Security of Electricity Supply

in Northern Ireland

and related issues

A Paper By The Northern Ireland

Authority for Energy Regulation

July 2005

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1 Introduction

1.1 On the 4 August 2005, the Planning Appeals Commission (PAC) will begin to hear an appeal by AES Kilroot Ltd (AES) - the owners of Kilroot power station ("Kilroot") - against the non-determination by the Planning Service of an application by AES to install a flue gas desulphurisation plant (FGD) at Kilroot. The installation of FGD will also require the consent of the Department of Enterprise Trade and Investment (DETI) under Article 39 of the Electricity (Northern Ireland) Order 1992.

1.2 The Northern Ireland Authority for Energy Regulation (NIAER) is among the objectors to the planning application. Should either the planning application to install FGD be refused or Article 39 consent not be granted, this will raise questions about Kilroot's role in the Northern Ireland electricity market, possibly from 2008 onwards. This will in turn raise questions about the security of electricity supply and the cost of electricity in Northern Ireland – again potentially from 2008 onwards.

1.3 This paper examines these subjects and considers whether they would be affected if Kilroot fails to obtain planning approval or consent under Article 39, and if so how they might be dealt with.

2 Background

2.1 The effect of implementation of the EU's Large Combustion Plant Directive (2001/80/EC) (LCPD) will be to require power stations to reduce, amongst other things, the sulphur dioxide emissions (SO_2) arising from their generation activities.

2.2 Under the LCPD, Member States are required to set limits for SO_2, nitrogen oxides and dust from large combustion plants. The more stringent requirements on SO_2 emissions from power stations built before 1987 (including Kilroot) commence in 2008.

2.3 However, the UK Government has not yet confirmed how it will implement the LCPD. There are two possible approaches to implementation – imposing plant by plant emissions limit values (ELVs) for each power station or introducing a national emission reduction plan (NERP) which imposes an overall emissions limit at a national level. Under a NERP, operators that exceed their target reductions will be able to sell allowances to those operators who do not meet their targets. This market mechanism is aimed at ensuring that the national target is met, whilst providing flexibility at an individual plant level to meet the target at least cost.

2.4 The impact of the LCPD on power station operators including Kilroot will therefore depend on how it is implemented by the UK Government.

2.5 The power industry in Northern Ireland has already made significant progress in reducing its SO_2 emissions. There are several ways of reducing SO_2 emission as the industry has already amply demonstrated. Examples include gas conversion at Ballylumford and subsequent repowering with more efficient combined cycle gas turbines (CCGT), replacement of old oil fired capacity at Coolkeeragh with a new CCGT, and the displacement of generation with imports from Great Britain. Kilroot

is now the only major emitter of SO^2 in Northern Ireland. Its options to reduce its SO^2 emissions include installing FGD, using lower sulphur coal, operating for fewer hours or converting to gas. Further, if the LCPD is implemented in the UK by way of adoption of a NERP, it will also be possible for power stations such as Kilroot that exceed their emissions targets to continue to operate and buy allowances to match that excess.

2.6 Operators of power stations constructed before 1987 (including Kilroot) were also given the opportunity to "opt out" of the LCPD regime provided they agreed to operate for no more than 20,000 hours in the period from 2008 to 2015.

2.7 Taking advantage of the opt out would have allowed Kilroot to continue to operate until 2015 (albeit at reduced hours from 2008) without the need to take other steps to reduce its emissions or participate in any NERP.

2.8 Whilst the LCPD required opt outs to be notified by 30 June 2004, in view of the uncertainty as to the manner of implementation of the LCPD in the UK, the Government has allowed operators to opt out with the opportunity to subsequently opt back in before 31 December 2005 (having extended the original deadline from 30 June 2005) once the manner of implementation is clarified. Those operators that have taken advantage of this opportunity, retain the flexibility to opt back in once the form of implementation of the LCPD is finalised. All coal - fired power stations in Great Britain which have not installed or committed to install FGD have taken advantage of this facility.

2.9 Although the Government allowed coal fired power stations the maximum amount of time and flexibility as to how they would comply with the LCPD and reduce their SO_2 emissions, AES, despite urging by NIAER, insisted in not exercising its option to opt out. It has therefore reduced its options should it not be in a position to install FGD

2.10 Kilroot may (depending on the manner of implementation of the LCPD) have to (or indeed may choose to) cease operations as a coal burning plant if it fails to obtain either planning permission or consent under Article 39 of the Electricity Order to install FGD.

2.11 It is in this context, and in light of its responsibilities in relation to protecting the interests of consumers and to security of supply under the Energy (Northern Ireland) Order 2003, that the potential security of supply and cost issues caused by the possible closure of Kilroot are being considered by NIAER, and any consequential implications for the cost of electricity in Northern Ireland.

3 NIAER's Approach

3.1 Kilroot was, until the two new combined cycle gas turbines (CCGTs) were installed at Ballylumford in 2003 and Coolkeeragh in 2005, the most efficient plant on the Northern Ireland system. However, the installation of this new plant (with a combined total capacity of 1,000 MW) and the EU led aims of a low carbon economy, have altered the situation markedly.

3.2 As a base load plant Kilroot emits about 2.8 million tonnes of CO_2 per year. The price of CO_2 at the end of June 2005 was £16 per tonne. At this price carbon would add

£44.8m to the annual cost of electricity from Kilroot, compared to about £18m for the same output from a CCGT. While the cost of carbon in the future could go up or down, both the logic of the Climate Change policies of the British Government and the EU, and international opinion point to carbon increasing in price over the next two decades (which are the critical decades for the future of Kilroot).

3.3 Against this background NIAER did not believe that it was either desirable or likely that Kilroot would have a long-term future as a base load station.

3.4 If Kilroot were no longer to have a base load role, this would not necessitate its closure. Every electricity system requires plant, which is dispatched less often to cover peaks in demand, reserves in case another plant breaks down and relief when more efficient plants are undergoing planned maintenance. Kilroot fulfilling this role would not, in NIAER's view and the other options available to it, necessitate Kilroot locking into a commitment to fit FGD. But it did not necessarily exclude it. If Kilroot were to function as the system's insurance against failures, accidents and emergencies, then one of the key questions for NIAER would be the price of fitting FGD and the impact of that price on customer's bills.

3.5 The capital cost of fitting FGD at Kilroot has been estimated at approximately £35 million with additional annual operation and maintenance costs of around £1 million plus an effective 3% increase in the cost (fuel and CO_2) of each unit generated (as a result of additional internal load for operating the FGD plant itself).

3.6 Despite the other options available to it, AES has insisted on proceeding to fit FGD. AES also contends that the cost of installation of FGD should be met by Northern Ireland Electricity plc ("NIE") under the long term power purchase arrangements it has in place in relation to the output from Kilroot (Power Purchase Agreement). These costs would then be passed on to electricity consumers in Northern Ireland. Whilst the dispute as to financial liability for FGD is in the course of being referred to independent experts, it remains AES's stated position that NIE should bear the cost of the FGD. Therefore NIAER must, until that issue has been resolved, assume that the costs of fitting FGD will be recovered by AES under the Power Purchase Agreement.

3.7 Because of the structure of the Power Purchase Agreement, if AES's contention is correct, in effect electricity consumers will bear the cost of the FGD. They will have to pay a high price for modifications to a plant, which may not be required to generate very much electricity. In addition, with the likely introduction of the single electricity market (SEM) in 2007 (as described in section 5 below), if AES's contention is correct and the cost of installation of FGD is met by NIE, AES will (assuming it operates in the SEM which it is likely to do after the Power Purchase Agreement expires or is terminated) have received an advantage over those power stations operating in the SEM that have had to fund FGD themselves.

3.8 In the absence of any willingness on the part of AES to re-negotiate the terms of the Power Purchase Agreement, there are two possible outcomes to the current situation:

(a) if the consents to fit FGD are granted (and AES is correct in its contention that its costs are recoverable under the Power Purchase Agreement), costs to electricity customers will increase. Indeed in it submissions to PAC, DETI suggests that if the costs of fitting FGD are recovered from consumers this

could provoke an immediate 3% rise in electricity prices and risk a further 3% rise if further abatement technology is also needed; or

(b) if consents are not granted and AES does not choose to meet its obligations under the LCPD by other means (for example conversion to gas or operation within a NERP), the consequence could be the end of electricity generation at Kilroot, possibly by 2008.

3.9 It is NIAER's view that neither the potential increase in electricity costs occasioned by the fitting of FGD nor the increase in CO_2 emissions caused by prolonging the operation of Kilroot as a base load plant in circumstances where other lower cost, less environmentally damaging alternatives are available, are consistent with wider Government energy policy including the goals of reducing energy costs, building competitive markets and enhancing sustainability in energy. It is predominantly on these grounds that NIAER has objected to AES's planning application for FGD.

4 The consequences of Kilroot's closure

4.1 NIAER has sought solutions to the potential choice between increasing prices to consumers and prolonging adverse environmental effects in terms of CO_2 emissions on the one hand, and the possibility of Kilroot closing in 2008 on the other hand. In the absence of a willingness on the part of AES to renegotiate the Power Purchase Agreement however, NIAER is now in the position of having to consider the consequences of Kilroot being refused FGD and choosing not to meet its obligations under the LCPD in another way.

4.2 However, the closure of Kilroot as a coal fired power station in 2008 could provide an opportunity to both remedy a potential generator capacity shortfall and reduce prices if the capacity were replaced in a timely way. The rest of this paper considers how that capacity might be replaced to alleviate those security of supply concerns and the consequent effect of such replacement on the cost of electricity.

5 The Single Electricity Market (SEM)

5.1 The Governments of the United Kingdom and the Irish Republic have committed themselves to the creation of a competitive single electricity market in 2007 encompassing both Northern Ireland and the Republic of Ireland. Work is at present advancing rapidly on the design of this market. In principle this market should result in the timely introduction of adequate generating capacity once the market identifies a new opportunity. In this context, the news that Kilroot would be unable to continue as a coal fired plant might be expected to produce a response that would plug any perceived gap.

5.2 However, until transmission constraints between Northern Ireland and the Republic have been removed - and this may take another six or seven years - there can be no assurance that new capacity will come forward in that part of the island that faces a generation capacity deficit in the immediate future.

5.3 On the other hand, the credible expectation that a single electricity wholesale market will emerge shortly, should mean that any generation which does come forward should do so in the confidence that it will, within the near future, be able to offer its

capacity and energy in an island wide market. In this sense SEM is potentially part of the solution to any concerns about a security of supply deficit created by the prospect of the closure of Kilroot.

5.4 However, what is also clear is that the timing of its introduction does not permit Northern Ireland to test the effectiveness of the SEM in bringing forward sufficient generation by 2008 as the market would have to respond before the SEM became fully operational.

5.5 NIAER and DETI each has a statutory duty to see that there is sufficient generating capacity available to ensure security of supply is maintained at a reasonable standard. In the circumstances, NIAER and DETI would need to be sure that there would be sufficient capacity available at a reasonable price in the period 2008 to 2012 (at which point transmission constraints between Northern Ireland and the Republic are likely to have been removed) if Kilroot closed, and that in the period post 2012, any necessary adjustments to generation capacity could be made once the SEM is fully operational. DETI has the power to invite tenders for generating capacity (or direct the Authority to do so) at any time in the event that there is insufficient capacity existing, under construction or planned to meet the projected demand for electricity at any time in the future.

6 Options for Replacing Kilroot

6.1 It appears apparent that, if Kilroot closes, Northern Ireland will need in the region of 400 MW of additional plant to cover the period 2008 to 2012, and that the plant must for the most part be located in Northern Ireland.

6.2 In the period 2008 to 2012 onwards, Northern Ireland's primary need will not be to replace the electricity production which used to come from Kilroot but the generating capacity that Kilroot represents and the option of being able, as the occasion requires, to call upon it to generate. It has long been NIAER's view that the cost of Kilroot under the Power Purchase Agreement of around £60m per annum was excessively high even when it was a base load plant. It follows that any figure in that region for a non base load plant with its capital costs repaid would be even more unacceptably high.

6.3 NIAER has no intention of being prescriptive about what can or should provide the capacity that could replace Kilroot. This is a matter for the market. However, since maintaining security of supply is fundamental to every aspect of economic and social life, NIAER does have to be completely confident that there will be additional competitively priced capacity available.

6.4 New capacity will come on stream over the next three years. This will include renewables (some of which may be schedulable) and possibly some more CHP. DETI has adopted a policy of seeking to reduce electricity demand by 1% per annum (allowing for economic growth) through enhanced energy efficiency programmes. However, while these measures may reduce the size of the generation deficit that would arise from Kilroot's closure, they do not - on present information - appear to be likely to fill it.

6.5 The options which are technically possible to cater for any shortfall within the timescale include:

- open cycle gas turbines (OCGTs);
- retaining existing old units at Ballylumford;
- converting Kilroot to run on gas;
- temporary mobile generating units;
- building a third CCGT;
- some combination of the above

6.6 There are therefore many ways of ensuring that the early closure of Kilroot would not be a problem. With the exception of a third CCGT, all the above could be delivered within the timescale required and before any closure of Kilroot in 2008. A fully developed CCGT might take slightly longer, though a high efficiency single shaft machine similar to the 106 MW generator at Ballylumford could be part of a solution. They would all be compatible with the development of SEM either because they would close down once that market becomes fully operational or because they could expect to participate in and be rewarded by that market.

6.7 Those offering to provide capacity will have to test their proposals against a number of criteria including:

- timeliness: can they have the capacity available by the date it may be required?
- cost: will it be lower cost than a continuation of Kilroot and the sunk cost of FGD?
- role in SEM: would the capacity be adequately remunerated in SEM?

Any formal process for the tendering of additional capacity will also need to be undertaken in a form that complies with the requirements of Directive 2003/54/EC concerning common rules for electricity (the Electricity Directive) and the new regulations published by the Department.

7 Next Steps

7.1 In view of the above, NIAER proposes asking SONI, on behalf of NIAER and DETI, to invite initial expressions of interest from parties who may be interested in providing generation capacity in Northern Ireland for the period from 2008 onwards.

7.2 Once the expressions of interest have been received, DETI, SONI and NIAER will consider what steps are necessary to secure any necessary additional capacity including, if appropriate, the undertaking of a formal tender process which complies with the Electricity Directive and the Electricity (Northern Ireland) Order 1992 (as amended by the Electricity Order 1992 (Amendment) Regulations (Northern Ireland) 2005).