CER

CAPACITY PAYMENT ISSUES

27 March 2003

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1. INTRODUCTION

This document provides an evaluation of selected issues raised in submissions to CER in response to the Second Options Paper published on January 24 and the February 6 Industry Forum

This paper summarises the comments received that refer to a need for a capacity payment or a capacity mechanism, then provides a more detailed discussion of some issues arising under such mechanisms, with a focus on the detailed proposal put forward by ESB PowerGen.

2. SUBMISSIONS

In submissions on CER's Second Options Paper on proposed trading arrangements, several parties expressed a view that some type of permanent capacity mechanism or capacity payment was desirable.

2.1 ESB POWERGEN

The essence of the proposed capacity mechanism is set out in Paragraphs 23 and 24 of their submission. These sections of their submission are reproduced below.

- *A capacity price is derived for each year on the basis of an explicit formula that links price to the system security margin (in turn linked to the expected demand / supply balance for the coming year). This would be a much less volatile measure than would result from a "spot" LoLP type calculation. However, the capacity price would increase as the security margin decreased and vice versa so as to encourage efficient plant entry; for example, excess entry will suppress the price, preventing payment for capacity that is not needed. This price could be determined on a rolling average basis over a number of years to smooth out intra year volatility.*
- *The capacity price formula is calibrated such that, over the cycle between incremental generation investments, it will provide enough cash to cover the additional revenue that a Best New Entrant would require, over and above that which it expects to earn through the spot market. This calibration process could be locked into the price resulting from the competitive process. Once this capacity formula is calibrated it should remain stable so as to provide market confidence.*
- *Prices are forecast a number of years (eg 3) into the future, to provide information for new investors. Only the year ahead's price is firm, with the remaining prices being revised in subsequent years.*
- *An important consequence of the year ahead price being firm is that the price is not susceptible to short term withdrawal of plant from the market (the main criticism of the old England & Wales Pool LOLP mechanism)*
- *The annual capacity price would be profiled over the year and all generators receive a payment based on the resulting capacity price and their actual availability*
- *The net costs of capacity are recovered from Suppliers, in an equitable manner, based on their customers requirement for capacity*

As a further step to provide a predictable source of revenues, the TSO/ SMO could be empowered to offer a medium to long-term hedge against future capacity prices in order to ensure new investment;

In essence, the ESB mechanism involves payments to generators (new and existing) with the level of payments being a function of:

1. The tightness of the supply demand balance,
2. The additional revenue that the best new entrant would require to enter the market, and
3. The amount of installed capacity made available by each market participant.

The mechanism is predicated on a form of regulated bidding by ESB as stated in Clause 15 (b) "with ESB's bids regulated to marginal cost" although participants other than ESB would not be required to bid marginal cost.

2.2 IBEC

IBEC makes two points that are directly relevant to the capacity mechanism/ capacity payment issue.

- Any capacity mechanism must be carefully designed to avoid subverting the market. At any time, all available generation plant (or controllable demand) provides the same capacity value, and the EEUWG would contend that this should be more explicitly recognised by the CER.
- If the value of capacity is paid to a small number of parties through some non-market mechanism, then the remaining generators may fail to recover their costs over a period.

2.3 ISLAND ENERGY

Island Energy is of the opinion that "reserve capacity and peaking plants will not be constructed on the basis of price signals from a centralised market, we believe the capacity payments mechanisms should be used instead." They also propose that such capacity payments "could be sculpted to reward availability at the peak, however, it should not be payable for any period that generators self nominate" and that the "capacity payment could be set as a BNE OCGT capacity price."

2.4 ESB NATIONAL GRID

ESB National Grid seems to broadly support the ESB PowerGen conclusion regarding capacity, stating an opinion that "the introduction of a separate explicit capacity mechanism will provide a generator with a stable, permanent and fair return for investing in the Irish market" and that "a volatile spot market is unlikely to provide the incentive for new generation capacity."

2.5 ESBIE

Like other respondents, ESBIE has the opinion that "the best way to attract new generators into the market is to provide an explicit, stable, long-term capacity mechanism to make up the shortfall in generator's revenue and to reduce the risk attached to entering the market." ESBIE further states that any "capacity mechanism should be non-discriminatory and available to all generators, both existing and new and would be seen by potential investors as a positive signal."

It is notable that while proposing a capacity payment scheme that is in itself a large potential intervention in the market, ESBIE suggests that this scheme would allow "CER to adjust an appropriate lever to ensure additional capacity without need to recourse to other safety net options and reduces regulatory intervention in the market to provide more certainty to investors."

One basis for this proposal seems to be a concern that any action under the default buyer option might "impose additional risk on ESB PES by transferring project risk from the new entrant to ESB PES" or might "provide an incentive to a new entrant that is not available to an existing generators and therefore is inherently unfair."

2.6 AIRTRICITY

Airtricity perceives that the current capacity payment mechanism has the result of unfairly treating renewables and that such inequities should not continue under any new trading arrangements.

2.7 IRELAND POWER ENERGY LIMITED

IPEL is broadly in favour of capacity payments of some sort.

3. APPROACHES TO MARKET ENTRY

Within competitive electricity markets, approaches to the addition of new generation capacity normally fall into one of two categories:

1. *Price Mechanisms* – which rely on the market - prices in the spot market and market hedge contracts with supply/retail companies - to induce new generators to enter the market.
2. *Capacity Instruments* – which rely on dedicated interventions of one form or another designed to force or induce the entry of new capacity into the market.

CER in its Second Consultation Paper has proposed the first approach (albeit with a safety net mechanism) as the primary means by which new capacity is to be brought on stream. ESB and other parties have indicated a preference for a mechanism based on the second approach.

The two approaches tend to be mutually exclusive to the extent that capacity instruments generally have the effect of suppressing prices in the spot market, thus removing the price mechanism as a means of inducing new capacity.

Indeed, capacity mechanisms may be necessary because of implicit or explicit measures to limit spot market prices, as in the ESB PowerGen proposal and as in a number of US markets where “market power monitoring and mitigation” schemes act as *de facto* spot market price caps. A combination of managed (or even regulated) spot market prices and a regulated capacity payment scheme starts to look a lot more like a regulated generation industry than a market.

4. COMMENTS ON CAPACITY MECHANISMS

In the material that follows, we evaluate the proposed capacity mechanisms by comparing them with CER's proposed approach. This discussion covers some issues that are indirectly related to the capacity mechanism itself (ie, spot market prices), as these are integral parts of the proposed alternate approaches. This discussion is primarily focused on the detailed proposal put forward by ESB PowerGen and includes a discussion of:

- Markets Permanently Distorted by Temporary Mechanisms
- Spot market prices
- Setting the Capacity Payment
- Efficiency in Plant Mix
- Security of Supply
- Cost of Energy Production
- Barriers to Exit
- Transaction/Administration Costs
- Prices faced by Consumers, and
- Wealth Effects

4.1 MARKETS PERMANENTLY DISTORTED BY TEMPORARY MECHANISMS

A major feature of the ESB proposal is the differential between how ESB, as a government-owned dominant participant, is treated and how other market participants are treated. The capacity mechanism proposed by ESB is totally dependent on this difference in treatment and is unworkable otherwise. In effect, ESB is proposing to incorporate into the market itself some features (eg, marginal cost bidding) that are related to the control of market dominance. In effect, the very structure and fabric of the Irish electricity market will be formed around these measures. If and when ESB is no longer a government-owned or dominant participant, the market will retain these features but they will be predicated on a false premise and so the market structure will no longer be meaningful.

While the simple answer to this is that the market will be modified when ESB is no longer dominant, this is not easy or simple. Features of a market such as capacity payments will be extremely difficult to remove, as many market participants will have developed business strategies around these payments and will lobby hard to keep them. Such temporary measures will, unless they have no real economic effect on anyone, become a permanent part of the market.

While it is true that the mechanisms proposed to control ESB market dominance (eg, the vesting contract package held by the Central Trader) will have an effect on the spot market by improving its competitiveness, the spot market itself functions independently from these mechanisms. Indeed, a primary premise of the CER proposals to control the exercise of ESB's market power is that these mechanisms can, when appropriate (eg, if ESB were disaggregated and privatised), be removed and the market itself will not need to be changed.

Developing a market that is inextricably linked to participant-specific issues such as ESB dominance is to entrench these issues even more deeply into the marker structure and to invite a significant market review and redesign in the future.

4.2 SPOT MARKET EFFECTS

ESB has proposed that their plant would have bids that are "regulated to marginal costs" without defining marginal cost or how such marginal costs would be verified. This regulation, in itself, presents a difficult task for CER to perform properly.

As discussed below, the paper does not suggest that the overall market-clearing price market approach[1] be changed, so that power plants low in the merit order (ie, due to low marginal cost) would receive some contributions, perhaps significant, to fixed costs from the implicit capacity margins in this type of market. While ESB proposes that only ESB plant be required to bid at marginal cost, new entrants that might bid at market levels would rarely be dispatched and so would rarely raise prices above marginal cost levels.

The result of ESB's proposed marginal cost bidding scheme would be spot market prices that would be lower (both on average and at the peak) than the market based spot market proposed for Ireland. Such lower prices would mean that the signals for new entry would be greatly diminished. It would no longer be likely that any generating plant would earn a sufficient return from the spot market alone.

In addition, the incentive for loads to hedge the risk of spot prices would be greatly diminished. This would have the effect of reducing activity in the hedge market, removing another important feature of the energy-only spot market proposed for Ireland.

4.2.1 Regulation of marginal cost bidding

Marginal cost is not a simple concept in practice. To appreciate the complexity of calculating marginal cost we note that it will be important to take account of issues such as take-or-pay fuel contracts, minimum running, overnight start-up and shut down costs, and hydro water values – to name a few. In reality, a generator offering into the market, when considering its marginal cost, looks at many factors other than "avoidable fuel cost". The true marginal cost will vary by the status of the generation units (eg, whether it is on or off, at what level is it running and whether it is being used for reserve), planned future usage of the unit (eg, what are the anticipated start-up, shutdown and reserve decisions) and the status of fuel positions (eg, whether annual/monthly volumes are within contract limits and what effective prices are being charged). In a self-commitment market (no side payments for start-ups and shut-downs) generators take control of all these factors to operate their plant optimally, which is to their commercial advantage and to the overall efficiency of the electricity system.

It will not be an easy task to gather the necessary information to develop meaningful regulated marginal cost bids; a regulated marginal cost bidding approach is likely to devolve into a simpler and much less effective approach based on something like average generation costs. An important reason for participants to develop their own bids is that these participants are better able to make accurate dynamic calculations. Another reason is that participants have incentives to make operational and other changes (eg, fuel contracts) to power plants that may not be present in a regulated marginal cost bidding scheme.

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[1] This approach is different from a pay-as-bid market, as would be seen in a decentralised bilateral contract market.

4.3 SETTING THE CAPACITY PRICE

In a centralised spot market there is an inherent capacity payment between a generator's marginal cost and the market-clearing price. Even with marginal cost bidding, there may be some capacity contribution to low-marginal-cost units from a market-clearing price spot market. The ESB proposal seems to suggest that the capacity payment level would be set by developing a forecast of spot market prices and determining the additional amount needed by a hypothetical new entrant entering this market. This will be a more complex process in practice than ESB suggest.

The first issue is that spot prices must be estimated over a five-year period into the future. Such a forecast would, like all market simulations, need to incorporate a great deal of uncertain inputs and events, including fuel prices, power plant efficiency, power plant status and availability, and system demand and load shape. This forecast would also include a set of assumptions about new entry over the 5-year period, with assumptions about the new entrant's plant type, fuel type, size, location, and other factors. Importantly, this new entrant might be a series of new entrants of different types (eg, a CCGT and several OCGTs) instead of a single new power plant.

The capacity amount would then be calculated for this new entrant (however, it is difficult to see how this would work if there are assumed to be multiple new entrants of different types). All operational power plants would then receive this capacity payment. This would be an indirect capacity mechanism, as discussed below, and might not result in new entry.

The CER, put in the position of developing the capacity price, would face the uncomfortable choice between:

- Setting a high capacity payment to help ensure needed new entry, but providing an extraordinary return to ESB; or
- Setting a low capacity payment that would provide an appropriate return to ESB, but that might provide insufficient incentives for new entry.

4.4 EFFICIENCY IN PLANT MIX

An important consideration in evaluating any capacity mechanism is the extent to which it will induce the right kind of plant to enter the market – for example the introduction of low fixed cost / high running cost peaking plant when additional capacity is required to meet relatively infrequent peaks, or high fixed cost low running cost capacity when the existing supply mix is such that (expensive) peakers are running a lot of the time.

The price mechanism within the energy only market has implicit within it a mechanism to select the right type of new plant. For example, if peakers are running relatively frequently, the price duration curve may be such that it would be economic for a mid-merit plant to enter the market. Similarly, if there are relatively infrequent episodes of very high prices, it might be most economic for a peaker to enter.

Under the ESB mechanism, the Regulator must first determine what kind of additional plant is required, in order for the right capacity payment level to be set. If a new baseload plant is required, the requisite capacity payment may be very small, or even zero – because the difference between the short run marginal cost of the new plant and the system marginal price may be sufficient to cover the cost of the installed capacity. On the other hand, if new peaking plant is required, the requisite capacity payment may be much

larger – because the system marginal price may be very close to the plant's short run marginal cost leaving insufficient revenue to cover its fixed costs.[2]

Thus with the price mechanism, it is the market participants that decide what kind of plant ought to be introduced, while under the ESB mechanism, it is the Regulator.[3] It is unlikely that the Regulator would choose the next plant to be built in the same manner as actual market participants. This is not the Regulator's core area of expertise – nor should it be. Thus, under the ESB mechanism, it is more likely that the wrong type of plant would be selected in the Regulator's analysis.

4.5 SECURITY OF SUPPLY AND INCENTIVES FOR ACTUAL NEW ENTRY

The ESB proposal includes, and indeed must include, a generation adequacy safety net. CER's calculation of the capacity payments needed for new entry is likely to get the amount wrong, regardless of the effort spent on these calculations. As the ESB capacity mechanism might (if it works as described) mean that the payments decrease to zero if there is excess capacity, there is unlikely to be excess new entry in any case, even if the capacity payment is set at a high level.

However, PA knows of no other electricity market like this. It will be difficult for experienced power plant developers and market analysts to analyse this market, should they decide to do so, so that the uniqueness of the market may present barriers to entry. It is even less likely that the CER would be able to determine an appropriate level of capacity payments that would reflect the returns needed by these power plant developers to make an investment decision. In order to provide incentives to new entry, CER may be forced to simply set a very high capacity price.

An assessment of the ability of each of the approaches to assure supply adequacy requires a careful consideration of the way in which each of the mechanisms work.

The price mechanism works through the price of energy rising until such time that new entry is drawn into the market. The more the supply/demand balance tightens, the higher the price (eg, increased potential for spot price might rise to VoLL), and thus the greater the rewards for new entrants.

The ESB capacity payment mechanism works in a similar kind of way in that it is prices that trigger new entry – the difference being that it is the price of capacity and energy, rather than just the price of energy.[4]

There are, however, some important differences between the two mechanisms. In particular the proposed CER price mechanism is by its nature dynamic and responsive. Prices would move up and down in relation to ever changing expectations about the

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[2] This is especially likely to be the case if the introduction of capacity payments is accompanied by some limitation on the extent to which plant can bid above its short run marginal cost. We understand that some form of regulatory intervention in this area would accompany the introduction of capacity payments. If this were not the case, capacity payments would simply be an additional revenue stream to the generators – ie the generators would receive "payments for capacity" twice, once through the periodic high price events resulting from uncapped spot prices and again through the capacity payments.

[3] This is particularly the case in the peaking portion of the merit order.

[4] In this respect the proposed ESB mechanism is quite different in type from other capacity mechanisms – such as the capacity obligations proposed in the FERC SMD – where the mechanism focuses directly on securing physical capacity, rather than relying on price level changes to induce new capacity.

supply demand balance. As the supply/demand balance tightens prices should rise. As the supply/demand balance becomes more favourable, prices should fall.

The ESB mechanism is, by design, less dynamic and less responsive. ESB propose that the capacity payments be fixed in advance and adjusted no more than every three years. Thus the Regulator must determine in advance the value of the capacity payments. In so doing, it must provide revenue just sufficient to induce new capacity at the right point in the merit order. A lower level of expected revenue may mean that the new capacity will fail to materialise. A higher level of revenue may mean that too much new capacity is built and may result in a windfall gain to all generators.

Thus, whereas the price mechanism has a self-calibrating mechanism for continually adjusting the strength of the new investment signal in line with changing conditions, the ESB mechanism is locked into a particular pre-determined view of supply adequacy and the level of capacity payment required to bring the supply to the desired level. The prospect of the Regulator miscalculating and undershooting means that there is some chance that the mechanism may fail to lead to the requisite new additions of capacity. To avoid this outcome there may be a tendency for the Regulator to overestimate the capacity payment.

4.6 COST OF ENERGY PRODUCTION

The cost of energy produced by an electricity system is largely a function of the amount and type of installed capacity. If too little capacity is installed, system operating costs may be higher than appropriate – because of the excessive use of peakers. On the other hand, if too much capacity is installed (or if it is of the wrong type) any reductions in system operating costs may be more than offset by the additional fixed costs of excess installed capacity.[5]

As such, the cost of energy production is to a large extent dependent upon the quality of the signals relating to the type and quantity of new build.

As discussed above, the price mechanism has inherent within it incentives to bring on the right kind of new capacity at the right time. In contrast, the ESB mechanism is critically dependent on the regulator's non-market view of the type of new capacity required and the consequential setting of the level of the capacity payment. While there is no direct link between the type of capacity assumed in setting the capacity payment and the type of plant that is built, the nature of the capacity payments may mean that a different mix of plant is built under the capacity payment scheme as compared to the CER market price scheme. This outcome may increase the chance that electricity is not being produced at least cost.

In addition to the price signals to long-term investment, important price signals to short-term behaviour are also lost. ESB is confident that a marginal cost bidding regime would result in a more assured merit order dispatch. However, the actual outcome of such a regime would depend on how accurately marginal cost is calculated taking account of all the dynamics of situation on the half-hour. It is extremely doubtful that the regulated marginal cost bidding scheme would approximate market outcomes, even if the outcome were consistent with ESB's views of "merit order dispatch."

[5] The cost of such excess capacity may be borne by the investors in the excess capacity, rather than the system customers. A narrow evaluation of the overall costs and benefits might only focus on the net benefits to customers and ignore the net benefits to other market participants.

In addition important signals to bring plant on in peak periods and to operate plant at above-normal levels may be blunted or removed. Even more troubling is that the relatively weak signals from this regulated marginal cost bidding spot price would reduce or remove the incentives for load response, even if other measures were taken (eg, provide capacity payments to interruptible loads). CER's proposed market price scheme for Ireland would provide these signals directly.

4.7 BARRIERS TO EXIT

It is argued that explicit capacity payments may aid new entry, but they also have the possibility of introducing new barriers to exit. Plant is likely to receive a capacity payment if it is deemed to be available even though it may never generate. These plants may still cover their fixed costs (which is likely for a fully depreciated plant) but do not add to the generation supply in Ireland. Trading arrangements should encourage inefficient old plant to be shut and be replaced by more suitable and more efficient new plant. The capacity payment proposed by ESB is likely to have the reverse effect.Barriers to exit are important in a small market. Sites for building new plant are strictly limited and inoperable plant takes up valuable land that may be suitable for the location of new plant. Additionally new owners, should they be able to buy a retired ESB power plant sufficiently cheaply, may be able to refurbish the plant and make it operational. Barriers to exit have the effect of increasing customer prices and reducing real operable installed capacity. Another worry is that it seems possible for ESB to conduct a strategic retirement plan that is aimed at maintaining the capacity payment at desired levels if new entry threatens to reduce the capacity payment. So, as long as all ESB plant is getting the capacity payment, this plant may remain in operation as a part of the ESB portfolio. However, if the capacity payment is threatened, ESB could selectively retire/shutdown power plants in a manner to maximise ESB's total capacity payment revenue and profits.

4.8 TRANSACTION/ADMINISTRATION COSTS

The price mechanism requires relatively little in the way of additional administration or transactions. It is only once the safety net is triggered that additional administrative procedures come into play.

The ESB mechanism is, in contrast, much more regulatory intensive. Specifically, it requires the Regulator to develop projections for the initial five years and every three years thereafter:

1. The future trajectory of energy prices (including intra-day and seasonal variability),
2. The point(s) in the merit order where new capacity is required and the "expected" new entry itself,
3. The revenue the new entrant will earn from energy sales (which will require an understanding of the likely dispatch characteristics (time of day, seasonal variability etc.) so that it can be combined with the projections of future energy prices (Point 1 above),
4. The cost of new entry of the type being induced, and
5. The quantum of payment required to induce the new capacity to come on-stream at the desired point(s) in the merit order – this being the difference between the cost of new entry and the likely revenue to be received from energy sales. This will mean an assessment of a power plant developer's decision process, in combination with an assessment of new entrant costs.

All of these tasks are individually difficult; the task of getting them as right as possible is likely to be relatively resource intensive.

However, these are not the only regulatory/administrative costs associated with the ESB capacity mechanism. In addition to the above, the monies required to fund the capacity mechanism have to be raised *"from Suppliers, in an equitable manner based on their customers' requirement for capacity"*. This may involve not only the costs of physical collection, but also the somewhat problematic task of determining what might count as the equitable allocation of costs, and each customer's requirement for capacity.[6]

ESB argues that the centralised spot market will require a burden of market monitoring on CER that is at least as great as the cost of administering the capacity mechanism. In practice CER will have an on going monitoring of the market under both arrangements. Under a regime of regulated marginal cost bidding, especially if this is defined with any degree of sophistication, CER will have to constantly monitor ESB's compliance to its rules. A light-handed approach will not be permissible. Under a deregulated centralised market CER is able to take a more benign approach and allow the market to operate. ESB's concerns as to what bidding behaviour by generators is acceptable will be resolved by CER establishing guidelines for it monitoring function.

4.9 PRICES FACED BY CONSUMERS

The prices faced by consumers are a function of both the underlying costs of producing electricity and the way in which payments to generators are structured.

With respect to the underlying costs of producing electricity, it was argued above that the price mechanism is more likely to induce the right type of new plant, and that the price mechanism involved fewer administrative/regulatory costs. Thus a consideration of the underlying costs of producing electricity suggests that the price mechanism is likely to lead to lower costs to consumers – other things being equal.

Further to the issue of the underlying costs, we need to consider, in addition, whether the combined capacity and energy payments under the ESB mechanism would be more or less than the energy only payments under the price mechanism alternative.

On this issue, it seems likely that the payments to generators would be higher under the ESB mechanism than under the energy price mechanism. Note, in particular, in off-peak periods, it seems reasonable to assume that the energy price under both mechanisms will be the same - determined by the short run marginal cost of the last dispatched station in the merit order. Thus the payments to generators will be greater under the ESB mechanism (by the amount of the capacity payment) than under the price mechanism.

It is only on the relatively infrequent occasions that the last peaking stations in the merit order are dispatched that the price under the price mechanism will go higher than under the price mechanism than under the ESB mechanism - thus raising the possibility of higher payments to generators (assuming that the payments associated with an uncapped spot price are higher than the combined payments assuming a capacity payment and a capped spot price.)

For all of the reasons outlined above, we expect electricity prices for customers to be higher under the ESB mechanism than under the price only mechanism.

[6] We assume by the nature of the proposal that the requirement for capacity is independent of the requirement for energy – otherwise, an adder to the energy price could fund the mechanism.

4.10 WEALTH EFFECTS

Further to the discussion above, the higher payments to generators under the ESB capacity mechanism may result in a transfer of wealth from consumers to generators (vis-à-vis the price mechanism).

5. CONCLUSIONS

From the discussion presented above, we conclude that, vis-à-vis the price mechanism as proposed by CER, the capacity mechanism proposed by ESB and other parties may:

- Create a market that will not survive in the long-term
- Severely blunt spot market price signals
- Add to the costs of producing electricity in Ireland
- Place a considerable technical and administrative burden on CER
- Raise prices for consumers
- Reduce incentives to re-furbish or build on existing sites
- Result in a net transfer of wealth from consumers to generators - including ESB.
- Do little (if anything) to increase security of supply.

As a consequence PA does not favour these proposed capacity mechanisms.