

*NIAER Paper*

**Payments for Generation Capacity Margin**

**Decision Paper**

**June 2003**

## Background

- 1.1 In August 2002 the Director General for Electricity Supply (DGES) issued a consultation paper entitled “Payments for Generation Capacity Margin”. A number of responses were received and subsequently a paper summarising the consultation responses was issued.
- 1.2 The August consultation paper discussed two main issues:
  - (1) Generation Security Standard
  - (2) Capacity Payments
- 1.3 It is important to establish from the outset that the proposed capacity payment system will be periodically reviewed to guard against gaming by generators. The system has been designed such that generators cannot gain from withholding capacity to gain capacity payments.
- 1.4 Since 1999 no individual or organisation has had responsibility for maintaining a Generation Security Standard for Northern Ireland. Prior to 1999, NIE’s Power Procurement Business (PPB), as part of its licence duties, was required to have sufficient generation plant under contract to ensure that a minimum level of system black outs and brown outs were experienced.
- 1.5 However this requirement on PPB changed after the EU Directive on the Internal Market in Electricity opened the electricity market for generation partly to competition. Continuing liberalisation means that PPB’s share of the total Northern Ireland market will diminish and with increasing generation competition there will be no generation purchase obligation. PPB’s costs will no longer be met by all customers and thus it should not bear the responsibility of maintaining any future capacity margin. The August 2002 consultation paper asked for views on how such a standard should be set and who ought to bear responsibility for it.
- 1.6 In order to develop an appropriate generation security standard, irrespective of who bears the responsibility for maintaining it, a statement of future generation capacity is required. Such a statement covers projections of generation capacity, demand, load growth, availability etc. over a projected period of time.
- 1.7 If it is forecast that Northern Ireland will be short of generation capacity it is possible that no new generation proposal may come forward and therefore a generation shortfall may occur.
- 1.8 Approaches to generation adequacy have the goal of correcting market failures that prevent the energy market by itself from being able to achieve that level of capacity which on the basis of statistical probability of technical failures provides a specified level of security.

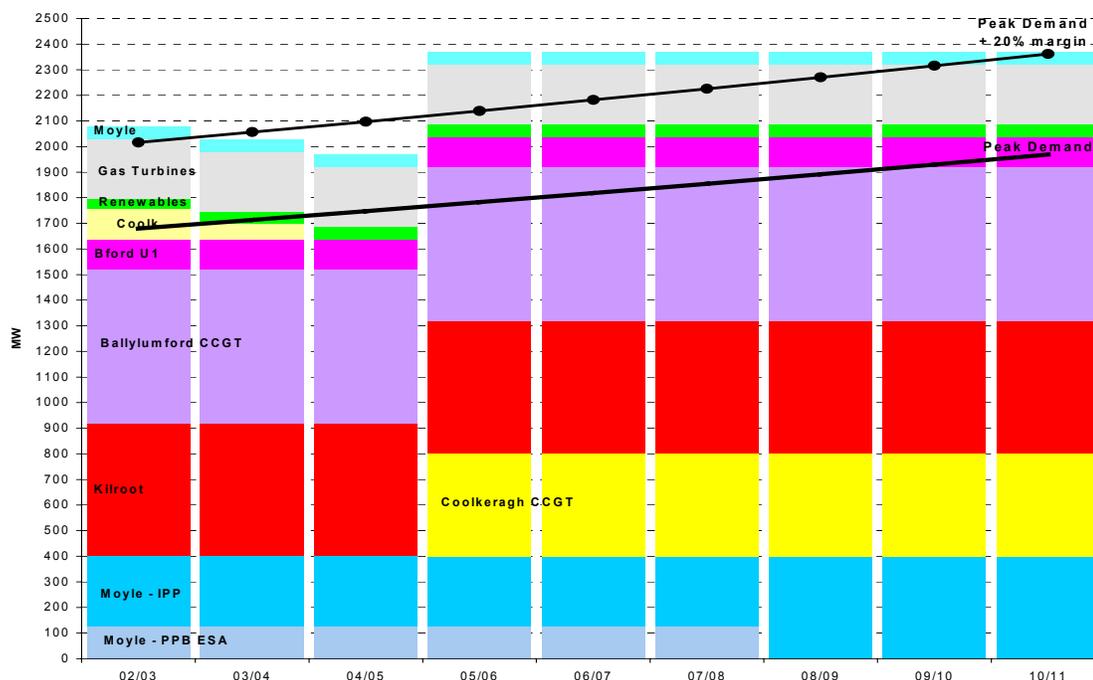
- 1.9 There are no widely recognised international good examples of effective approaches to securing a sufficient generation margin. No market exists anywhere in which direct customer valuation of reliability determines capacity additions and a true market based solution to reliability remains to be constructed.
- 1.10 One way of addressing a potential generation shortfall may be to recover revenues from customers for a capacity margin payment. This payment would be to generators who provide capacity on the Northern Ireland system. The August consultation paper asked for views on what form such a payment could take.
- 1.11 The format of any such payment in the open market will need to guard against gaming by independent plant operators and designed to prevent perverse outcomes.
- 1.12 The Capacity Payment mechanism proposed herein for the Northern Ireland market will be subject to periodic review by Ofreg, and given the uncertainty surrounding the generation market after 2010 (when the first of the NIE PPB long term contracts may be cancelled), Ofreg will not commit to continuing this form of capacity payment system unchanged beyond 2010.

## **Generation Capacity Statement**

- 2.1 System Operator Northern Ireland (SONI) has been assigned to produce a statement of generation capacity and work is currently being undertaken in relation to this. SONI will produce a seven-year capacity statement and is investigating the adoption of a loss of load expectation (LOLE) standard similar to that adopted in most European countries.
- 2.2 This statement will merely provide scenarios in relation to the likely electricity supply/demand balance over the coming years. It can only, by its very nature, be predictive and potential investors will need to make their own assessment of the financial merits of investing in new generation plant.
- 2.3 It is intended that the capacity payment system will provide indicators to the industry as to the need for investment in new capacity. In other words appropriate levels of investment in capacity should be dictated by market forces. It may however be the case that despite indications of a predicted short fall of capacity no investors come forward. To date there is little sign of an appetite among investors for taking market risk with new generation in either Northern Ireland or the Republic. If this is the case Ofreg and DETI will need to decide the most appropriate action to take.
- 2.4 Therefore, as of yet, responsibility has not been assigned for the maintenance of any future capacity margin. This is a matter to be decided by policy-makers with advice from Ofreg and electricity industry representatives.

## Northern Ireland Generation Sector

- 3.1 Increasing market opening and thus exposure of the electricity sector to competition gives rise to concerns over supply adequacy and the promotion of any investment in generation capacity which may be needed.
- 3.2 In Northern Ireland, at least in the short and medium term, the stock of available generation is fixed. Generating capacity in Northern Ireland may only be able to vary in the short term through investment in renewables, CHP and demand side management measures, for example load management and energy efficiency.
- 3.3 Figures available on demand forecasts and generation availability indicate that there should be enough generation to meet Northern Ireland's requirements for the next ten years even if no additional conventional fossil fuel generation is added to the system, other than the planned 400 MW CCGT at Coolkeeragh in 2005. .
- 3.4 The following chart illustrates the capacity versus demand situation in Northern Ireland between 2002/03 and 2010/11, using a favourable set of assumptions.



Source: NIE

- 3.5 The graph illustrates that only in 2003/04 and 2004/05 will the percentage of total capacity over peak demand be less than 20%. However this is being addressed by the recent tender for additional capacity undertaken by NIE's PPB. The graph shows capacity margin at its lowest (excluding 2003/04 and 2004/05) in 2010/2011.
- 3.6 However the capacity versus demand graph can be interpreted in a number of ways. The figures include Moyle at 400MW but it may be argued that interconnectors cannot be fully relied upon for generation adequacy planning. Moreover even if it were included, on average to date 100 MW of this capacity has been destined for the Republic of Ireland market.
- 3.7 In addition the graph assumes a figure of 520MWs for Kilroot. As an oil burning plant Kilroot can run at 520MWs but on coal it is contracted at 390MWs. Given that coal is at present the lower cost fuel, Kilroot normally runs on coal except when demand is high and the system is short of generating capacity. However for the purposes of calculating total generation capacity available to Northern Ireland for generation adequacy we can assume Kilroot operating at 520MWs as the switch from coal to oil is uncomplicated with a short changeover time.
- 3.8 The reliability of renewables in the capacity figure is also questionable and therefore we assume they cannot be included in any generation adequacy calculation.
- 3.9 Therefore if renewables are excluded and prudent measures of interconnector reliability of 80MWs North-South and 250MWs on Moyle (i.e. allowing for single pole failure), the capacity margin scenario is altered and capacity may not be sufficient to meet a 20% additional margin above peak demand until new generation assets are constructed.
- 3.10 In the light of this demand versus capacity assessment given the need to attract new investment in generation, it is proposed that some mechanism be put in place to reward generators for their availability.
- 3.11 If we make the pessimistic assumption above, then the capacity payment will have two roles. The first will be to provide contextual information to potential investors to assist in any investment decision. The second is to place a system value on the available capacity of existing generation.

## Methods to Secure Sufficient Generation Capacity

- 4.1 The rationale behind the proposed capacity payments arrangement is dual purpose. Firstly, generators will be rewarded for the contribution they make to capacity availability and towards covering the generation security margin. Secondly, the variation in the level of payments made (whether daily or half – hourly – see section 5 below) should provide contextual information to the market in relation to investment decisions – ie the type of generation (peaking or base load) which the system requires
- 4.2 The Ofreg consultation paper in August 2002 discussed two main options in relation to the allocation of capacity payments. A capacity based approach would make a daily assessment of spare capacity on the system at a time when the capacity margin is at it's minimum. Alternatively an energy based approach would allocate a capacity payment on the basis of undelivered energy or energy which could have been delivered.
- 4.3 The issue of rewarding generators for availability differs from but is linked to the provision of sufficient generation capacity to meet peak demand plus any security standard applied.

### *Rewarding Generators for Availability*

- 4.4 In a competitive market a capacity margin can be maintained by individual players ensuring they have access to a margin in the event of plant failure.
- 4.5 Proposals put forward in the August 2002 consultation paper were (i) a capacity based approach and (ii) an energy based approach.
- 4.6 Following consideration of responses Ofreg favours the capacity based approach.
- 4.7 The capacity based approach is dependent upon the level of capacity margin required. Given the responses from the consultation exercise and discussion with industry representatives, it is generally accepted that a capacity margin of 20% over system peak is desirable, and is consistent with a LOLE of 8 – 9 hours per annum, an internationally comparable standard.
- 4.8 The provision of any sort of generation adequacy margin, which in turn contributes to system security, has a public good attribute. Without real time demand responsiveness or contractual commitments for voluntary load shed it is impossible to determine the differing levels of benefit which various customers will receive from the provision of a security margin. Therefore the cost of providing a capacity payment should be spread across all customers as a public service obligation (PSO) charge.

- 4.9 Although eligible customers may have to bear a marginal increase in PSO costs as a result of the proposed capacity payment scheme, they should benefit in other ways. Current availability payments paid to generators are a component of the Power Purchase Agreements (PPAs). NIE Power Procurement Business (PPB) is obliged to make significant fixed payments to generators based on the availability of generation plant, whether or not that plant actually produces electricity. The principle that applies is that the more energy PPB sells, the greater contribution each unit sale makes to the fixed costs ie the average total cost to consumers falls.
- 4.10 Further liberalisation of the market and the current PPB price control conditions mean that PPB is incentivised to trade that energy which it does not need for the franchise sector. Therefore this energy will be available at a competitive price to the eligible market, such that adjusting for capacity costs, there should be lower cost energy available on average to the wholesale market.
- 4.11 Only generators with a capacity greater than 10MWs will be eligible for capacity payments. Generators who wish to be considered eligible must also nominate their availability to the system operator up to a predetermined period before dispatch. Wind generators do not currently participate in the arrangements for top up and spill which currently apply to conventional generators in Northern Ireland. Therefore wind generation or any other form of intermittent generation will not be eligible for capacity payments.
- 4.12 The Bulk Supply Tariff produced by NIE PPB presently places a value of £36 per kW on the value of capacity. This is an approved regulated tariff, and as such Ofreg agrees with this capacity valuation.
- 4.13 Therefore given the current nature of the Northern Ireland electricity market and generation sector the most suitable way to reward availability and signal the need or otherwise for investment in generation is a capacity payment mechanism. The mechanism is described fully in the next section.

## Composition of Capacity Payments

- 5.1 The proposed payments for capacity are derived from the capacity based approach outlined in section 4 of the August 2002 consultation paper. Under this approach a daily assessment is made of spare capacity on the system.
- 5.2 It is based on the capacity margin figure of 20%. Thus assuming that peak demand is 1725 another 345 MWs are required to meet demand plus cover the margin. This is an indicative figure at this stage, and in practice will be set by interaction between Ofreg and SONI.
- 5.3 Following the indicative figure, the capacity rate of £36 per kW then leads to a total annual amount of money required to meet capacity payments of £12.42 million. This sum of money is modest compared to the total electricity system cost, and in any event, as PPB contracted plant will make up the majority of capacity, there will be little impact on net PSO costs.
- 5.4 If we assume that the capacity available to the system is measured, and compared to the system peak, then there will either be a surplus, deficit or balance of system capacity margin.
- 5.5 There remain two options within the capacity methodology to allocate funds to participating generators. The first option is to divide the annual total into an amount of capacity payment per day (in this example £34,027 per day) and allocate the total amongst generators in accordance to the balance of capacity margin over peak that day shared amongst generators on a pro-rata basis, based on capacity provision at the highest demand point of the day.
- 5.6 The second method is to allocate capacity funds to each half-hour settlement period (ie £1418 per half hour period) and calculate the following : (i) system demand in the half hour, (ii) available generation capacity, (iii) capacity margin (ie 20 % more than each half hour peak), (iv) proportion of margin provided by each available generator and (v) calculate payments to participants.
- 5.7 Having agreed the principle that generation capacity payments are necessary, Ofreg will agree an appropriate implementation mechanism with SONI from the two options above, and inform the market.
- 5.8 The introduction of this new capacity payment will not grant new revenue to those generators currently under long term contract to NIE's PPB. The payments made to the generators under the long-term contracts will remain unchanged. However it will be necessary to calculate the capacity margin provided by the contracted PPB plant in order to determine the allocation made to any other independent generation which qualifies for the capacity payments.

- 5.9 It will be necessary for some entity to calculate the contribution each generator makes to the available capacity over a given period. It would not be cost effective to set up a new body to do this so the obvious choice is either NIE's PPB or SONI. SONI emerges as the preferred option given that PPB is increasingly being encouraged to take on a more active trading role in the market and therefore there may be a potential commercial conflict of interest.
- 5.6 SONI will experience a cost in relation to this new role and will need to be able to recover this.
- 5.7 Gaming will not be straightforward under the system, as it will not be apparent when there will be a benefit from withholding capacity to receive a capacity payment –the (independent) generator wouldn't know ex-ante what the rest of market was going to do, and this uncertainty would tend to prevent capacity withholding. In addition the situation would be monitored closely and SONI will determine if any significant divergences from expected behaviour have occurred. The scheme will include penalty mechanisms should it become apparent that there has been manipulation of the system by participants.