Montenegro, there is, for the time being, integrated generation and supply companies - thus no wholesale market. In FYROM the soon to be privatized distribution company (supplier) will not be eligible and thus will have to buy its electricity from the wholesale supplier attached to the TSO. In UNMIK KEK generation company sells to KEK public supplier.

In most participants to the survey the retail market for large eligible industrial consumers is more open than wholesale market, since eligible consumers can import directly or sign contracts with traders or generating companies (e.g. Bulgaria, Montenegro), a right not enjoyed by the wholesale supplier,. As a result most of the competition at this stage seems to be based on trade between participants to the survey rather than within participants to the survey, therefore capacity contracting may need to be addressed concurrently with the pricing and allocation of capacity on the interconnectors. Also, timetables for retail competition vary, with some specifying full retail competition within 12 months, a factor that affects the risk position of suppliers when they consider entering into longer term contracts for either energy or capacity.

3 Investment requirements

Various studies, most recently (June 2005) the Generation Investment Study (GIS) commissioned by the World Bank, have identified the need for considerable investments in the SEE in generation capacity (new power plants and re-powering of existing ones) until 2020.

A major issue common to most liberalised electricity markets is how to provide appropriate incentives to prospective private investors and financing institutions to commit funds for such long term projects, while at the same time avoiding excessive tariff increases, since electricity tariff affordability is a major issue for the region.

The introduction of competition in generation fundamentally changes the planning dynamics for new investments. Under a monopoly regime the “capacity market” is administered by the vertically integrated company through a central planning process determining, by an engineering related criterion, the type and size of new generating capacity and the associated transmission facilities required. This process enabled the utility to recover all “prudent” investment costs including a reasonable return on equity, through the regulated tariffs charged to its captive customers. In competitive electricity markets, the timing and the type of new generating investments is driven more by expectations of market prices, generating plant operating costs and resulting profit margins, while opportunities for cross border trade play a significant role depending on the availability of interconnection capacity.

As a primary consequence electric energy generation becomes a more commercial and riskier business. Centralized planning by monopoly utilities is replaced by decentralized investment decisions by individual investors in response to commercial incentives. Furthermore, competitive generating companies will often base their market entry decisions on very broad strategic considerations and qualitative expectations for future business prospects, rather than exclusively on a narrow analytic valuation using rigorous formula.

Generation reliability is explicitly valued, priced and determined through market mechanisms and performance incentives rather than through prescriptive criteria.

4 Capacity Support Mechanisms

A major concern, acknowledged early in market opening, is whether long term reliability will be fully sustained solely by competitive prices, with no other incentives. We must recognize that, as yet, processes to enable market based mechanisms to provide the necessary signals to spur investments in needed generating capacity and transmission infrastructure, although continuously evolving, are neither fully developed nor mature. Further stress-testing through periods of capacity shortages and/or high prices in a fully developed market is needed. The situation is further aggravated by government or regulatory intervention to regulate tariffs or introduce market caps to keep electricity consumer costs at an “affordable” level.

Furthermore experience from other electricity markets has shown that part of the problem has been the reticence of suppliers to commit to long term contracts with generators, especially with new entrants. Thus, while one element of the problem is whether competitive prices will support new capacity; a second element is whether suppliers are willing to enter into long term contracts with generators at prices that can support new capacity. The two problems are clearly related. Since as stated in Section 3 the risk position of suppliers regarding long term contracting relates to competition in the retail market, there seem to be many very good reasons for linking competition in the wholesale market to competition in the retail market. Retail competition puts a very real discipline on the wholesale market and provides the incentives and capacity to unleash the potential demand-side responses that can add to the efficiency of the market. But, it also highlights part of the challenge for the suppliers. Generators want to lock in long term contracts because of the capital intensity of generation and the need for long term contracts to make financing of generation capacity bankable, while retail suppliers face the challenge to minimize risks 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. This differing contract preferences seem to be a common problem in competitive markets – especially in the early days of the wholesale market when there is little history (and a lot of uncertainty) upon which to base price expectations. A rapid or uncertain timetable for full retail competition adds to this problem. One response by generators has been to re-integrate, or seek long term commercial relationships, with retail suppliers.

Experience so far shows that 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. In the longer term though it is questionable whether new investments can be attracted even if as an incentive energy-only prices are coupled with a range of derivative contracts (forward contracting and other risk management practices) based upon the energy-only price (underlying market). Energy-only markets cannot prevent price volatility and periods of unreliable system operation, therefore they fail to ensure system reliability and cause exposure to huge price volatility, and market power.

Safety nets to guarantee sufficient capacity in the medium term have been adopted under the principle to only act after the last possible investment decision by market participants has passed. In such cases the plant is usually a peaking one, that has the lowest investment cost. This plant will only act to suppress peak prices and meet immediate capacity requirements.

As the other extreme to the energy-only market paradigm we may consider ‘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 required. The intervention of the

"agent" that calls the tender into the market is not consistent with the objective to establish a sustainable competitive market design, capable to bring in new supply as and when is needed, based on competition development in wholesale market and retail market. It is also likely the "agent" is required to make commercial judgments about the type and other characteristics of the plant to be brought into the market. Coupled with the ad hoc nature of the intervention, tender rounds may be problematic for existing generators who will face a wealth loss associated with the consequential reduction on system marginal price (SMP).

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, dampens the boom and bust cycle and provides for a reliable electricity service. Product definition is critical to the design of capacity markets, while market power is an important issue which requires the enactment of appropriate activity rules. Even considering criticisms that capacity markets are an artificial requirement imposed by policy makers and/or regulators, it seems that a capacity and energy market seems to be more "natural" than an energy only market and is a common contracting approach in the resource sector, e.g. unregulated contracts with foundation customers for gas pipelines, and other capital intensive industries. The ability of a capacity provider to shift between markets, especially within a regional market, has also a significant effect on the ability of a power system to count on capacity reserves. In the case the "agent" undertakes itself the development of new capacity with subsequent on sale to market participants than in addition to the above concerns the "agent" bears a considerable amount of commercial risk.

In earlier market designs customers paid for capacity, dispatched or available, as an adder to the Day Ahead Market price, calculated on the basis of its reliability value. Capacity payments were funded through uplift. More recently international markets have shown an increasing interest in using options as a vehicle for assuring system reliability.

An alternative method establishes a required 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 the 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. Such a mechanism provides a high degree of assurance that new capacity will be induced into the market and a sustainable mechanism for continual new entry without the need for ad hoc interventions on the part of Regulators or other central agents. Also it is the market and not the Regulator that determines the type of capacity required (baseload, peaking). A factor not to be overlooked nevertheless, is the need for a tightly defined backstop mechanism to cover for the case retail suppliers do not enter into (sufficiently) long term contracts that would give investors, and their banks, the confidence to build enough new capacity. Such an issue becomes more important considering additional market uncertainties, especially for newly competitive markets where there is little history.

An essential issue to consider in establishing a capacity market is the disconnection between the capacity and energy markets, while in a long run equilibrium the expected social cost of unserved energy as reflected by the energy-only market should equal the marginal cost of incremental capacity. 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.

Also of importance relevant to supply adequacy and generating investment requirements is the role of pricing, including appropriate tariffs structure i.e. through time of use or interruptible tariffs, and demand response. Users do respond to price signals especially when these signals are strong enough to properly reflect the capacity constraints as evidenced from the success of programs where suppliers (to the retail market) offered to pay for verifiable load reductions in critical peak periods. The implication is that while it is important to take measures improving the climate for investment in new generating capacity it is equally important to facilitate market-driven demand responses and ensure that the market design does not discourage or undervalue such responses which may have significant positive effects not only for power system economics, including for network savings, but also from the environmental dimension. Such methods evidently can reduce demand for peaking capacity and may also result in improved operation (increase capacity factor and average fuel efficiency) for new power plants (e.g. CCGTs), reducing costs and increasing their revenues Arguably in SEE one must pay particular attention to the affordability issue which limits the capability to introduce prices high enough to act as effective signals for demand restraint or shift to low price periods. Another issue is the availability of appropriate metering systems to enable reliable verification of load reduction and extend the utilization of the price/demand mechanism, hence its effect, to larger numbers of retail customers. In any case however, the role of pricing and demand responses should not be under-estimated.

5 Capacity Support Mechanisms in the Energy Community

As of 7 May 2006, eleven participants to the survey have replied to the questionnaire: Romania, Bosnia & Herzegovina, Serbia, Montenegro, UNMIK, Hungary, Turkey, FYROM, Italy, Austria and Greece.
Italy and Greece are the only that have implemented a capacity mechanism, both of which are currently running the transitional phases of their respective mechanisms. It should be mentioned though that Italy still hasn't finalized its permanent scheme, after its rejection by the majority of generators. Romania and UNMIK are still in the planning process.

The rest haven't planned or implemented any kind of capacity mechanism, excluding the renewable energy sources support mechanisms. A number of participants to the survey (Hungary, FYROM, Turkey) still have in place long term Power Purchase Agreements (PPAs) in order to guarantee the funding of generation units. In Serbia, Bosnia-Herzegovina and Montenegro the generation investments are still planned centrally; in Austria the interconnection capacities in conjunction with the existing hydro resources are considered adequate to cover the expected demand in the future.

In the following each one of the implemented or planned mechanisms is presented according to responses received to the Questionnaire.

Italy

After the black-out of June 2003, the Italian Government was worried about scarcity of spare generation capacity in Italy. In October 2003, the 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. According to the Act n. 290 the Italian Government has to design a competitive system in order to remunerate generation capacity.

Such capacity remuneration system must be compliant with the following principles:

- Competition between planned capacity and installed capacity;
- Transparency;
- Non-discrimination (interruptible load equivalent to generation capacity);
- Capacity remuneration commeasured to the capacity target set by the TSO;
- Capacity remuneration for planned capacity conditioned upon the submission of adequate securities by the project leader.

The capacity remuneration system's architecture shall be designed by the TSO according to the criteria and conditions set by the Authority.

In March 2005, the 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.

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 (= production units entitled to offer in the balancing market) which were actually available to produce in the days above; the generator receives a payment calculated ex-ante according to a published formula.

The Authority must set:

- the capacity payment taking into account the budget already elected 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.

Greece

The Greek Capacity Assurance Mechanism aims to ensure long-term capacity availability and is based on the obligation of the suppliers to present sufficient guarantees in that direction. Moreover, the mechanism aims to reduce the generator's business risk, by guaranteeing part of his fixed costs, and the smooth fluctuation of prices in the wholesale market, due to the reduction of the short term risk of the generators.

Each unit issues Capacity Availability Tickets (CATs) for the total of its net capacity. The CATs can be seen as promises for future capacity availability. Each CAT corresponds to one MW produced by one specific generation unit for one specific Reliability Year. CATs are submitted to the CAT Register kept by the TSO and constitute an offer to the suppliers for the conclusion of CACs. The generators are obliged to deposit their Capacity Availability Tickets to the CAT Register in order to be able to participate in the day ahead market (DAM) (mandatory participation – no transactions are allowed outside the DAM).

CACs are concluded between the generators who issued the CATs and the suppliers. Each CAC is supplementary to each CAT, valid when signed by the CAT issuing generator and a supplier and deposited to the CAC Depository. The supplier that concluded the CAC may freely transfer it to a different supplier, without needing the approval or consent of the corresponding generator. Apart from the CACs, generators and suppliers may freely conclude private financial deals concerning the CACs. The CACs themselves do not contain any financial agreements.

Each supplier has Capacity Adequacy Obligations. These obligations correspond 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. The suppliers cover their capacity obligations by presenting sufficient guarantees. The guarantees presented by each supplier are 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 calculated 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 TSO should transfer the CACs as soon as possible via an auction and aims 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.

In case a payment is required, the TSO collects the necessary capital from the suppliers through an uplift account. The TSO, after a request by the generator, can organize an auction to transfer the CACs it holds. The Producer defines the lowest sale price for each CAC that is auctioned. There can be CAC auctions either for individual CACs or for groups of CACs, when these are standardized. In case the generator wishes it, a standardized Contract for Differences as underlying to the CAC facilitates the selling of the CAC. The levies that are collected from the auction of the CACs are fully transferred to the corresponding generators.

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.

Romania

In Romania a Capacity Mechanism will be put in place in order to ensure that the TSO has a sufficient amount of available generating capacity, namely 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, ensuring long-term availability of capacity to supply demand and 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.

Under this mechanism, 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 floor price is set so that the Capacity Contracts are not attractive to those generators that are able to earn higher profits through general participation in the bilateral or centralized wholesale markets. The strike price is set at a level exceeding the marginal costs of the most expensive generator in the system.

The cost of the mechanism is passed through network charges to the consumers. The amount paid to the generators is reduced by the penalties charged to the generators for having available their committed capacity or for not generating when called. In general, the generators will be paid the Closing Capacity Price for all their contracted capacity, after deduction of the amounts when the Market Clearing Price on the DAM was higher than the Strike Price and after deduction of the non-compliance penalties.

The Closing Capacity Price is a result of the auction organized by TSO for Capacity Procurement. Where prices for provision of capacity are deemed to be too high by the TSO and/or the Competent Authority, the TSO may decide to diminish the Capacity Requirement and award contracts accordingly. Alternatively the TSO and/or the Competent Authority may choose to re-run the Capacity Auction with a Maximum Price in force.

The amount of penalty applicable to each non-compliant party will be based on a percentage of the market clearing price of the DAM, subject to a minimum penalty, as determined by the Competent Authority. Any penalties would be netted from monthly payments due to be paid to the contract holder.

UNMIK

UNMIK's generation adequacy studies show that there is an urgent need for new generating capacity. There exists a huge gap between generating capacity and demand; even average

monthly demand is higher than the installed generating capacity. Moreover, the high import prices just aggravate the situation. Therefore UNMIK decided to implement a capacity mechanism in order to encourage new investments in generation and to ensure that the fixed costs of older generating units will be recovered, thus allowing them to remain available.
The capacity mechanism is based on the trading of Capacity Availability Certificates (CACs). Generators and importers sell CACs to the suppliers and exporters, each trade being registered centrally. Failure of the Suppliers to acquire the necessary CACs results in a penalty payment.
The CACs are tradable certificates, awarded to generators or cross border traders in each settlement period, specifying that a MW of generating capacity is expected to be available. The availability is not tested at each settlement period, but can be challenged anytime by the System Operator, imposing penalties in the case of declarations of 'false' availability.
The CACs can be used by the suppliers as evidence of satisfaction of their capacity obligations. The obligations of the suppliers are calculated on an hourly basis, based on their customer's consumption during each hour, increased by a regulatory defined reserve margin. The suppliers are charged with a penalty for any shortfall between certificates held and their obligation. It should be noted that whereas the suppliers' obligations are based on the real consumptions of their customers, the suppliers need to secure the necessary amount of CACs before this consumption is realized.
CACs are valued in terms of avoidance of the set penalty price. Generators receive payment from suppliers based on the market value of certificates awarded. Generating capacity receives payment by just being available (or more precisely, by expecting it to be available). The penalty price for failure to hold a required certificate is calculated by the regulator as the marginal value of a peak generation unit required to satisfy the long-term security of supply of UNMIK.

The Tables 2 and 3 below show in a condensed form the information received.

Table 2 – General Information regarding capacity support mechanisms

	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 3– Specific Information regarding each capacity support mechanism

	UNMIK	Romania	Italy	Greece
Market Description	Capacity Market	Capacity Contracts	Capacity Payments[1]	Capacity Market [2]
Type of Transactions	Bilateral Contracts	Single Buyer (TSO Auctions)	Capacity Payments	Bilateral Contracts
Basic Participants & their Role	**Producers** are awarded Capacity Availability Certificates (CACs) on an hourly basis, based on their expected availability for each hour of the next day. **Suppliers** are imposed capacity obligations[3] for each settlement period based on their customers' consumption during that hour, 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, for specific Procurement Periods for Capacity as specified by the TSO, based on forecasted capacity needs of the System. **Suppliers** do not take part in the mechanism. The **TSO** recovers the cost from the consumers.	**Producers** receive by the TSO an ex-post capacity payment, but only if their units were dispatchable during the 'Highly Critical' or 'Medium Critical' days of the previous year. The TSO defines the 'Highly Critical' or 'Medium Critical' days as the days during which there could be insufficient capacity resources to meet demand and the reserve margin. The TSO calculates the capacity payment upon the criteria established by the Regulator.	**Producers** are obliged to issue Capacity Availability Certificates (CACs). **Suppliers** are imposed capacity obligations based on their customers' metered average consumption during the "Hours of Increased Probability for Load Failure" defined by the TSO, which can be covered by concluding CACs or by paying a Penalty. **TSO**: administrator
Requirement for Unit Availability	The capacity is expected to be available during a settlement period, in order to be nominated for CACs for that specific settlement period.	The capacity must be available for the duration of the Capacity Contract.	The capacity must be available during the 'Highly Critical' or 'Medium Critical' days in order to receive the Capacity Payment.	The capacity must be available at all times, according to the terms specified in the CAC.

	UNMIK	Romania	Italy	Greece
Determination of Capacity Price	The price of the CACs results from the Capacity Market. It will always be though less than or equal to the (Supplier's) Penalty value.	The producers receive a payment equal to the Closing Capacity Price, which is a result of the relevant Auction, after deducting the 'excess income' of the producer, according to the option embedded in the Capacity Contract, and the non-compliance Penalties.	The Capacity Payment is calculated upon the criteria (formula) established by the Regulator.	The price of the CACs results from the Capacity Market. [4] It will always be though less than or equal to the (Supplier's) Penalty value.
Penalty Values	(for **Suppliers**) The Penalty value is defined on a yearly basis, based on the long term marginal value of a peak unit of capacity required to satisfy the long term security of supply of UNMIK. **(for Producers)** There are non-compliance Penalties for not having available the committed capacity.	(for **Producers**) There are non-compliance Penalties either for not having available the committed capacity or for not generating when called. The Penalty value applicable to each non-compliant party is based on a percentage of the market clearing price of the DAM, subject to a minimum penalty.	None	**(for Suppliers)** The Penalty value is defined on an annual basis (based on the annual carrying charges for a new combustion turbine, installed and connected to the transmission system). **(for Producers)** There are non-compliance Penalties for not having available the committed capacity.

[1] Transitional Mechanism.
[2] For the successful initiation of the capacity support mechanism in Greece, the TSO will conclude capacity contracts for a pre-specified amount of capacity through tendering. These capacity contracts will guarantee a minimum income for the generators in order to cover part of their fixed costs.
[3] The capacity obligations in the Greek and UNMIK mechanism are calculated differently.
[4] In the transitional phase of the mechanism (until 1/1/2008) the price of the CACs has been regulated at 35.000 €/MW

6 Synopsis of Capacity Support Mechanism implementation

Currently there is a range of views from the Energy Community as to whether capacity mechanisms are needed and which type of mechanism should be implemented.

The most important reasons for not supporting the introduction of a capacity support mechanism are:

- Existence of adequate generation capacity (currently and as foreseen in the coming years).
- Existence of PPAs providing adequate financial support to the generators.
- Decisions regarding capacity expansion are (still) taken centrally.
- Trust in the energy-only market model.

On the other hand, there are four participants to the survey that have either implemented or are planning to implement a capacity support scheme, as well as a number of other participants that are considering this option in order to encourage investments in capacity generation. So far, the mechanisms considered by the Energy Community participants to the survey involve some form of capacity contracts.

Given the challenges of introducing competitive energy markets, it is not surprising that the emphasis is placed on the immediate requirements. However there are good reasons to anticipate future requirements and introduce capacity support mechanisms earlier. Greater uncertainty will create a barrier to investment and contracting and, to the extent that investment and contracting decisions are taken before the capacity support mechanisms are introduced, delaying the introduction of a capacity support mechanism increases the windfall gains and losses. If existing generation capacity is being privatized, it is important to specify the future market environment as clearly as possible, especially the conditions for investment in new capacity. If not, it creates greater uncertainty and may create legal problems later on unless there are strong powers for making the changes necessary to introduce a capacity support mechanism. Similarly it may discourage contracting or create windfall gains or losses should participants contract on the assumption of an energy-only market.

Greece's and UNMIK's capacity support mechanisms are based on the bilateral trading of Capacity Contracts between generators and suppliers. Although these two mechanisms seem very similar, they do have differences, most important of which are the following:

- 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 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 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. If so there would be many more hours of potential capacity constraint in the UNMIK market when it is necessary to provide strong signals for existing capacity to be available. The design question is whether the additional complexity is warranted by the need to provide stronger incentives for existing generation to be available outside the critical price periods.

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. This type of mechanism connects the capacity and the energy markets, reducing the price volatility of the energy markets through the employment of the call options.

The main difference between the Greece/UNMIK and the Romania/Italy mechanisms is the participation of the suppliers. In Greece/UNMIK the suppliers have capacity obligations which they must fulfill 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 the contrary, in Romania/Italy, the TSO acts on behalf of the suppliers, procuring the necessary capacity through auctions.

As all of the above mechanisms are either proposed or have just been implemented, there is no experience yet on the actual implementation of any capacity support mechanism in the Energy Community and, consequently, conclusions can not be drawn on the actual efficiency of any of the proposed capacity support mechanisms.

Finally, an issue that may need 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.

ANNEX

Draft TOR for the 'Survey of existing capacity support mechanisms in the Energy Community countries'

1. Existence of mechanism(s) supporting new capacity

In this section the participants must fill in details of any mechanism(s) supporting new generation capacity currently in place in their country. The term mechanism refers to any set of measures taken in order to encourage the building of new plants or the upgrading of installed plants. It could be in the form of government auctioning of energy contracts, tax relief for new generation capacity investments or even the existence of a separate mechanism in the market, like the Capacity Credit markets in the U.S. The capacity mechanism doesn't have to be directly related to new investments, it may also facilitate new investments when they are needed, for example by increasing the income of the producers when there is capacity scarcity, therefore encouraging new investments and entry to the market. Note also that more than one mechanism could be in place, for example a two parts tariff as well as the operation of a capacity mechanism.

1.1 Basic reasons for new capacity support mechanism(s)

The reasons why the capacity mechanism(s) described above were originally put in place should be explained here, as well as why such mechanism(s) was chosen.

1.2 Signaling of need for new capacity investments

Describe how the government and the market participants realize the need for new capacity investments. For example, do they rely on annual/periodic capacity studies or just on the incumbent to act when it decides is appropriate?

2 Description of the mechanism(s)

A detailed description of each mechanism in place should be given here.
In the following some more mechanism specific details will be asked for. The participant may have to repeat some information already given above.

2.1 Centralized / Decentralized

2.2 Planning Period

How many years does it look ahead?

2.3 Commitment Period

Over what period should the capacity be available?

2.4 Participants

Specify which parties participate in the mechanism.
In the following define the exact roles of the parties mentioned above.

- Mechanism Operator
- Demand Side
- Generation Side
- Other

2.5 Type of Payments

The participants should give here a more detailed description of the payments made, related to the mechanism. Payments under contracts related to the mechanism should be included here.
In the following some more mechanism specific details will be asked for, in order to categorize these payments.

2.5.1 Explicit payments

Any explicit payments made in the context of the mechanism should be mentioned here, as well as other details, for example who receives these payments (all capacity or just new capacity), how often they are made etc

a. Received when producing

Specify here if these payments are related to the amount of energy a unit has produced and how this affects the payments, as well as any other appropriate information.

b. Received when available

Specify here if these payments are related to the availability of a unit and how this affect the payments, if the availability of the unit refers at all hours or to the availability at times of system stress, as well as any other appropriate information.

c. Other

2.5.2 Implicit payments

Any implicit payments made in the context of the mechanism should be mentioned here, as well as other details, for example who receives these payments (all capacity or just new capacity), how often they are made etc

a. Two parts tariff

Specify here if the tariff structure facilitates the inclusion of implicit payments for capacity support through a two parts tariff structure (energy + capacity/fixed cost). Give details as to how this payment (as a percentage of the capacity/fixed cost) is determined and how it is passed on to the producers, as well as any other appropriate information.

b. Other

2.5.3 Payments depend on location

If the payments are correlated with the location of the unit, specify here how the location affects the payment and why was this policy undertaken, as well as any other appropriate information.

2.5.4 Other

2.6 Determination of Price

2.6.1 Central

Specify if the price is determined by the Government or by a specific organization and how this price is determined.

2.6.2 Auction

Specify who holds the auctions, the type of the auction, who can participate in the auctions, any constraints put to the price of the auction, as well as any other appropriate information.

2.6.3 Market

Specify if it is determined through a separate market, some details on how the market operates and at what price the market is cleared, who can participate at this market, as well as any other appropriate information.

2.7 Penalties

The participant should give here a detailed description of all the penalties in place related to the mechanism.
In the following give more information for the relevant penalties, as well as give some indication of their price level.

a. For non-compliance of participating units
b. For non-compliance of participating demand side

2.8 Power Mitigation

Specify if there are any power mitigation measures included in the mechanism and how they work. If there are none, explain the reasons for this policy choice.

2.9 Mechanism Cost

Specify how the costs of the mechanism are covered.

3 Other forms of capacity support

3.1 Secured Contracts

Do any long-term contacts still exist (PPAs)? Are these contracts allowed? Are any plants operate outside the day market and are any exclusive rights for the operation of the plant exist?

3.2 Captive market

Is there any category of consumers supplied by specified generators on an agreed price? Does the existence of a captive supply market support the operation of specific plants?

3.3 Guaranteed Income

4 Other related information

Include here any other related information that you would like to share but have not included above.
Please state also any distortions/ problems that have been noticed due to the implementation of the chosen capacity support mechanism.