

# **Balancing Mechanism and Connect and Manage Constraint Payments to Windfarms**

## **Briefing Note**

**(Prepared 5<sup>th</sup> November 2013, updated 3<sup>rd</sup> January 2014)**

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### Introduction

National Grid (NG) balances supply and demand for electrical power through the Balancing Mechanism (BM). The daytime/night-time, weekday/weekend, summer/winter etc fluctuations are largely self-regulated, which means that if there is to be no demand then the electricity is not generated. NG does the fine tuning second by second by asking for more or less generation and paying for it, or compensating for the generator's losses when it has to shut down.

The compensation is best explained by the Renewable Energy Foundation (REF) here: <http://www.ref.org.uk/energy-data/notes-on-wind-farm-constraint-payments>

In summary, all “constrained off” generators are paid for the electricity they have been prevented from selling. In the case of oil, coal or gas, the generators give NG a rebate for the saving on fuel. In the case of wind, the generators lose their Renewable Obligation Certificate (ROC) and Climate Change Levy Exemption (CCLE) and need to be compensated for that loss. That is only fair and reasonable.

In practice, because wind energy is the most expensive to constrain off, NG never chooses voluntarily to constrain off wind energy for routine balancing of the grid. In practice, it is only constrained off if NG has no other option.

### Why constrain output?

Wind generated electricity needs to be constrained off if:

- there is no available capacity on the transmission system or
- there is insufficient demand

### An example

This is easily illustrated by considering the transmission system north of Inverness. All electricity consumed north of Inverness either comes through the Grid bottleneck at Beaulay, is generated by hydro, or is generated by wind. The transmission was designed to supply:

- a small scattered population
- the industrial area around Invergordon
- Dounreay

and to collect electricity from the hydro schemes and Dounreay when it operated.

At periods of low demand and high wind the overall output north of Beaulay exceeds the capacity of the transmission system. In low demand periods it is unlikely that hydro will be operational but if it is, once it is constrained off the only other option to maintain grid security is to constrain

off wind. This puts the windfarm owners in a strong negotiating position, allowing them to ask for payment in excess of the total value of the ROC and CCLE, which for illustration is in the order of £50 per MWh.

Note that in addition to compensation for the loss of the ROC and the CCLE, the windfarm is still paid for the electricity it did not generate as well.

For a period, operators were able to demand extravagant sums in compensation (£981 was the highest payment for £50 worth of loss). Last autumn the rules were changed to supposedly prevent “excess profit” being made, but even then the average payment on (for example) Sunday 3<sup>rd</sup> October was £84/MWh, with the highest being £149/MWh.

When challenged, Government, the wind industry and even OFGEM point to the greater payments made to other forms of generation. That is certainly true, but the other generators receive their payments as part of the *necessary* balancing of the grid, whereas wind operators get much higher payments to avoid the instability of the grid created by the wind plants themselves. It should also be noted that in the run up to a wind generation constraint, conventional generation will also have been constrained off to allow the rising wind generated energy on to the grid, thereby compounding the cost of constraints overall.

The situation described in the Highlands north of Beaulieu is replicated at the Scottish Border and also deeper into the North of England. The cross border connection has been upgraded from about 2GW to about 3GW capacity, but constraints continue to rise in frequency, and therefore in overall cost. Note that from time to time a constraint in Caithness can be caused by lack of transmission capacity at the Border or even further south.

In a properly engineered and managed transmission system, generators would only be connected *after* the transmission capacity was in place, but our Governments have changed that through the Connect and Manage Scheme.

## **Connect and Manage**

This is the introduction to National Grid’s Quarterly Report on the Connect and Manage scheme for the period ending 30<sup>th</sup> June 2013:

<http://www.nationalgrid.com/NR/rdonlyres/093614C6-E56B-43C6-BAE0-4B8CBB5FE0D2/61872/ConnectandManageQuarterlyReport010413to300613v10.pdf>

It says, in part:

### **“1.1 Background to Connect & Manage (C&M)**

Following consultation on models for improving grid access, the Department of Energy and Climate Change (DECC) introduced the enduring C&M regime in July 2010 with an implementation date of 11 August 2010. Under this access regime, generators are offered connection dates based on the time taken to complete a project’s ‘enabling works’, i.e. ahead of the completion of any wider transmission system reinforcements required under the security standards. Connecting generators ahead of the completion of wider works may result in additional constraints on the National Electricity Transmission System. Under the C&M regime any costs arising from the management of these constraints are socialised.”

## Definitions of **highlighted phrases** as I understand them

- **Enabling works** - work under the control of the developer including getting cables to a connection point
- **Wider transmission system reinforcements** - work required to upgrade the National Grid to be able to take the new generation and to meet established security of supply requirements
- **costs arising from the management of these constraints** - payment to wind farms to stop generating and to maintain grid security standards
- **are socialised** - spread across all Grid users, who in turn spread them across their customers

An article in the Telegraph on 4<sup>th</sup> November 2013 printed a quote from NG as follows:

“A National Grid spokesman said constraint payments to wind farm companies totalled £7 million in 2012/13, adding that this represented only four per cent of the £170 million given to all electricity generators.”

Jenny Hogan, spokeswoman for Scottish Renewables had a letter in the Herald on 5<sup>th</sup> November 2013 in which she says:

“According to National Grid, from April, 2012 to March, 2013 it cost £169.6m to constrain all types of electricity generators from the grid. During the same period, the cost of constraining wind farms was £7.16m.”

REF publish data <http://www.ref.org.uk/constraints/index.php> obtained from NG of constraint payments made to windfarms under the Balancing Mechanism, but other “commercially confidential” arrangements also exist <http://www.ref.org.uk/press-releases/249-ref-calls-for-transparency-over-secret-wind-power-constraint-payments>. Ms Hogan’s letter refers to a sum of £7.16m in 2012/13. REF’s figure for that period is £4.06m, the difference presumably being the “commercially confidential” payments.

If on any given day the demand and availability of transmission capacity and production of electricity by wind is such that wind has to be constrained off, then on any future date if the same circumstances apply the same amount of wind generation has to be constrained off ***along with the equivalent value of all other generation which has been added in the interim, be it wind or solar panel***. This situation will persist until such a time that £110bn worth of transmission reinforcement, to be unlocked by the Westminster Energy Bill, is completed.

Example: Say a windfarm of 20 turbines is constrained off for eight hours on Day 1, Year 1. Its operators build an extension of say another 20 turbines which opens in Year 2. Once again, by reason of the demand/supply requirements, it has to be constrained off. This time, the constraint payment is made for **40** turbines not to generate.

It is worth noting that Whitelee Windfarm (the largest in Europe), for example, was connected *eight* years before the transmission system, which ought to have been in place in a properly ordered world, was complete.

Whitelee Windfarm has received £4,944,429 in constraint payments to date (November 2013).

It follows that constraint payments will continue to rise steeply until transmission is constructed, or sanity returns. The following is an analysis of yearly totals taken from REF's data:

Year (April to March)	Cost £	MWh	Average Price £/MWh
pre 1/4/11	174,128	975	179
20/11/12	14,762,568	69,274	213
20/12/13	4,055,220	35,594	114
2013(to 5 <sup>th</sup> Nov)	27,026,009	309,321	87
<b>Totals</b>	<b>£46,017,925</b>	<b>415,164</b>	<b>111</b>

Of the £46m paid to date, £27m has been incurred since 1<sup>st</sup> April 2013. National Grid has forecast payments for constraints of between £11m and £18m for the whole of 2013/14. £895,226 was paid out over the three days between 1<sup>st</sup> to 3<sup>rd</sup> November 2013.

**5<sup>th</sup> November 2013**

## Additional Material, added on 3<sup>rd</sup> January 2014

### Important Note

Figures reported by REF above are constraint payments made under the Balancing Mechanism and include some of those payments made under Connect and Manage. The two are not to be confused. Payments under Connect and Manage are made exclusively to those generators connected under the scheme. Up to 30<sup>th</sup> June 2013 payments were made exclusively to onshore wind plants but the scheme applies to all forms of generation which NG has contracted to connect in advance of transmission upgrades being completed. For example, early marine energy development in the Pentland Firth is almost certainly included and will attract C & M payments for a period.

The astonishing fact is disclosed (see Table 6.1.2 below from page 13 of National Grid's Quarterly Report ending June 2013 into the Connect and Manage Regime) that National Grid has entered into contracts to allow generators with a capacity of 36.5GW to connect to the transmission system on average five years before that system is capable of handling the generation.

#### 6.1.2 Transmission Connected and Large Embedded Generation Signed Agreements for Connect and Manage Connections (Split by Agreement Type)

TO	Status	Agreement Category	Number of Projects Capacity (MW) Average of Advancement under C&M (years)		
			Number of Projects	Capacity (MW)	Average of Advancement under C&M (years)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	38	21,305	3
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
<b>NGET Total</b>			<b>38</b>	<b>21,305</b>	<b>3</b>
SPT	Future	Large Embedded Generation	4	119	10
		Transmission Connected Generation	28	5,808	6
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	1	206	8
<b>SPT Total</b>			<b>33</b>	<b>6,133</b>	<b>7</b>
SHE	Future	Large Embedded Generation	15	462	5
		Transmission Connected Generation	65	8,265	5
	Connected	Large Embedded Generation	10	287	5
		Transmission Connected Generation	2	107	8
<b>SHE Total</b>			<b>92</b>	<b>9,121</b>	<b>5</b>
<b>Grand Total</b>			<b>163</b>	<b>36,558</b>	<b>5</b>

## Extract from Table 6.1.2

Status	Agreement Category	Number of Projects	Capacity (MW)	Average of Advanceme
Future	Large Embedded Generation	0	0	0
	Transmission Connected Generation	38	21,305	3
Connected *	Large Embedded Generation	0	0	0
	Transmission Connected Generation	0	0	0
<b>NGET Total</b>		<b>38</b>	<b>21,305</b>	<b>3</b>
Future	Large Embedded Generation	4	119	10
	Transmission Connected Generation	28	5,808	6
Connected *	Large Embedded Generation	0	0	0
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<b>SPT Total</b>		<b>33</b>	<b>6,133</b>	<b>7</b>
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<b>SHE Total</b>		<b>92</b>	<b>9,121</b>	<b>5</b>
<b>Grand Total</b>		<b>163</b>	<b>36,558 #</b>	<b># 5</b>

On the basis of the NG figures, which show that 13 projects with a connected capacity of 600MW\* generated £17m of constraint payments in the three months ending 30<sup>th</sup> June 2013, what total value of constraint payments can we expect from a contracted connection of 36.5GW on average five years# ahead of the system being capable of transmission?

**A simplistic calculation is (36,500MW/600MW) x £17m x 20 quarters = £20,700,000,000 (£20.7bn). There is not, so far, any other calculation to dispute this.**

**That's TWENTY POINT SEVEN BILLION POUNDS.**

## 2. Updated analysis of yearly wind constraint payments taken from REF Data

Year (April to March)	Cost £	MWh	Average Price £/MWh
pre 1/4/11	174,128	975	179
2011/12	14,762,568	69,274	213
2012/13	4,055,220	35,594	114
2013 ( To31 <sup>st</sup> Dec)	32,640,557	379,124	94
<b>Totals</b>	<b>£51,632,473</b>	<b>£484,967</b>	<b>£106 (my calc)</b>

### **3. Whitelee Wind Farm**

As of 31<sup>st</sup> December 2013, Whitelee Wind Farm has received £8,332,942 in constraint payments.

**Stuart Young**  
**3rd January 2014**