

Reaching Renewable Targets, Efficiently

Grattan Healy, 28th September 2011, 3rd ed¹

Introduction

Ireland, like all other Member States, has agreed with the EU to strongly develop its renewable sources of energy, with a view to securing future energy supplies at reasonable cost in the medium to long term, while reducing Ireland's contribution to climate change.

Fossil fuels and nuclear are still heavily subsidised means of generation. In addition to this, both fossil fuel and nuclear plant cause extensive external costs that fall on the greater society rather than the plant operators. These subsidies and external costs have resulted in an imperfect market. In this imperfect market condition, renewable energies are, for now at least, artificially uncompetitive. In order to address this imbalance, various means of supporting renewable generation have been developed, the most successful of which is the fixed or guaranteed price mechanism, known in Ireland as the Renewable Energy Feed-in Tariff (or REFIT).

Ireland has concluded that, to reach its binding 16% gross energy consumption target under the 2009 Renewables Directive², it should focus mostly on electricity from its abundant wind resources, and has indicated in the National Renewable Energy Action Plan (NREAP) submitted to the EU³ that it intends to have 42.5% of all electricity coming from renewable sources (mostly wind) by 2020. This can impose a cost on electricity consumers via the Public Service Obligation (PSO), though studies in Ireland now suggest this cost is fully offset by reductions in market prices due to the so-called 'merit order effect' of wind power⁴ and indeed by 2020 there will be a net benefit to consumers⁵.

However, having so much variable 'non-synchronous' type generation on the grid up to 2020 will pose significant challenges for what is a small market with a rather isolated grid. The Transmission System Operators (TSOs) on the island (Eirgrid and SONI) in particular have carried out extensive groundbreaking studies to consider this issue, and have proposed operating methods that would nevertheless maintain a secure system. Unfortunately, these procedures pose potentially serious problems for the development of renewable generation.

Overall there are very sound economic reasons for promoting renewables in an efficient manner⁶, such as a switch in our energy account from €5.6bn in imports

¹ All previous versions are hereby replaced and withdrawn

² 2009/28/EC, 23 April 2009

³ <http://www.dcenr.gov.ie/Energy/Sustainable+and+Renewable+Energy+Division/Renewable+Energy+Directives+and+National+Renewable+Energy+Action+Plan.htm>

⁴ "Impact of Wind Generation on Wholesale Electricity Costs in 2011", Sustainable Energy Authority of Ireland (SEAI), and Eirgrid, Feb 2011

⁵ "The impact of wind on pricing within the Single Electricity Market", Redpoint for Wind Skillnet (Irish Wind Energy Association), 4th Feb 2011

⁶ eg: see the work of SEAI:

http://www.seai.ie/News_Events/Press_Releases/Pathways_to_2050_release.pdf

for 2010⁷ to some €10bn in exports in the future⁸. In addition, there are significant legal obligations coming from the EU Treaties and Directives, which require Ireland to facilitate renewables properly, most of which have been ignored to date.

REFIT Model

The fixed or guaranteed price mechanism originated in Denmark, but was later changed to a very different and much less effective scheme. Germany and Spain improved the original Danish scheme, and now have the most effective guaranteed price mechanisms in Europe with the results to prove it. It is implemented in Ireland as the Renewable Energy Feed in Tariff (REFIT).

The guaranteed price mechanism is a very simple concept, the ultimate aim of which is to increase renewable deployment by providing investor certainty in a relatively new sector. A typical scheme, like REFIT, provides by regulation a guaranteed price for the electricity generated by a renewable project over the first 15 years. Since the expected output of such a project can be estimated with great precision (eg: by wind analysis experts), the revenue stream over the first 15 years of the project can be projected in advance with considerable accuracy. Some allowance for the uncertainty of the estimates is used, which discount the projected revenue stream to ensure that a more or less worst-case scenario is covered when banking the project (rather than using a production that should be exceeded 50% of the time, the banks in Ireland generally use 90% of the time, to be prudent in this sector).

Renewable projects have pretty clearly defined capital costs, and the financing of these (through interest and loan repayments) represents the bulk of the costs that underlie the cost of electricity from these projects. The ongoing operational costs (maintenance, insurance, rents etc) are the other main source of cost, but could be less than half of the financing costs. All of these costs must be covered by the project's revenue stream, and there needs to be a return to the investors whose risk equity funded the development and construction of the project in the first instance, otherwise there would be no projects at all.

To keep the REFIT guaranteed prices to a minimum, so as to minimize cost to the consumer, three things are required:

- maximum output from the project (in the case of wind, the most appropriate turbines for the site at the optimal hub height in an efficient layout, full dispatch when available, plus minimal losses and impacts of TLAF and DLAF⁹);
- minimal costs (some major costs are determined by world markets - cost of purchasing and maintaining turbines, cost of finance, while the rest are determined locally, most often by the authorities [land leases being the major exception], eg: connection costs, costs associated with grid code requirements, council rates and capital contributions and costs associated with planning compliance, transmission and line maintenance charges, CER levy);
- minimal uncertainty (the major sources of uncertainty are long term wind forecasting, risks of constraint and curtailment that is not fully compensated, and cost overruns and delays on the grid connection).

⁷ €5.57bn imports of energy products in 2010, CSO External Trade statistics, 31 March 2011 (http://www.cso.ie/releasespublications/documents/external_trade/2010/extrade_dec2010.pdf)

⁸ Minister Eamon Ryan, Joint Oireachtas Committee on Climate Change & Energy Security, 24th March 2010 (<http://debates.oireachtas.ie/CLJ/2010/03/24/printall.asp>)

⁹ Transmission and Distribution Loss Adjustment Factors

Where any costs are raised, these have to be recovered from the project revenue, so they force up the required REFIT price in proportion, if the projects are to remain viable and get built. However, the constraint of having to seek EU state aid approval makes the adjustment of REFIT prices to cope with such issues very difficult indeed.

For projects already built, REFIT prices will simply not be adjusted, so that increased costs will initially reduce returns to investors, and if significant, could force projects into banking difficulties and may oblige them to shut down. Such an eventuality would compromise all future financing of such projects in Ireland.

Where for any reason (usually grid issues) such projects are not allowed to generate their full potential output, the same logic applies. Where the loss of output is known in advance, and the REFIT price reflects that loss, the project could still be financed and remain viable. Naturally enough if increased losses of output are applied to existing projects, then they run the risk of failing, and compromising all future development.

The most detrimental way to affect REFIT is to introduce increased uncertainty. An estimated level of output loss, which might increase further in some unpredictable way, would have to be overcompensated for in the REFIT price. In other words the projected revenue stream would have to be proportionately higher than the anticipated loss, to satisfy the banks that the uncertainty was covered off. The total cost of such projects would then be considerably higher over their lifetimes, and would therefore cost the consumer more in the end. This is the most economically inefficient way to promote renewables.

Indeed, under the Government's own 'Better Regulation' policy¹⁰, costs to the consumer and the economy arising from regulations are supposed to be assessed in a Regulatory Impact Analysis (RIA), at which point these excess costs would have to be justified. While the original SEM proposal was subject to an RIA, it is not apparent that the current set of decisions within the SEM regarding the treatment of wind, which give rise to these costs, has been subject to an RIA. Given that the cost of curtailment could reach €100m or more per year (with 6000MW of wind), an RIA should be carried out without delay, and published.

In any of these cases, if the REFIT price was not adjusted to cope, then the development of projects would grind to a halt, and Ireland's policy and agreements with the EU would be left in tatters. Massive carbon costs and fines would follow and a substantial opportunity for Ireland to build a new internationally tradable sector would be lost.

Current situation

All of these issues are present in Ireland today - additional costs from the authorities, loss of output and hugely increased uncertainty as regards grid connection and project dispatch, not to mention the absence of certain key instruments. Consequently, the wind industry has more or less ground to a halt. Project completions dropped in 2010 to 115MW from twice that in 2009. At a time when other markets are ramping up, we appear to be hitting a wall.

Extra costs are being imposed on both existing and new projects, mostly by the authorities. And unknown levels of constraint and curtailment are already being imposed on projects by the grid authorities - the expected levels presented to projects by the TSO are not capped and are non-binding. CER decisions on the

¹⁰ Better Regulation, Jan 2004, approved by Cabinet; www.betterregulation.ie

implementation of REFIT and now SEM policy, clarify that these losses will not be fully compensated for.

Furthermore, Gate 3 is to be delayed yet again, possibly another two years, having been initiated in 2007 - that's 6 years just to get a valid grid connection offer, having already waited up to 3 years to get into a Gate. And some projects will be lucky if they get what is loosely described as 'firm access' to the grid in 2020 (16 years after application in some cases!). It is hard to imagine any other regulatory process experiencing longer waiting times as a matter of course.

Despite all of this, the REFIT price remains the same, and indeed, REFIT 2 is to be less generous than REFIT 1. Worse still, up to today, REFIT has not really been available at all since late 2009, and none is expected to be available for projects much before January 2012 - a huge regulatory barrier. In summary then, the Government's policy is not just being undermined by its own authorities, it is being demolished.

State Aids

Since the funds that support renewables come from the consumer, it is odd that they are treated as state aid. This arises because the European Commission and Courts have developed a legally perverse argument that such private funds become state funds once they are even handled by a state authority or body. In Ireland, they are handled by CER and/or Eirgrid. It has been argued since 2002 that this needs to be changed, so that the Irish support scheme can, like Germany's, be outside state aids and much more flexible as a result. This author has suggested that we examine ways to handle these funds through a private body, so that we can then seek agreement with the European Commission that these are not state aids. The authorities here have resisted this move for nine years so far, leaving us with a very inflexible scheme, and indeed no scheme at all since the end of 2009! If the losses to projects due to the curtailment issue persist (ie: lack of full compensation), then Ireland will have to seek a revision of REFIT and waste up to 2 more years on seeking a revised state aid approval. This delay will almost certainly make the targets in the NREAP unobtainable.

Optimizing cost to the consumer

An argument continuously presented to the renewables sector from all quarters to justify most of the problems it faces is: 'cost to the consumer'. It appears that even Eirgrid has taken upon itself the role of consumer protection agency, as it argues against compensation for curtailment for this reason¹¹. It appears particularly hard for the authorities to justify payments from the consumer for output that is not produced, as a result of curtailment. However, this type of payment is completely normal and exists currently in all electricity systems, including Ireland's, when it comes to compensation for transmission constraints, also for fossil fuel plant. These amount to some €100m per year, with only a small proportion arising from renewables¹². Curtailment is really just a form of constraint that arises because the system has not been developed (with storage, interconnection and appropriate operating procedures, as required by the RES

¹¹ Author conversation with Fintan Slye, Director of Operations, Eirgrid, Industry Forum on 'Programme for a Secure Sustainable Power System', Eirgrid, Dundalk, 17th August 2011

¹² Transmission System Operators' Submission for Dispatch Balancing Costs, October 2011 - September 2012, 29th April 2011 (search for 'imperfections' at: www.allislandproject.org)

Directive) to cope with variable non-synchronous generation with priority of dispatch, such as wind.

The key point is that not keeping supported projects whole leads to more cost to the consumer, not less. For now at least, this insight seems to be beyond the grasp of the authorities in Ireland. A very simplified generic example will illustrate the point.

Illustrative example

A planned renewable project is going to start generating soon to produce 1000 units of electricity at a REFIT price of 10 euro cent each. It requires all of that €100 of revenue to meet its total costs including financing, and the bank is willing to finance it with a loan up to 80% of its capital cost on that basis.

However, the grid operator proposes to reduce that output by some unpredictable amount, somewhere between 5 and 10% say. There are now a few possible outcomes:

1. The Regulator decides there will be no compensation at all for the lost output, the bank either refuses to fund, or lowers the gearing from 80% to say 65%; either way the project is cancelled; the national targets will not be met, and Ireland will be made to pay a penalty at least equivalent to what it would have cost to support the project in the first place, on top of the associated carbon costs. Cost to the consumer is nominally zero, but Ireland pays the €100 (plus carbon costs) and has absolutely no benefit. That €100 is paid by the taxpayer, the consumer in a different guise.
2. The Regulator still maintains there will be no compensation, so in order to meet targets the Government decides to adjust the REFIT price to cover the risks of curtailment. Given the uncertainties about the degree of curtailment, the banks require the price to be 10% higher (ie: 11 cent) to maintain their offer of 80% debt finance, and Government agrees. The project proceeds, is curtailed 5%, so is only able to generate 950 units, but is paid 11 cent for each of those units; total cost to the consumer is €104.5, and cost per unit generated is 11 cent¹³.
3. The Regulator decides to allow full compensation at the REFIT price to the project, which goes ahead, still only generates 950 units due to curtailment, is paid 10 cent per unit generated, ie: €95, plus €5 compensation for lost output; cost to the consumer is €100, and the cost of each unit generated is 10.5 cent¹⁴.
4. The Regulator makes the grid authorities meet their legal obligations to develop the grid in order to transmit the full power of the project and not reduce its output, so that it goes ahead and generates the full 1000 units at 10 cent each, which is clearly the legally correct and most economically efficient outcome (when we also consider the economic benefits).

Conclusion from example

So, simplistic statements that we must avoid cost to the consumer are short sighted in the extreme. The whole idea of REFIT is to impose a cost on the consumer in the most efficient manner possible (lowest uncertainty) to get the

¹³ 950 units x 11 c. each =€104.50

¹⁴ 950 units x 10 c. each =€95; full compensation for curtailment of 50 units x 10 c. =€5; €100 ÷ 950 units generated =10.5 c. total cost each

desired outcome at lowest cost. If the various authorities continue to undermine that model, they will not reduce cost to the consumer, they will either continue to increase it¹⁵, or block development and leave the State with a massive bill and no benefit at all.

A corollary of this conclusion is that some cost to the consumer is in line with policy, while the rest is not. The authorities need to stop being simplistic in their analysis by treating all such cost the same way, and need to be more subtle in their analysis of cost to the consumer, as the above example illustrates. This is why an RIA is now essential.

Connection process and costs

A very significant source of cost and delay for all generation projects is the grid connection. On the one hand, the network owners and operators insist on the network being owned by ESB, in order that the system can be operated properly (also a vestige of the 1927 Electricity Act). And yet at the same time ESB, Eirgrid and CER insist that projects that wish to connect pay the full cost (and more) of the shallow and some deep connection assets (in the distribution system), which are then handed over effectively for free to the network owner. This is not only an abuse by the network authorities, it is a cost inefficiency, and it causes much of the complication and delay in the whole connection process.

NOW Ireland commissioned a study¹⁶ that shows that this approach is economically inefficient, as the consumer ultimately pays, whether the network owner pays for grid or not. Since the cost of capital of the network owner is roughly half that of commercial renewable projects, then this causes excess cost on the economy.

In achieving renewable targets, that excess and unnecessary cost is potentially large. For the 6000MW or so of wind proposed for connection by 2020, the total connection cost would be of the order of €1.2bn, though some of this is already spent. Financing such investment at a capital cost that is twice what is necessary, is an extra drain on an already troubled economy.

The Statutory Instrument that transposed parts of the 2009 RES Directive directed CER to implement Article 16.4¹⁷, which deals with the allocation of the cost of connection (see Annex). It obliged CER to carry out a review by 30th June 2011, with a view to improving the regime, though we are not aware that CER has done so. Given the scale of the costs involved and their potential impact on consumers, as discussed above, it would seem obvious that CER should now carry out an RIA on whatever decision it proposes to make on the implementation of this article¹⁸. CER would then have to justify these excess costs to the consumer and put the full RIA out for consultation. CER ought to do so without any further delay given that the 'Gate 3' connection offers will soon be fully valid. Any decision to change the connection charging policy so as to reduce cost to the consumer would need to be made early enough to allow the offers to be revised in time, but would also have to be made in agreement with the authorities in Northern Ireland under the umbrella of the SEM.

¹⁵ And such excess cost has not been assessed or justified in an RIA, under the Government's own "Better Regulation" policy.

¹⁶ National Offshore Wind Association of Ireland, "Assessment of the Irish Offshore Wind Energy Support Scheme and Prospects for Investment in Offshore Wind Projects", KHSK Economic Consultants, July 2010

¹⁷ Section 4(5), SI 147 of 2011, 28th March 2011

¹⁸ Again to be in compliance with the Government's 'Better Regulation' policy

A further issue related to grid connection arises from constraint and curtailment. As part of the Gate 3 process, which began already in 2007, Eirgrid has run an Incremental Transfer Capability (ITC) model to estimate availability of firm access for renewable projects out to 2020. Some doubts were raised at the time that this process was not really suitable for the allocation of grid capacity in Gate 3. The regulator was advised that this was the wrong approach in any case, since the cost of constraint and particularly curtailment should not fall on renewable projects due to the obligations in the Directives. If those costs were not imposed on renewable projects, then all of the modelling and research involved in preparing Firm Access Quantities (FAQs, outcome of the ITC) and constraint reports, would have been completely unnecessary. These massive studies are about to be repeated, again, almost at the last minute, when the sector was assured that they couldn't be (due to time constraints). Judging by the PGORs¹⁹, the results are so full of caveats that they will not be of any real use in any case. This has gone on now for 3 or 4 years and looks set to continue for another 2 years at least, another massive regulatory barrier.

Electricity users' concerns

Electricity users are justifiably concerned by rising costs. Electricity and gas prices have for some years been trending upwards, due to the inexorable rise in fossil fuel costs. Even the short-term reductions in prices, caused by recession bring with them the costs of uncertainty.

Despite the additional cost to business of our dependence on imported oil and gas, there is an acceptance that this is inevitable, out of our control and something that we must live with. In truth, the only inevitability is that, as long as we remain dependent on imports, we have no control over price. This is married to the probability that the direction of this price will continue relentlessly upwards.

This apparently inevitable situation for consumers could be mitigated by switching to domestic energy sources. Such a suggestion generally raises the argument that it will lead to PSO charges on our electricity bills. Such charges currently exist and are largely for generation either through dirty peat or imported gas. Despite the fact that a small minority of the PSO has been attributable to renewables, it has attracted the majority of media and indeed political scrutiny. Furthermore, the PSO for renewables has often been negative, but was disguised by the PSO for fossil plant. And SEAI and Eirgrid have now shown that any PSO for renewables is fully offset by reductions in wholesale prices due to the 'merit order effect' of wind. These facts are not made coherent and transparent to the electricity consumer.

Large users of electricity, mainly industry, are also shown the transmission charges (TuOS) on their bills. They therefore naturally tend to resist anything that raises either the PSO or the TuOS charges. There is clearly a need to explain authoritatively to these users precisely how these costs arise, and why shifting to renewables in an efficient manner will in fact reduce energy costs, the PSO and TuOS charges, while also hugely augmenting security of energy supply.

Picking up on some of the specifics in this paper, electricity users need to be shown:

- the general economic benefit of renewables, primarily the mitigation of rising global fossil fuel costs, as summarized in the table below;

¹⁹ Eirgrid "Possible Generator Output Reduction" reports

Electricity costs

Sources of wholesale cost	Comment	Mitigation
Cost of imported fossil fuels: gas, coal and oil	Completely at the mercy of international markets, peak oil, Russia, wars, etc	Raise proportion of indigenous fuels
Cost of indigenous fossil fuels: peat and gas	Peat costs relatively high & fixed; Peat supply running out and not a long term alternative; gas cost driven by cost of imported gas, as above; Corrib reserves are quite small, approximately 20 years.	Raise proportion of wind; view gas as back-up fuel, and not as base load source.
Cost and efficiency of fossil generating plant	Increasingly efficient but expensive CCGT plant, however still wasting 50% of primary energy, and not flexible	Raise proportion of wind
PSO payments for fossil fuel plant	Very large PSO for peat plant and some PSO for gas powered plant under CER schemes	Remove PSO for peat by an agreed date (c. 10 years); raise proportion of wind
PSO payments for renewables	Much less, & fully offset by 'merit order effect' on wholesale price (SEAI, Eirgrid); will be net benefit in 2020 (IWEA)	Minimize project revenue uncertainty; PSO will reduce towards zero as international fossil prices rise
Transmission charges (TuOS) arising from general grid development	Grid required for national economic development, meet electricity demand	Put as much of the design and construct process out to tender as possible
Transmission charges arising from grid development for renewables	Grid required to enable Ireland to meet legally binding RES targets	Put as much of the design and construct process out to tender as possible
Transmission charges arising from constraints etc	Arising from fossil plant not running, variation in fossil costs, trips, SEMO costs, wind predictability, etc	Move to dispatchability of renewables
Possible transmission charges arising from grid connections	Only deep Transmission reinforcements covered today (above)	Less costly method, would reduce PSO charges more than increase in TuOS

- by virtue of the switch to renewables, the potential to eliminate the energy supply risks and cost consequences of supply interruptions;

- we are in any case obliged by the EU to meet renewable targets, so as to address climate change obligations and secure energy supplies in a cost efficient manner; we will be obliged to pay the cost of meeting those targets whether we achieve them or not, plus significant carbon costs if we fail, and we therefore need to do so in the most economically efficient manner, as set out in the two following points;

- failing to develop the grid and therefore reducing the output of renewable generation (constraint or curtailment) and not fully compensating for lost revenue will require higher REFIT costs, a higher PSO and just increase the cost on the consumer, which is the least efficient way to meet the targets;
- the cost of grid connections for renewable projects at their higher commercial capital cost must be covered by REFIT; since these assets will be owned and maybe even built by the network owner (ESB), the costs could be financed at their lower financing costs, imposing a lower cost on the consumer via TuOS, enabling a lower REFIT, with an overall net benefit to the consumer (which would also reduce the negative perception of the PSO charge for renewables).

Legal issues

Ireland has been under considerable legal obligations as regards renewable energy since 27th October 2003, the transposition deadline for the original RES-E Directive. Ireland never transposed it into Irish law but relied on administrative measures for some aspects of the Directive; the grid obligations were virtually ignored. However, the Directive has had direct effect here in any case since that date, as if it were fully transposed. Article 7 of that Directive imposed quite onerous grid obligations on Ireland:

"1. Without prejudice to the maintenance of the reliability and safety of the grid, Member States shall take the necessary measures to ensure that transmission system operators and distribution system operators in their territory guarantee the transmission and distribution of electricity produced from renewable energy sources. They may also provide for priority access to the grid system of electricity produced from renewable energy sources. When dispatching generating installations, transmission system operators shall give priority to generating installations using renewable energy sources insofar as the operation of the national electricity system permits."²⁰

Ireland has more or less respected priority of dispatch for renewables, though had at one stage attempted to place other plant, such as PSO-supported peat-fired generation, in the same category, contrary to this rule. More recently an attempt was made through the Single Electricity Market (SEM) to undermine priority of dispatch for economic reasons, but the industry made it clear to the SEM Committee that this was illegal, and would lead to legal action, which halted that unwelcome development.

However, the first sentence of Article 7 imposed equally onerous obligations on the authorities, and these have been systematically ignored in Ireland. It was argued in this country that the qualification at the start of the sentence meant that nothing had to be done, which is a very limited and somewhat suspect interpretation, since what is the point of the sentence if that was the real intent? As was pointed out to the authorities in writing by Meitheal na Gaoithe in 2004²¹, the sentence imposes a

²⁰ RES-E Directive, 2001/77/EC of 27th September 2001; these obligations have been considerably strengthened in Article 16 of the follow-on RES Directive, quoted in the Annex.

²¹ "Article 7 of the Renewables Directive now places the TSO under an obligation to examine other positive solutions that will guarantee dispatch and transmission of renewables, rather than simply seeking negative responses that reduce its output and efficiency. It should clearly have in place a first class forecasting system to enable optimal grid dispatch planning. As regards approaches to dealing with surplus energy at moments of low demand, there is energy storage, alternative uses of energy (use of heat pumps and CHP heat substitution) and energy exports, as has been done in other jurisdictions. ... The Renewables Directive, once fully understood, will be seen to place renewable energies ahead of all other energy sources in the dispatch merit order, since they get priority dispatch and may only be dispatched off for specific technical reasons, and also must have their output transmitted, except for "Reaching Renewable Targets, Efficiently", Grattan Healy, 28th September 2011, 3ed

direct obligation on them to take measures to guarantee the transmission of (all) power from renewables, although the qualification does mean that they need not adopt measures which compromise the stability of the network, something the industry would agree with.

The renewables sector would never demand the adoption of measures that would destabilize the network, as it is not in their interest to see instability in the system that can be attributed to renewables. Rather, the sector wishes to see measures adopted that increase the stability of the system, while allowing more renewables to generate, and believes this Article has entitled them to those measures since 2003. With the current policy of uncompensated curtailment²², if these measures are not adopted, and quickly, existing projects will go into default and wind up in court.

Through its somewhat belated but groundbreaking work, Eirgrid's so called 'Facilitation of Renewables' study (FoR²³) concludes that for now, only 50% of generation at any time can come from wind. Beyond that wind must be curtailed. Given the obligations that have been on the authorities since 2003, it is not clear how such an approach can be considered 'facilitating renewables'? Further work by Eirgrid based on FoR describes 4 sets of measures that would be required to raise this cap to 75%, though the indicative plan sees the last of these only being adopted in 2019²⁴.

Eirgrid has continued its groundbreaking work and, a year after FoR, launched a further report²⁵, and followed up with a recent industry forum. At that Forum, when asked about the long delays proposed for the 4 sets of measures required to get the cap raised from 50% to 75%, it was conceded by EirGrid that they could have engaged more effectively with the industry and in a more open and transparent way on what was being done²⁶. Given that the measures proposed by Eirgrid are relatively straightforward, and several had been flagged already in 2004, it seems to this author and many others that, technically, those 4 measures could have been carried out already, and that the cap could now be set at 75%.

In conclusion, the authorities had an obligation to really facilitate renewables since 2003, there are measures that could have been adopted since then to avoid or at least reduce curtailment, many of which were flagged as early as 2004, and those measures would not fall under the exclusion at the start of Article 7 of the RES-E Directive (otherwise Eirgrid wouldn't propose them). The 4 sets of measures proposed by Eirgrid are not due to be in place until 2019, and curtailment is already starting to affect the wind industry as a result. The authorities would seem to be operating outside the law, and face the real risk that the financiers of the existing projects will come after them in the courts.

reliability and safety reasons. These guarantees do not apply to other forms of generation."

- Page 5/6, Submission of 15 April 2004 by Meitheal na Gaoithe to CER in response to ESBNG proposal on the conditions relating to the resumption of connection offers (published version, 23 April 2004).

²² The previous decisions of CER and DCENR, restricting the payment of REFIT to metered output only, mean that projects do not get any REFIT support when constrained or curtailed. The recent SEM Committee decision, "Principles of Dispatch and the Design of the Market Schedule in the Trading and Settlement Code, SEM-11-062, 26th August 2011, did not change this situation, and indeed opens up the possibility of the further loss of market revenue in some circumstances in the future, due to what is termed 'material harm'.

²³ All Island TSO Facilitation of Renewables Studies, DigSilent, 4 June 2010, which followed the All-island Grid Study, already published in Jan 2008

²⁴ See Eirgrid "Possible Generator Output Reduction' reports (or PGORs), section B.7.1

²⁵ "Ensuring a Secure, Reliable and Efficient Power System in a Changing Environment", Eirgrid/SONI, June 2011

²⁶ Fintan Slye, Director of Operations, Eirgrid, in response to question from the author, Industry Forum on 'Programme for a Secure Sustainable Power System', Eirgrid, Dundalk, 17th August 2011

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Consequently, the authorities will be forced in due course to provide full compensation to all projects as if the cap was already at 75%, and that will have to include the full REFIT payment. Indeed, this author has argued over the years and would continue to argue that, given how long the obligations have been in place, that the authorities could have taken much wider measures to guarantee the full output of all renewables on the island, as required by the Directive. As a result, it seems apparent that all constraint and curtailment has to be fully compensated, and again, it seems likely that this argument will stand up in court at some point.

One way to do this is to alter the calculation of the REFIT payments to allow for all available non-metered energy to be paid the REFIT price. One practical method would be to recognize this treatment in project PPAs²⁷, which would allow the compensation payments to be made under the existing REFIT scheme, unamended.

As to the extent of these obligations, there is no reason to suppose that a limit would be linked to the capacity of renewable generation as against the capacity of the generating system or the level of highest or lowest demand. Since Article 16.1 of the RES Directive obliges the authorities to employ storage, interconnection and other measures to accommodate renewable generation, the obligation may only change when all electricity used on the island comes from renewable sources. From there on, we enter a different world of net exports, which is now stated Government policy.

Grid access

It is worth noting that a further significant legal issue now exists. While the 2001 RES-E Directive only stated that renewables 'may' be granted priority access (quoted above), the 2009 RES Directive states in Article 16.2:

"(b) Member States shall also provide for either priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources;"

Section 4.2.7 of Ireland's NREAP states:

"The Gate process is thus a form of priority access commensurate with the achievement of our 2020 RES-E target."

Some projects that applied to connect in 2004 are still waiting for valid connection offers, 7 years later, and as stated already, may have to wait a total of 9 years. Some will only achieve firm access by 2020. In the meantime, considerable fossil plant has been allowed to connect, and indeed, is causing problems for connection of and firm access for renewables. This will not stand up to legal scrutiny as 'priority access'.

The UK has adopted what is known as 'Connect and Manage', which seems an eminently sensible approach that we should emulate. It provides relatively tight time limits for shallow connection, and allows socialisation of all losses thereafter, which goes some way towards the full compensation the industry requires. Crucially, this policy places the cost in the right place to get the grid upgraded, which is the point of the next section. However, the TSO would apparently have to radically change the scheduling of its reinforcements to accommodate such a policy.

To be able to make grid available quickly enough here, GRID 25 would have to be accelerated, and shared assets would have to be built ahead, probably based on planning permissions.

²⁷ Power Purchase Agreements, signed with supply companies, to comply with REFIT and SEM rules
"Reaching Renewable Targets, Efficiently", Grattan Healy, 28th September 2011, 3ed

In Germany, a really efficient and integrated approach is provided by law, where the receipt of planning permission 'entitles' the project to both grid access and REFIT. Adopting such an approach would force regulatory linkages to be made, so that we might finally get things in the right order, and end the woes of renewable energy projects. However, this approach would necessitate an exit from state aids controls for REFIT, to give it the necessary flexibility and scale.

Incentivisation

As things stand here, we face a situation in which the grid has not been developed to meet the legal obligations, and the consequences of that failure will fall on renewable energy projects through lost revenue arising from uncompensated constraint and curtailment. Renewable projects are not in a position to fix the grid. The costs are falling in the wrong place to incentivize grid development. Were those costs to fall where they belong - in the market - CER would be able to weigh those costs against grid development, and very quickly 'motivate' Eirgrid to take the requisite measures more quickly, so as to avoid curtailment, as required by the RES Directive.

Conclusions

The renewable energy sector is one of very few that could provide immediate and substantial economic stimulus, at little or no cost to the State or the electricity consumer. Switching a net import bill of some €6bn to an export of €10bn would provide an annual positive shock of some €16bn to the economy at a time when Ireland has become hugely indebted. The state is blessed with a huge and competitive renewable energy resource, one of the few good cards it has in a very tricky hand. Despite this, the renewable energy sector faces a crisis.

Government policy in this sector, designed to meet its EU target obligations, is being systematically undermined by the State's own authorities. The lack of a single authority, or even joined up thinking, combined with simplistic analysis as described, leads each 'silo' to deal with its own issues in isolation, so that each silo is in its own way demolishing the State's policy. On current trends, the sector will collapse, targets will be missed by a substantial amount, and Ireland will end up facing punitive costs for that failure: fines for failure to meet RES targets (at least equivalent to the cost of meeting them in the first place) plus carbon costs.

There are numerous overriding reasons why the approach of the authorities needs urgent and radical reform. In the first instance, the way that the authorities are chipping away at Government policy, most especially the REFIT model, is only going to increase cost to the consumer, not reduce it. This is one key area of very shortsighted thinking throughout the authorities. Accepting that some cost is part of the policy, while avoiding unnecessary costs is the correct approach. It will in fact ensure that the little or no cost at all falls on the consumer, due to the cost benefit effects of renewables. We now need to adjust REFIT payments, so that they cover off losses, by being paid on availability to generate, not metered output.

Related to the previous point is the question of market efficiency, where costs need to fall on those responsible for taking action and minimizing those costs, not those who have no power at all to improve the situation. Where curtailment costs arise from inadequate development of the grid, there is no point whatever in heaping those costs on renewable projects, who are not the ones responsible for that failure to meet what are in fact legal obligations. CER and Eirgrid need to see those costs within the market, in order to rectify the situation.

A further major reason why the current approach simply will not continue is that EU obligations, in particular as regards grid, are being directly flouted by the authorities. It is only a question of time before some aggrieved project seeks legal redress arising from a banking default, due to the failure of the authorities to respect the legal obligations on the State to develop the grid so as to guarantee the transmission of electricity from renewables.

The approach of the authorities has amounted to either a declared moratorium (as in 2003/4), or a de facto one, as at present. Delays of 16 years from application to firm access just will not be allowed to continue. A shift in the constraint and curtailment policy, along with the change that is obviously required to connection charging policy, would take most of the complication and delay out of the connection process, and radically reduce connection times, and maybe Ireland would have some chance of meeting its targets. Adoption of a UK type 'connect and manage' policy would be a good idea.

This reduction in connection time is also essential to allow the CER to make planning a condition of grid connection, as it should be, so that we can finally exit the crazy system we now have of allocating grid capacity to projects that in reality do not exist. That crazy situation arises purely and simply because of the huge delays in getting connected, which mean that planning cannot be a condition at the moment, so that genuine projects must apply for grid first, and some less scrupulous developers just make grid applications on spec. We should return to something like the 70-day process that exists for some projects, with an appropriate grouping element, but no 'Gates'.

Finally, Ireland will need a REFIT scheme that is, like Germany's, free of state aids, so that it can respond to the market as it develops. That, along with an end to the Gates, would allow Ireland to finally join the dots by adopting a rule similar to Germany, where achievement of planning grants an automatic entitlement to grid access and REFIT.

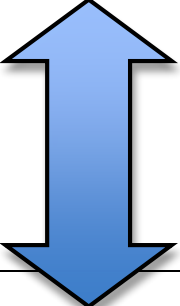
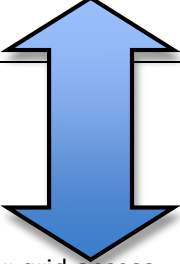

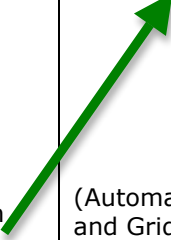
A key issue is the widespread lack of understanding of these issues within the authorities and amongst electricity users, leading to silo-based short-term thinking, based on simplistic avoidance of cost. In fact, the current approach will raise costs, delay development, cause infringement of Directives and most importantly, leave Ireland in the lurch as regards energy security. A job of work is required, especially from SEAI, to redress these misunderstandings by engaging in relevant and immediate analysis to be followed by a programme of education of all stakeholders.

All in all, Ireland is presenting itself as not serious, while speaking about leading the world in renewables. Any careful observer would see right through that talk and recognize it for what it currently is - posturing. If we are to start regaining some credibility after the economic chaos we have just created, then we need to match our words on renewables with actual deeds. We need to start by creating a system in which investors can have confidence and some certainty. We have to reduce the financial risk, the economic inefficiency and, more importantly, eliminate the substantial political risk that currently exists. Until we achieve this we cannot hope to fulfil our undoubted potential. If Ireland takes the simple and logical steps proposed by many in this industry, some of which are described in this paper, then we might well earn our place as one of the leaders in the World on renewable energy.

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POLICY DIAGRAM

	CURRENT STATUS	ACTIONS	JOIN THE DOTS
SUPPORT	<p>No REFIT since 2009</p> <p>REFIT subject to state aids (causes delays, rigidity & batches with capacity limits)</p> <p>REFIT conditional on planning and Grid</p> <p>REFIT undermined by authorities on cost, output reduction* & uncertainty</p> <p>REFIT economically inefficient</p> <p>No export trade or support mechanism</p>	<p>Get REFIT 2 through state aids and offer (DCENR)</p> <p>Confirm economic inefficiency (SEAI)</p> <p>Pay REFIT on Availability - via PPAs? (DCENR; RIA?)</p> <p>Reduce costs from authorities - LAs, Grid (DCENR, DOE)</p> <p>'REFIT 3' - devise scheme to take out of state aids and provide review mechanism (DCENR)</p> <p>Establish market mechanism for export (support from buyer) (DCENR)</p> <p style="text-align: center;"><i>Incentives</i></p>	<p>FIRST PRIORITY - Launch REFIT 3</p> 
PLANNING	<p>Increasing opposition - lower % grants</p> <p>Lottery, especially ABP</p> <p>SACs etc applied incorrectly</p> <p>AA route overlooked</p> <p>No SEA Onshore</p> <p>SEA Offshore</p> <p>Foreshore system simply not working</p>	<p>Revise Planning Act (DECL) to:</p> <ul style="list-style-type: none"> - add certainty to planning extensions - regulate that designations not bar to projects, require AA <p>Reform ABP (DECL)</p> <p>Sort Foreshore (DECL)</p> <p>Involvement of population in projects to reduce opposition (DCENR)</p>	<p>Legislate to make REFIT and Grid automatic on receipt of Planning</p> 
GRID	<p>Takes up to 10 years for connection</p> <p>Takes up to 16 years for 'firm access'</p> <p>So planning can't be a condition for grid</p> <p>Firm access being undermined</p> <p>Constraint and curtailment (50% cap)</p> <p>Uncertainty over market compensation</p> <p>Projects pay for grid they can't own</p> <p>GRID 25 slow (SEA?)</p> <p>Grid reinforcement planning & development is rigid</p> <p>No storage on network</p> <p>Limited interconnection</p> <p>"Secure System" delay to 2019</p> <p>No transmission guarantee</p> <p>No priority or guaranteed access</p> <p>Priority of dispatch will hit early limit</p> <p>SEM constraint on changes</p> <p>Revised studies delaying Gate 3</p>	<p>Full market compensation in SEM for output reduction* (SEMC) - RIA?</p> <p>Accelerate Grid 25 & 'Secure System' (CER/Eirgrid)</p> <p>Further measures to reduce constraint & curtailment</p> <ul style="list-style-type: none"> & guarantee transmission to 100% RE (eg: storage) (CER/Eirgrid) <p>Reinforcement scheduling more flexible, respond to plannings (Eirgrid)</p> <p>"Who Owns Pays" connection charging** (SEMC) - RIA? (with MW/km limit to avoid excess)</p> <p style="text-align: right;"><i>Enabling</i></p>  <p>Priority Access (3 yr time limit) for real firm access (no 'Gates', but grouping based on planning) (CER/Eirgrid)</p> <p>Firmer TLAF/DLAF/TuOS/DuOS (CER)</p> <p>Cancel revised Gate 3 studies (ITC, PGOR) (CER/Eirgrid)</p> <p>Provide for Export (CER/DCENR)</p>	<p>3 year grid access limit</p> <p>(Automatic REFIT and Grid on planning mutually dependent and reinforcing)</p> 

* Constraint & curtailment ** Implementation of Article 16.4 of RES Directive through SI 147/2011

ANNEX

RES Directive, 2009/28/EC, 23 April 2009

Article 16

Access to and operation of the grids

1. Member States shall take the appropriate steps to develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system, in order to allow the secure operation of the electricity system as it accommodates the further development of electricity production from renewable energy sources, including interconnection between Member States and between Member States and third countries. Member States shall also take appropriate steps to accelerate authorisation procedures for grid infrastructure and to coordinate approval of grid infrastructure with administrative and planning procedures.

2. Subject to requirements relating to the maintenance of the reliability and safety of the grid, based on transparent and non-discriminatory criteria defined by the competent national authorities:

(a) Member States shall ensure that transmission system operators and distribution system operators in their territory guarantee the transmission and distribution of electricity produced from renewable energy sources;

(b) Member States shall also provide for either priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources;

(c) Member States shall ensure that when dispatching electricity generating installations, transmission system operators shall give priority to generating installations using renewable energy sources in so far as the secure operation of the national electricity system permits and based on transparent and non-discriminatory criteria. Member States shall ensure that appropriate grid and market-related operational measures are taken in order to minimise the curtailment of electricity produced from renewable energy sources. If significant measures are taken to curtail the renewable energy sources in order to guarantee the security of the national electricity system and security of energy supply, Member States shall ensure that the responsible system operators report to the competent regulatory authority on those measures and indicate which corrective measures they intend to take in order to prevent inappropriate curtailments.

3. Member States shall require transmission system operators and distribution system operators to set up and make public their standard rules relating to the bearing and sharing of costs of technical adaptations, such as grid connections and grid reinforcements, improved operation of the grid and rules on the non-discriminatory implementation of the grid codes, which are necessary in order to integrate new producers feeding electricity produced from renewable energy sources into the interconnected grid.

Those rules shall be based on objective, transparent and non-discriminatory criteria taking particular account of all the costs and benefits associated with the connection of those producers to the grid and of the particular circumstances of producers located in peripheral regions and in regions of low population density. Those rules may provide for different types of connection.

4. Where appropriate, Member States may require transmission system operators and distribution system operators to bear, in full or in part, the costs referred to in paragraph 3. Member States shall review and take the necessary measures to improve the frameworks and rules for the bearing and sharing of costs referred to in paragraph 3 by 30 June 2011 and every two years thereafter to ensure the integration of new producers as referred to in that paragraph.

5. Member States shall require transmission system operators and distribution system operators to provide any new producer of energy from renewable sources

wishing to be connected to the system with the comprehensive and necessary information required, including:

- (a) a comprehensive and detailed estimate of the costs associated with the connection;
- (b) a reasonable and precise timetable for receiving and processing the request for grid connection;
- (c) a reasonable indicative timetable for any proposed grid connection.

Member States may allow producers of electricity from renewable energy sources wishing to be connected to the grid to issue a call for tender for the connection work.

6. The sharing of costs referred in paragraph 3 shall be enforced by a mechanism based on objective, transparent and non-discriminatory criteria taking into account the benefits which initially and subsequently connected producers as well as transmission system operators and distribution system operators derive from the connections.

7. Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against electricity from renewable energy sources, including in particular electricity from renewable energy sources produced in peripheral regions, such as island regions, and in regions of low population density. Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources.

8. Member States shall ensure that tariffs charged by transmission system operators and distribution system operators for the transmission and distribution of electricity from plants using renewable energy sources reflect realisable cost benefits resulting from the plant's connection to the network. Such cost benefits could arise from the direct use of the low-voltage grid.

(only quoting sub-sections relating to electricity)