Public

Ref: FOI/25/071

National Energy System Operator
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22 July 2025

Dear requester

Request for Information

Thank you for your request for information which we received on 23 June 2025. Your request has been considered under the Environmental Information Regulations 2004 (EIR) as we have identified that the information contained within the requested reports meets the definition of 'environmental information' provided at Regulation 2(1)(c) of the EIR.

Request

You asked us:

I was trying to find the Quarterly Reports on the Connect and Manage Regime published by NGET and then NGESO, but have had difficulty locating them. I can only find the report for May-August 2012 (https://www.neso.energy/document/41856/download). Can you provide me a link to these reports online or send them to me directly? They started to be published alongside the Connect and Manage regime from 2010 I believe

Our response

We confirm that we hold information in scope of your request.

To locate Connect and Manage Quarterly Reports a search can be conducted for "Connect and Manage" on the NESO website. Search results can be filtered by content type 'document': Search | National Energy System Operator. Copies of the reports listed below have been provided alongside this response letter:

- 1 May 2011-31 July 2011 (Quarterly Report)
- 1 August 2011-30 April 2012 (Quarterly Report)
- 1 May 2012-31 August 2012 (Quarterly Report)
- 1 September 2012-31 December 2012 (Quarterly Report)
- 1 January 2013-31 March 2013 (Quarterly Report)
- 1 April 2013-30 June 2013 (Quarterly Report)
- 1 July 2013-30 September 2013 (Quarterly Report)
- 1 October 2013-31 December 2013 (Outturn Interim Report)
- 1 April 2014-30 June 2014 (Interim Outturn Report)
- July 2014 Forecast & Actuals Report (2013/14 & Q1 2014/15)
- 1 July 2014-30 September 2014 (Interim Outturn Report)
- 1 October 2014-31 December 2014 (Interim Outturn Report)
- 1 January 2015-31 March 2015 (Interim Outturn Report)
- 1 April 2015 (Connect & Manage Forecast Report April 2015)
- 1 April 2015-30 June 2015 (Interim Outturn Report)
- 1 July 2015-30 September 2015 (Interim Outturn Report)

This concludes our response to your request.

Advice and assistance

- The 'Outturn Interim Report on the Connect and Manage Regime For Period: 01 October 2013 – 31 December 2013' states: '*Since December 2013 discussions have taken place between OFGEM and National Grid. As a result of which, it has been agreed to revise the format and practice of C&M reporting in order to improve clarity of the driving issues under the regime, whilst also cutting down on the administrative burden for all parties involved. An Annual Report will be published around April 2014 which will provide projections by Financial Year, together with outturn figures.*'
- Due to the age of the reports, some of the links no longer work. If you are unable to access the links in the reports, please let us know if there is any further recorded information that you would like to request
- Connection offers are made substantially in the form of and under the terms of the Connection and Use of System Code (CUSC). All documents relating to the CUSC are available here to download, including the latest version of the code in full and details of any revisions: CUSC Code Documents | National Energy System Operator. Section 1 and 13 of the CUSC may be of interest.

Next steps

If you are dissatisfied with our handling of your request, you can ask us to review our response. If you want us to carry out a review, please let us know within 40 working days and quote the reference number at the top of this letter. You can find our procedure here: Freedom of Information and Environmental Information Regulations | National Energy System Operator. The

ICO's website also provides guidance on the internal review process: What to do if you are dissatisfied with the response | ICO.

If you are still dissatisfied after our internal review, you can complain to the Information Commissioner's Office (ICO). You should make complaints to the ICO within six weeks of receiving the outcome of an internal review. The easiest way to lodge a complaint is through their website: www.ico.org.uk/foicomplaints. Alternatively, they can be contacted at: Wycliffe House, Water Lane, Wilmslow, SK9 5AF.

Thank you for your interest in the work of the National Energy System Operator (NESO).

Regards,

The Information Rights Team, National Energy System Operator (NESO)

nationalgrid

Quarterly Report on the Connect and Manage Regime

01 May 2011 – 31 July 2011

August 2011
V1

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1.0 Introduction

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 transmission system. Under the C&M regime any costs arising from the management of these constraints are socialised.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Report on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document - January 2011

C&M Derogation reports for projects with a signed C&M agreement

Quarterly Report on the Connect and Manage Regime - 11 August 2010 to 30 April 2011

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements in the previous quarter, 1 May 2011 to 31 July 2011. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 7 new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 1 project has connected in the previous quarter. This section also explains why National Grid is yet to realise any constraint costs associated with the management of any constraints arising from the operation generators connecting in advance of the completion of their wider works up to 31 July 2011;
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 31 July 2011 and explains why National Grid is still to identify any carbon benefit from these projects.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 5** shows the cumulative level of acceleration of connections that the C&M approach is delivering;

- **Section 6** illustrates current lead times for connection applications;

- **Section 7** provides data on C&M signed projects with a capacity in the region of 26GW that have benefited with advanced connection dates. This section shows an average advancement of 6 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[1] process an average advancement of 11 years is seen;

- **Section 8** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

[1] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the transmission system.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHETL – Scottish Hydro Electricity Transmission Limited, the TO for northern Scotland;
- SPT – Scottish Power Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 May 2011 and 31 July 2011.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year	Completion of wider works	Advancement (years)
Cour	Transmission Connected Generation	SHETL	25.3	2014	2023	9
Duncansby - Stage 1	Transmission Connected Generation	SHETL	30	2016	2023	7
Duncansby - Stage 2	Transmission Connected Generation	SHETL	30	2017	2023	6
Duncansby - Stage 3	Transmission Connected Generation	SHETL	35	2018	2023	5
Hare Hill Wind Farm Extension	Transmission Connected Generation	SPT	33.15	2016	2023	7
Harestanes Extension	Transmission Connected Generation	SPT	163	2014	2023	9

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 May 2011 and 31 July 2011. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer. These projects are aggregated at connection point level to demonstrate the benefits they have received from C&M.

Connection Point	TO	Capacity (MW)	Advancement (years)
Macduff Keith	SHETL	2.4	9

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 31 July 2011 and explains why no additional constraint costs can be attributed to these projects to date.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[2]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the transmission system occur when generation exceeds the capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the transmission system will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Current Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of the embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

We are considering how we might include the impact of these projects in future reports.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 May 2011 and 31 July 2011

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	1	13
Connected Total		**1**	**13**

[2] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

3.3.2 Total C&M Generation Connected (up to 31 July 2011)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	1	13
	Small Embedded Generation	17	17
	Transmission Connected Generation	2	56
Connected Total		**20**	**86**

3.4 Actual Constraint Cost by TNUoS Zone

As at 31 July 2011, no constraint costs have been identified as being attributable to projects that have benefited from earlier connection dates due to projects either not yet generating or as a result of those reasons described in section 3.2.

TNUoS Zone	11 Aug 10 – 11 Feb 11	12 Feb 11 – 30 Apr 11	1 May 11 – 31 Jul 11	Total
Z1	£0	£0	£0	£0
Z2	£0	£0	£0	£0
Z3	£0	£0	£0	£0
Z4	£0	£0	£0	£0
Z5	£0	£0	£0	£0
Z6	£0	£0	£0	£0
Z7	£0	£0	£0	£0
Z8	£0	£0	£0	£0
Z9	£0	£0	£0	£0
Z10	£0	£0	£0	£0
Z11	£0	£0	£0	£0
Z12	£0	£0	£0	£0
Z13	£0	£0	£0	£0
Z14	£0	£0	£0	£0
Z15	£0	£0	£0	£0
Z16	£0	£0	£0	£0
Z17	£0	£0	£0	£0
Z18	£0	£0	£0	£0
Z19	£0	£0	£0	£0
Z20	£0	£0	£0	£0
Total	**£0**	**£0**	**£0**	**£0**

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

As some connected projects are either not yet generating or as a result of those reasons described in section 3.2, we are currently unable to assess the overall reduction in carbon emissions and quantify the amount of carbon saved.

4.1 Actual Carbon Savings by TNUoS Zone

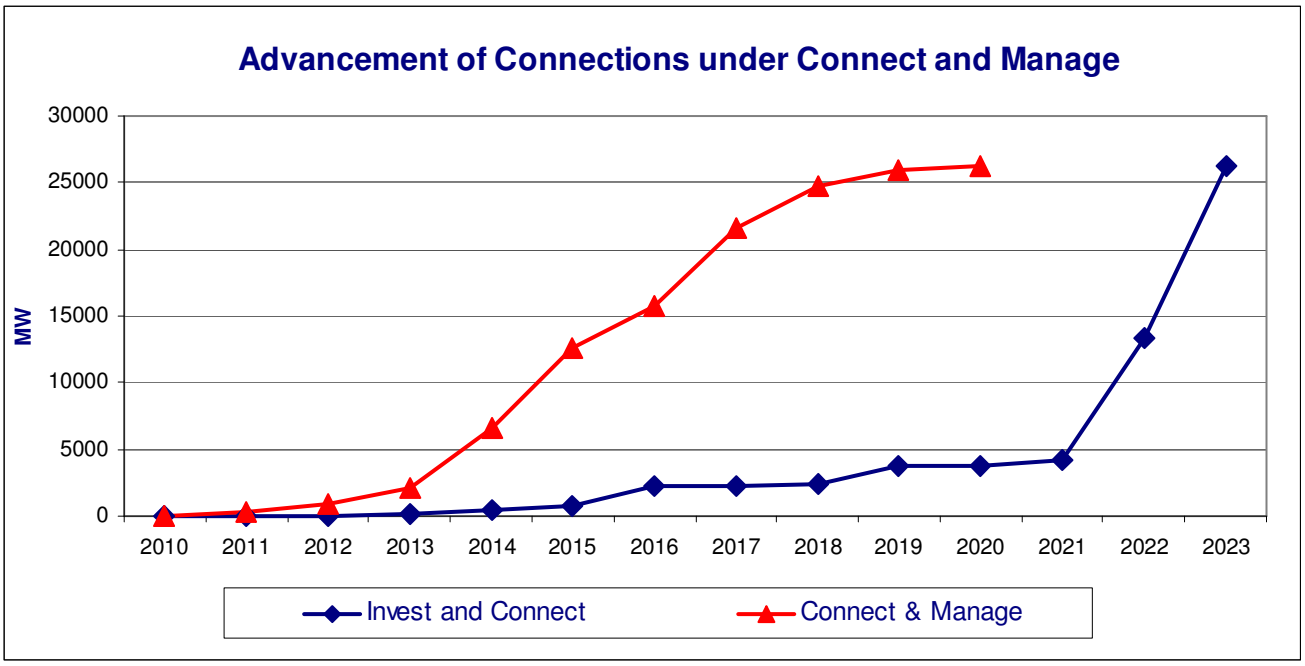
TNUoS Zone	11 Aug 10 – 11 Feb 11	12 Feb 11 – 30 Apr 11	1 May 11 – 31 Jul 11	Total
Z1	0	0	0	0
Z2	0	0	0	0
Z3	0	0	0	0
Z4	0	0	0	0
Z5	0	0	0	0
Z6	0	0	0	0
Z7	0	0	0	0
Z8	0	0	0	0
Z9	0	0	0	0
Z10	0	0	0	0
Z11	0	0	0	0
Z12	0	0	0	0
Z13	0	0	0	0
Z14	0	0	0	0
Z15	0	0	0	0
Z16	0	0	0	0
Z17	0	0	0	0
Z18	0	0	0	0
Z19	0	0	0	0
Z20	0	0	0	0
Total	**0 Tonnes**	**0 Tonnes**	**0 Tonnes**	**0 Tonnes**

5.0 Acceleration of Connection Dates

Chart 5.1 shows the cumulative profile of contracted generation capacity that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect' projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

5.1 Advancement of Connections under C&M



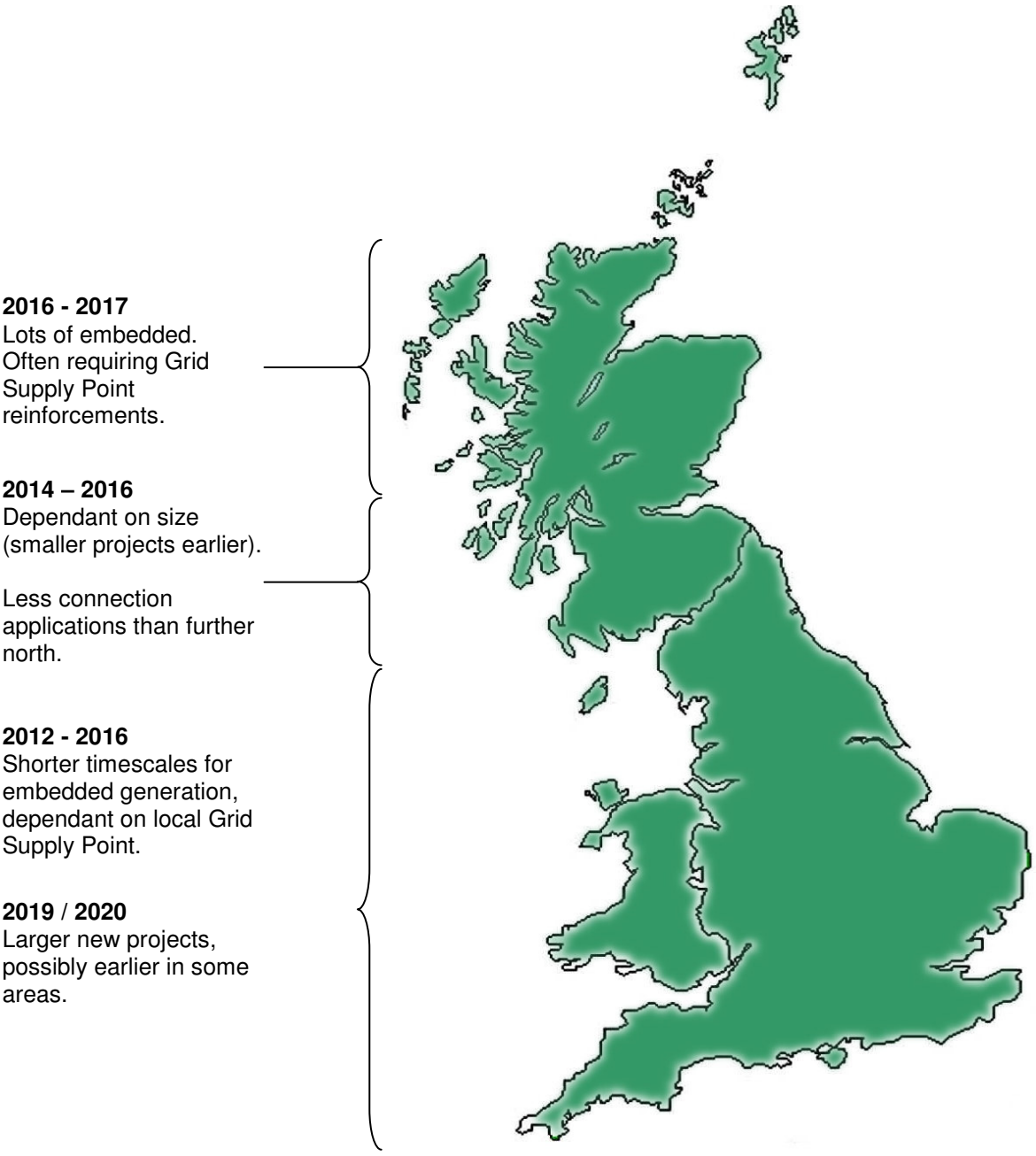
6.0 Connection Timescales

This section provides an indication of the likely connection dates that we would currently expect to offer to connection applications in various geographical locations around the country. These dates have been based around those that have been offered to projects under C&M arrangements.

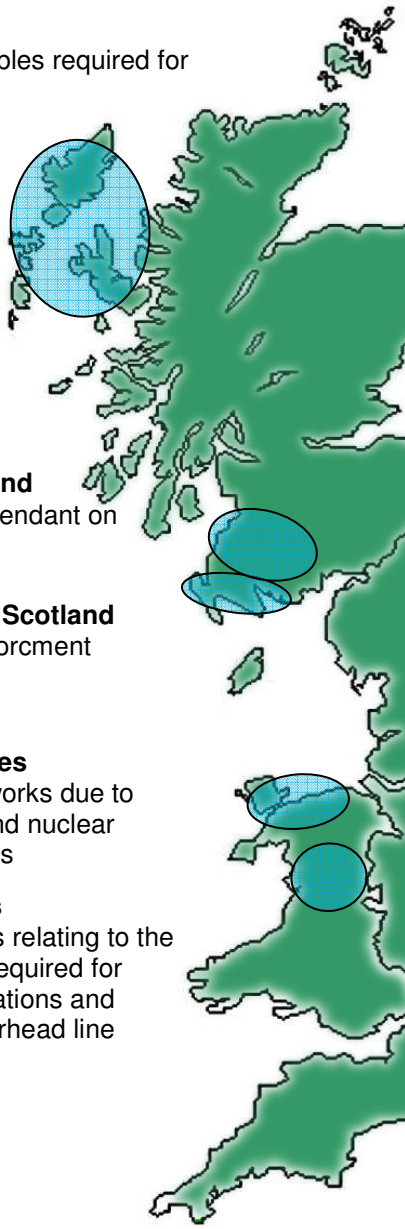
Diagram 6.1 provides a high level overview of the likely connection dates around the country and the dates if generation had to wait for the completion of wider works. Diagram 6.2 highlights areas where local difficulties may extend lead times.

Please note that these are indicative only and are subject to confirmation on an individual case by case basis. We welcome the opportunity to discuss your aspirations for grid connections ahead of any formal application. To discuss an individual project please contact either your Connection Agreement Manager or our Electricity Connections Team (telephone number 01926 654634).

6.1 Illustrative Connection Timescales - Likely Connection Dates



6.2 Illustrative Connection Timescales – Areas of Local Difficulty



Shetland Isles
HVDC undersea cables required for connection.

Western Isles
HVDC undersea cables required for connection.

South West Scotland
Enabling works dependant on collector substation

South West Coast Scotland
Transmission Reinforcment

Eastern England
Extent of enabling works due to Offshore connections

North Wales
Enabling works due to offshore and nuclear connections

Mid Wales
Challenges relating to the consents required for new substations and 400kV overhead line route.

South East England
Extent of enabling works due to Offshore and Nuclear connections

7.0 Summary of Signed Agreements for Accelerated Connection

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2;
- Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

7.1 Transmission Connected and Large Embedded Generation.

The same data is broken down in two different ways in the tables in this section. 7.1.1 shows the split between renewable and non-renewable generation and 7.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

7.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Renewable/Non-Renewable)

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Non Renewable	5	3647	7
		Renewable	10	10533	5
	Connected	Non Renewable	0	0	0
		Renewable	0	0	0
NGET Total			**15**	**14180**	**6**
SHETL	Future	Non Renewable	0	0	0
		Renewable	34	4993	6
	Connected	Non Renewable	0	0	0
		Renewable	3	69	9
SHETL Total			**37**	**5062**	**6**
SPT	Future	Non Renewable	2	1650	6
		Renewable	19	5103	7
	Connected	Non Renewable	0	0	0
		Renewable	0	0	0
SPT Total			**21**	**6753**	**7**
Grand Total			**73**	**25995**	**6**

7.1.2 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Agreement Type)

TO	Status	Agreement Category	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	15	14,180	6
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**15**	**14,180**	**6**
SHETL	Future	Large Embedded Generation	13	505	4
		Transmission Connected Generation	21	4,488	6
	Connected	Large Embedded Generation	1	13	12
		Transmission Connected Generation	2	56	8
SHETL Total			**37**	**5,062**	**6**
SPT	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	21	6,753	7
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
SPT Total			**21**	**6,753**	**7**
Grand Total			**73**	**25,995**	**6**

7.2 Small Embedded Generation Benefiting from C&M

Table 7.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the transmission system.

All of the projects in table 7.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	1	81	3
	Connected	0	0	0
NGET Total		**1**	**81**	**3**
SHETL	Future	55	167	11
	Connected	17	17	12
SHETL Total		**72**	**184**	**11**
SPT	Future	3	40	12
	Connected	0	0	0
SPT Total		**3**	**40**	**12**
Grand Total		**76**	**305**	**11**

8.0 Assessment of Anticipated C&M Constraint Costs

This section contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

Two scenarios have been considered for this analysis, the 'Contracted' position which assumes all projects will progress as per their current contracted position and a second scenario based around a 'More Likely' connection background.

8.1 'Contracted' Assessment

It is normal for National Grid to hold more contracts offering connection than will actually proceed and many of the generators that do proceed will either revise their capacity or request a delay to their connection. We therefore believe that the analysis carried out on the Contracted background produces a low likelihood, high cost result.

8.2 'More Likely' Assessment

Our 'More Likely' scenario uses the contracted data for the first two years, where there is more certainty around delivery of generation projects but beyond this uses data from our 'Gone Green' scenario for subsequent years. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020 compared to the contracted scenario. This assumes a level of termination or slippage of connections.

It should be noted that although this scenario is 'More Likely', it remains a scenario and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which maybe impacted by the connection of additional generation) and the progression of network reinforcements.

8.3 Scenario Outputs

The costs in the following tables represent the outcome of analysis using a snapshot of data and the scenarios explained above and are not an explicit forecast of what this cost maybe.

'Contracted' Assessment

Contracted	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	Total
E&W Constraint Costs (£m):	0.3	1.5	5.6	40.2	168.0	124.0	157.4	247.4	744.3
Scotland Constraint Costs (£m):	0.0	13.9	21.0	88.7	93.8	167.8	126.2	94.1	605.4
Total (£m):	**0.3**	**15.4**	**26.6**	**128.8**	**261.8**	**291.8**	**283.6**	**341.6**	**1349.8**

'More Likely'

More Likely	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	Total
E&W Constraint Costs (£m):	0.3	1.5	0.1	2.0	2.0	17.1	10.3	63.6	97.0
Scotland Constraint Costs (£m):	0.0	13.9	22.5	63.5	24.4	25.9	12.5	22.9	185.6
Total (£m):	**0.3**	**15.4**	**22.6**	**65.5**	**26.4**	**43.0**	**22.9**	**86.5**	**282.7**

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Quarterly Report on the Connect and Manage Regime

01 August 2011 – 30 April 2012

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1.0 Introduction

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 transmission system. Under the C&M regime any costs arising from the management of these constraints are socialised.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Report on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document - January 2011

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 May 2011 to 31 July 2011

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 August 2011 to 30 April 2012. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

This report is intended to be issued on a quarterly basis. However due to issues associated with analytical capability to generate the required data, this report covers the last three quarters. As the aforementioned issues have now been resolved, the next report will be issued in September 2012 to cover the period 1 May 2012 to 31 August 2012 and quarterly thereafter.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 50 new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 28 projects have connected since the previous Quarterly Report was published. This section also sets out the costs incurred in managing these constraints, by TNUoS zone.
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 30 April 2012.
- **Section 5** provides information on the extent and timing of the C&M Enabling Works.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 6** shows the cumulative level of acceleration of connections that the C&M approach is delivering;

- **Section 7** illustrates current lead times for connection applications;

- **Section 8** provides data on C&M signed projects with a capacity in the region of 30GW that have benefited with advanced connection dates. This section shows an average advancement of 6.5 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[1] process an average advancement of 11 years is seen;

- **Section 9** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

[1] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHETL – Scottish Hydro Electricity Transmission Limited, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 August 2011 and 30 April 2012.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year	Advancement (years)
Allt Duine Stage 1	Transmission Connected Generation	SHETL	87	2015	8
Allt Duine Stage 2	Transmission Connected Generation	SHETL	90	2018	5
Bay of Skaill (stage 1)	Transmission Connected Generation	SHETL	29	2016	7
Bay of Skaill (stage 2)	Transmission Connected Generation	SHETL	38	2017	6
Bay of Skaill (stage 3)	Transmission Connected Generation	SHETL	63	2018	5
Bay of Skaill (stage 4)	Transmission Connected Generation	SHETL	320	2020	3
Beinn an Tuirc 2	Large Embedded Generation	SHETL	5.7	2011	12
Clashindarroch	Large Embedded Generation	SHETL	54	2014	9
Clyde (additional capacity)	Transmission Connected Generation	SPT	171	2014	9
Corriemoillie	Transmission Connected Generation	SHETL	22	2015	8
Dorenell	Transmission Connected Generation	SHETL	180	2018	5
Druim Ba Wind Farm	Transmission Connected Generation	SHETL	93	2014	9
Dunmaglass	Transmission Connected Generation	SHETL	98.5	2015	8
Galawhistle	Transmission Connected Generation	SPT	55.2	2017	6
Glendoe	Transmission Connected Generation	SHETL	100	2012	11
Glentaggart	Transmission Connected Generation	SPT	20.7	2015	8
Hill of Fishrie	Large Embedded Generation	SHETL	12.5	2014	9
Inch Cape Stage 1	Transmission Connected Generation	SPT	350	2017	6
Inch Cape Stage 2	Transmission Connected Generation	SPT	350	2018	5
Inch Cape Stage 3	Transmission Connected Generation	SPT	350	2019	4
Kings Lynn B	Transmission Connected Generation	NGET	981	2015	1
Lochluichart extension (Erica)	Transmission Connected Generation	SHETL	21.6	2014	9
Meygen Stage 3	Transmission Connected Generation	SHETL	78	2018	5
Meygen Stage 4	Transmission Connected Generation	SHETL	15	2019	4
Moorhouse Farmers	Large Embedded Generation	SPT	47.5	2013	10
North Nesting	Transmission Connected Generation	SHETL	250	2016	7
Novar 2 Wind Farm Alness	Large Embedded Generation	SHETL	32	2011	3
Sound of Islay Tidal	Large Embedded Generation	SHETL	10	2013	5
South Holland Power Station - Stage 2	Transmission Connected Generation	NGET	390	2014	8
Tibberchindy (Drumnafunner)	Large Embedded Generation	SHETL	20	2015	8
Tom Nan Clach	Transmission Connected Generation	SHETL	150	2018	5
Tullo 2	Large Embedded Generation	SHETL	12.5	2012	11
Viking Wind Farm	Transmission Connected Generation	SHETL	300	2016	7
West Browncastle	Large Embedded Generation	SPT	36	2013	10
WKN Sallachy	Transmission Connected Generation	SHETL	66	2016	7

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 August 2011 and 30 April 2012. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer. These projects are aggregated at connection point level to demonstrate the benefits they have received from C&M.

Connection Point	TO	Capacity (MW)	Advancement (years)
Coupar Angus	SHETL	16.35	10
Crookston	SPT	9.2	11
Dunoon	SHETL	5.4	11
Fasnakyle	SHETL	10	10
Fiddes	SHETL	9.3	11
Grudie Bridge	SHETL	2.4	9
Keith	SHETL	20.2	10.2
Kintore	SHETL	9.2	11
Linmill	SPT	7.7	12
Lunanhead	SHETL	14.9	10.5
Saltcoats	SPT	2.4	11
Strichen	SHETL	1.6	11
Tummel Bridge	SHETL	2	11

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 30 April 2012.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[2]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the National Electricity Transmission System occur when generation exceeds the capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the National Electricity Transmission System will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Current Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of the embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

We are considering how we might include the impact of these projects in future reports.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 August 2011 and 30 April 2012

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	3	86
	Small Embedded Generation	23	128
	Transmission Connected Generation	2	338
Grand Total		**28**	**552**

3.3.2 Total C&M Generation Connected (up to 30 April 2012)

[2] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	3	86
	Small Embedded Generation	36	139
	Transmission Connected Generation	3	346
Connected Total		42	571

3.4 Actual Constraint Cost by TNUoS Zone

The table in section 3.4 shows a summary of the actual constraint costs up to and including 30 April 2012 for the 6 Transmission Connected or Large Embedded sites connected on C&M terms, of which 5 were active at times during the aforementioned period. This analysis does not include Small Embedded Generation.

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	Total C&M Constraint Costs up to 30 Apr 2012
Z1	£72,489	£39,391	£111,880
Z2	£0	£0	£0
Z3	£2,236,215	£198	£2,236,413
Z4	£1,725,634	£30,121	£1,755,755
Z5	£123,542	£0	£123,542
Z6	£0	£0	£0
Z7	£0	£0	£0
Z8	£0	£0	£0
Z9	£0	£0	£0
Z10	£0	£0	£0
Z11	£0	£0	£0
Z12	£0	£0	£0
Z13	£0	£0	£0
Z14	£0	£0	£0
Z15	£0	£0	£0
Z16	£0	£0	£0
Z17	£0	£0	£0
Z18	£0	£0	£0
Z19	£0	£0	£0
Z20	£0	£0	£0
Total	**£4,157,880**	**£69,710**	**£4,227,590**

Methodology behind the calculations

We firstly looked at each individual half hour period where output from a C&M unit encounters a relevant constraint, ranked in date of connection order. Each constraint action is then assessed at Balancing Mechanism Unit (BMU) level, ranked in price order (£/MWh), to determine the costs and volumes of those actions attributable to the respective C&M units.

We also have allowed for intertrips, which help manage power flows in lieu of taking constraint actions to pull back conventional BMU. Assignment of intertrip costs is done on the basis of

apportionment of the cost/MWh for intertrip setting (arming fee/MW output of intertripped units) against the MW outputs of the C&M units running at that time.

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

In the period up to and including 30 April 2012 there were 6 Transmission Connected or Large Embedded sites units connected on C&M terms, of which 5 were active at times during the aforementioned period. This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Savings by TNUoS Zone

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	Total Carbon Saving (tonnes) up to 30 Apr 2012
Z1	6,774	5,140	11,914
Z2	0	0	0
Z3	104,442	42	104,484
Z4	48,387	2,773	51,160
Z5	2,682	0	2,682
Z6	0	0	0
Z7	0	0	0
Z8	0	0	0
Z9	0	0	0
Z10	0	0	0
Z11	0	0	0
Z12	0	0	0
Z13	0	0	0
Z14	0	0	0
Z15	0	0	0
Z16	0	0	0
Z17	0	0	0
Z18	0	0	0
Z19	0	0	0
Z20	0	0	0
Total	**162,285**	**7,955**	**170,240**

Methodology behind the calculations

We firstly considered what carbon output there would have been had the C&M unit not run and so some other BMU plant would have been called to meet the demand. This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the National Electricity Transmission System (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes (and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We can then use this information to identify the carbon outputs of the respective BMUs, with their respective Carbon Factor[3], giving the Carbon saved values in tonnes.

[3] Nominal carbon factor for Windfarms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

Where these are utilised they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

5.0 Enabling Works Report

This section contains the Enabling Works report, which in accordance with CUSC Section 13.4, National Grid are required to provide on or before the end of each Financial Year. This report shows the following:

(a) by reference to the number of Offers made under the Connect and Manage Arrangements during that Financial Year, the percentage of Offers where the Enabling Works were above the MITS Connection Works and the percentage of Offers where the Enabling Works were below the MITS Connection Works

1 April 2011 to 31 March 2012	Number
Offers Made	104
% of Enabling Works above MITS	18
% of Enabling Works below MITS	1
% of Enabling Works to MITS	81

(b) by reference to each Construction Agreement where the Enabling Works were completed during that Financial Year, the period of time that it took to complete those Enabling Works and the transmission owner that undertook them.

Site Name	Time Taken for Enabling Works to be comple	Transmission Owner undertaking Enabling Work
Beinn an Tuirc 2	n/a as Enabling Works already completed	SHETL
Glendoe	n/a as Enabling Works already completed	SHETL
Hill of Towie	2.5 years	SHETL
Novar II	2.5 years	SHETL
Whitelee Extension	2.5 years	SPT

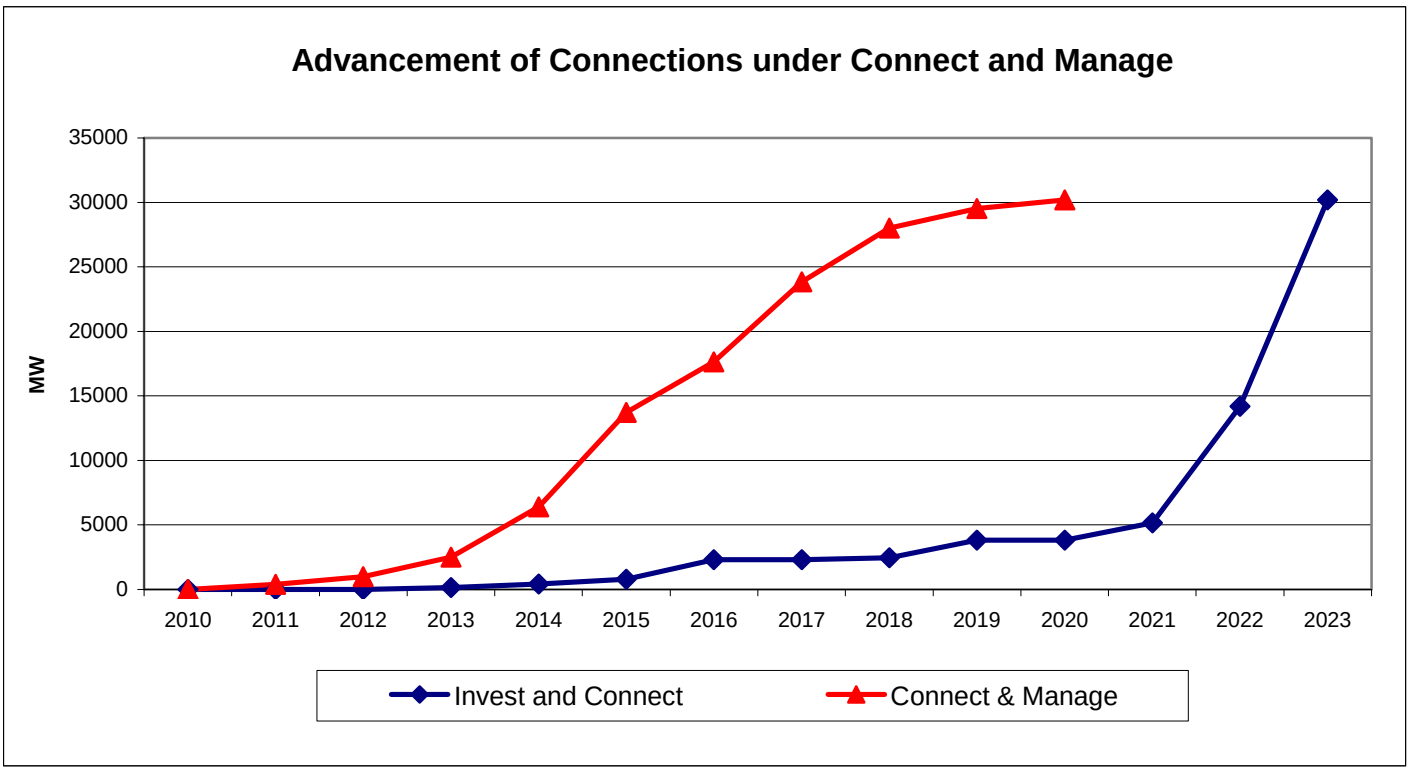
National Grid will continue to provide this data as part of the Quarterly Report published at the end of the applicable financial year.

6.0 Acceleration of Connection Dates

Chart 6.1 shows the cumulative profile of contracted generation capacity that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect' projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

6.1 Advancement of Connections under C&M



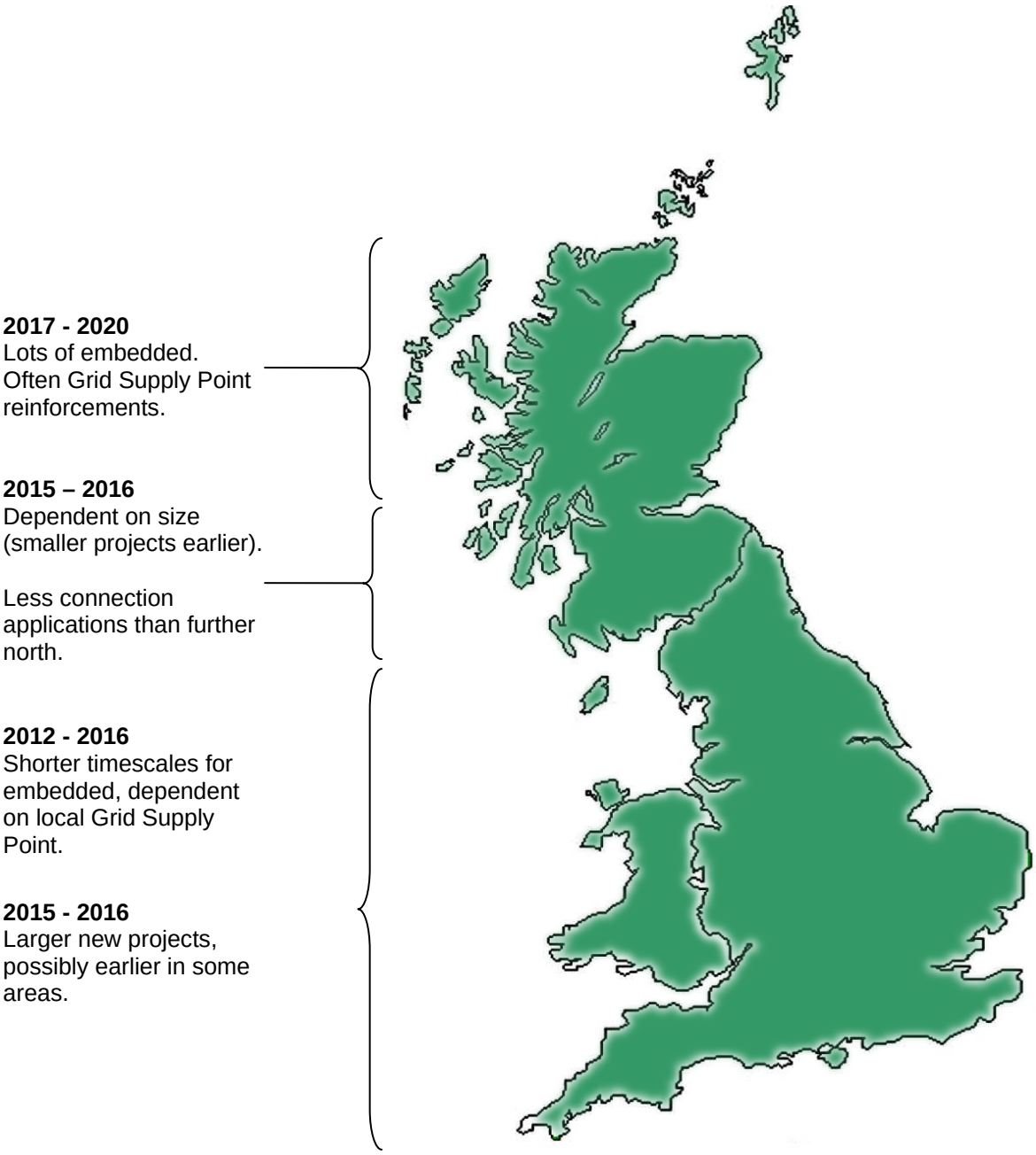
7.0 Connection Timescales

This section provides an indication of the likely connection dates that we would currently expect to offer to connection applications in various geographical locations around the country. These dates have been based around those that have been offered to projects under C&M arrangements.

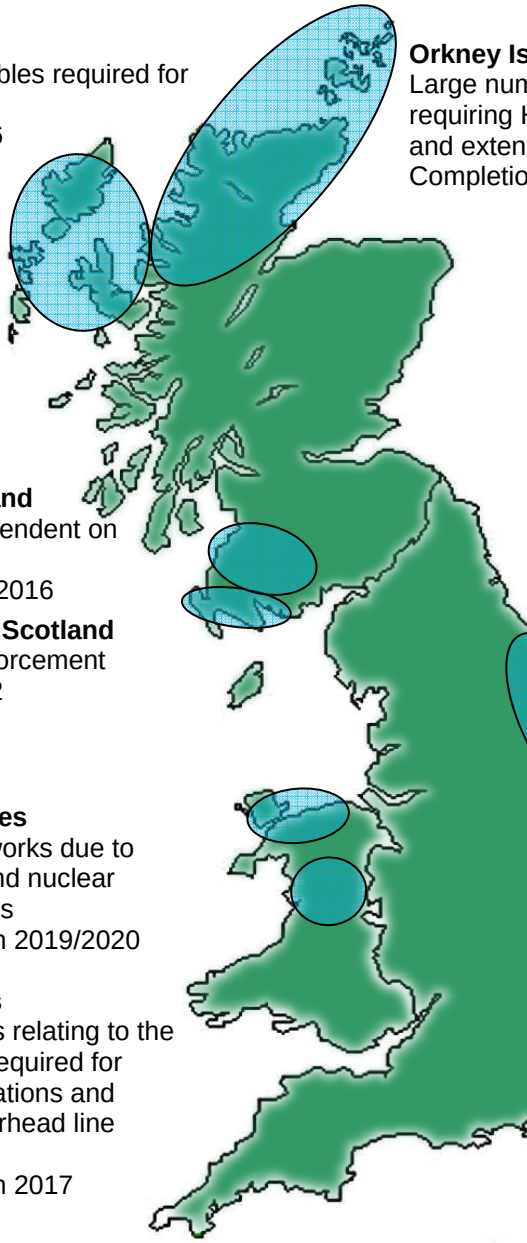
Diagram 7.1 provides a high level overview of the likely connection dates around the country and the dates if generation had to wait for the completion of wider works. Diagram 7.2 highlights areas where local difficulties may extend lead times.

Please note that these are indicative only and are subject to confirmation on an individual case by case basis. We welcome the opportunity to discuss your aspirations for grid connections ahead of any formal application. To discuss an individual project please contact either your Connection Agreement Manager or our Electricity Connections Team (telephone number 01926 654634).

7.1 Illustrative Connection Timescales - Likely Connection Dates



7.2 Illustrative Connection Timescales – Areas of Local Difficulty



Shetland Isles
HVDC undersea cables required for connection.
Completion by 2016

Western Isles
HVDC undersea cables required for connection.
Completion by 2016

Orkney Islands and Caithness
Large number of connection applications requiring HVDC undersea cable solutions and extensive onshore reinforcement.
Completion by 2021

South West Scotland
Enabling works dependent on collector substation
Completion by late 2016

South West Coast Scotland
Transmission Reinforcement
Completion by 2022

Eastern England
Extent of enabling works due to Offshore connections
Completion 2019/2020

North Wales
Enabling works due to offshore and nuclear connections
Completion 2019/2020

Mid Wales
Challenges relating to the consents required for new substations and 400kV overhead line route.
Completion 2017

South East England
Extent of enabling works due to Offshore and Nuclear connections
Completion 2019/2020

8.0 Summary of Signed Agreements for Accelerated Connection

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2;
- Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

8.1 Transmission Connected and Large Embedded Generation.

The same data is broken down in two different ways in the tables in this section. 8.1.1 shows the split between renewable and non-renewable generation and 8.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

8.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Renewable/Non-Renewable)

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Non Renewable	5	3647	6
		Renewable	10	10574	5
	Connected	Non Renewable	0	0	0
		Renewable	0	0	0
NGET Total			**15**	**14221**	**6**
SHETL	Future	Non Renewable	0	0	0
		Renewable	61	8010	6
	Connected	Non Renewable	0	0	0
		Renewable	5	194	7
SHETL Total			**66**	**8204**	**6**
SPT	Future	Non Renewable	2	1650	6
		Renewable	23	5449	7
	Connected	Non Renewable	0	0	0
		Renewable	1	238	8
SPT Total			**26**	**7337**	**7**
Grand Total			**107**	**29762**	**6**

8.1.2 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Agreement Type)

TO	Status	Agreement Category	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	15	14,221	6
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**15**	**14,221**	**6**
SHETL	Future	Large Embedded Generation	16	523	6
		Transmission Connected Generation	45	7,488	6
	Connected	Large Embedded Generation	3	86	7
		Transmission Connected Generation	2	108	8
SHETL Total			**66**	**8,204**	**6**
SPT	Future	Large Embedded Generation	2	84	10
		Transmission Connected Generation	23	7,016	7
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	1	238	8
SPT Total			**26**	**7,337**	**7**
Grand Total			**107**	**29,762**	**6**

8.2 Small Embedded Generation Benefiting from C&M

Table 8.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

All of the projects in table 8.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	0	0	0
	Connected	1	81	2
NGET Total		**1**	**81**	**2**
SHETL	Future	51	242	10
	Connected	32	32	12
SHETL Total		**83**	**274**	**11**
SPT	Future	5	46	11
	Connected	3	26	12
SPT Total		**8**	**72**	**11**
Grand Total		**92**	**427**	**11**

9.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

The following contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

A scenario around a 'More Likely' connection background has been considered for this analysis.

9.1 'More Likely' Assessment

Our 'More Likely' scenario uses the contracted data for 2012-2013 and 2013-2014, where there is more certainty around delivery of generation projects but beyond this uses data from our 'Gone Green' scenario[4] for subsequent years. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020 compared to the contracted scenario. This assumes a level of termination or slippage of connections compared with the contracted data from 2014-2015 onwards.

It should be noted that although this scenario is 'More Likely', it remains a scenario and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which maybe impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support Customer connections and other strategic reinforcements.

9.2 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and the scenario explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

The total estimated Connect and Manage cost is calculated by subtracting the estimated constraint costs of those projects studied under the Invest and Connect regime (as of 1 April 2011) from the total estimated constraint costs upon the conclusion of the analysis for Tranche 9 (Customer Offers made up until 9 March 2012).

We are looking to align the Connect and Manage reporting with the Energy scenarios that National Grid currently report against, namely "Slow Progression"[5], "Gone Green" and "Accelerated Growth"[6]. National Grid will need to agree with DECC and Ofgem as to whether all of the above scenarios are appropriate for Connect and Manage reporting but we will be looking to report against some or all of these scenarios from our December 2012 Quarterly Report. The September 2012 report will cover assessment of the anticipated Connect and Manage constraint costs against the "More Likely" scenario.

'More Likely' Assessment

Total C&M Cost including Tranche 9 GB	2012-2013	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021
Total C&M Cumulative MW	981	2,503	6,409	13,716	17,625	23,826	27,994	29,762	30,189
More Likely (£m)	41.5	81.6	84.5	9.3	2.9	31.2	33.3	128.0	-152.0

- In 2020/2021 the forecast constraint costs under the Invest and Connect regime are overstated as the behaviour of generators in responding to the Connect and Manage connections, e.g. by reducing output, is not captured in this baseline scenario. When the

[4] In the Gone Green scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.
[5] In the Slow Progression scenario developments in renewable and low carbon energy are comparatively slow, and emissions and renewable targets for 2020 are not met after 2025.
[6] The Accelerated Growth scenario uses the same view of energy demand as Gone Green but has faster development of offshore generation. All environmental targets are reached, earlier than the required dates.

constraint costs under Invest and Connect are subtracted from the estimated constraint costs for the Connect and Manage connections, we can arrive at a negative number.

nationalgrid

Quarterly Report on the Connect and Manage Regime

01 May 2012 – 31 August 2012

October 2012
V1.0

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1.0 Introduction

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 transmission system. Under the C&M regime any costs arising from the management of these constraints are socialised.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document - January 2011

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 August 2011 to 30 April 2012

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 May 2012 to 31 August 2012. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 27[1] new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 4 projects have connected since the previous Quarterly Report was published. This section also sets out the costs incurred in managing these constraints, by TNUoS zone.
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 31 August 2012.
- **Section 5** provides information on the extent and timing of the C&M Enabling Works.

[1] In table 2.1, La Na Greine, which has 3 stages, is counted as 3 C&M agreements for this analysis so there are 14 transmission connected & large embedded generation projects in total.

In table 2.2, there are 13 projects, which are aggregated below at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 27.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 6** shows the cumulative level of acceleration of connections that the C&M approach is delivering;

- **Section 7** illustrates current lead times for connection applications;

- **Section 8** provides data on C&M signed projects with a capacity in the region of 31GW that have benefited with advanced connection dates. This section shows an average advancement of 6 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[2] process an average advancement of 10 years is seen;

- **Section 9** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

[2] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHETL – Scottish Hydro Electricity Transmission Limited, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 May 2012 and 31 August 2012.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year	Advancement (years)
Aberdeen Bay	Transmission Connected Generation	SHETL	77	2015	8
Bad a Cheo	Transmission Connected Generation	SHETL	29.9	2020	3
Benbrack and Quantanas Hill	Transmission Connected Generation	SPT	74	2018	5
Celtic Array Platform 5	Transmission Connected Generation	NGET	500	2020	0
Corriemoillie Stage 2	Transmission Connected Generation	SHETL	25.5	2015	8
Glen App and Loch Ree	Transmission Connected Generation	SPT	51	2018	5
Greenwire Pentir	Transmission Connected Generation	NGET	1000	2018	2
La Na Greine (Siadar Stage 1)	Transmission Connected Generation	SHETL	10	2017	6
La Na Greine (Siadar Stage 2)	Transmission Connected Generation	SHETL	10	2018	5
La Na Greine (Siadar Stage 3)	Transmission Connected Generation	SHETL	20	2019	4
Loch Urr	Transmission Connected Generation	SPT	84	2018	5
Pentland Road Stage 2	Large Embedded Generation	SHETL	4.2	2015	8
South Millenium	Transmission Connected Generation	SHETL	25	2016	7
Strathy Wood	Transmission Connected Generation	SHETL	84	2020	3

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 May 2012 and 31 August 2012. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer. These projects are aggregated at connection point level to demonstrate the benefits they have received from C&M.

Connection Point	TO	Capacity (MW)	Advancement (years)
Broadford	SHETL	5.35	3
Coylton	SPT	22.5	9
Fraserburgh	SHETL	1.6	11
Harris	SHETL	1.5	8
Keith	SHETL	2.3	9
Kilmarnock South	SPT	14.3	11
Lairg	SHETL	2.5	7
St Fergus	SHETL	9.2	11
Stornoway	SHETL	3	8
Strichen	SHETL	9.2	10
Tummel Bridge	SHETL	1.5	8

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 31 August 2012.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[3]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the National Electricity Transmission System occur when generation exceeds the transmission capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the National Electricity Transmission System will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 May 2012 and 31 August 2012

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Small Embedded Generation	4	35
Grand Total		4	35

[3] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

3.3.2 Total C&M Generation Connected (up to 31 August 2012)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	3	86
	Small Embedded Generation	43	189
	Transmission Connected Generation	3	346
Connected Total		**49**	**620**

3.4 Actual Constraint Cost by TNUoS Zone

The table in section 3.4 shows a summary of the actual constraint costs up to and including 31 August 2012 for the 6 Transmission Connected or Large Embedded sites connected on C&M terms. This analysis does not include Small Embedded Generation.

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	Total C&M Constraint Costs up to 31 Aug 2012
Z1	£72,489	£39,391	£157,690	£269,570
Z2	£0	£0	£0	£0
Z3	£2,236,215	£198	£2,784	£2,239,197
Z4	£1,725,634	£30,121	£27,357	£1,783,112
Z5	£123,542	£0	£0	£123,542
Z6	£0	£0	£0	£0
Z7	£0	£0	£1,160	£1,160
Z8	£0	£0		£0
Z9	£0	£0		£0
Z10	£0	£0		£0
Z11	£0	£0		£0
Z12	£0	£0		£0
Z13	£0	£0		£0
Z14	£0	£0		£0
Z15	£0	£0		£0
Z16	£0	£0		£0
Z17	£0	£0		£0
Z18	£0	£0		£0
Z19	£0	£0		£0
Z20	£0	£0		£0
Total	**£4,157,880**	**£69,710**	**£188,991**	**£4,416,581**

Methodology behind the calculations

To produce the figures above each individual half hour period where output from a C&M unit encounters a relevant constraint is ranked in date of connection order. Each constraint action is then assessed at Balancing Mechanism Unit (BMU) level, ranked in price order (£/MWh), to determine the costs and volumes of those actions attributable to the respective C&M units.

In these calculations an allowance for intertrips, which help manage power flows in lieu of taking constraint actions to pull back conventional BMU, has been made. Assignment of intertrip costs is

done on the basis of apportionment of the cost/MWh for intertrip setting (arming fee/MW output of intertripped units) against the MW outputs of the C&M units running at that time.

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

In the period up to and including 31 August 2012 there were 6 Transmission Connected or Large Embedded sites units connected on C&M terms. This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Savings by TNUoS Zone (in tonnes)

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	Total Carbon Saving (tonnes) up to 31 Aug 2012
Z1	6,774	5,140	34,947	46,861
Z2	0	0	0	0
Z3	104,442	42	3,067	107,551
Z4	48,387	2,773	6,491	57,651
Z5	2,682	0	0	2,682
Z6	0	0	0	0
Z7	0	0	0	0
Z8	0	0		0
Z9	0	0		0
Z10	0	0		0
Z11	0	0		0
Z12	0	0		0
Z13	0	0		0
Z14	0	0		0
Z15	0	0		0
Z16	0	0		0
Z17	0	0		0
Z18	0	0		0
Z19	0	0		0
Z20	0	0		0
Total	**162,285**	**7,955**	**44,505**	**214,745**

This 214,745 tonnes saving equates to approximately 370 return flights from London to New York on a Boeing 747 assuming 500 passengers per flight.[4]

Methodology behind the calculations

The calculations considered what carbon output there would have been had the C&M unit not run and so another BMU plant would have been called to meet the demand. This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the National Electricity Transmission System (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes

[4] Data obtained using http://www.carbonneutralcalculator.com/flightcalculator.aspx

(and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We can then use this information to identify the carbon outputs of the respective BMUs, with their respective Carbon Factor[5], giving the Carbon saved values in tonnes.

[5] Nominal carbon factor for Windfarms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

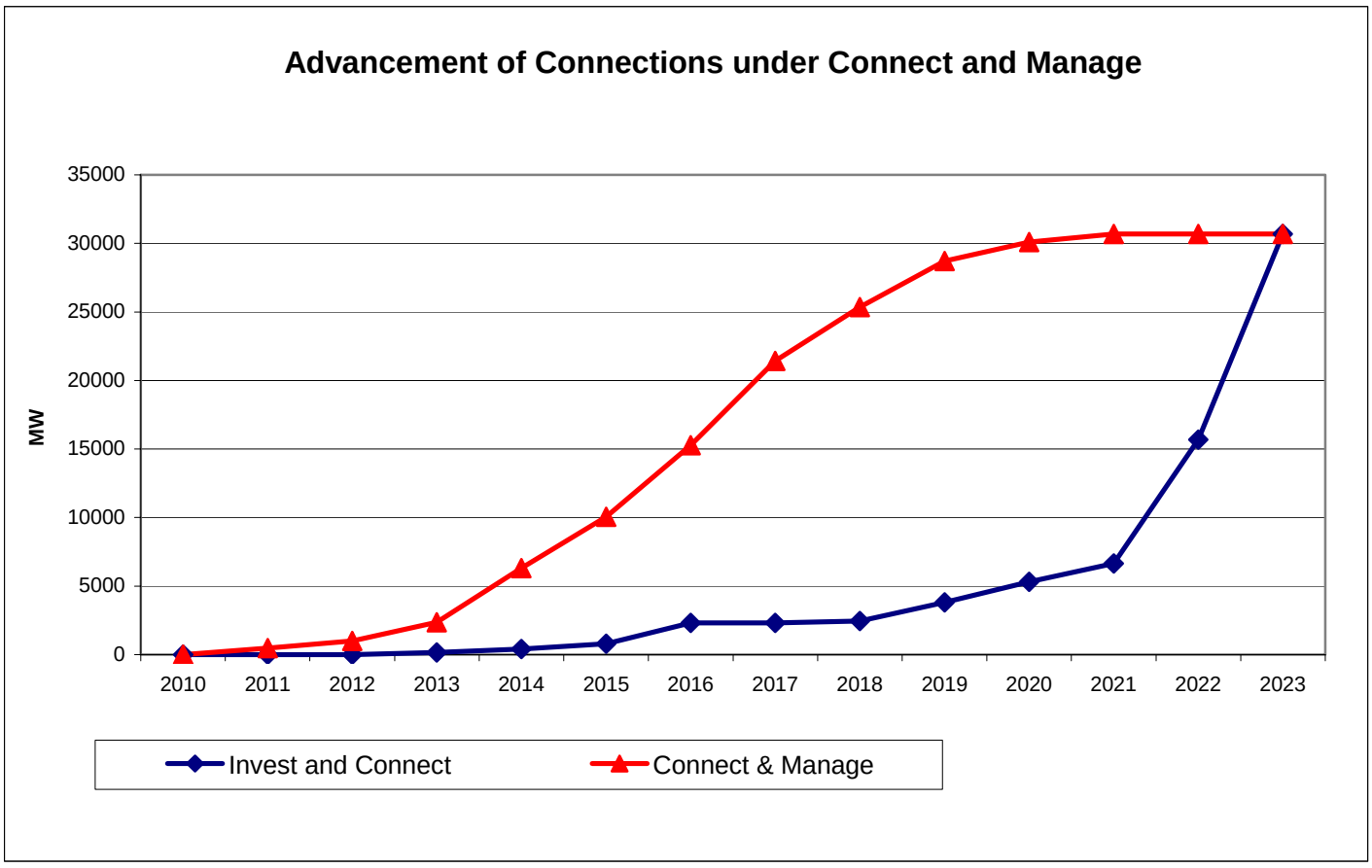
Where these are utilised they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

5.0 Acceleration of Connection Dates

Chart 5.1 shows the cumulative profile of contracted generation capacity that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect' projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

5.1 Advancement of Connections under C&M



6.0 Connection Timescales

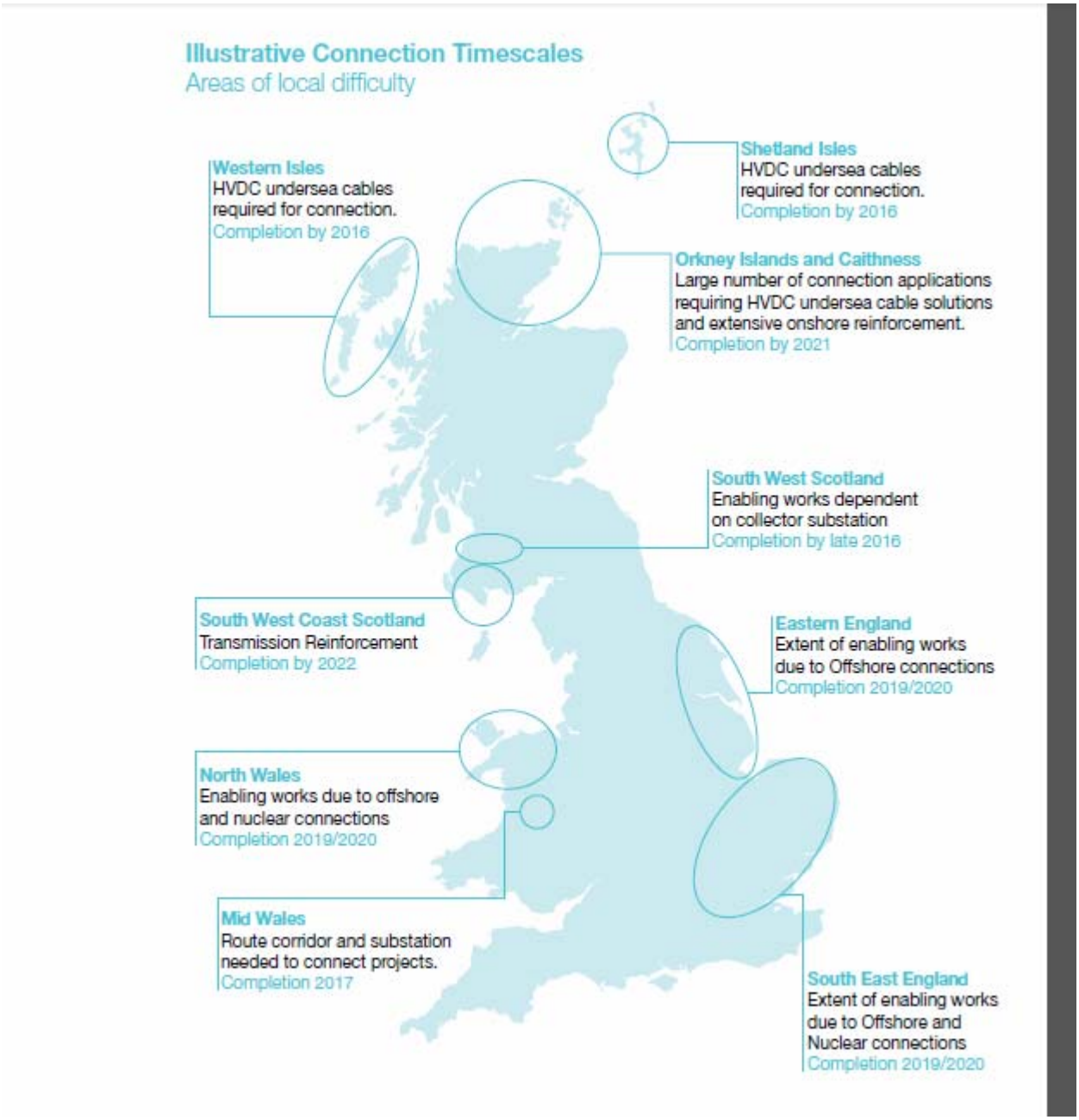
This section provides an indication of the likely connection dates that we would currently expect to offer to connection applications in various geographical locations around the country. These dates have been based around those that have been offered to projects under C&M arrangements.

Diagram 6.1 provides a high level overview of the likely connection dates around the country and the dates if generation had to wait for the completion of wider works. Diagram 6.2 highlights areas where local difficulties may extend lead times.

Please note that these are indicative only and are subject to confirmation on an individual case by case basis. We welcome the opportunity to discuss your aspirations for grid connections ahead of any formal application. To discuss an individual project please contact either your Connection Agreement Manager or our Electricity Connections Team (telephone number 01926 654634).

6.1 Illustrative Connection Timescales - Likely Connection Dates

6.2 Illustrative Connection Timescales – Areas of Local Difficulty



7.0 Summary of Signed Agreements for Accelerated Connection

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2.
- Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

7.1 Transmission Connected and Large Embedded Generation.

The same data is broken down in two different ways in the tables in this section. 7.1.1 shows the split between renewable and non-renewable generation and 7.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

7.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Renewable/Non-Renewable)

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Non Renewable	5	3647	6
		Renewable	19	12074	4
	Connected	Non Renewable	0	0	0
		Renewable	0	0	0
NGET Total			**24**	**15721**	**5**
SHETL	Future	Non Renewable	0	0	0
		Renewable	69	8295	6
	Connected	Non Renewable	0	0	0
		Renewable	5	194	7
SHETL Total			**74**	**8489**	**6**
SPT	Future	Non Renewable	0	0	0
		Renewable	26	5658	7
	Connected	Non Renewable	0	0	0
		Renewable	1	238	8
SPT Total			**27**	**5896**	**7**
Grand Total			**125**	**30106**	**6**

7.1.2 Transmission Connected and Large Embedded Generation Signed Agreements for Accelerated Connections (Split by Agreement Type)

TO	Status	Agreement Category	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	24	15,721	5
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**24**	**15,721**	**5**
SHETL	Future	Large Embedded Generation	16	473	6
		Transmission Connected Generation	53	7,822	6
	Connected	Large Embedded Generation	3	86	7
		Transmission Connected Generation	2	108	8
SHETL Total			**74**	**8,489**	**6**
SPT	Future	Large Embedded Generation	2	84	10
		Transmission Connected Generation	24	5,575	7
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	1	238	8
SPT Total			**27**	**5,896**	**7**
Grand Total			**125**	**30,106**	**6**

8.2 Small Embedded Generation Benefiting from C&M

Table 8.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

All of the projects in table 8.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	0	0	0
	Connected	1	81	3
NGET Total		**1**	**81**	**3**
SHETL	Future	56	239	10
	Connected	38	72	12
SHETL Total		**94**	**310**	**10**
SPT	Future	5	64	10
	Connected	4	36	12
SPT Total		**9**	**99**	**11**
Grand Total		**104**	**491**	**10**

8.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

The following contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

A scenario around a 'More Likely' connection background has been considered for this analysis.

8.1 'More Likely' Assessment

Our 'More Likely' scenario uses the contracted data for 2012-2013 and 2013-2014, where there is more certainty around delivery of generation projects but beyond this uses data from our 'Gone Green' scenario[6] for subsequent years. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020 compared to the contracted scenario. This assumes a level of termination or slippage of connections compared with the contracted data from 2014-2015 onwards.

It should be noted that although this scenario is 'More Likely', it remains a scenario and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which may be impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support Customer connections and other strategic reinforcements.

We are considering moving away from this "More Likely" scenario and are proposing that Connect and Manage modelling will align with our energy scenarios, namely Accelerated Growth, Gone Green and Slow Progression scenarios. Timing for this change and whether we model on some of or all of the three energy scenarios has yet to be determined but until such decision is made, we will continue to use the "More Likely" scenario.

8.2 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and the scenario explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

'More Likely' Assessment

Total C&M Cost including Tranche 12 GB	2012-2013	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021
Total C&M Cumulative MW	992	2,356	6,321	10,053	15,277	21,430	25,362	28,707	30,597
More Likely (£m)	41.4	95.7	73.0	26.1	-1.4	43.1	98.9	181.2	162.9

- Connect and Manage forecast constraint costs are now calculated based on the cost of the C&M projects' advancement (i.e. between their date of connection to the National Electricity Transmission System and completion of the Wider Reinforcement Works) as opposed to the previous method, which did not take cognisance of the completion of the Wider Reinforcement Works and assumed that constraint costs attributable to C&M could continue to be measured after the wider reinforcement works are completed.

- A disadvantage of the analysis used is that when the constraint costs under 'invest and connect' are subtracted from the estimated constraint costs for the C&M connections, we can arrive at a negative number. This is illustrated in the negative constraint cost in 2016-17.

[6] In the Gone Green scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.

nationalgrid

Quarterly Report on the Connect and Manage Regime

01 September 2012 – 31 December 2012

January 2013
V1.0

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1.0 Introduction

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 transmission system. Under the C&M regime any costs arising from the management of these constraints are socialised.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document - January 2011

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 May 2012 to 31 August 2012

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 September 2012 to 31 December 2012. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 11 new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 25 projects have connected since the previous Quarterly Report was published. This section also sets out the costs incurred in managing these constraints, by TNUoS zone.
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 31 December 2012.
- **Section 5** provides information on the extent and timing of the C&M Enabling Works.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 6** provides data on C&M signed projects with a capacity in the region of 33 GW that have benefited with advanced connection dates. This section shows an average advancement of 6 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[1] process an average advancement of 10 years is seen;

- **Section 7** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

1.3 Next Report

The next C&M Quarterly Report will be published on **19 April 2013** and will cover the period 1 January 2013 to 31 March 2013.

[1] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHE – Scottish Hydro Electricity Transmission, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 September 2012 and 31 December 2012.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year	Advancement (years)
Codling Park	Transmission Connected Generation	NGET	1000	2017	6
Dalnessie Windfarm	Transmission Connected Generation	SHE	81	2018	5
Druim Leathann (formerly known as Tolsta)	Transmission Connected Generation	SHE	39	2017	6
Fairburn Extension Windfarm	Transmission Connected Generation	SHE	51	2020	3
Limekilns	Transmission Connected Generation	SHE	90	2020	3
Moy Windfarm	Large Embedded Generation	SHE	60	2014	9
Stronelairg Windfarm	Transmission Connected Generation	SHE	298.8	2018	5

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 September 2012 and 31 December 2012. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer. These projects are aggregated at connection point level to demonstrate the benefits they have received from C&M.[2]

Connection Point	TO	Capacity (MW)	Advancement (years)
Fort William	SHE	5.7	9
Kintore	SHE	9.2	9
Hunterston Farm	SPT	25	11
Livingston East	SPT	7	11

[2] In table 2.2, there are 4 projects, which are aggregated below at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 11.

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 31 December 2012.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[3]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the National Electricity Transmission System occur when generation exceeds the transmission capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the National Electricity Transmission System will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 September 2012 and 31 December 2012

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	3	58
	Small Embedded Generation	22	127
Grand Total		25	185

[3] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

3.3.2 Total C&M Generation Connected (up to 31 December 2012)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	6	144
	Small Embedded Generation	65	315
	Transmission Connected Generation	3	346
Connected Total		**74**	**805**

3.4 Actual Constraint Cost by TNUoS Zone

The table in section 3.4 shows a summary of the actual constraint costs up to and including 31 December 2012 for the 9 Transmission Connected or Large Embedded sites connected on C&M terms. This analysis does not include Small Embedded Generation.

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	1 Sep 2012 to 31 Dec 2012	Total
Z1	£72,489	£39,391	£157,690	£981,749	£1,251,319
Z2	£0	£0	£0	£0	£0
Z3	£2,236,215	£198	£2,784	£27,223	£2,266,420
Z4	£1,725,634	£30,121	£27,357	£657,844	£2,440,956
Z5	£123,542	£0	£0	£142,804	£266,346
Z6	£0	£0	£0	£0	£0
Z7	£0	£0	£1,160	£1,167,944	£1,169,104
Z8	£0	£0	£0	£0	£0
Z9	£0	£0	£0	£0	£0
Z10	£0	£0	£0	£0	£0
Z11	£0	£0	£0	£0	£0
Z12	£0	£0	£0	£0	£0
Z13	£0	£0	£0	£0	£0
Z14	£0	£0	£0	£0	£0
Z15	£0	£0	£0	£0	£0
Z16	£0	£0	£0	£0	£0
Z17	£0	£0	£0	£0	£0
Z18	£0	£0	£0	£0	£0
Z19	£0	£0	£0	£0	£0
Z20	£0	£0	£0	£0	£0
Total	**£4,157,880**	**£69,710**	**£188,991**	**£2,977,564**	**£7,394,145**

Methodology behind the calculations

To produce the figures above each individual half hour period where output from a C&M unit encounters a relevant constraint is ranked in date of connection order. Each constraint action is then assessed at Balancing Mechanism Unit (BMU) level, ranked in price order (£/MWh), to determine the costs and volumes of those actions attributable to the respective C&M units.

In these calculations an allowance for intertrips, which help manage power flows in lieu of taking constraint actions to pull back conventional BMU, has been made. Assignment of intertrip costs is

done on the basis of apportionment of the cost/MWh for intertrip setting (arming fee/MW output of intertripped units) against the MW outputs of the C&M units running at that time.

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

In the period up to and including 31 December 2012 there were 9 Transmission Connected or Large Embedded sites units connected on C&M terms. This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Savings by TNUoS Zone (in tonnes)

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	1 Sep 2012 to 31 Dec 2012	Total Carbon Saving (tonnes)
Z1	6,774	5,140	34,947	65,198	112,059
Z2	0	0	0	0	0
Z3	104,442	42	3,067	457	108,008
Z4	48,387	2,773	6,491	61,630	119,281
Z5	2,682	0	0	4,001	6,683
Z6	0	0	0	0	0
Z7	0	0	0	56,257	56,257
Z8	0	0	0	0	0
Z9	0	0	0	0	0
Z10	0	0	0	0	0
Z11	0	0	0	0	0
Z12	0	0	0	0	0
Z13	0	0	0	0	0
Z14	0	0	0	0	0
Z15	0	0	0	0	0
Z16	0	0	0	0	0
Z17	0	0	0	0	0
Z18	0	0	0	0	0
Z19	0	0	0	0	0
Z20	0	0	0	0	0
Total	**162,285**	**7,955**	**44,505**	**187,543**	**402,288**

Methodology behind the calculations

The calculations considered what carbon output there would have been had the C&M unit not run and so another BMU plant would have been called to meet the demand. This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the National Electricity Transmission System (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes (and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We can then use this information to identify the carbon outputs of the respective BMUs, with their respective Carbon Factor[4], giving the Carbon saved values in tonnes.

Future Carbon Savings

As part of the next C&M Quarterly Report, to be published on 19 April 2013, we are intending to include a section on the carbon saved values in tonnes for future connections up to 2020.

[4] Nominal carbon factor for Windfarms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

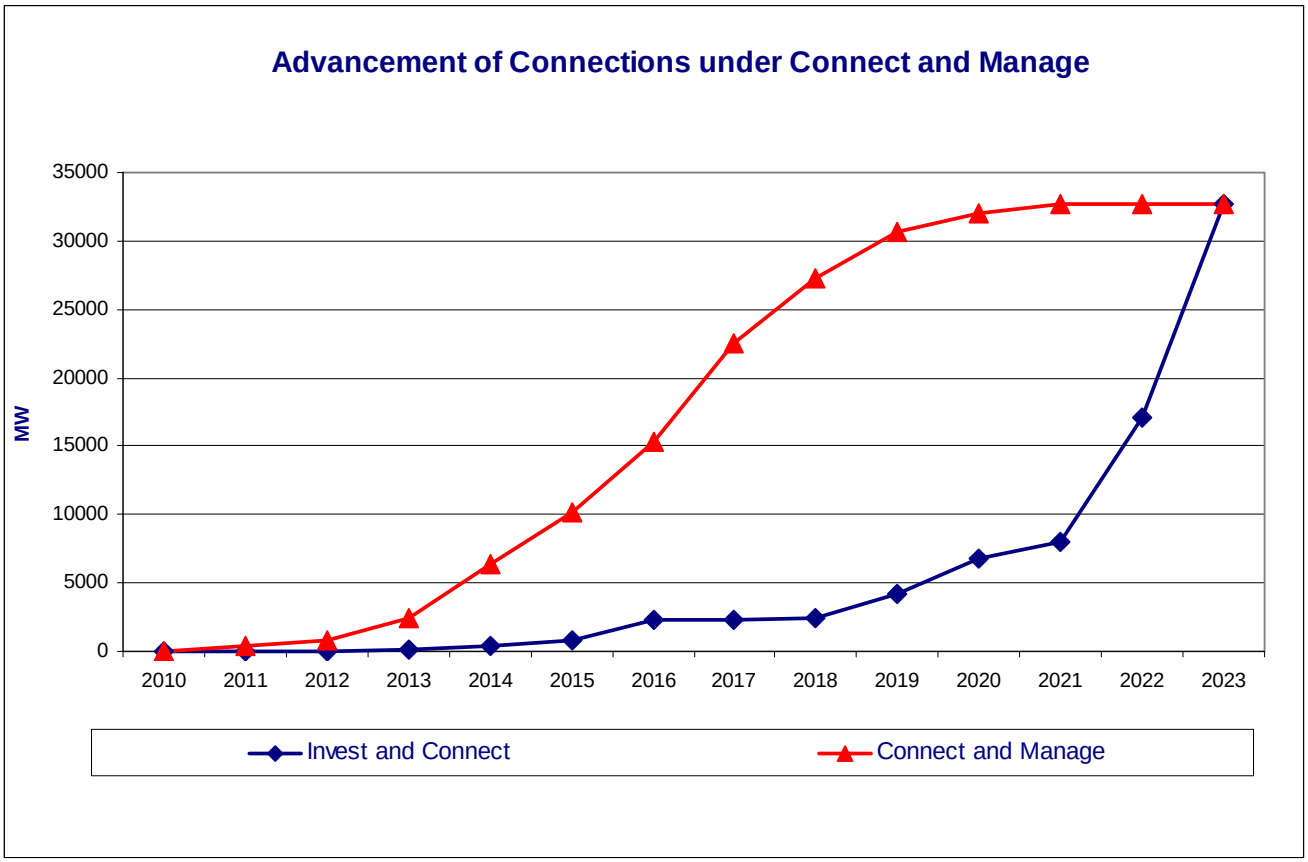
Where these are utilised they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

5.0 Acceleration of Connection Dates

Chart 5.1 shows the cumulative profile of contracted generation capacity that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect' projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

5.1 Advancement of Connections under C&M



6.0 Summary of Signed Agreements for Connect and Manage Connections

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2.
- Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

6.1 Transmission Connected and Large Embedded Generation

The same data is broken down in two different ways in the tables in this section. 6.1.1 shows the split between renewable and non-renewable generation and 6.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

6.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Connect and Manage Connections (Split by Renewable/Non-Renewable)

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	Non Renewable	5	3647	6
		Renewable	21	13474	4
	Connected	Non Renewable	0	0	0
		Renewable	0	0	0
NGET Total			**26**	**17121**	**5**
SPT	Future	Non Renewable	0	0	0
		Renewable	26	5658	7
	Connected	Non Renewable	0	0	0
		Renewable	1	238	8
SPT Total			**27**	**5896**	**7**
SHE	**Future**	Non Renewable	0	0	0
		Renewable	73	8856	6
	Connected	Non Renewable	0	0	0
		Renewable	8	252	6
SHE Total			**81**	**9108**	**6**
Grand Total			**134**	**32126**	**6**

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 (years)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	26	17,121	5
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**26**	**17,121**	**5**
SPT	Future	Large Embedded Generation	2	84	10
		Transmission Connected Generation	24	5,575	7
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	1	238	8
SPT Total			**27**	**5,896**	**7**
SHE	Future	Large Embedded Generation	15	474	6
		Transmission Connected Generation	58	8,382	6
	Connected	Large Embedded Generation	6	144	6
		Transmission Connected Generation	2	108	8
SHE Total			**81**	**9,108**	**6**
Grand Total			**134**	**32,126**	**6**

6.2 Small Embedded Generation Benefiting from C&M

Table 6.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

All of the projects in table 6.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	0	0	0
	Connected	1	81	3
NGET Total		**1**	**81**	**3**
SPT	Future	2	34	10
	Connected	9	97	11
SPT Total		**11**	**131**	**11**
SHE	Future	41	188	9
	Connected	55	137	11
SHE Total		**96**	**325**	**10**
Grand Total		**108**	**538**	**10**

7.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

The following contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

A scenario around a 'More Likely' connection background has been considered for this analysis.

7.1 'More Likely' Assessment

Our 'More Likely' scenario uses the contracted data for 2012-2013 and 2013-2014, where there is more certainty around delivery of generation projects but beyond this uses data from our 'Gone Green' scenario[5] for subsequent years. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020 compared to the contracted scenario. This assumes a level of termination or slippage of connections compared with the contracted data from 2014-2015 onwards.

It should be noted that although this scenario is 'More Likely', it remains a scenario and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which may be impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support Customer connections and other strategic reinforcements.

We are considering moving away from this "More Likely" scenario and are proposing that Connect and Manage modelling will align with our energy scenarios, namely Accelerated Growth, Gone Green and Slow Progression scenarios. Timing for this change and whether we model on some of or all of the three energy scenarios has yet to be determined but until such decision is made, we will continue to use the "More Likely" scenario.

7.2 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and thescenario explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

'More Likely' Assessment

Connect and Manage Year	Total C&M Cumulative MW	Total C&M Cost (£m)*
2012-2013	806	39.7
2013-2014	2336	93.1
2014-2015	6418	68.2
2015-2016	10150	27.2
2016-2017	15374	2
2017-2018	22566	50.5
2018-2019	27278	66.9
2019-2020	30623	106.1
2020-2021	32663	114.1

- Connect and Manage forecast constraint costs are now calculated based on the cost of the C&M projects' advancement (i.e. between their date of connection to the National Electricity Transmission System and completion of the Wider Reinforcement Works) as opposed to the previous method, which did not take cognisance of the completion of the Wider

[5] In the Gone Green scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.

Reinforcement Works and assumed that constraint costs attributable to C&M could continue to be measured after the wider reinforcement works are completed.

nationalgrid

Quarterly Report on the Connect and Manage Regime

01 January 2013 – 31 March 2013

June 2013
V1.0

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1.0 Introduction

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.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document - January 2011

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 January 2013 to 31 March 2013

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 January 2013 to 31 March 2013. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 20[1] new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 1 project has connected since the previous Quarterly Report was published. This section also sets out the costs incurred in managing these constraints, by TNUoS zone.
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 31 March 2013.
- **Section 5** provides information on the extent and timing of the C&M Enabling Works.

[1] In table 2.1, Triton Knoll, which has 2 stages, is counted as 2 C&M agreements for this analysis so there are 9 new transmission connected & large embedded generation projects in total.

In table 2.2, there are 11 new small embedded projects, which are aggregated below at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 19.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 6** illustrates current lead times for connection applications;

- **Section 7** provides data on C&M signed projects with a capacity in the region of 34 GW, as compared with ~ 33 GW at the time of our previous C&M Quarterly Report dated 4 February 2013, that have benefited with advanced connection dates. This section shows an average advancement of 5 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[2] process an average advancement of 10 years is seen;

- **Section 8** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

1.3 Next Report

The next C&M Report is due to be published on 19 July 2013 but we are currently exploring with Ofgem the potential benefits of changing the reporting frequency to half-yearly.

[2] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHE – Scottish Hydro Electricity Transmission, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 January 2013 and 31 March 2013.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year
Beinneun	Transmission Connected Generation	SHE	85	2021
Glencassley Windfarm	Large Embedded Generation	SHE	65	2015
Islay Marine Energy Park	Large Embedded Generation	SHE	30	2015
Lochluichart Windfarm Stage 2	Transmission Connected Generation	SHE	18	2016
South Millenium Stage 2	Transmission Connected Generation	SHE	25	2021
Spalding Energy Expansion (Additional Capacity)	Transmission Connected Generation	NGET	80	2017
Triton Knoll Platform 2 Stage 1	Transmission Connected Generation	NGET	200	2021
Triton Knoll Platform 2 Stage 2	Transmission Connected Generation	NGET	200	2022
Wathegar 2	Large Embedded Generation	SHE	22.5	2020

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 January 2013 and 31 March 2013. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer.

Connection Point	TO	Capacity (MW)	Advancement (years)
Bathgate	SPT	9	10
Broadford	SHE	1.2	2
Clachan North West	SHE	1.35	8
Fort Augustus	SHE	1.15	7
Fort William	SHE	2.5	7
Grudie Bridge	SHE	2	9
Killin	SHE	5.6	6
Macduff	SHE	4.6	9
Macduff	SHE	9.9	8
Rannoch	SHE	5.5	7
Tummel Bridge	SHE	1.3	8

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 31 March 2013.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[3]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the National Electricity Transmission System (NETS) occur when generation exceeds the transmission capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the NETS will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 January 2013 and 31 March 2013

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	1	41
Grand Total		1	41

[3] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

3.3.2 Total C&M Generation Connected (up to 31 March 2013)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	7	196
	Small Embedded Generation	66	318
	Transmission Connected Generation	3	346
Connected Total		**76**	**859**

3.4 Actual Constraint Cost by TNUoS Zone

The table in section 3.4 shows a summary of the actual constraint costs up to and including 31 March 2013 for the 10 Transmission Connected or Large Embedded sites connected on C&M terms[4]. This analysis does not include Small Embedded Generation.

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	1 Sep 2012 to 31 Dec 2012	1 Jan 2013 to 31 Mar 2013	Total
Z1	£72,489	£39,391	£157,690	£1,137,695 *(was £981,749)*	£329,314	£1,736,579
Z2	£0	£0	£0	£0	£0	£0
Z3	£2,236,215	£198	£2,784	£722,011 *(was £27,223)*	£60,142	£3,021,350
Z4	£1,725,634	£30,121	£27,357	£0 *(was £657,844)*	£76	£1,783,188
Z5	£123,542	£0	£0	£157,360 *(was £142,804)*	£136,263	£417,165
Z6	£0	£0	£0	£0	£0	£0
Z7	£0	£0	£1,160	£1,852,983 *(was £1,167,944)*	£990,750	£2,844,893
Z8	£0	£0	£0	£0	£0	£0
Z9	£0	£0	£0	£0	£0	£0
Z10	£0	£0	£0	£0	£0	£0
Z11	£0	£0	£0	£0	£0	£0
Z12	£0	£0	£0	£0	£0	£0
Z13	£0	£0	£0	£0	£0	£0
Z14	£0	£0	£0	£0	£0	£0
Z15	£0	£0	£0	£0	£0	£0
Z16	£0	£0	£0	£0	£0	£0
Z17	£0	£0	£0	£0	£0	£0
Z18	£0	£0	£0	£0	£0	£0
Z19	£0	£0	£0	£0	£0	£0
Z20	£0	£0	£0	£0	£0	£0
Total	**£4,157,880**	**£69,710**	**£188,991**	**£3,870,049 *(was £2,977,564)***	**£1,516,545**	**£9,803,175**

[4] When running the analysis for the period 1 January 2013 to 31 March 2013 it was discovered that costs for Intertrips had been excluded for the period 1 September 2012 to 31 December 2012. In addition, 1 of the sites has been transferred from TNUoS zone 4 to TNUoS zone 3. Based on the above, revised numbers (shown against previous numbers) for the period 1 September 2012 to 31 December 2012 have been included.

Methodology behind the calculations

To produce the figures above each individual half hour period where output from a C&M unit encounters a relevant constraint is ranked in date of connection order. Each constraint action is then assessed at Balancing Mechanism Unit (BMU) level, ranked in price order (£/MWh), to determine the costs and volumes of those actions attributable to the respective C&M units.

In these calculations an allowance for intertrips[5], which help manage power flows in lieu of taking constraint actions to pull back conventional BMU, has been made. Assignment of intertrip costs is done on the basis of apportionment of the cost/MWh for intertrip setting (arming fee/MW output of intertripped units) against the MW outputs of the C&M units running at that time.

[5] An automatic control arrangement where generation (or demand) may be reduced or disconnected following a system fault event to relieve localised network overloads, maintain system stability, manage system voltages and/or ensure restoration on the NETS.

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

In the period up to and including 31 March 2013 there were 10 Transmission Connected or Large Embedded sites units connected on C&M terms.[6] This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Savings by TNUoS Zone (in tonnes)

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 30 Apr 2012	1 May 2012 to 31 Aug 2012	1 Sep 2012 to 31 Dec 2012	1 Jan 2013 to 31 Mar 2013	Total Carbon Saving (tonnes)
Z1	6,774	5,140	34,947	65,574 *(was 65,198)*	45,294	157,729
Z2	0	0	0	0	0	0
Z3	104,442	42	3,067	62,133 *(was 457)*	20,090	189,774
Z4	48,387	2,773	6,491	0 *(was 61,630)*	570	58,221
Z5	2,682	0	0	6,989 *(was 4,001)*	9,364	19,035
Z6	0	0	0	0	0	0
Z7	0	0	0	*56,264 (was 56,257)*	69,795	126,058
Z8	0	0	0	0	0	0
Z9	0	0	0	0	0	0
Z10	0	0	0	0	0	0
Z11	0	0	0	0	0	0
Z12	0	0	0	0	0	0
Z13	0	0	0	0	0	0
Z14	0	0	0	0	0	0
Z15	0	0	0	0	0	0
Z16	0	0	0	0	0	0
Z17	0	0	0	0	0	0
Z18	0	0	0	0	0	0
Z19	0	0	0	0	0	0
Z20	0	0	0	0	0	0
Total	**162,285**	**7,955**	**44,505**	**190,960 *(was 187,543)***	**154,112**	**550,817**

[6] When running the analysis for the period 1 January 2013 to 31 March 2013 it was discovered that costs for Intertrips had been excluded for the period 1 September 2012 to 31 December 2012. In addition, 1 of the sites has been transferred from TNUoS zone 4 to TNUoS zone 3. Based on the above, revised numbers (shown against previous numbers) for the period 1 September 2012 to 31 December 2012 have been included.

Methodology behind the calculations

The calculations considered what carbon output there would have been had the C&M unit not run and so another BMU plant would have been called to meet the demand. This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the National Electricity Transmission System (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes (and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We can then use this information to identify the carbon outputs of the respective BMUs, with their respective Carbon Factor[7], giving the Carbon saved values in tonnes.

Future Carbon Savings

As part of this C&M Quarterly Report, we intended to include a section on the carbon saved values in tonnes for future connections up to 2020. However, this data is not available at this time but we will continue to explore how we can present this information in future submissions.

[7] Nominal carbon factor for Windfarms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

Where these are utilised they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

5.0 Enabling Works Report

When C&M was introduced, it was envisaged that the Enabling Works required would generally be no greater than to the nearest Main Interconnected Transmission System(s) ("MITS") substation[8]. The following report, produced in accordance with CUSC Section 13.4, analyses Connection and Modification Offers made to Customers over the previous financial year to identify whether or not the Enabling Works were greater than works necessary to connect to a MITS (above the MITS), or provided at a point less than a MITS substation (below the MITS) or to the nearest MITS substation **(Chart 5.1)**. In addition, the report focuses on how long it took for Enabling Works to be completed for those sites connected to the NETS in the previous financial year **(Chart 5.2)**.

This report specifically shows the following:

Chart 5.1 – Enabling Works above and below the MITS[9]

(a) by reference to the number of Offers made under the Connect and Manage Arrangements during that Financial Year, the percentage of Offers where the Enabling Works were above the MITS Connection Works and the percentage of Offers where the Enabling Works were below the MITS Connection Works

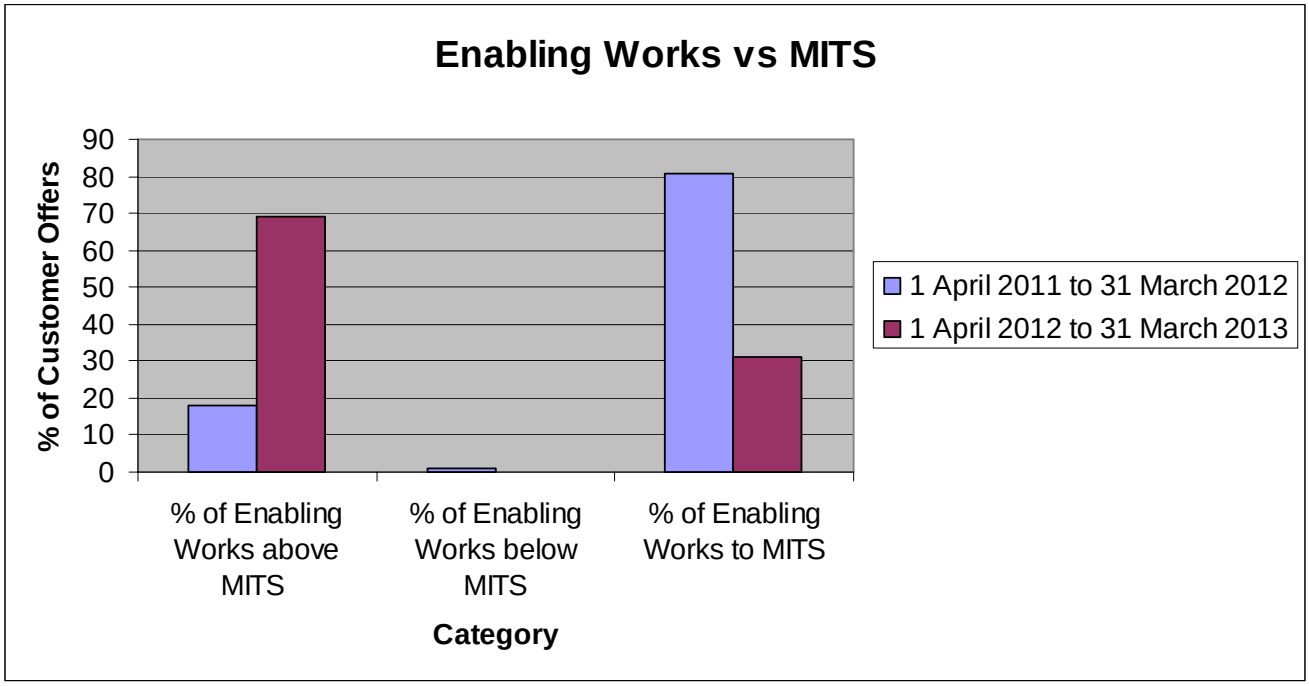


Chart 5.2 – Time taken for Enabling Works to be completed (rounded up to nearest half year)

(b) by reference to each Construction Agreement where the Enabling Works were completed during that Financial Year, the period of time that it took to complete those Enabling Works and the transmission owner that undertook them.

Site Name	Time Taken for Enabling Works to be completed	Transmission Owner undertaking Enabling Works
Bailie Wind Farm Stage 1	2.5 years	SHE
Cairn Uish II	2 years	SHE
Kildrummy	2 years	SHE
Rosehall	3 years	SHE

[8] A MITS Substation is a Transmission substation with connections to more than 4 Transmission Circuits, excluding Grid Supply Point transformer circuits.
[9] Analysis based on 104 Connection or Modification Offers sent between 1 April 2011 and 31 March 2012 and 67 Connection or Modification Offers sent between 1 April 2012 and 31 March 2013.

Conclusions

- As illustrated by Chart 5.1, Enabling Works under Connect and Manage are increasingly extending beyond the MITS; and
- As per Chart 5.2, Enabling Works under Connect and Manage are currently taking between 2 and 3 years to complete.

Next Report

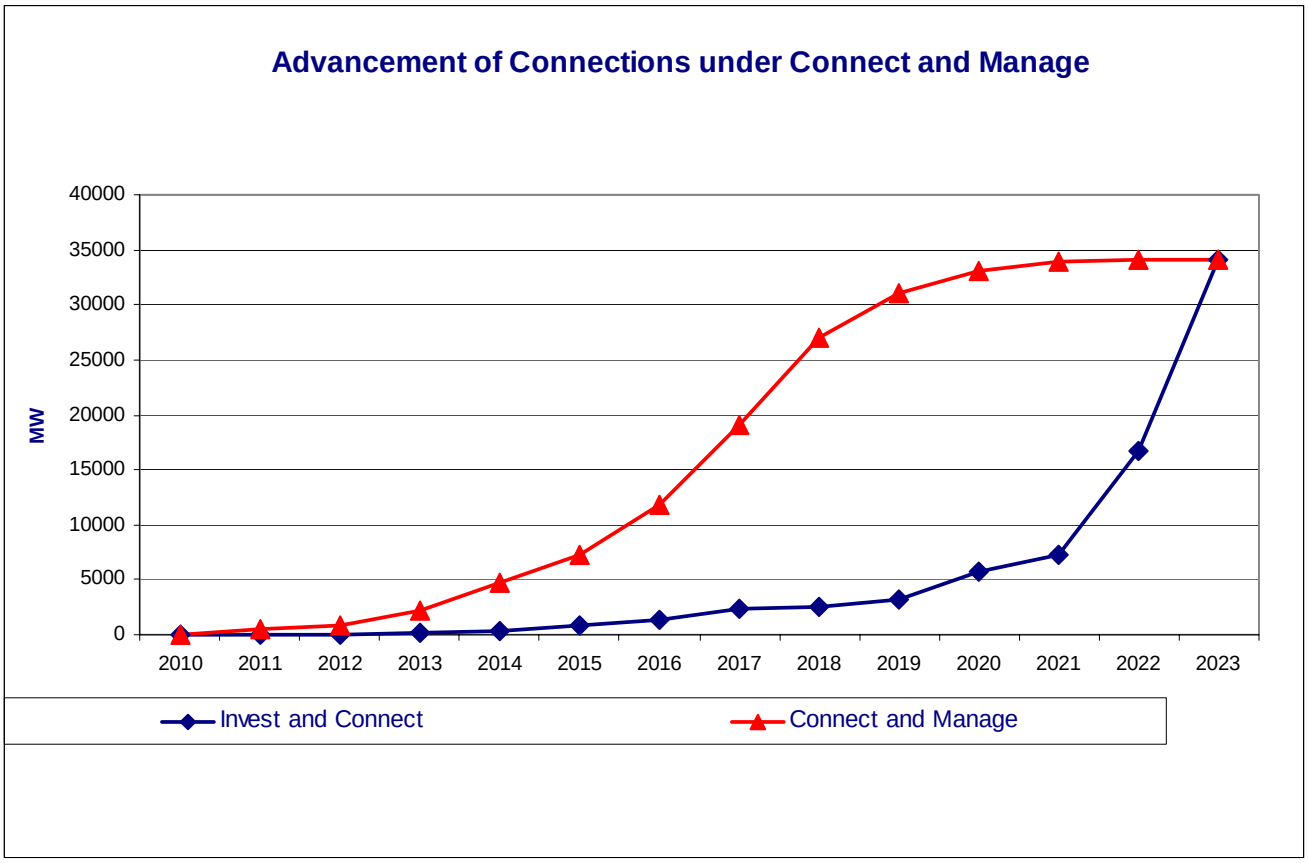
National Grid will continue to provide this data as part of the Quarterly Report published at the end of the applicable financial year i.e. for the financial year 1 April 2013 to 31 March 2014, the Enabling Works Report will be published in April 2014.

6.0 Acceleration of Connection Dates

Chart 6.1 shows the cumulative profile of contracted generation capacity that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect' projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

6.1 Advancement of Connections under C&M



7.0 Summary of Signed Agreements for Connect and Manage Connections

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2.

Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

7.1 Transmission Connected and Large Embedded Generation

The same data is broken down in two different ways in the tables in this section 7.1.1 shows the split between renewable and non-renewable generation and 7.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

7.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Connect and Manage Connections (Split by Renewable/Non-Renewable)[10]

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)
NGET	Future	Non Renewable	6	3941
		Renewable	25	14874
	Connected	Non Renewable	0	0
		Renewable	0	0
NGET Total			**31**	**18815**
SPT	Future	Non Renewable	0	0
		Renewable	29	5659
	Connected	Non Renewable	0	0
		Renewable	1	238
SPT Total			**30**	**5897**
SHE	Future	Non Renewable	0	0
		Renewable	75	8512
	Connected	Non Renewable	0	0
		Renewable	9	303
SHE Total			**84**	**8816**
Grand Total			**145**	**33527**

[10] Quarterly Report from 1 August 2012 to 31 December 2012 reported that there were 134 transmission connected/large embedded projects but since the last report, there has effectively been an additional 15 sites (9 new signed agreements set out in table 2.1, 1 site that should have previously been included, plus 5 existing sites that have additional staged agreements) and a reduction of 4 sites (3 terminations and 1 existing site that has 1 less staged agreement). This gives an overall figure of 145 sites.

7.1.2 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)
NGET	Future	Large Embedded Generation	0	0	0
		Transmission Connected Generation	31	18,815	4
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**31**	**18,815**	**4**
SPT	Future	Large Embedded Generation	3	116	10
		Transmission Connected Generation	26	5,543	6
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	1	238	8
SPT Total			**30**	**5,897**	**7**
SHE	Future	Large Embedded Generation	17	541	6
		Transmission Connected Generation	58	7,972	5
	Connected	Large Embedded Generation	7	196	5
		Transmission Connected Generation	2	107	8
SHE Total			**84**	**8,816**	**5**
Grand Total			**145**	**33,527**	**5**

7.2 Small Embedded Generation Benefiting from C&M[11]

Table 7.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

All of the projects in table 7.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement (years)
NGET	Future	0	0	0
	Connected	1	81	3
NGET Total		**1**	**81**	**3**
SPT	Future	3	43	10
	Connected	9	97	11
SPT Total		**12**	**140**	**11**
SHE	Future	52	229	9
	Connected	56	140	11
SHE Total		**108**	**369**	**10**
Grand Total		**121**	**591**	**10**

[11] Quarterly Report from 1 August 2012 to 31 December reported that there were 108 small embedded sites but after rigorous data validation, there were 2 additional sites that should have been included so should have been 110 small embedded sites in total. There have been 11 new signed agreements for small embedded sites (set out in table 2.2) giving the total of 121.

8.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

The following contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

Previous forecast C&M constraints were based on a 'More Likely' Scenario, which used contracted data for 2012-2013 and 2013-2014 and the 'Gone Green' 2011 scenario for subsequent years. This has now been replaced by analysis against both a 'Gone Green' 2012 and a 'Slow Progression' 2012 scenario. The 'Slow Progression' scenario provides a comparison with 'Gone Green' 2012 and allows the reader comparison between both scenarios with the expectation that the forecast C&M constraint costs will be somewhere between these two numbers.

8.1 Changes from 'Gone Green 2011' to 'Gone Green 2012'

As explained above, C&M modelling is based on Gone Green 2012[12] rather than Gone Green 2011 and is run in an enhanced model. The key changes are:

- Localised as opposed to generic wind load factor profiles, which provides more accuracy;
- Simplified node and boundary model has been replaced with an enhanced more detailed model at a substation level;
- Updated forward fuel prices putting coal above gas in the Merit Order[13] so coal plant is more attractive to run;
- Changed generation mix to reflect Gone Green 2012 such that less plant is due to connect in early years but there is still a significant amount of plant expected to connect post 2018;
- Changed boundary capabilities (including some new boundaries); and
- Further C&M connection Offers have been made to customers.

These changes have significantly impacted on the total forecast C&M costs between those stated in our C&M Quarterly Report dated 4 February 2013[14] and this C&M Quarterly Report and these, together with an explanation of such costs, are set out in section 8.4.

8.2 'Gone Green' Assessment

Our 'Gone Green' scenario uses data from our 'Gone Green 2012' scenario[15]. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020. This assumes a level of termination or slippage of connections compared with the contracted position.

8.3 'Slow Progression' Assessment

Our 'Slow Progression' scenario uses data from our 'Slow Progression 2012' scenario. Our 'Slow Progression' scenario has been the subject of previous industry consultation and is based on

[12] The Connect and Manage Gone Green 2012 scenario also takes into account the Transmission Entry Capacity reductions for connected plant that were notified to National Grid in March 2013 and reflecting the Scottish boundary capabilities following the announcement by SHE Transmission in December 2012 of delays to a number of their transmission reinforcement works

[13] The Merit Order is a way of ranking available sources of energy in ascending order with the cheapest plant being brought on first to meet demand

[14] http://www.nationalgrid.com/NR/rdonlyres/C58A2961-91C5-49C4-ADCC-302AE8F4FC04/58783/ConnectandManageQuarterlyReport010912to311212v1.pdf - section 7.2

[15] In the Gone Green scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.;

developments in renewable and low carbon energy being comparatively slow, and the renewable energy target for 2020 is not met until some time between 2020 and 2025. The carbon reduction target for 2020 is achieved but not the indicative target for 2030.

It should be noted that these both remain as scenarios and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which may be impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support Customer connections and other strategic reinforcements.

8.4 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and the scenario explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

'Gone Green 2012' and 'Slow Progression 2012' Assessment

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	93.1*	14.6	22.2
2014-2015	68.2	13.2	21.3
2015-2016	27.2	23.8	11.8
2016-2017	2	6.5	7.9
2017-2018	50.5	92.1	22.3
2018-2019	66.9	142.8	14.8
2019-2020	106.1	159.1	82.7
2020-2021	114.1	125.6	84.9
Modelling Scenario	Gone Green 2011	Gone Green 2012 + latest tranche of new C&M connection Offers	Slow Progression 2012 + latest tranche of new C&M connection Offers
Date of analysis	20 December 2012 - published as part of C&M Quarterly Report dated 4 February 2013	06 June 2013	06 June 2013

*Total C&M Cost for 2013-2014 as of 20 December 2012 was based on the contracted scenario, which is no longer run. The 2013-2014 cost against the Gone Green 2011 scenario was £51m

- C&M forecast constraint costs are calculated based on the cost of the C&M projects' advancement (i.e. between their date of connection to the NETS and completion of the Wider Reinforcement Works) as opposed to the previous method, which did not take cognisance of the completion of the Wider Reinforcement Works and assumed that constraint costs attributable to C&M could continue to be measured after the wider reinforcement works are completed.

- C&M forecast constraint costs are low under 'Gone Green' 2012 in 2013-2014 and 2014-2015 as less plant is forecast to connect than under 'Gone Green' 2011;

- The C&M forecast constraint costs drop in 2016-2017 due primarily to the Hunterston-Deeside link coming onto the NETS; and

- The C&M forecast constraints rise from 2017-2018 onwards due primarily to the anticipated level of increase under 'Gone Green' 2012 of Round 3 offshore wind and further onshore wind in Scotland.

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Quarterly Report on the Connect and Manage Regime

01 April 2013 – 30 June 2013

August 2013
V1.0

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1.0 Introduction

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.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document – March 2013

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 January 2013 to 31 March 2013

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 April 2013 to 30 June 2013. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** provides a summary of the 22[1] new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 10 projects have connected since the previous Quarterly Report was published and 13 transmission connected and large embedded generation C&M projects are connected to the National Electricity Transmission System. This section also sets out the costs incurred in managing these constraints, by TNUoS zone.
- **Section 4** provides information on the amount of carbon saved through the earlier connection of renewable generation up to 30 June 2013.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 5** illustrates current lead times for connection applications;

[1] In table 2.1, Cantick Head, which has 3 stages, is counted as 3 C&M agreements for this analysis so there are 14 new transmission connected & large embedded generation projects in total.

In table 2.2, there are 8 new small embedded projects, which are aggregated below at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 21.

- **Section 6** provides data on C&M signed projects with a capacity in the region of 37 GW, as compared with 34GW at the time of our previous C&M Quarterly Report dated 24 June 2013, that have benefited with advanced connection dates. This section shows an average advancement of 5 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[2] process an average advancement of 10 years is seen;

- **Section 7** provides scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

1.3 Next Report

The next C&M Report is due to be published on 18 October 2013 but we are currently exploring with Ofgem the potential benefits of changing the reporting frequency to half-yearly.

[2] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHE – Scottish Hydro Electricity Transmission, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows new transmission connected and large embedded agreements that have signed C&M agreements between 1 April 2013 and 30 June 2013.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year	Count of Project
Abernedd Stage 1	Transmission Connected Generation	NGET	500	2015	1
Cantick Head Stage 1	Transmission Connected Generation	SHE	30	2019	1
Cantick Head Stage 2	Transmission Connected Generation	SHE	65	2020	1
Cantick Head Stage 3	Transmission Connected Generation	SHE	65	2021	1
C-Gen North Killingholme Power Station	Transmission Connected Generation	NGET	490	2016	1
Corriegarth Stage 2	Transmission Connected Generation	SHE	19.1	2015	1
Crossburns	Transmission Connected Generation	SPT	100	2018	1
Dorenell Stage 2	Transmission Connected Generation	SHE	40	2018	1
Kyllachy	Transmission Connected Generation	SHE	48.5	2018	1
Marex	Transmission Connected Generation	NGET	1500	2018	1
Markinch Biomass CHP Plant	Large Embedded Generation	SPT	3	2013	1
South Kyle	Transmission Connected Generation	SPT	165	2018	1
Tullo 2 Stage 2	Large Embedded Generation	SHE	12.5	2015	1
Viking Wind Farm Stage 2	Transmission Connected Generation	SHE	112	2018	1

2.2 Small Embedded Generation

The table below shows new small embedded generation which has been progressed through the SOW process between 1 April 2013 and 30 June 2013. For these projects National Grid have a contract with the relevant DNO at the transmission connection point and not with the project developer.

Connection Point	TO	Capacity (MW)	Advancement under C&M (years)
Broadford	SHE	1.99	2
Cassley	SHE	5.5	4
Coylton	SPT	29.75	8
Fort William	SHE	1.75	8
Kintore	SHE	2.3	8
Macduff	SHE	2.7	3
Mybster	SHE	2.85	3
Port Ann	SHE	1.1	9

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 30 June 2013.

It provides a summary of projects that have connected and along with any costs incurred in managing these constraints, by TNUoS zone[3]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link;

TNUoS Zone Map

3.1 Background

Constraints on the National Electricity Transmission System (NETS) occur when generation exceeds the transmission capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under C&M generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the NETS will not be compliant with the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of embedded generation and are therefore unable to allocate any related constraint costs or related carbon savings to these generators.

3.3 Connected Generation by Agreement Type

The tables in section 3.3 provide a summary of the total number of connected projects by agreement type.

3.3.1 New C&M Generation Connected between 1 April 2013 and 30 June 2013

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	3	91
	Small Embedded Generation	7	31
Grand Total		10	122

3.3.2 Total C&M Generation Connected (up to 30 June 2013)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	10	287
	Small Embedded Generation	73	349
	Transmission Connected Generation	3	313
Connected Total		86	950

[3] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

3.4 Actual Constraint Cost by TNUoS Zone

The table in section 3.4 shows a summary of the actual constraint costs up to and including 30 June 2013 for the 13 Transmission Connected or Large Embedded sites connected on C&M terms[4]. This analysis does not include Small Embedded Generation.

TNUoS Zones	1 Apr 2011 to 31 Mar 12	1 Apr 2012 to 31 Mar 13	1 Apr 2013 to 30 Jun 13	Total
Z1	£ 72,489	£ 1,664,090	£ 4,830,423	£ 6,567,002
Z2	£ -	£ -	£ -	£ -
Z3	£ 2,236,215	£ 785,135	£ 3,078,384	£ 6,099,734
Z4	£ 1,725,634	£ 57,554	£ 120,844	£ 1,904,032
Z5	£ 123,542	£ 293,623	£ 1,145,314	£ 1,562,479
Z6	£ -	£ -	£ -	£ -
Z7	£ -	£ 2,844,893	£ 8,031,129	£ 10,876,022
Z8	£ -	£ -	£ -	£ -
Z9	£ -	£ -	£ -	£ -
Z10	£ -	£ -	£ -	£ -
Z11	£ -	£ -	£ -	£ -
Z12	£ -	£ -	£ -	£ -
Z13	£ -	£ -	£ -	£ -
Z14	£ -	£ -	£ -	£ -
Z15	£ -	£ -	£ -	£ -
Z16	£ -	£ -	£ -	£ -
Z17	£ -	£ -	£ -	£ -
Z18	£ -	£ -	£ -	£ -
Z19	£ -	£ -	£ -	£ -
Z20	£ -	£ -	£ -	£ -
Total	**£ 4,157,880**	**£ 5,645,295**	**£ 17,206,094**	**£ 27,009,269**

- Since the last C&M Quarterly Report, the number of C&M Transmission Connected or Large Embedded sites that are now connected has increased from 10 to 13 but all 13 sites are located in Scotland.

- Constraint Costs attributable to the C&M plant increased towards the end of 2012 as new C&M plant became active and their output had to be accommodated by managing the output of other plant in their regions. The units lay behind various local Scottish internal constraints and behind Cheviot (B6) constraints which limit power flow from Scotland to England & Wales. Constraint costs increased further during the period 1 April 2013 to 30 June 2013 due to tightened constraint limit brought on by planned outage work in Cheviot region to accommodate transmission upgrades which will help address the constraints in the future, combined with a cable fault in the same area. This was compounded by high winds and therefore high output of non-C&M plant behind the constraints and the need to manage the flows over the constraint boundaries. During this time virtually all of the output of the C&M units contributed to the constraints, which had to be managed by pulling back other units in the region, then replacing the energy elsewhere in England & Wales; the costs of those actions are attributed to the C&M units in the table above.

Methodology behind the calculations

To produce the figures above each individual half hour period where output from a C&M unit encounters a relevant constraint is ranked in date of connection order. Each constraint action is then assessed at Balancing Mechanism Unit (BMU) level, ranked in price order (£/MWh), to determine the costs and volumes of those actions attributable to the respective C&M units.

In these calculations an allowance for intertrips[5], which help manage power flows in lieu of taking constraint actions to pull back conventional BMU, has been made. Assignment of intertrip costs is

[5] An automatic control arrangement where generation (or demand) may be reduced or disconnected following a system fault event to relieve localised network overloads, maintain system stability, manage system voltages and/or ensure restoration on the NETS.

done on the basis of apportionment of the cost/MWh for intertrip setting (arming fee/MW output of intertripped units) against the MW outputs of the C&M units running at that time.

4.0 Carbon Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

In the period up to and including 31 March 2013 there were 10 Transmission Connected or Large Embedded sites units connected on C&M terms.[6] This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Savings by TNUoS Zone (in tonnes)

TNUoS Zones	1 Apr 2011 to 31 Mar 12	1 Apr 2012 to 31 Mar 13	1 Apr 2013 to 30 Jun 13	Total
Z1	6,774.00	150,955.00	44,943.00	202,672.00
Z2	-	-	-	-
Z3	104,442.00	85,332.00	20,112.00	209,886.00
Z4	48,387.00	9,834.00	8,445.00	66,666.00
Z5	2,682.00	16,353.00	9,248.00	28,283.00
Z6	-	-	-	-
Z7	-	126,058.00	60,488.00	186,546.00
Z8	-	-	-	-
Z9	-	-	-	-
Z10	-	-	-	-
Z11	-	-	-	-
Z12	-	-	-	-
Z13	-	-	-	-
Z14	-	-	-	-
Z15	-	-	-	-
Z16	-	-	-	-
Z17	-	-	-	-
Z18	-	-	-	-
Z19	-	-	-	-
Z20	-	-	-	-
Total	**162,285**	**388,532**	**143,236**	**694,053**

- Since the last C&M Quarterly Report, the number of C&M Transmission Connected or Large Embedded sites that are now connected has increased from 10 to 13 but all 13 sites are located in Scotland; and

- For the period 1 April 2013 to 30 June 2013, output from the 13 C&M sites was highest during 14 to 18 April 2013, which was a time of strong winds and very high wind power across GB. The average CO2 displaced by the C&M units varied according to the plant on the National Electricity Transmission System but the effective average across the three months was 1 tonne CO2/1 MWh.

Methodology behind the calculations

The calculations considered what carbon output there would have been had the C&M unit not run and so another BMU plant would have been called to meet the demand. This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the National Electricity Transmission System (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes (and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We can then use this information to identify the carbon outputs of the respective BMUs, with their respective Carbon Factor[7], giving the Carbon saved values in tonnes.

Future Carbon Savings

As part of this C&M Quarterly Report, we intended to include a section on the carbon saved values in tonnes for future connections up to 2020. However, this data is not available at this time but we will continue to explore how we can present this information in future submissions and intend to include this information in the next C&M Quarterly Report.

[7] Nominal carbon factor for Windfarms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

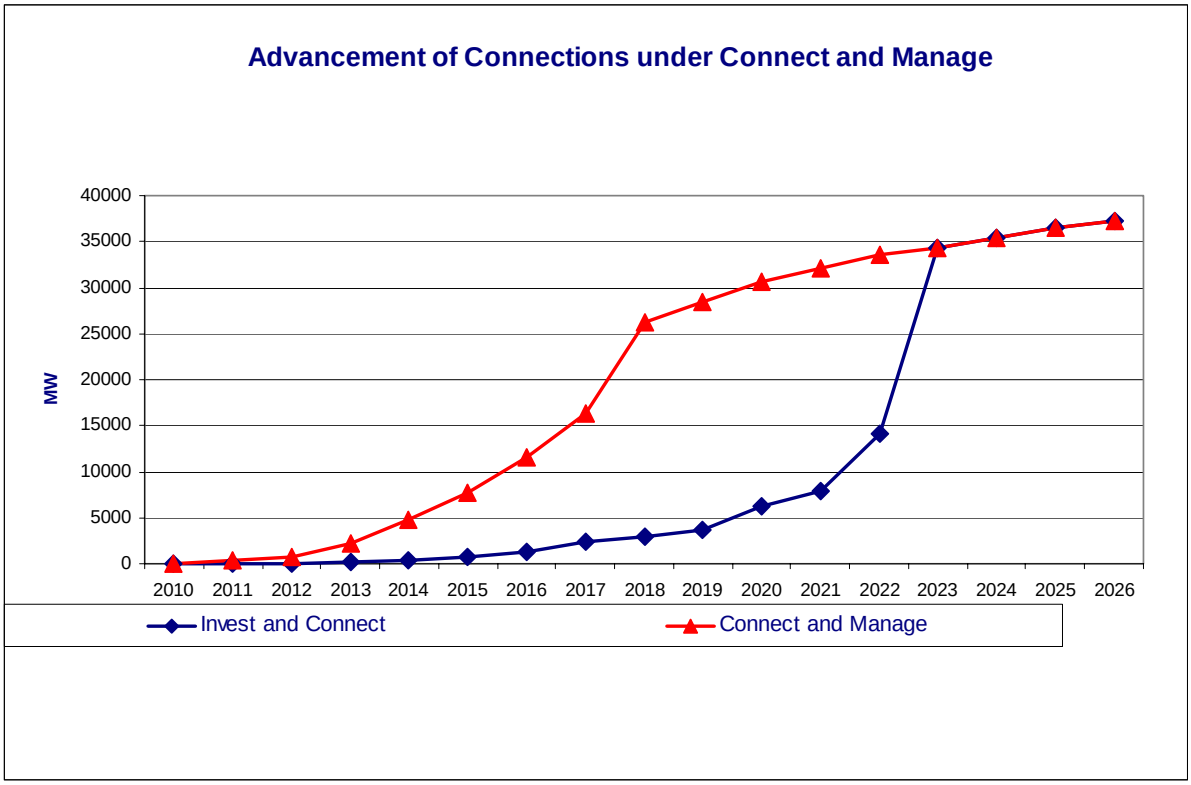
Where these are utilised they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

5.0 Acceleration of Connection Dates

Chart 5.1 shows the cumulative profile of contracted generation capacity, which includes both connected sites and sites yet to be connected, that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect', projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from customer's signed agreements, which in some cases, at the customer's preference, are later than the earliest connection date that could have been achieved.

5.1 Advancement of Connections under C&M



The convergence of the Invest & Connect and Connect &Manage lines on the graph in section 5.1 illustrates the point in time at which the amount of new generation connected to the network under the Connect and Manage regime, and previous Invest and Connect regime would be at the same level. The difference between the two lines prior to this point illustrates the amount of generation connections which are being brought forward in time due to the adoption of the Connect &Manage regime over the previous Invest & Connect regime.

6.0 Summary of Signed Agreements for Connect and Manage Connections

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes;

- New signed C&M agreements including those referred to in section 2.

Projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status;

- Future relates to those projects yet to connect.
- Connected relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design, considerations and customer preference rather than type of generator.

6.1 Transmission Connected and Large Embedded Generation

The same data is broken down in two different ways in the tables in this section 6.1.1 shows the split between renewable and non-renewable generation and 6.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TO's areas as defined in section 2.

6.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Connect and Manage Connections (Split by Renewable/Non-Renewable)[8]

[8] Quarterly Report from 1 January 2013 to 31 March 2013 reported that there were 145 transmission connected/large embedded projects but since the last report, there has effectively been an additional 18 sites (14 new signed agreements set out in table 2.1 plus 4 existing sites that have additional staged agreements). This gives an overall figure of 163 sites.

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)
NGET	Future	Non Renewable	8	4931
		Renewable	30	16374
	Connected	Non Renewable	0	0
		Renewable	0	0
NGET Total			**38**	**21305**
SPT	Future	Non Renewable	0	0
		Renewable	32	5927
	Connected	Non Renewable	0	0
		Renewable	1	206
SPT Total			**33**	**6133**
SHE	Future	Non Renewable	0	0
		Renewable	80	8726
	Connected	Non Renewable	0	0
		Renewable	12	395
SHE Total			**92**	**9121**
Grand Total			**163**	**36558**

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)
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
NGET Total			**38**	**21,305**	**3**
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
SPT Total			**33**	**6,133**	**7**
SHE	Future	Large Embedded Generation	15	462	6
		Transmission Connected Generation	65	8,265	5
	Connected	Large Embedded Generation	10	287	5
		Transmission Connected Generation	2	107	8
SHE Total			**92**	**9,121**	**5**
Grand Total			**163**	**36,558**	**5**

6.2 Small Embedded Generation Benefiting from C&M[9]

Table 6.2 shows the small embedded generation that has benefited from C&M. This generation are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

All of the projects in table 6.2 are renewable fuel types.

[9] Quarterly Report from 1 January 2013 to 31 March 2013 reported that there were 121 small embedded sites but after rigorous data validation, there have been 8 new signed agreements for small embedded sites (set out in table 2.2) and 1 site that has terminated giving the total of 128.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement under C&M (years)
NGET	Future	0	0	0
	Connected	1	81	3
NGET Total		**1**	**81**	**3**
SPT	Future	4	73	9
	Connected	9	97	11
SPT Total		**13**	**170**	**11**
SHE	Future	51	206	8
	Connected	63	171	11
SHE Total		**114**	**378**	**10**
Grand Total		**128**	**629**	**10**

7.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

The following contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

A scenario around a 'Gone Green' and a 'Slow Progression' connection background has been considered for this analysis. The 'Slow Progression' scenario provides a comparison with 'Gone Green' 2012 and allows the reader comparison between both scenarios with the expectation that the forecast C&M constraint costs will be somewhere between these two numbers.

7.1 'Gone Green' Assessment

Our 'Gone Green' scenario uses data from our 'Gone Green 2012' scenario[10]. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020. This assumes a level of termination or slippage of connections compared with the contracted position.

7.2 'Slow Progression' Assessment

Our 'Slow Progression' scenario uses data from our 'Slow Progression 2012' scenario[11]. Our 'Slow Progression' scenario has been the subject of previous industry consultation and is based on developments in renewable and low carbon energy being comparatively slow, and the renewable energy target for 2020 is not met until some time between 2020 and 2025. The carbon reduction target for 2020 is achieved but not the indicative target for 2030.

It should be noted that these both remain as scenarios and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which may be impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support Customer connections and other strategic reinforcements.

7.3 Changes in Modelling since last Quarterly Report

As National Grid have been notified of a number of sites that were reducing their generation capacity to take effect on 1 April 2013, it was felt prudent to include such capacity reductions in our modelling. We had already reflected these changes in our C&M Gone Green 2012 model but neglected to include within our C&M Slow Progression 2012 model. This has now been rectified with the key impact being reduced forecast constraint costs across all years under Slow Progression 2012.

7.4 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and the scenario explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

'Gone Green 2012' and 'Slow Progression 2012' Assessment

[10] In the Gone Green scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.
[11] In the Slow Progression scenario the renewable target for 2020 is not met until some time between 2020 and 2025. The carbon reduction target for 2020 is achieved but not the indicative target for 2030.

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	11.1	14.6	17.8	22.2
2014-2015	9.8	13.2	14.9	21.3
2015-2016	21.2	23.8	1.8	11.8
2016-2017	3.3	6.5	1.5	7.9
2017-2018	86.5	92.1	10	22.3
2018-2019	149.9	142.8	8.8	14.8
2019-2020	181.2	159.1	17.7	82.7
2020-2021	126.9	125.6	29.3	84.9
Modelling Scenario	Gone Green 2012 + latest tranche of new C&M connection Offers	Gone Green 2012 + previous tranche of new C&M connection Offers	Slow Progression 2012 + latest tranche of new C&M connection Offers	Slow Progression 2012 + previous tranche of new C&M connection Offers
Date of analysis	05 July 2013	06 June 2013	05 July 2013	06 June 2013

- Current C&M forecast constraint costs are those in yellow highlighted text whilst those in grey highlighted text are the C&M forecast constraint costs from the previous Quarterly Report and are included merely to provide the reader with a comparison.

- C&M forecast constraint costs are calculated based on the cost of the C&M projects' advancement (i.e. between their date of connection to the NETS and completion of the Wider Reinforcement Works) as opposed to the previous method, which did not take cognisance of the completion of the Wider Reinforcement Works and assumed that constraint costs attributable to C&M could continue to be measured after the wider reinforcement works are completed.

- C&M forecast constraint costs are low under 'Gone Green' 2012 in 2013-2014 and 2014-2015 as less plant is forecast to connect than under 'Gone Green' 2011;

- The C&M forecast constraint costs drop in 2016-2017 due primarily to the Hunterston-Deeside link coming onto the NETS;

- The C&M forecast constraints rise from 2017-2018 onwards due primarily to the anticipated level of increase under 'Gone Green' 2012 of Round 3 offshore wind and further onshore wind in Scotland; and

- As explained in Section 7.3, the C&M forecast constraints for Slow Progression 2012 have reduced across all years as generation capacity has reduced.

nationalgrid

Quarterly Report on the Connect and Manage Regime

01 July 2013 – 30 September 2013

November 2013
V1.0

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1.0 Introduction

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 National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS). Connecting generators ahead of the completion of wider works may result in additional constraints on the National Electricity Transmission System (NETS). Under the C&M regime, any costs arising from the management of these constraints are socialised.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document – March 2013

C&M Derogation reports for projects with a signed C&M Agreement

Quarterly Report on the Connect and Manage Regime - 01 April 2013 to 30 June 2013

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 July 2013 to 30 September 2013. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

Our analysis of the forecast future amount of carbon dioxide saved out to 2020 detailed in Section 4.2, and estimated future constraint costs set out in Section 7, are based on our Gone Green 2012[1] and Slow Progression 2012[2] scenarios whilst the rest of this report takes account of the contracted position.

On the operation of the C&M regime, information is provided in the following sections:

- **Section 2** provides a summary of the 16[3] new C&M agreements signed in the previous quarter;
- **Section 3** confirms that 5 projects have connected since the previous Quarterly Report was published and that 15 transmission connected and large embedded generation C&M projects are currently connected to the NETS. This section also sets out the costs incurred in managing those constraints associated with the new C&M connections, by TNUoS zone.

[1] In the Gone Green 2012 scenario the renewable target for 2020 and the emissions targets for 2020, 2030 and 2050 are all reached.

[2] In the Slow Progression 2012 scenario the renewable target for 2020 is not met until some time between 2020 and 2025. The carbon reduction target for 2020 is achieved but not the indicative target for 2030.

[3] In table 2.2, there are 7 new small embedded projects (including 2 new small embedded projects at Kintore), which are aggregated at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 16.

- **Section 4** provides information on the amount of carbon dioxide saved through the earlier connection of renewable generation up to 30 September 2013 and provides a forecast of future amount of carbon dioxide saved out to 2020.

Information on the overall benefits and potential impacts of allowing connections ahead of the completion of the wider works is provided in the following sections:

- **Section 5** illustrates current lead times for connection applications;

- **Section 6** provides data on C&M signed projects with an aggregate capacity in the region of 37.5 GW (as compared with 37GW at the time of our previous C&M Quarterly Report dated 8 August 2013) that have benefited from advanced connection dates. This section shows an average advancement of 5 years for transmission connected and large embedded generation that will connect via the Distribution Network Operator (DNO). For small embedded generation that will connect via the DNO and progress through the Statement of Works (SOW)[4] process, an average advancement of 9 years is seen. Although the average advancement seen is reducing over time, this trend is due primarily to the success of the C&M regime as many generators have taken the opportunity to enter into advanced connection dates;

- **Section 7** sets out scenarios of potential future additional constraint costs arising from the earlier connection of projects, under the C&M regime.

We would appreciate any feedback you may have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address:

transmissionconnections@uk.ngrid.com

1.3 Next Report

The next C&M Report is due to be published at the end of January 2014.

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[4] Statement of Works projects are those small scale embedded generation projects identified by the relevant DNO as having a potential impact on the National Electricity Transmission System.

2.0 New Signed Agreements

The data in the tables below (and throughout the document) is reported by each Transmission Owner's (TOs) area:

- NGET – National Grid Electricity Transmission, the TO for England & Wales;
- SHE – Scottish Hydro Electricity Transmission, the TO for northern Scotland;
- SPT – SP Transmission Limited, the TO for southern Scotland.

2.1 Transmission Connected and Large Embedded Generation

The table below shows the 9 new transmission connected and large embedded agreements that have signed C&M agreements between 1 July 2013 and 30 September 2013.

Project	Agreement Category	TO	Capacity (MW)	C&M Connection Year
Ardchonnel Wind Farm	Transmission Connected Generation	SHE	40.7	2021
Cumberhead	Transmission Connected Generation	SPT	99	2019
Edintore	Large Embedded Generation	SHE	20.4	2020
Glen App Windfarm	Transmission Connected Generation	SPT	32.2	2016
Glenmount	Transmission Connected Generation	SPT	73	2019
Kilgallioch Stage 1	Transmission Connected Generation	SPT	274	2015
Kype Muir	Transmission Connected Generation	SPT	99.9	2019
Lynemouth Power Station	Large Embedded Generation	NGET	376	2015
Millenderdale Wind Farm	Transmission Connected Generation	SPT	21	2018

2.2 Small Embedded Generation[5]

The table below shows new small embedded generation which has been progressed through the SOW process between 1 July 2013 and 30 September 2013. For these projects, National Grid has a contract with the relevant DNO at the transmission connection point and not with the project developer and hence the table below shows the capacity at the Connection Point rather than that for the individual small embedded generator.

Connection Point	TO	Advancement under C&M (years)	Capacity (MW)
Dounreay	SHE	3	1.5
Fasnakyle	SHE	8	1.55
Fort William	SHE	8	9.9
Kintore*	SHE	8	8.9
Macduff	SHE	3	4.6
Thurso	SHE	3	1.44

*Kintore comprises of 2 new small embedded projects so the total number of small embedded generation C&M agreements that have been signed (via their DNO) between 1 July 2013 and 30 September 2013 is 7.

[5] In table 2.2, there are 7 new small embedded projects (including 2 new small embedded projects at Kintore), which are aggregated at connection point level to demonstrate the benefits they have received from C&M. The combined number of actual projects in tables 2.1 and 2.2 is 16.

3.0 Constraint Costs Attributable to C&M Regime

This section provides information on connected C&M generation up to 30 September 2013.

It provides a summary of projects that have connected along with any costs incurred in managing C&M constraints associated with such projects. This data is shown for each TNUoS zone[6]. For reference, a map of the TNUoS Zones can be viewed by clicking on the following link:

TNUoS Zone Map

3.1 Background

Constraints on the NETS occur when generation exceeds the transmission capacity that is available. National Grid incurs costs on behalf of the industry in compensating generators to accommodate such constraints.

Under the C&M regime, generators are able to connect ahead of the completion of any wider reinforcement works meaning that parts of the NETS will not be compliant with the National Electricity NETS SQSS leading to constraints until these works are completed.

The NETS SQSS sets out the minimum requirements for the planning and operation of the NETS. These standards include the need to complete wider system reinforcement works to accommodate energy flows from new generators.

3.2 Embedded Generation Metering Limitations

National Grid does not have access to real time metering information for certain types of embedded generation and is therefore unable to allocate any related constraint costs or related carbon dioxide savings to these generators.

3.3 Connected Generation by Agreement Type

Table 3.3.1 provides a summary of the total number of connected projects by agreement type for the period between 1 July 2013 and 30 September 2013.

3.3.1 New C&M Generation Connected between 1 July 2013 and 30 September 2013

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	1	32
	Small Embedded Generation	3	26
	Transmission Connected Generation	1	111
Grand Total		**5**	**169**

[6] Transmission Networks Use of System (TNUoS) charges are calculated on a zonal basis.

Table 3.3.2 shows the total number of connected projects by agreement type for the period up to and including 30 September 2013.

3.3.2 Total C&M Generation Connected (up to and including 30 September 2013)

Status	Agreement Category	Number of Projects	Capacity (MW)
Connected	Large Embedded Generation	11	319
	Small Embedded Generation	76	375
	Transmission Connected Generation	4	424
Connected Total		**91**	**1,119**

3.4 Actual Constraint Cost by TNUoS Zone

As part of our ongoing drive to improve data that we hold within National Grid, we have identified areas where we can improve our calculation of actual C&M constraint costs (and actual tonnes of carbon dioxide saved as a result of advancing the C&M connections, as set out in section 4.1 of this report).

As part of this round of reporting, we have taken the opportunity to further refine the source data that feeds into the assessment of C&M related constraint costs and to revise our calculation methodology. This has led to:

- the identification of some additional instances of constraint management groups and output volume attributable to the C&M plant; and
- a process to negate potential double counting of attribution where a C&M Balancing Mechanism Unit (BMU) lies within several active network constraints.

Although additional constraint management groups have been identified, the removal of double counting of attribution where a C&M BMU lies within several active network constraints negates this and in fact produces an overall reduction in actual constraints from 1 April 2013 to 30 June 2013. Therefore, the figures detailed for the 1 April 2013 to 30 June 2013 C&M Quarterly Report (dated 8 August 2013) are restated here in Table 3.4.1 according to the current data and improved methodology. These costs include those constraint management actions taken in the BMU and those taken by arming intertrips, but do not currently include those taken through contracts.

Table 3.4.1 - Actual C&M Constraint Costs for 1 April 2013 to 30 June 2013

TNUoS Zone	1 Apr 2013 to 30 Jun 2013	1 Apr 2013 to 30 Jun 2013 RESTATED
Z1	£4,830,423	£3,219,196
Z2	£0	£0
Z3	£3,078,384	£2,556,297
Z4	£120,844	£198,803
Z5	£1,145,314	£938,570
Z6	£0	£0
Z7	£8,031,129	£4,685,222
Z8	£0	0
Z9	£0	0
Z10	£0	0
Z11	£0	0
Z12	£0	0
Z13	£0	0
Z14	£0	0
Z15	£0	0
Z16	£0	0
Z17	£0	0
Z18	£0	0
Z19	£0	0
Z20	£0	0
Total	**£17,206,095**	**11,598,088**

As per Table 3.3.2, a total of 15 Transmission Connected or Large Embedded sites have connected under the C&M regime. The table in section 3.4.2 shows a summary of the actual constraint costs up to and including 30 September 2013 for these 15 Transmission Connected or Large Embedded sites connected on C&M terms. This analysis does not include Small Embedded Generation.

3.4.2 Actual Constraint Costs overall

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 31 Mar 2013	1 Apr 2013 to 30 Jun 2013 RESTATED	1 Jul 2013 to 30 Sep 2013	Total
Z1	£72,489	£1,664,090	£3,219,196	£3,200,457	£8,156,232
Z2	£0	£0	£0	£	£0
Z3	£2,236,215	£785,135	£2,556,297	£183,233	£5,760,880
Z4	£1,725,634	£57,554	£198,803	£176,846	£2,158,837
Z5	£123,542	£293,623	£938,570	£481,032	£1,836,767
Z6	£0	£0	£0	£	£0
Z7	£0	£2,844,893	£4,685,222	£1,183,384	£8,713,499
Z8	£0	£0	£0	0	£0
Z9	£0	£0	£0	£0	£0
Z10	£0	£0	£0	£0	£0
Z11	£0	£0	£0	£0	£0
Z12	£0	£0	£0	£0	£0
Z13	£0	£0	£0	£0	£0
Z14	£0	£0	£0	£0	£0
Z15	£0	£0	£0	£0	£0
Z16	£0	£0	£0	£0	£0
Z17	£0	£0	£0	£0	£0
Z18	£0	£0	£0	£0	£0
Z19	£0	£0	£0	£0	£0
Z20	£0	£0	£0	£0	£0
Total	**£4,157,880**	**£5,645,295**	**£11,598,088**	**£5,224,952**	**£26,626,215**

The following bullet points set out the main reasons for the change in actual C&M constraint costs between those restated figures for the period 1 April 2013 to 30 June 2013 and those costs for the period 1 July 2013 to 30 September 2013:

- Since the last C&M Quarterly Report, the number of C&M Transmission Connected or Large Embedded sites that are now connected has increased from 13 to 15, with all 15 sites located in Scotland;

- During 1 July to 30 September 2013, constraint actions were taken for 55% of the generation output on C&M plant. This was as a result of construction outages required to support NETS reinforcement.

- Constraint costs attributable to C&M plant during this quarter reflected the general profile of wind power output in Scotland as the C&M units lie behind the Cheviot (B6) transmission constraint at the Scotland/England border. Planned circuit outages to improve the NETS in that vicinity limited the transfer of energy to England and Wales at times of high generation output in Scotland. The primary drivers of C&M constraint costs were the circuit outages of Currie-Smeaton during early August 2013 and Cockenzie-Kaimes during late August to September 2013;

- Occasions of highest constraint cost occurred around 17 to 18 August 2013 and 31 August to 2 September 2013 when there was high wind power and conventional generation in Scotland combined with low local demand (weekend and overnight), which then required extensive pullback in order to manage the flow across the Cheviot boundary; and

- The actual C&M constraints for the period 1 April 2013 to 30 September 2013 represent ~ 7% of the total constraints for the same period.

Methodology behind the calculations

To produce the figures above each individual half-hour period where output from a C&M unit encounters a relevant constraint is examined. Each constraint action is then assessed with regard to the C&M unit output, talking into consideration the unit's rank order of connection date and the cost order of constraint actions so as to determine the actions, costs and volumes attributable to each respective C&M unit. In cases where C&M units lay within several constraints that are active at the same time, the attributed costs and volumes are solved in order of the constraint most local to the C&M Unit, outwards, in such a way that the effect of the C&M unit is not double-counted.

The calculations include constraint management actions taken to pull back plant through bids in the Balancing Mechanism, through trades and through the arming costs of intertrips, which help manage power flows in lieu of taking actions to pull back plant. Constraint management actions taken through Contracts between National Grid and other parties are currently not assessed due to the complexity of counterfactual assessment of output.

4.0 Carbon Dioxide Saved

The key benefit of the C&M regime is the provision of earlier connection dates for generation projects. Generation from renewable projects that have connected earlier may offset generation from other sources.

As mentioned in the previous section, in the period up to and including 30 September 2013 there were 15 Transmission Connected or Large Embedded sites units connected on C&M terms.[7] The table in section 4.1 shows a summary of the actual carbon dioxide savings up to and including 30 September 2013 for the 15 Transmission Connected or Large Embedded sites connected on C&M terms. This analysis does not include Small Embedded Generation.

4.1 Actual Carbon Dioxide Savings by TNUoS Zone (in tonnes)

As explained in section 3.4, we have restated the C&M actual constraint figures for the period 1 April 2013 to 30 June 2013. As there was also identification of some additional instances of constraint management costs and output volume attributable to the C&M plant, this will also impact on the actual tonnes of carbon dioxide saved for the period 1 April 2013 to 30 June 2013. It has also come to our attention that the figures published in our C&M Quarterly Report (dated 8 August 2013) for the period 1 April 2013 to 30 September 2013 were in fact the total constraint volumes attributable to C&M Units rather than the actual tonnes of carbon dioxide saved.

Therefore, the figures detailed for the 1 April 2013 to 30 June 2013 C&M Quarterly Report (are restated here in Table 4.1.1 according to the current data and improved methodology, and totalled to date in Table 4.1.2. At the same time, we have shown what the actual tonnes of carbon dioxide saved for the period 1 April 2013 to 30 June 2013 should have been, prior to the process improvements identified above, in order to provide the full picture.

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Table 4.1.1 - Actual Carbon Savings in Tonnes from 1 April 2013 to 30 June 2013

TNUoS Zone	1 Apr 2013 to 30 Jun 2013 NUMBERS THAT WERE PUBLISHED 8 AUGUST 2013	1 Apr 2013 to 30 Jun 2013 NUMBERS THAT SHOULD HAVE BEEN PUBLISHED 8 AUGUST 2013	1 Apr 2013 to 30 Jun 2013 RESTATED
Z1	44,943	59,147	59,293
Z2	0	0	0
Z3	20,112	79,533	79,605
Z4	8,445	8,135	8,152
Z5	9,248	8,422	8,451
Z6	0	0	0
Z7	60,488	72,460	72,578
Z8	0	0	0
Z9	0	0	0
Z10	0	0	0
Z11	0	0	0
Z12	0	0	0
Z13	0	0	0
Z14	0	0	0
Z15	0	0	0
Z16	0	0	0
Z17	0	0	0
Z18	0	0	0
Z19	0	0	0
Z20	0	0	0
Total	**143,236**	**227,697**	**228,079**

4.1.2 Actual Carbon Savings in Tonnes

TNUoS Zone	1 Apr 2011 to 31 Mar 2012	1 Apr 2012 to 31 Mar 2013	1 Apr 2013 to 30 Jun 2013 RESTATED	1 Jul 2013 to 30 Sep 2013	Total Carbon Saving (tonnes)
Z1	6,774	150,955	59,293	72,126	289,148
Z2	0	0	0	0	0
Z3	104,442	85,332	79,605	13,548	282,927
Z4	48,387	9,834	8,152	7,231	73,604
Z5	2,682	16,353	8,451	7,209	34,695
Z6	0	0	0	0	0
Z7	0	126,058	72,578	49,176	247,812
Z8	0	0	0	0	0
Z9	0	0	0	0	0
Z10	0	0	0	0	0
Z11	0	0	0	0	0
Z12	0	0	0	0	0
Z13	0	0	0	0	0
Z14	0	0	0	0	0
Z15	0	0	0	0	0
Z16	0	0	0	0	0
Z17	0	0	0	0	0
Z18	0	0	0	0	0
Z19	0	0	0	0	0
Z20	0	0	0	0	0
Total	**162,285**	**388,532**	**228,079**	**149,290**	**928,186**

As per Table 3.3.2, a total of 15 Transmission Connected or Large Embedded sites have connected under the C&M regime. The table in section 4.1.2 shows a summary of the actual tonnes of carbon dioxide saved up to and including 30 September 2013 for these 15 Transmission Connected or Large Embedded sites connected on C&M terms. This analysis does not include Small Embedded Generation.

The following bullet points provide a comparison of the tonnes of carbon dioxide saved between those restated figures for the period 1 April 2013 to 30 June 2013 and those values for the period 1 July 2013 to 30 September 2013:

- Since the last C&M Quarterly Report, the number of C&M Transmission Connected or Large embedded sites that are now connected has increased from 13 to 15, with all 15 sites located in Scotland;

- For the period 1 July 2013 to 30 September 2013, output from the 15 C&M sites was highest between 15 and 16 September 2013, most of which was able to be transmitted without constraint; and

- The average Carbon Dioxide displaced by the C&M units varied according to the plant on the NETS but the effective average across the three months was 837kg CO2/1 MWh.

Methodology behind the calculations

The calculations considered what carbon dioxide output there would have been had the C&M unit not run (and an alternative BMU plant been run in its place in order to meet demand). This was calculated by examining the Bid Offer Acceptances (BOAs) offered by the market but not used on the NETS (e.g. available headroom) at each period and arranging them in price order, which provides a cost order for stacking the BOAs.

The volumes of this stack are then set against the volumes of the C&M outputs at that time (with the C&M units stacked in connection date order), in order to make an assessment of which BOA volumes (and therefore which conventional BMUs) would have been called upon to had the C&M units not been present.

We then use this information to identify the carbon dioxide outputs of the respective BMUs, with their respective Carbon Factor[8], giving the Carbon Dioxide saved values in tonnes.

4.2 Future Carbon Savings

As promised in previous C&M Quarterly Reports, we have now included a section on forecast tonnes of carbon dioxide saved up to 2020-2021 by allowing advanced connections under the C&M regime.

[8] Nominal carbon factor for wind farms of 0 Tonnes/MWh is assumed.

CO2 emissions are estimated as Coal = 0.92, Gas = 0.41, Oil = 0.65 and Other = 0 in Tonnes of CO2 per MWh. These are broadly in line with the "life cycle" approximations quoted in 'Postnote' October 2006 No. 268, published by Parliamentary Office of Science and Technology - http://www.parliament.uk/documents/post/postpn268.pdf

Where these are utilised, they are multiplied by a volume of energy from generation to give a tonnes of CO2 represented by that energy from a particular fuel source. In turn this can then be used to compare the CO2 emissions from the same volume of energy from different sources.

For example, in the case of a wind farm, connecting it to the NETS will cause its output to displace other generation, typically from the bottom of the dispatch stack, which implies that it is displacing marginal/expensive thermal (and hence CO2 emitting) plant

We have shown these figures against both our Gone Green and Slow Progression scenarios for comparison purposes. To give an overall context, the figure of 7,561,725 estimated tonnes of CO2 saved under Gone Green for 2020-2021 equates to ~ 3 medium sized coal units[9]

	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021
Estimated tonnes of CO2 saved - Gone Green	635,685	747,252	1,501,752	1,726,405	3,937,652	6,464,155	6,547,379	7,561,725
Estimated tonnes of CO2 saved - Slow Progression	652,069	552,859	991,920	1,497,292	2,084,326	3,295,234	3,167,131	4,092,721

Future carbon saved in the Gone Green scenario is a reflection of increased wind generation in the assumed running pattern within the C&M future constraint cost model.

Methodology behind the calculations

When assessing the impact of C&M, National Grid uses the Plexos tool to simulate the dispatch of GB generation. Two simulations are performed, the first activating new generators on their 'wider works' date and the second activating new generators on their 'enabling works' date.

Plexos reports on the amount of carbon dioxide emitted in both simulations. The 'enabling works' run will tend to have lower carbon emissions in a given year than the 'wider works' run because of the large amount of new wind generation connecting earlier in time in this simulation[10]. Therefore, the difference in emissions between the two runs can be said to be the amount of carbon dioxide 'saved' due to permitting the earlier connection of the renewable generation.

However, a limitation of the analysis is that it does not net-off the plant that would have closed anyway regardless as to whether C&M was introduced or not.

[9] The figure of coal plant emissions of 0.96 Tonnes per MWh is taken from http://www.rte-france.com/en/sustainable-development/eco2mix/co2-emissions-per-kwh-of-electricity-generated-in-france,

Using an example of a 480MW medium sized coal plant with a load factor of 66% which runs all year round so number of running hours is 8760 (24 hours x 365 days), this would equate to ~2.5 million tonnes of emissions of carbon dioxide (0.96 Tonnes/MWh x (66% x 480)MW x 8760 hours).

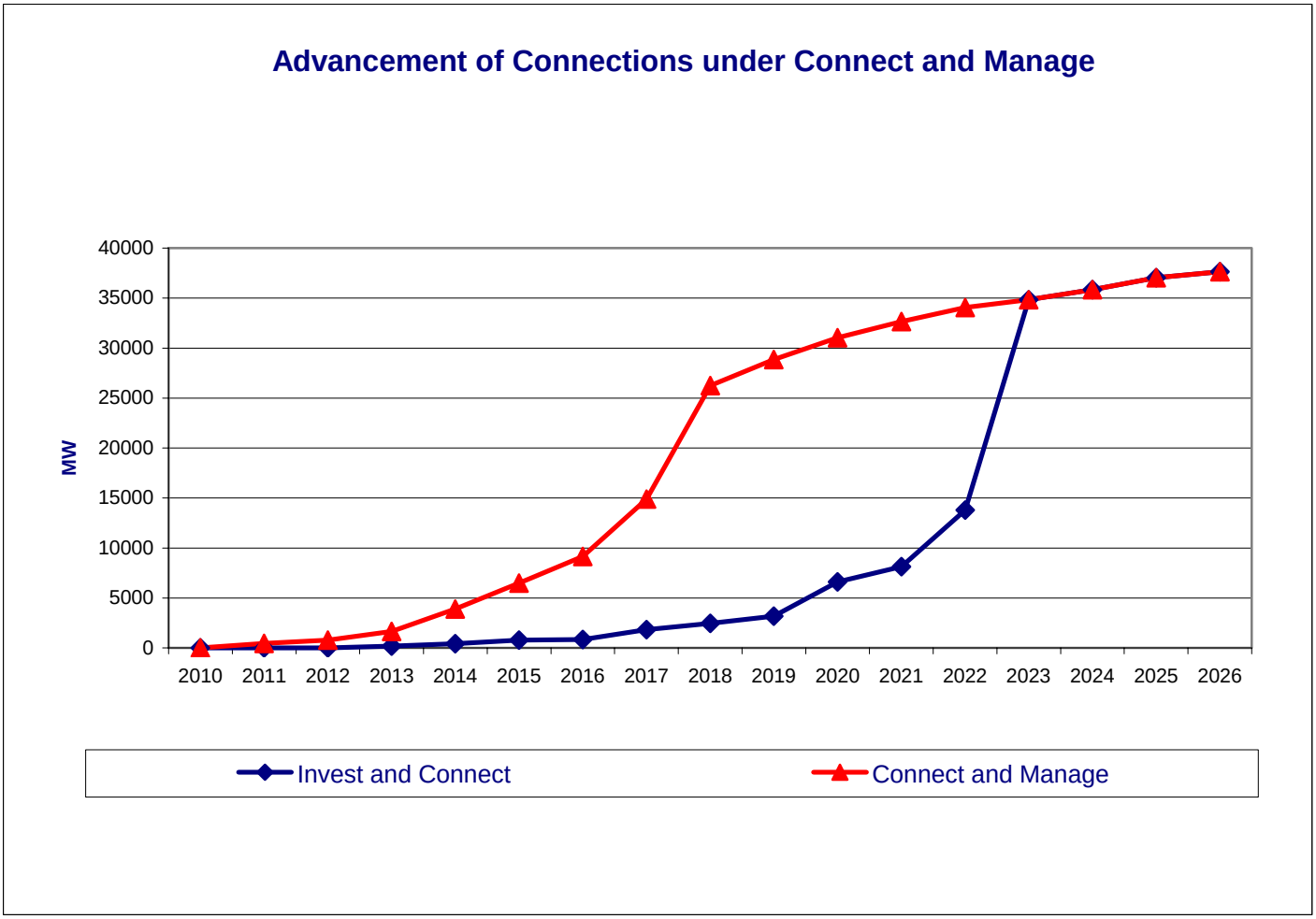
Therefore, 7.5 million tonnes of carbon is about the size of 3 medium size coal units.

5.0 Acceleration of Connection Dates

Chart 5.1 shows the cumulative profile of contracted generation capacity, which includes both currently connected sites and sites yet to be connected, that has been facilitated through C&M compared to the profile that would have been achieved under the previous 'Invest and Connect' regime. Under 'Invest and Connect', projects would need to wait for wider works to be completed prior to connection.

It is worth noting that the chart uses the C&M dates from Customers' signed agreements, which, in some cases (at the customer's preference), are later than the earliest connection date that could have been achieved.

5.1 Advancement of Connections under C&M



The convergence of the Invest & Connect and Connect & Manage lines on the graph in section 5.1 illustrates the point in time at which the amount of new generation connected to the network under the C&M regime and the previous Invest and Connect regime would be at the same level. The difference between the two lines prior to this point illustrates the amount of generation connections which are being brought forward in time due to the adoption of the C&M regime over the previous Invest & Connect regime.

6.0 Summary of Signed Agreements for Connect and Manage Connections

This section provides a summary of all projects with a signed C&M agreement. For the avoidance of doubt this includes:

- newly signed C&M agreements including those referred to in section 2; and
- projects that previously had an ICM agreement and now have a C&M agreement.

The projects in the tables below are reported by status:

- 'Future' relates to those projects yet to connect; and
- 'Connected' relates to those projects which have already connected.

The variation in average years of advancement in this section is due to local network conditions, associated design considerations and customer preference rather than type of generator.

6.1 Transmission Connected and Large Embedded Generation

The same data is broken down in two different ways. The table in section 6.1.1 shows the split between renewable and non-renewable generation whilst the table in section 6.1.2 shows the type of contractual agreements held by the generators.

Both tables show the number of projects, the aggregate amount of capacity held by these projects and the average advancement of these projects without the need to wait for completion of wider reinforcement works. The data is reported for connections in each of the TOs' areas as defined in section 2.

6.1.1 Transmission Connected and Large Embedded Generation Signed Agreements for Connect and Manage Connections (Split by Renewable/Non-Renewable)[11]

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)
NGET	Future	Non Renewable	6	4931
		Renewable	31	16406
	Connected	Non Renewable	0	0
		Renewable	0	0
NGET Total			**37**	**21337**
SPT	Future	Non Renewable	0	0
		Renewable	35	6192
	Connected	Non Renewable	0	0
		Renewable	3	349
SPT Total			**38**	**6541**
SHE	Future	Non Renewable	0	0
		Renewable	76	8709
	Connected	Non Renewable	0	0
		Renewable	12	395
SHE Total			**88**	**9104**
Grand Total			**163**	**36982**

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)
NGET	Future	Large Embedded Generation	1	376	8
		Transmission Connected Generation	36	20,961	3
	Connected	Large Embedded Generation	0	0	0
		Transmission Connected Generation	0	0	0
NGET Total			**37**	**21,337**	**3**
SPT	Future	Large Embedded Generation	3	87	10
		Transmission Connected Generation	32	6,106	6
	Connected	Large Embedded Generation	1	32	10
		Transmission Connected Generation	2	317	9
SPT Total			**38**	**6,541**	**7**
SHE	Future	Large Embedded Generation	16	477	6
		Transmission Connected Generation	60	8,233	5
	Connected	Large Embedded Generation	10	287	5
		Transmission Connected Generation	2	107	8
SHE Total			**88**	**9,104**	**5**
Grand Total			**163**	**36,982**	**5**

[11] Quarterly Report from 1 April 2013 to 30 June 2013 reported that there were 163 transmission connected/large embedded projects but since the last report, this figure has remained the same (there are 9 new signed agreements set out in table 2.1 but this is countered by 1 agreement that been superceded following signature of another connection agreement, and 8 staged agreements that are no longer required although the actual projects are still progressing). This gives an overall figure of 163 sites.

6.2 Small Embedded Generation Benefiting from C&M[12]

Table 6.2 shows the small embedded generation that has benefited from C&M, and which have been identified by the relevant DNO as having a potential impact on the NETS.

All of the projects in table 6.2 are renewable fuel types.

TO	Status	Number of Projects	Capacity (MW)	Average of Advancement under C&M (years)
NGET	Future	0	0	0
	Connected	1	81	3
NGET Total		**1**	**81**	**3**
SPT	Future	3	64	9
	Connected	10	106	11
SPT Total		**13**	**170**	**11**
SHE	Future	55	216	7
	Connected	65	188	11
SHE Total		**120**	**404**	**9**
Grand Total		**134**	**655**	**9**

[12] Quarterly Report from 1 April 2013 to 30 June 2013 reported that there were 128 small embedded sites but after rigorous data validation, there have been 7 new signed agreements for small embedded sites (set out in table 2.2) and 1 site that has terminated giving the total of 134.

7.0 Assessment of Anticipated C&M Constraint Costs

Assessment of Anticipated Connect and Manage Constraint Costs

This section contains an assessment of the anticipated cost of temporary derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed.

Analysis of C&M constraint costs has been based around a 'Gone Green' and a 'Slow Progression' connection background. The 'Slow Progression' scenario provides a comparison with 'Gone Green' 2012 and allows a comparison to be made between both scenarios, with the expectation that the forecast C&M constraint costs will be somewhere between these two numbers.

Although the generation mix for both Gone Green 2013 and Slow Progression 2013 are now available, the C&M model also requires revised boundary capabilities across GB, which will not be available until completion of our Electricity Ten Year Statement at the end of November 2013.

7.1 'Gone Green' Assessment

Our 'Gone Green' scenario uses data from our 'Gone Green 2012' scenario. Our 'Gone Green' scenario has been the subject of previous industry consultation and is based on achieving relevant targets for renewable generation by 2020. This assumes a level of termination or slippage of connections compared with the contracted position.

7.2 'Slow Progression' Assessment

Our 'Slow Progression' scenario uses data from our 'Slow Progression 2012' scenario. Our 'Slow Progression' scenario has been the subject of previous industry consultation and is based on developments in renewable and low carbon energy being comparatively slow, and the renewable energy target for 2020 is not met until some time between 2020 and 2025. The carbon reduction target for 2020 is achieved but not the indicative target for 2030.

It should be noted that these both remain as scenarios and actual constraint costs will be affected by a number of factors, including delivery of connection projects, other changes to the contracted generation background, changes to fuel costs, market conditions (which may be impacted by the connection of additional generation) and the progression of network reinforcements to be delivered to support customer connections and other strategic reinforcements.

7.3 Changes in Modelling since last Quarterly Report

We have been working on a number of improvements to the modelling of future C&M constraint costs and continue to have regular discussion with DECC and Ofgem in respect of these. The key areas of concern relate to enhancing our view on long term costs for which network reinforcements are uncertain, and assumptions around SO action and optimisation.

In summary, as part of our latest analysis, there are two areas of change that we have taken forward to improve the accuracy of our forecasts which were applicable to our Gone Green scenario, but not our Slow Progression scenario as the costs in this instance were consistent with these revised assumptions:

1. **Removal of costs on compliant boundaries**
   We have removed additional costs from constraint boundaries that are compliant. (Historic analysis included additional costs on boundaries that continued to be compliant following a C&M connection, even though no further reinforcement was required on the boundary);

2. **Assumptions on very long term Investment**
   Where no investment plan has yet been developed, we have assumed constraint issues continue at the prevailing level pre 2020, and that reinforcement options will be bought forward in due course.

The above changes have been applied to our Gone Green 2012 Baseline model and a comparison of our revised Gone Green 2012 Baseline model ("Revised Baseline") with our previous Baseline position are set out in Table 7.3.1 below:

Table 7.3.1

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	13.8	15.1
2014-2015	12.5	13.1
2015-2016	22.5	22.8
2016-2017	3.5	6
2017-2018	21.5	79.2
2018-2019	62.2	116.6
2019-2020	65.2	123.2
2020-2021	43.6	103.3
Modelling Scenario	Gone Green 2012 Revised Baseline	Gone Green 2012 Baseline
Date of analysis	28 October 2013	26 April 2013

The overall impact of these changes is to reduce costs relative to our previous analysis. The removal of costs on compliant boundaries (Item 1 above) has a similar level of impact across years from 2016 onwards. Our revised assumptions on very long term investment (Item 2 above) removes the sharp increase in costs from 2020 onwards although we only currently publish figures out to 2020-2021 and hence Table 7.3.1 does not show this trend in its entirety but does show a reduction from £65.2m in 2019-2020 to £43.6m in 2020-2021.

Overall, the result is a yearly reduction of forecast C&M costs in 2017-2018 through to 2020-2021 of between 50% and 70%.

7.4 Explanation of current C&M Modelling process

The Gone Green 2012 and Slow Progression 2012 scenarios are used to assess future C&M constraint costs. Approximately every 2 months, tranches of generation are added (to the baseline C&M model for the appropriate scenario) on the connection offers we are sending out in a determined period of time to work out the impact of allowing this generation to connect. We also confirm what impact this tranche would have on the overall GB Connect and Manage future constraint costs. However, when the next tranche is run, we disregard the previously run tranche until such time as we refresh the scenarios – the principle being that the Gone Green and/or Slow Progression scenario gives us all the generation we need so 1MW connecting would mean that 1MW wouldn't connect somewhere else.

To illustrate this, the Gone Green 2012 C&M model was created on 26 April 2013 (the "Baseline")[13] and this produced a forecast of C&M constraint costs.

A tranche of generation (in this case Tranche 15) is then added and the figures in orange highlighted text in Table 7.4.1 are the forecast C&M constraint costs following the addition of that tranche.

[13] Baseline has since been revised with a Revised Baseline dated 28 October 2013 – this is further explained in Section 7.3

Table 7.4.1

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	11.1	15.1
2014-2015	9.8	13.1
2015-2016	21.2	22.8
2016-2017	3.3	6
2017-2018	86.5	79.2
2018-2019	149.9	116.6
2019-2020	181.2	123.2
2020-2021	126.9	103.3
Modelling Scenario	Gone Green 2012 + Tranche 15	Gone Green 2012 Baseline
Date of analysis	08 July 2013	26 April 2013

Following the completion of this round of analysis, a new tranche of generation (in this case Tranche 16) is then added to the Baseline rather than the forecast C&M constraint costs following the addition of Tranche 15. It should be noted therefore that each successive tranche is added to the Baseline – it is not added to the previous tranche.

This process continues until such time as our Gone Green and Slow Progression scenarios and associated boundary limits are refreshed and the new C&M model is built accordingly. This is an annual process.

National Grid is currently in discussion with Ofgem and DECC on improving this analysis process. We will appraise of any further developments in future Quarterly Reports.

7.5 Scenario Outputs

The costs in the following table represent the outcome of analysis using a snapshot of data and the scenarios explained above and, because of future variables, cannot be a definitive forecast of what this cost may be.

'Gone Green 2012' and 'Slow Progression 2012' Assessment

Table 7.5.1 sets out the impact of the latest tranche of generation on the total forecast GB C&M constraint cost. For the avoidance of doubt, the figures in yellow highlighted text represent our current view total forecast GB C&M constraint costs, notwithstanding the current limitations in our current process as explained in section 7.4 of this report.

Table 7.5.1

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	15.7	13.8
2014-2015	12.4	12.5
2015-2016	25.2	22.5
2016-2017	2.4	3.5
2017-2018	57.2	21.5
2018-2019	108.8	62.2
2019-2020	70.4	65.2
2020-2021	83	43.6
Modelling Scenario	Gone Green 2012 + Tranche 16	Gone Green 2012 Revised Baseline
Date of analysis	28 October 2013	28 October 2013

- Current C&M forecast constraint costs are those in yellow highlighted text whilst those in red highlighted text are the New Baseline C&M forecast constraint costs as set out in Table 7.3.1. Section 7.4 above explains that we disregard the previously run tranche until such time as we refresh the scenarios and therefore the figures in red highlighted text are the best to use to provide the reader with a comparison of the impact of the latest tranche of generation on C&M forecast costs.

- C&M forecast constraint costs are calculated based on the cost of the C&M projects' advancement (i.e. between their date of connection to the NETS and completion of the Wider Reinforcement Works) as opposed to the previous method, which did not take cognisance of the completion of the Wider Reinforcement Works and assumed that constraint costs attributable to C&M could continue to be measured after the wider reinforcement works are completed.

- C&M forecast constraint costs for 2013-2014 (1 April 2013 to 31 March 2014) under 'Gone Green' 2012 are lower than the actual C&M constraints reported from 1 April 2013 to 30 September 2013. The forecast C&M constraint costs use the boundary capabilities set out in our current Electricity Ten Year Statement but the local constraint capability is not included within the Electricity Ten Year Statement. However, local constraints are very active in 2013-2014 as a result of outages required to enable the completion of the Wider Reinforcement Works and the costs associated with these are included in our calculation of C&M actual constraint costs. In addition, as we move into winter, there will not be planned outages on the NETS and therefore we expect that actual C&M constraints will be less for the next 6 months.

- C&M forecast constraint costs are low under 'Gone Green' 2012 in 2013-2014 and 2014-2015 as less plant is forecast to connect than under 'Gone Green' 2011.

- The C&M forecast constraint costs under 'Gone Green' 2012 drop in 2016-2017 due primarily to the Hunterston-Deeside link coming onto the NETS.

- The C&M forecast constraints rise from 2017-2018 onwards due primarily to a significant increase in generation post 2017. There is an additional 1134MW of wind generation (of which 996MW offshore) under Gone Green 2012 in 2017-2018 which means National Grid need to call off coal plant in England and Wales to relieve the constraints on the Cheviot boundary.

- Slow Progression figures are included for comparison purposes below as Table 7.5.2 but in 2015-2016 there is a decrease in forecast C&M constraint costs under 'Slow Progression' 2012, whilst there is an increase in forecast C&M constraint costs under 'Gone Green' 2012. This is because when Beauly-Denny commissions in 2015-2016, there is an expectation under 'Gone Green' 2012 for more generation to connect on the back of this than envisaged under 'Slow Progression' 2012.

Table 7.5.2

Connect and Manage Year	Total C&M Cost (£m)	Total C&M Cost (£m)
2013-2014	20.2	17.1
2014-2015	15.3	14.7
2015-2016	2.6	1.7
2016-2017	0.5	1.9
2017-2018	16.4	7.1
2018-2019	18	10.4
2019-2020	18.3	8.4
2020-2021	28.1	20
Modelling Scenario	Slow Progression 2012 + Tranche 16	Slow Progression 2012 Baseline
Date of analysis	28 October 2013	06 June 2013

Outturn Interim Report on the Connect and Manage Regime

For Period: 01 October 2013 – 31 December 2013

Introduction

Following consultation on models for improving grid access, the Department of Energy and Climate Change (DECC) introduced the enduring Connect and Manage (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 National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS). Connecting generators ahead of the completion of wider works may result in additional constraints on the National Electricity Transmission System (NETS). Under the C&M regime, any costs arising from the management of these constraints are socialised. This report documents the performance of that regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document – March 2013

Quarterly Reports on the Connect and Manage Regime

About this Report

Since December 2013 discussions have taken place between OFGEM and National Grid. As a result of which, it has been agreed to revise the format and practice of C&M reporting in order to improve clarity of the driving issues under the regime, whilst also cutting down on the administrative burden for all parties involved. An Annual Report will be published around April 2014 which will provide projections by Financial Year, together with outturn figures.

This report serves as an interim report, following from the published July-Sept 2013 Quarterly Report and in advance of an April 2014 full report. It provides information relating to the operation of the C&M regime for generation which has connected to the network under C&M terms between 01 October 2013 – 31 December 2013.

Format of this Report

For greater clarity, the report format gathers aggregated outturn data in a single tabulation (Please refer to Table 1 on Page 5).

In addition to reporting on constraint costs and carbon dioxide saved, as per previous published reports, the tabulation now includes various figures on energy output and energy constrained as they provide context as to the drivers of cost and carbon benefit. A narrative is also provided to assist the reader in understanding the context further.

Since previous reports a number of category naming conventions have now changed. Please find below an explanation of the categories which are contained within Table 1 (page 5):

1. Output of the C&M units (GWh): i.e. as per operational metering
2. Carbon Abatement (Thousand Tonnes): an estimation of the amount of CO2 emissions saved due to running the C&M renewable plant in place of the conventional plant that would have otherwise run.
3. C&M Output Contributing to System Constraints (GWh): That part of the Output (see 1.) of the C&M units which caused or exacerbated a transmission system constraint and therefore had to be managed through actions to pull back other plant behind that constraint boundary, or by other actions to enhance flow. (Otherwise known as the 'constraint attributable volume').
4. Constraint Costs Attributable to C&M Units (£k): the costs of actions to manage the constrained volume specific to the C&M output (see 1.).
5. TNUoS Generation Zone: Summated values for the C&M connected generators as distributed geographically according to the National Grid TNUoS Generation Zones[1].

Overall Trends

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The rows which are shaded in red represent those which have connected during the period covered by this report i.e. 6 additional generators. This brings the overall total to 21 generation units with an aggregate contracted capacity of 1.19GW.

Project	Fuel Type	Contracted Capacity (MW)	TNUoS Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	1	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	1	Oct 2011
Whitelee Extension	Onshore Wind	238	6	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	3	Dec 2011
Glendoe	Hydro	100	1	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	1	Dec 2012
Rosehall	Onshore Wind	25	1	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	2	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	1	May 2013
Calderwater	Onshore Wind	32	6	May 2013
Camster	Onshore Wind	50	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	1	Jun 2013
Harestanes Stage 1	Onshore Wind	111	6	Sep 2013
West of Duddon Sands Stage	Offshore Wind	206	6	Oct 2013
Berry Burn	Onshore Wind	67	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	2	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	5	Nov 2013
Lchluichart Windfarm Stage 1	Onshore Wind	51	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	2	Dec 2013
Total Contracted Capacity (MW)		1,190		

[1] http://www2.nationalgrid.com/UK/Industry-information/System-charges/Electricity-transmission/Transmission-Network-Use-of-System-Charges/Tools-and-Data/

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Since the C&M regime began there has been an increase in energy output from the C&M plant due both to the number of generators connected, and also a growth reflecting increases in operational plant of windfarm arrays already connected.

At the present time all C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

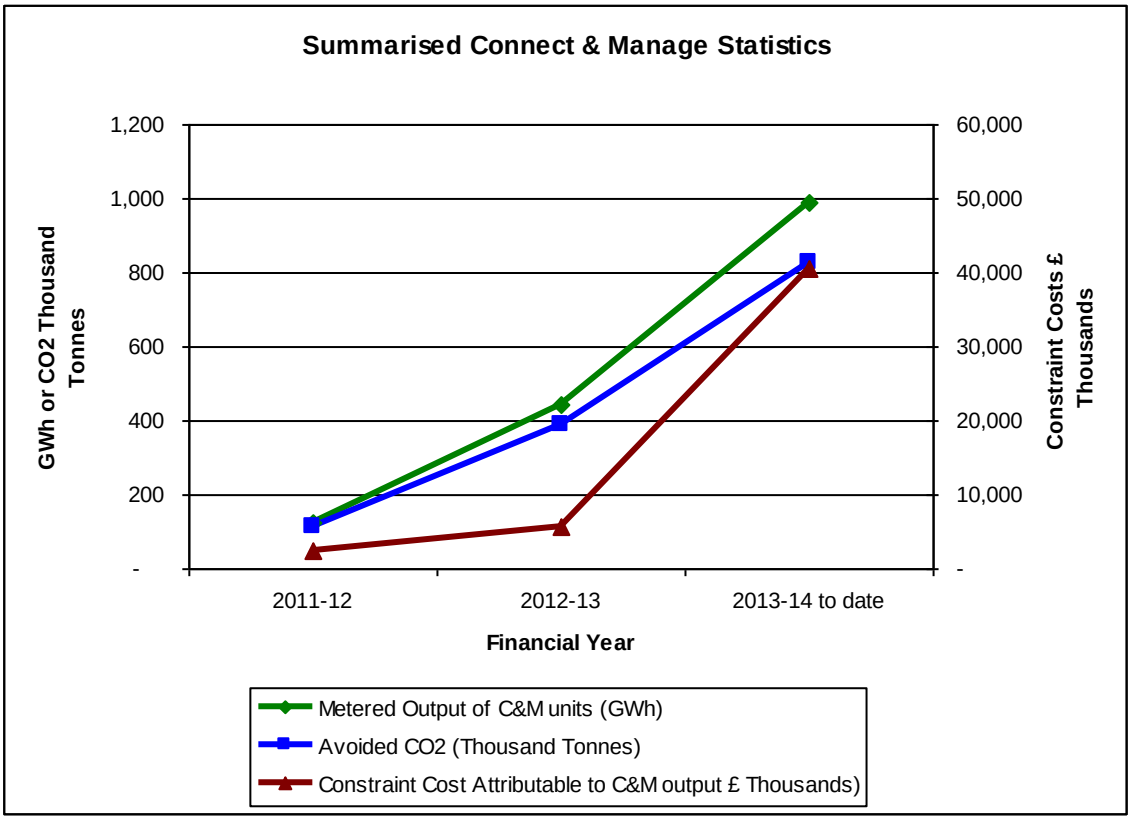
Constraint Costs

In line with the above growth, constraint costs attributable to the output of C&M units have risen from £2.4m as reported in 2011-12, to £40.4m for the 2012-13 year to date, with the total cost attributable to C&M since the start of the regime being £48.6m. It can be seen that of the total cost to date most is attributable to the combination of wind driven C&M connected generation together with network constraints existent in the current Financial Year.

Carbon Abatement

The carbon benefit (avoided CO2) goes hand in hand with the renewable C&M generation. Table 1 (see Page 5) shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, now totals 1.37 million tonnes.

Values of output, carbon benefit and constraint costs for the C&M regime to date are charted below:



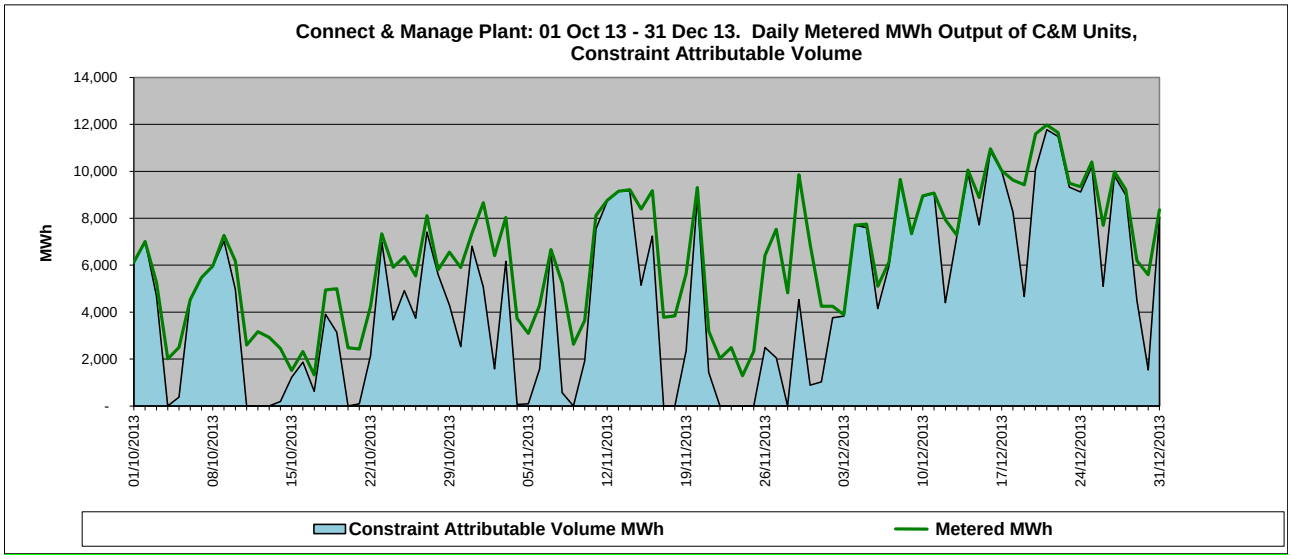
2013 – 2014 Year to Date and Current Quarter

As mentioned above, the bulk of C&M constraint costs to date have occurred in the current Financial Year due to the volume of C&M plant that has now become active. The cost profile reflects the seasonal nature of wind, with the Summer quarter (Q2) being the lowest, whereas the Autumn quarter (Q3) can be expected to be the highest.

The previous published reports identified that costs in this year have been driven by a combination of various factors; the general profile of wind in Scotland, high conventional generation in Scotland, existent system constraints both within the Scottish network with limited energy transfer capacity to England & Wales, and outages taken for work to improve the NETS. In particular, the current Autumn 2013 quarter was notably mild but especially windy in Scotland, so reducing local electricity consumption and transferring more energy to the NETS than would be the norm.

For context, Table 1 (see Page 5) provides aggregate power output data for the C&M units from which the relationship between the volume of C&M generation and the costs attributable can be drawn. In summary; for the year to date the metered output of the C&M units was 991 GWh. Of this, 671 GWh[2] coincided with network constraints and had to be managed by either pulling back other plant behind the constraint or by other measures to enhance the flow (e.g. by intertripping), whichever was most economic. This accounts for the C&M cost of £40.5m and is equivalent to and average of £60/MWh for the attributable volume. On some occasions in the current quarter it was necessary to pull back the C&M units themselves for constraint management; the estimated output which they would otherwise have achieved is approximately 8% greater than that metered.

As before, the outputs, carbon saving and constraint costs for the current quarter were driven by high autumn winds in Scotland. The seasonal nature is illustrated on the chart below which shows the output of the C&M units that is attributed to constraint management actions (blue fill) against the metered output (green). On average 75% of C&M output impacted a system constraint, with an average cost of constraint management actions at £55/MWh.



[2] See Table 1, Section "C&M Output Contributing to System Constraints" 2013-14 subtotal.

Table 1: Connect & Manage Outturn Data Summary[3]

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By TNoS Generation Zones 1	2	3	4	5	6	7	Other
Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-
	2012-13	443	120	-	108	1	26	-	188	-
	2013-14 Q1	232	70	-	44	11	12	-	95	-
	2013-14 Q2	178	88	-	22	10	10	-	48	-
	2013-14 Q3	581	242	-	120	20	20	-	179	-
	2013-14 Q4	-	-	-	-	-	-	-	-	-
	2013-14 to date	*991*	*400*	-	*186*	*41*	*42*	-	*322*	-
	Total to date	1,560	527	-	410	42	71	-	510	-
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousand Tonnes)	2011-12	115	7	-	105	-	3	-	-	-
	2012-13	388	151	-	85	10	16	-	126	-
	2013-14 Q1	228	59	-	80	8	8	-	73	-
	2013-14 Q2	149	72	-	14	7	7	-	49	-
	2013-14 Q3	447	178	-	102	13	14	-	140	-
	2013-14 Q4	-	-	-	-	-	-	-	-	-
	2013-14 to date	*1,327*	*309*	-	*196*	*28*	*29*	-	*262*	-
	Total to date	1,327	467	-	386	38	48	-	388	-
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-
	2012-13	97	26	-	9	2	7	-	53	-
	2013-14 Q1	160	44	-	34	8	9	-	65	-
	2013-14 Q2	80	45	-	3	5	6	-	21	-
	2013-14 Q3	431	178	-	77	15	16	-	145	-
	2013-14 Q4	-	-	-	-	-	-	-	-	-
	2013-14 to date	*671*	*267*	-	*114*	*28*	*31*	-	*231*	-
	Total to date	839	295	-	190	30	40	-	284	-
Constraint Costs Attributable to C&M units (£ Thousands)	2011-12	£ 2,432	£ 72	-	£ 2,236	-	£ 124	-	-	-
	2012-13	£ 5,646	£ 1,664	-	£ 785	£ 58	£ 294	-	£ 2,845	-
	2013-14 Q1	£ 11,598	£ 3,219	-	£ 2,556	£ 199	£ 939	-	£ 4,685	-
	2013-14 Q2	£ 5,224	£ 3,200	-	£ 183	£ 177	£ 481	-	£ 1,183	-
	2013-14 Q3	£ 23,703	£ 10,151	-	£ 3,891	£ 807	£ 904	-	£ 7,950	-
	2013-14 Q4	-	-	-	-	-	-	-	-	-
	2013-14 to date	*£ 40,525*	*£ 16,570*	-	*£ 6,630*	*£ 1,183*	*£ 2,324*	-	*£ 13,818*	-
	Total to date	£ 48,603	£ 18,306	-	£ 9,651	£ 1,241	£ 2,742	-	£ 16,663	-

[3] Note: Revision to FY 2011-12 Zone 4. Previously published figures of Carbon 48,387 tonnes, Constraint Cost £1,725,634 are withdrawn as these related to a windfarm which is not subject to C&M terms.

Report on the Connect and Manage Regime

Interim Outturn Report
Quarter 1 of April 2014 – 30 June 2014.

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to the first quarter of Financial Year 2014/15 and serves as an interim statement pending the annual report issued at the close of April 2015.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity of 1.215 GW is unchanged since the previous quarter.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	TNUoS Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	1	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	6	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	3	5	Dec 2011
Glendoe	Hydro	100	1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	1	1	Dec 2012
Rosehall	Onshore Wind	25	1	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	1	1	May 2013
Calderwater	Onshore Wind	32	6	7	May 2013
Camster	Onshore Wind	50	1	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	6	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	6	9	Oct 2013
Berry Burn	Onshore Wind	67	1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	5	6	Nov 2013
Lchluichart Windfarm Stage 1	Onshore Wind	51	1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	2	1	Dec 2013
Tullo II	Onshore Wind	25	1	1	Mar 2014
Total Contracted Capacity (MW)		1,215			

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Table 1: Connect & Manage Outturn Data Summary

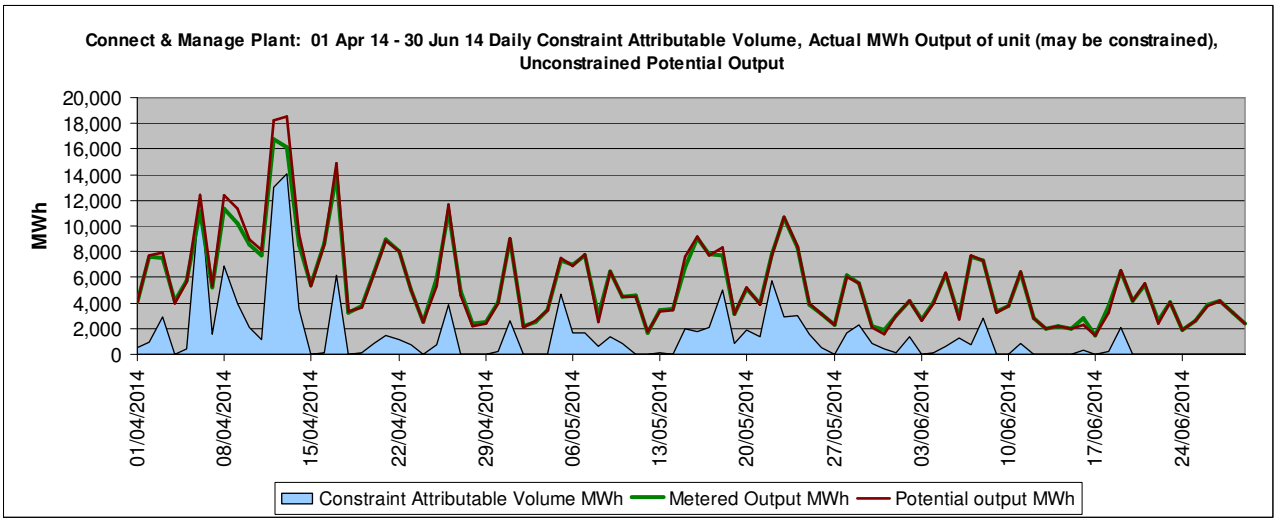
Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By TNoS Generation Zones 1	2	3	4	5	6	7	8	9	Other
Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33	-
	2014-15 Q1	*493*	*131*	-	*64*	*4*	*17*	*52*	*117*	-	*109*	-
	2014-15 Q2	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	**2,763**	**926**	**-**	**605**	**59**	**115**	**58**	**860**	**-**	**142**	**-**
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousand Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	-	-
	2014-15 Q1	*429*	*125*	-	*67*	*4*	*13*	*66*	*104*	-	*50*	-
	2014-15 Q2	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	**2,311**	**780**	**-**	**591**	**52**	**81**	**90**	**666**	**-**	**50**	**-**
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3	-
	2014-15 Q1	*137*	*49*	-	*31*	*1*	*6*	*9*	*34*	-	*7*	-
	2014-15 Q2	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	**1,528**	**565**	**-**	**356**	**42**	**68**	**13**	**475**	**-**	**10**	**-**
Constraint Costs Attributable to C&M units (£ Thousands)	2011-12	£ 2,432	£ 72	-	£ 2,236	-	£ 124	-	-	-	-	-
	2012-13	£ 5,645	£ 1,664	-	£ 785	£ 58	£ 294	-	£ 2,845	-	-	-
	2013-14	£ 71,760	£ 28,976	-	£ 16,948	£ 1,661	£ 3,616	£ 89	£ 20,366	-	£ 103	-
	2014-15 Q1	*£ 6,547*	*£ 2,223*	-	*£ 1,779*	*£ 35*	*£ 345*	*£ 208*	*£ 1,747*	-	*£ 210*	-
	2014-15 Q2	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	**£ 86,384**	**£ 32,935**	**-**	**£ 21,748**	**£ 1,754**	**£ 4,379**	**£ 297**	**£ 24,958**	**-**	**£ 313**	**-**

Costs and volumes for Quarter 2014 Q1 (& Q2) are expected to be the lowest in the year due to the seasonal nature of the windpower-driven generation that makes up most of the C&M fleet, and also drives much of the other generation in their vicinity BMU with which the C&M units compete for transmission capacity.

2013 – 2014 Current Year and Last Quarter

Metered Output

As per Table 1, output from the C&M units in 2014 Q1 quarter was 493GWh, which is around double that of the same quarter last year (232GWh), the increase being due to the additional capacity that has become operational in the intervening time. Of the metered output, 137GWh is attributable to system constraints. Metered output is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.



Constraint Costs

Constraint cost attributable to the C&M plant in the quarter was £6.5m against the forecast cost of £95.8m for the year. It should be noted that the majority of the costs are weather-driven and occur in quarters 3 & 4. Constraint costs have fallen compared to the same quarter last year (£11.6m) despite a doubling of the output of the C&M plant, which reflects network reinforcement works which have taken place in the intervening time. This has had the effect of both reducing the volume of constraint and the average cost of such action.

Constraint costs were highest between 12 – 14 April 2014 due to a period of very high winds in Scotland during which the output of windpower units flowing onto the transmission system had to be managed through actions to pullback generation in the region, including he C&M units themselves. The extent of the necessary pullback of C&M units is indicated by circa 2,000 GWh per day difference between the Potential Output and Metered Output on the chart above, representing the quantity pulled back at that time (respectively; Potential = red line reaching ~ 18,000 MWh, Metered = green line reaching ~ 16,000 MWh per day). The chart also shows the Constraint Attributable Volume (blue fill) almost reaching the Metered Output at that time, meaning that almost all of the energy from the C&M units at that time contributed to system constraints and so required similar volumes to be bought off from other generation units it the region and replaced elsewhere on the network.

Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run is estimated at 429,000 tonnes in the quarter.

Connect & Manage Forecast & Actuals Report July 2014

nationalgrid

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1.0 Introduction

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.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document – March 2013

C&M Derogation reports for projects with a signed C&M Agreement

Recent Connect and Manage reports

1.2 About this Report

This report is designed to provide information relating to the operation of the C&M regime for signed agreements from 1 April 2013 to 30 March 2014 and an assessment of forecast C&M costs for the following ten years. It provides an assessment of the potential ongoing overall benefits and the impact of allowing generation to connect ahead of the completion of wider works.

On the operation of the regime, information is provided in the following sections:

- **Section 2** reports on the performance of plant currently connected under the Connect & Manage regime with regard to the last quarter of Financial Year 2013/14 and the whole year in summary.

- **Section 3** provides an assessment of the anticipated additional costs which might be incurred as a result of the derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed ("Connect & Manage"). This is the first C&M forecast with 2013 Future Energy Scenarios and associated boundary limits.

We would appreciate any feedback you have on this report. If you have any questions or feedback then please do not hesitate to contact us via the following email address;

transmissionconnections@uk.ngrid.com

2.0 Connect & Manage Outturn Reporting

This section reports on the performance of plant currently connected under the Connect & Manage regime with regard to the last quarter of Financial Year 2013/14 and the whole year in summary.

For greater clarity, the format gathers aggregated outturn data in a single tabulation (Please refer to Table 1 on Page 5).

In addition to reporting on constraint costs and carbon dioxide saved, as per previous published reports, the tabulation now includes various figures on energy output and energy constrained as they provide context as to the drivers of cost and carbon benefit. A narrative is also provided to assist the reader in understanding the context further.

Since previous reports a number of category naming conventions have changed. Please find below an explanation of the categories which are contained within Table 1 (page 5):

1. Output of the C&M units (GWh): i.e. as per operational metering
2. Carbon Abatement (Thousand Tonnes): an estimation of the amount of CO2 emissions saved due to running the C&M renewable plant in place of the conventional plant that would have otherwise run.
3. C&M Output Contributing to System Constraints (GWh) [Constraint attributable volume]: That part of the Output (see 1.) of the C&M units which caused or exacerbated a transmission system constraint and therefore had to be managed through actions to pull back other plant behind that constraint boundary, or by other actions to enhance flow.
4. Constraint Costs Attributable to C&M Units (£k): the costs of actions to manage the constrained volume specific to the C&M output (see 1.). This covers costs of actions through the Balancing Mechanism and through Trades. Costs for arming Cheviot intertrips to raise transmission limits are included as appropriate although these are treated as zero-volume actions in (3) above.
5. TNUoS Generation Zone: Summated values for the C&M connected generators as distributed geographically according to the National Grid TNUoS Generation Zones[1].

[1] http://www2.nationalgrid.com/UK/Industry-information/System-charges/Electricity-transmission/Transmission-Network-Use-of-System-Charges/Tools-and-Data/

2.1 Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The rows which are shaded represent those projects connected during the April - March 13/14 year, with Tullo II having newly connected in the last quarter. This brings the overall total to 22 generation units with an aggregate contracted capacity of 1.215 GW.

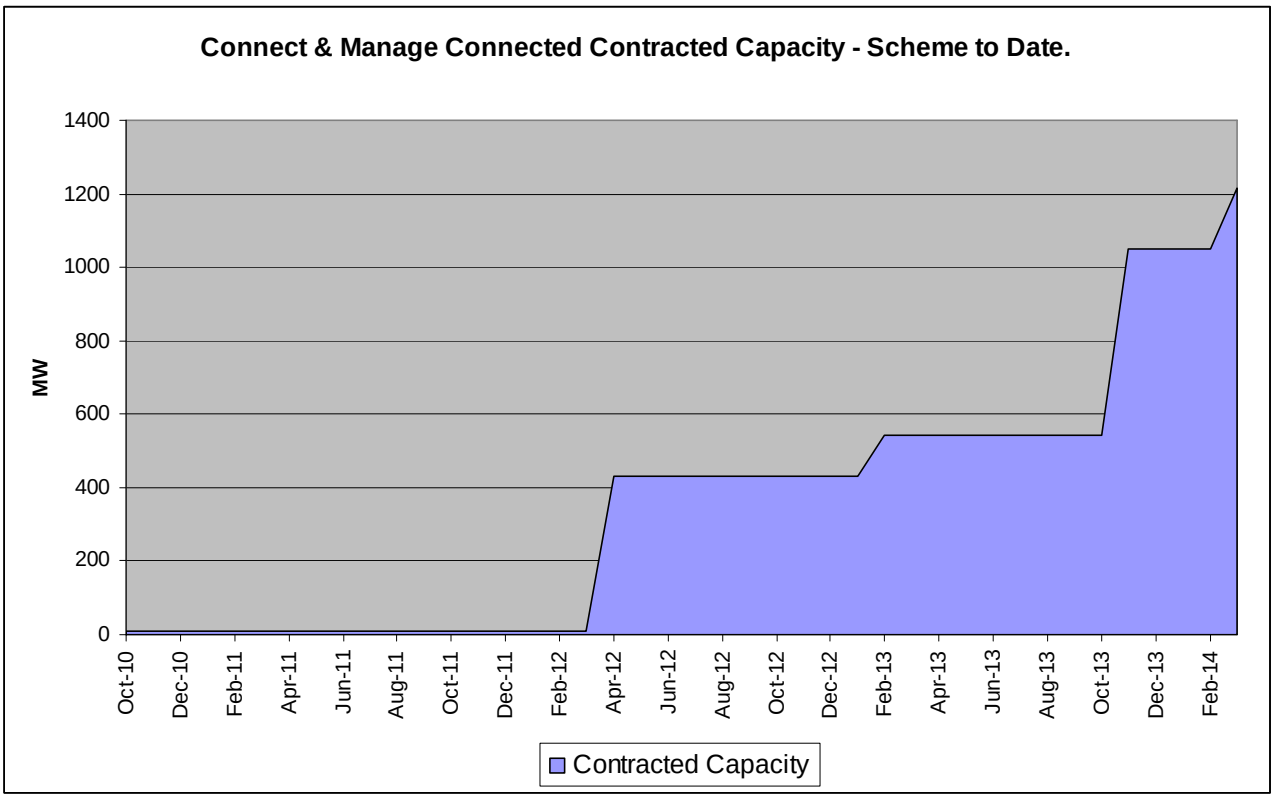
Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	TNUoS Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	1	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	6	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	3	5	Dec 2011
Glendoe	Hydro	100	1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	1	1	Dec 2012
Rosehall	Onshore Wind	25	1	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	1	1	May 2013
Calderwater	Onshore Wind	32	6	7	May 2013
Camster	Onshore Wind	50	1	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	6	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	6	9	Oct 2013
Berry Burn	Onshore Wind	67	1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	5	6	Nov 2013
Lchluichart Windfarm Stage 1	Onshore Wind	51	1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	2	1	Dec 2013
Tullo II	Onshore Wind	25	1	1	Mar 2014
Total Contracted Capacity (MW)		1,215			

Erratum; This table in Oct/Dec 2013 Interim Report incorrectly listed ETYS Zones as TNUoS zones. Both are tabulated above for completeness. Other outturn calculations and reporting by TNUoS zones are unaffected.

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output.

Overall Trends

Since the C&M regime began there has been an increase in energy output from the C&M plant due both to the number of generators connected, and also a growth reflecting increases in operational plant of windfarm arrays already connected. More than half of the total C&M capacity has been connected in the last reporting year, see chart below.



At the present time most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks. Consequently it is not always possible to accept the output of a particular C&M unit were it to cause a constraint limit to be exceeded. In effect the C&M unit output competes for transmission capacity with other generation behind that constraint: The constraint is managed by either restricting generation in that constraint group ("*Pulling Back*" by BM, trades or contracts) or by enabling a higher constraint limit (i.e. by intertrip), in most economic order.

Drivers behind the figures for 2013/4 Q4 January – March reflect a combination of the following:

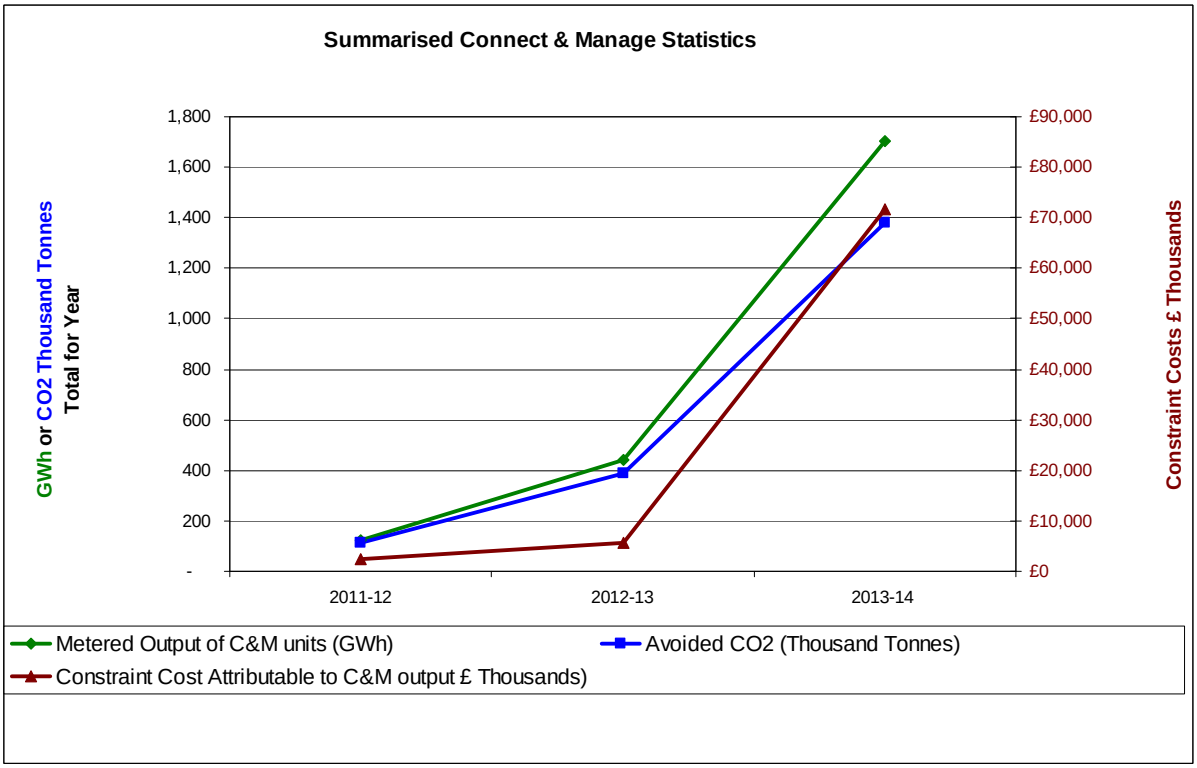
- Increased operational capacity of C&M units
- Increased operational capacity of non-C&M other generation in the locality of the C&M units (i.e.. windpower).
- Winter generation levels, with seasonal high windpower output across much of the quarter.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Table 1: Connect & Manage Outturn Data Summary[2]

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By TNoS Generation Zones 1	2	3	4	5	6	7	8	9	Other
Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-			-
	2012-13	443	120	-	108	1	26	-	188			-
	2013-14 Q1	*232*	*70*	-	*44*	*11*	*12*	-	*95*	-	-	-
	2013-14 Q2	*178*	*88*	-	*22*	*10*	*10*	-	*48*	-	-	-
	2013-14 Q3	*581*	*242*	-	*120*	*20*	*20*	-	*179*	-	-	-
	2013-14 Q4	*711*	*267*	-	*131*	*13*	*28*	*6*	*233*	-	*33*	-
	2013-14	1,702	667	-	317	54	70	6	555	-	33	-
	Total to date	2,271	794	-	541	55	99	6	743	-	33	-
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousand Tonnes)	2011-12	115	7	-	105	-	3	-	-	-	-	-
	2012-13	388	151	-	85	10	16	-	126	-	-	-
	2013-14 Q1	*228*	*59*	-	*80*	*8*	*8*	-	*73*	-	-	-
	2013-14 Q2	*149*	*72*	-	*14*	*7*	*7*	-	*49*	-	-	-
	2013-14 Q3	*447*	*178*	-	*102*	*13*	*14*	-	*140*	-	-	-
	2013-14 Q4	*553*	*187*	-	*139*	*9*	*20*	*24*	*174*	-	-	-
	2013-14	*1,377*	*496*	-	*335*	*37*	*49*	*24*	*436*	-	-	-
	Total to date	1,880	654	-	525	47	68	24	562	-	-	-
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	97	26	-	9	2	7	-	53	-	-	-
	2013-14 Q1	*160*	*44*	-	*34*	*8*	*9*	-	*65*	-	-	-
	2013-14 Q2	*80*	*45*	-	*3*	*5*	*6*	-	*21*	-	-	-
	2013-14 Q3	*431*	*178*	-	*77*	*15*	*16*	-	*145*	-	-	-
	2013-14 Q4	*553*	*221*	-	*135*	*11*	*22*	*4*	*157*	-	*3*	-
	2013-14	*1,224*	*488*	-	*249*	*39*	*53*	*4*	*388*	-	*3*	-
	Total to date	1,392	516	-	325	41	62	4	441	-	3	-
Constraint Costs Attributable to C&M units (£ Thousands)	2011-12	£ 2,432	£ 72	-	£ 2,236	-	£ 124	-	-	-	-	-
	2012-13	£ 5,646	£ 1,664	-	£ 785	£ 58	£ 294	-	£ 2,845	-	-	-
	2013-14 Q1	*£ 11,598*	*£ 3,219*	-	*£ 2,556*	*£ 199*	*£ 939*	-	*£ 4,685*	-	-	-
	2013-14 Q2	*£ 5,224*	*£ 3,200*	-	*£ 183*	*£ 177*	*£ 481*	-	*£ 1,183*	-	-	-
	2013-14 Q3	*£ 23,703*	*£ 10,151*	-	*£ 3,891*	*£ 807*	*£ 904*	-	*£ 7,950*	-	-	-
	2013-14 Q4	*£ 31,232*	*£ 12,405*	-	*£ 10,317*	*£ 478*	*£ 1,293*	*£ 89*	*£ 6,547*	-	*£ 103*	-
	2013-14	£ 71,757	£ 28,975	-	£ 16,947	£ 1,661	£ 3,617	£ 89	£ 20,365	-	£ 103	-
	Total to date	£ 79,835	£ 30,711	-	£ 19,968	£ 1,719	£ 4,035	£ 89	£ 23,210	-	£ 103	-

The Key indicators of metered output, Avoided CO2 emissions and Constraint Costs Attributable are charted below.



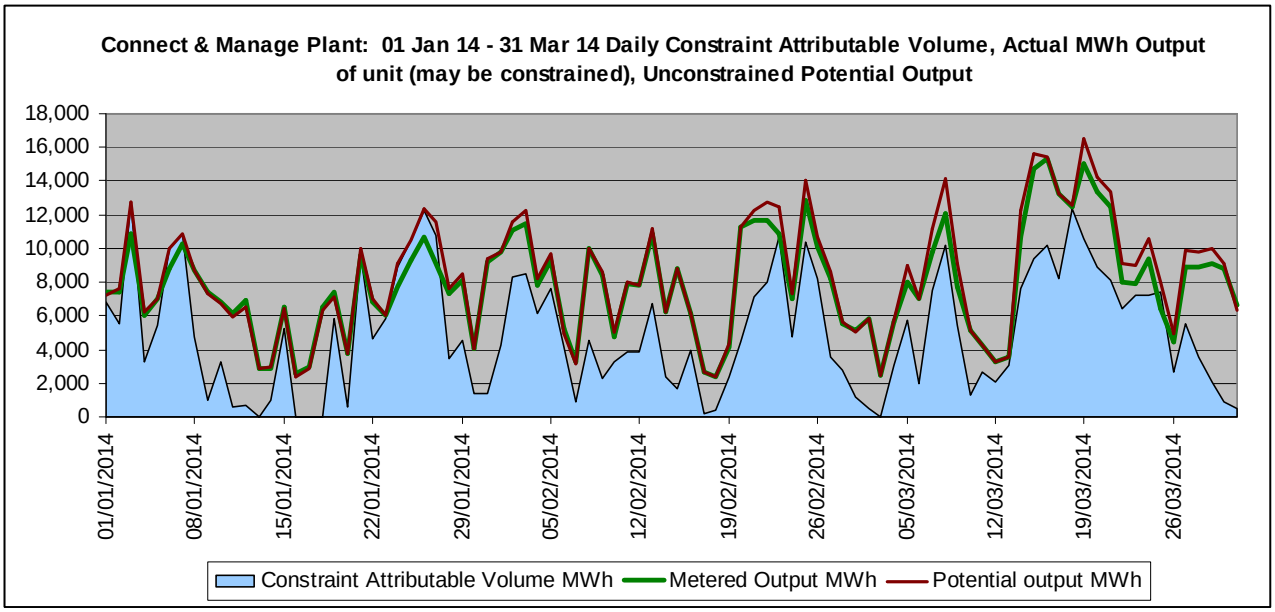
[2] Note: Revision to FY 2011-12 Zone 4. Previously published figures of Carbon 48,387 tonnes, Constraint Cost £1,725,634 are withdrawn as these related to a windfarm which is not subject to C&M terms.

2.2 2013 – 2014 Current Year and Last Quarter

Metered Output

In line with the installed capacity growth, the metered output of the C&M units has risen, with the total for year 2013/14 reaching 1,702 GWh as compared to 443 GWh in 2012/3. However, as output of the C&M units increases, they compete for transmission capacity against other generation in their vicinity, often with other windfarms, as mentioned above. As a consequence, on a windy day it can be necessary to restrict the output of the C&M unit, which leads to a difference between the potential unrestricted output of the C&M unit as compared to its actual metered output.

The chart below shows the metered output of the C&M units together with the potential unrestricted output that they could have achieved had no actions been required on these machines. The chart shape is primarily driven by windpower output in the region. The estimated total potential output of the C&M units in the quarter is 749 GWh, against the total 711 GWh metered. This chart is further discussed in the following section.



Constraint Costs

In line with the above growth, constraint costs attributable to the output of C&M units have risen from £2.4m as reported in 2011-12, to £71.8m for the full 2013-14, with the total cost attributable to C&M since the start of the regime being £79.8m, it being clear that the last two quarters are the chief contributors. The heightening costs reflect tightening competition for transmission as generation levels increase around the localities of the C&M units, often needing more expensive actions to resolve. In the above chart the 'Constraint Attributable Volume' is a volume of constraint actions directly attributable to the activity of the C&M unit. On occasions it is seen to exceed the actual metered output of the C&M unit, reflecting that in order to manage constraints at that time it was first necessary to pull back the C&M unit itself, and then to take further constraint management actions on other plant in the group so that the metered output could be transported over the transmission network.

Carbon Abatement

The carbon benefit (avoided CO2) goes hand in hand with the output of renewable C&M generation. Calculations are based on our estimate of the conventional fuel (coal, gas) that is displaced by the C&M units.

Table 1 (see Page 4) shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, now totals 1.88 million tonnes since the beginning of the scheme.

3.0 Assessment of anticipated additional costs and benefits as a result of C&M

3.1 Introduction

The following section provides an assessment of the anticipated additional costs which are as a result of the derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed ("Connect & Manage"). This is the first C&M forecast with 2013 Future Energy Scenarios and associated boundary limits.

The enduring Connect and Manage (C&M) regime was introduced by DECC to help meet climate change targets and ensure security of supply. However, it is also important to ensure that the additional cost of the regime is not excessive and National Grid can still demonstrate that it is meeting its obligation to run the system economically and efficiently.

C&M costs are complex to forecast due to the increasing level of uncertainty associated with how the market will meet future demand, as a result of the future closure of much plant which is the result of end of technical life and restriction on running (e.g. Large Combustion Plant Directive).

The forecasts of C&M costs have been steadily improved since the introduction of the regime. The following provides a high level description of the process for forecasting the additional costs as a result of C&M. This report provides more detail than previous reports to help understand the forecast impact of the regime in terms of costs and CO2 impact, and how much the transmission system may restrict the output of C&M plant and other associated impacts.

National Grid has adapted its approach to the C&M forecast of longer term C&M connectees to take account the interaction of the Network Development Policy (NDP). While shorter term C&M connectees would likely result in a cost uplift, in longer term timescales costs are still controlled by the NDP i.e. a decision to bring forward investment would be taken. To reflect this interaction with NDP, the forecast costs of C&M have been set to zero from 2019/20 for England & Wales and 2020/21 for Scotland.

3.2 Forecasting Process

The C&M constraint costs associated with the Future Energy Scenario "Gone Green 2013" are calculated assuming the connection dates of Connect & Manage units differ in two situations.

(a) Enabling works completed
(b) Wider works completed.

The first part of the process is to calculate the additional constraint costs arising as a result of the additional C&M generation connected in the Gone Green 2013 scenario at the completion of all associated wider works.

Generation is categorised as Connect and Manage between its enabling date and the wider works completion date. Once the wider works are complete, the generation is not considered as C&M capacity, beyond that point. Our cost forecasts are based on the difference in costs between the Enabling Dates scenario and the Wider Works scenario. This means that generation categorised as "C&M" is coming in and out of the assessment throughout the ten year forecast period. Scottish C&M capacity increases year on year due to the high volume of additional wind connecting in the Gone Green scenario in the later years in comparison to the completion of wider works for earlier connections.

National Forecast peak demand based on the Future Energy Scenarios presented in the Electricity Ten Year Statement (http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Electricity-ten-year-statement/) is profiled across the country using historical profiles. Hourly demands are produced based on a historic profile as a percentage of the peak demand. An unconstrained merit order which does not meet the transmission boundary capabilities is produced. This is done by scheduling plant to meet demand based on the most to least economic Short Run Marginal Costs. Short Run marginal costs are widely based on assumed heat rates (fuel to energy efficiency factors) and future fuel prices. Interconnectors and wind are treated separately;

- Interconnectors flows are modelled using a simplified merit order and forecasted European market prices based on the same underlying fuel prices as for the GB market.
- Wind flow is based on localised wind factors which are based on historical wind data.

To determine the constraint cost impact; a transmission network is added, with associated transmission boundary limits. The flow of power across the boundaries must comply with the boundary limits. This will result in the "pull back" of generation where there is an export constraint and "push through" of more generation where there is an import constraint. There will be equal and opposite balancing actions outside the constrained areas to ensure National demand is met.

The cost of varying these outputs is then calculated based on the typical corresponding bid and offer prices for varying the output of this generation within the Balancing Mechanism.

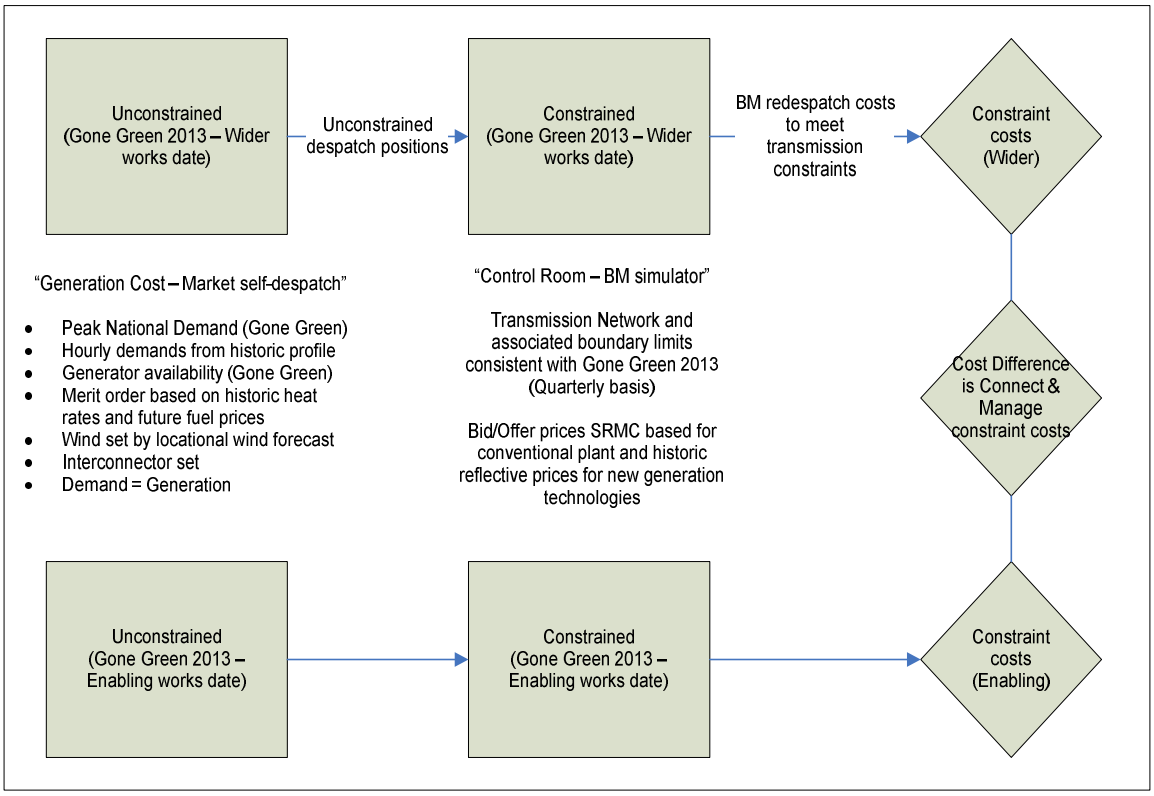
The difference in cost of the unconstrained and constrained models gives the constraint cost of "Gone Green 2013 – C&M connection at the date of completion of wider works" [1].

The same generation backgrounds are taken, modifying the connection dates of C&M generation, advanced to the completion of enabling works. **The impact on the behaviour of the market of the additional C&M generation made available; and consequent suppression of energy/fuel price and the subsequent effect on plant availability are not modelled.**

The assumed amount of available generation as a result of "enabling works" dates is greater and as a result, marginal plant will be displaced from the merit order to meet demand.
The unconstrained and constrained models are then produced for the "enabling works" scenario and the difference in costs between these two runs is the constraint cost of "Gone Green 2013 – C&M connect at completion of enabling works" [2].

The difference in constraint costs of [2] and [1] gives the constraint costs of C&M.

The following is a high level diagram showing this process.



The modelling approach does not consider the overall changes in market capacity and the associated impact on market behaviour and prices. It focuses primarily on the volume of C&M plant available in the future scenarios and the additional cost of resolving constraints during the periods that this C&M plant has connected to the transmission system but the wider reinforcement works required for compliant connections have not yet been completed.

In our approach, where lifetime derogation boundary costs exceed a specific limit, reinforcement works are advanced consistent with the general programme of work to provide a higher boundary limit earlier in the scenario timescale to achieve overall costs within an assumed cost limit. This approach reflects the situation that should occur in practice, where TSO's invest efficiently in their networks partly in response to higher constraint costs. Planned transmission investment should ensure that C&M costs decrease. In addition, a significantly higher volume of C&M in future years should lead to downward pressure on prices, which may cause other C&M projects to defer their connection to later years.

As the C&M generation connects, they will then be fully incorporated in all future scenarios and the system impact of these additional generation will evaluated in the application of National Grid's Network Development Policy (NDP), as discussed in section 3.3.2 below.

3.3 Impact of Connect & Manage Gone Green Scenario

3.3.1 Total Constraints Cost & Volumes: GB Market

The following charts show the forecasted costs and volumes of C&M constraints for 2014/15 through to 2023/24. To provide a consistent basis for forecast the boundary capabilities are calculated on a quarterly (seasonal) basis and do not take account of the impact of specific and individual maintenance outages, which would provide a greater resolution of boundary limits, for instance, on a weekly basis. Individual outages and their impact on boundary limits are only known for 2014/15 and not for 2015/16 onwards. A more detailed and comprehensive view of the forecast costs is provided under our SO incentives for 2014/15.

The reason for taking this approach was to provide an indicative view of the costs of Connect & Manage.

Points of note:

An approach adopted in previous years was the use of pre-agreed costs limits for individual constraint boundaries and the system as a whole. We have applied these cost limits to the C&M modelling to ensure that excessive costs are not incorporated into the output. We consider this a sensible approach to adopt given National Grid's licence obligation to plan and operate the system economically and efficiently, and this is also consistent with the Network Development Policy. If the lifetime derogation cost of a specific constraint boundary was forecasted to be in excess of the cost of the next incremental boundary reinforcement, then these reinforcement works will be advanced to provide a higher boundary limit earlier then presently presented in our Electricity Ten Year Statement (ETYS).. The costs shown reflect these adjusted limits for certain boundaries consistent with respecting lifetime derogation cost limits. These adjustments have only been made in the later years of the scenario to reflect the lead times associated with building new infrastructure.

3.3.2 Impact of Network Development Policy

In addition to the above approach, the impact of National Grid's Network Development Policy has also been taken into account in the cost assessment.

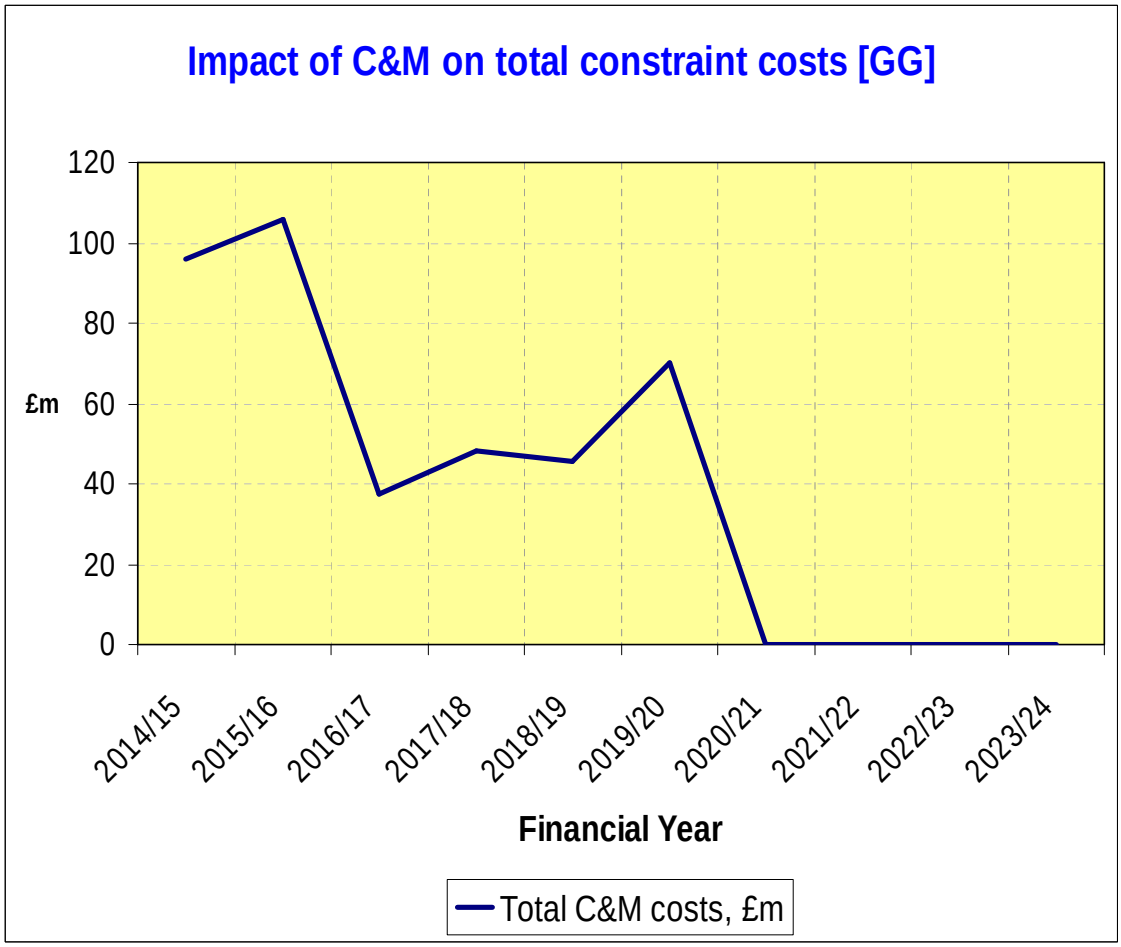
The RIIO price control introduced the Network Development Policy (NDP) for England and Wales where National Grid is the transmission owner. The NDP identifies the requirements for further transmission investment and considers the balance between the risks of investing too early in wider transmission reinforcements and the risks of investing too late, which include incurring inefficient congestion costs. The key output of the NDP is the identification of the appropriate action to take in the current year. This is selected through minimising the investment regrets against the credible range of future energy scenarios and sensitivities. The NDP provides a transparent process for the selection of transmission solutions and is presented in Chapter 4 of our Ten Year Statement. This will enable stakeholders to understand why decisions to build, and not to build, have been taken. The range of system requirements and NDP outcomes presented in this year's Electricity Ten Year Statement (ETYS) reflect the current slower market conditions and therefore some major projects are now being delivered in later years.

The impact of NDP on the Connect and Manage cost assessment is that from 2019/20 onwards, England and Wales boundaries will all be considered as "controlled" boundaries. This means that any constraint costs associated with additional connections or other changes will be fully managed within the NDP process. To be specific, as a result of the current C&M generation included in the Gone Green and Slow Progression 2013 scenarios, there are no expected C&M related constraint costs from 2019/20 onwards for England and Wales (E/W) boundaries. For Scotland, boundaries are controlled from 2020/21.

We assume this because if we made a decision to invest in 2013/14 on any of these projects associated with Network Development Policy in England and Wales we could deliver any project for 2019/20. However, for many of our major projects we have made these decisions not to carry on with the investment because we do not believe that the generation based on the balance of all of the scenarios will require the investment in these timescales, such as Bramford-Twinstead etc. When looking at Gone Green only there may have been constraints associated with these investments not being progressed to the timescales that only manifested itself in Gone Green. Therefore is appropriate to assume there would have been zero constraint costs in this scenario because, if we were making a single scenario decision, and not utilising Real time decision making of NDP looking at many scenarios, we would have been able to deliver the investment and therefore the constraint cost associated with wider works not being completed would be zero in Gone Green.

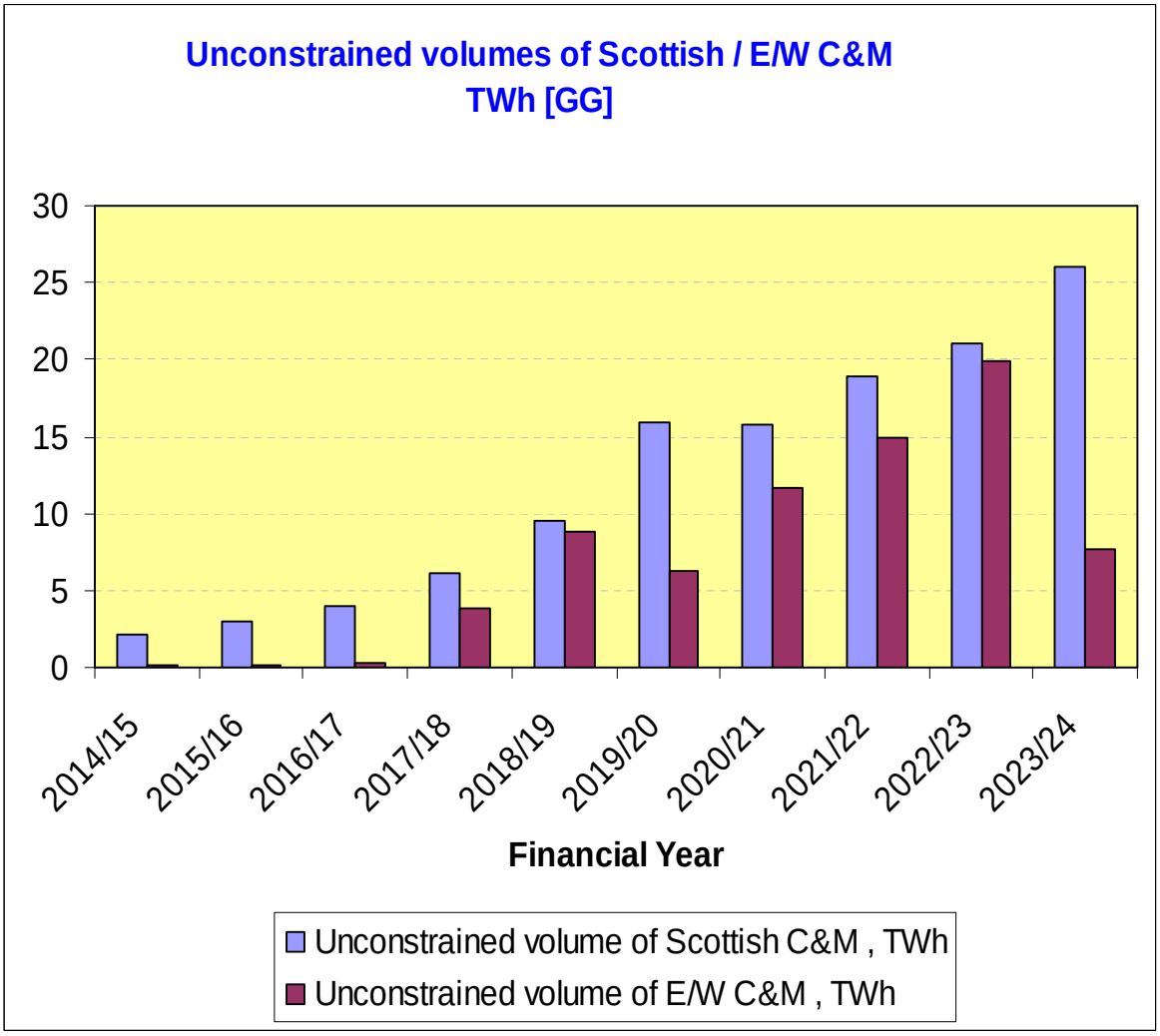
Assessing the balance of constraint costs vs investment:

When assessing whether to make an investment vs an efficient level of constraint we are using both the SQSS to identify where there may be pinch points on the network and then a cost benefit analysis looking at the cost of the investment compared to the expected constraint costs. A decision on whether to invest, in one scenario only, would be based on the investment providing sufficient benefit to the transmission system such that the cost of the investment over its life time is cheaper than the cost of the constraints expected without the investment. We make a decision on the optimal year of the investment such that the ratio of cost of investment-cost of constraints is maximised.



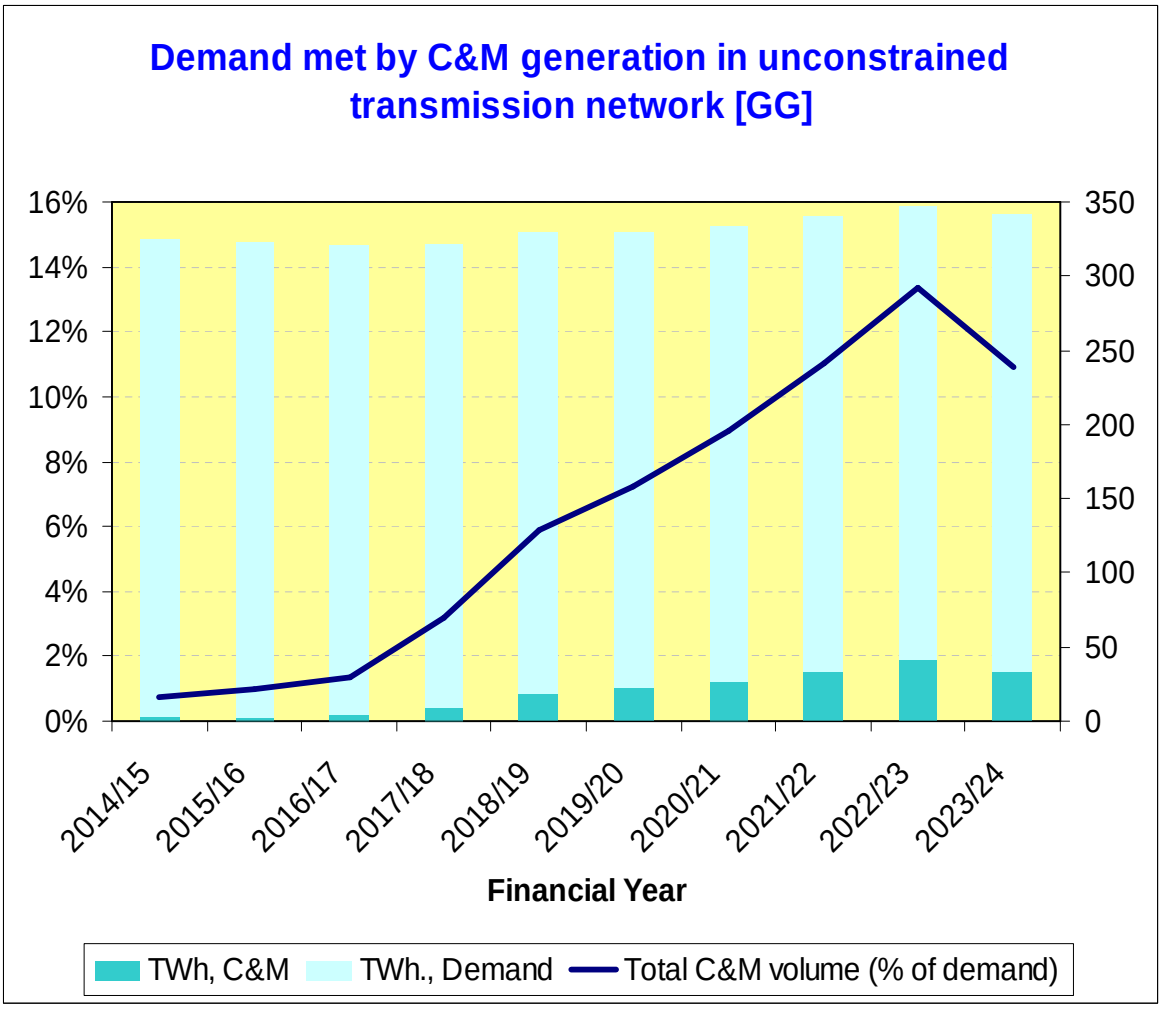
Outturn C&M costs for 2013/14 are £71.8m; these costs are forecast to continue to rise as additional C&M generation appears in Scotland and costs are incurred as a result of constraints within Scotland and the north of England (B7a Upper North - see Appendix A System Boundary Map). In 2014/15 there is an increase in B6 (Cheviot) limits as a result of additional series and shunt compensation in Scotland. This results in costs for B6 collapsing and costs being attributable to B7a. Following infrastructure reinforcements in 2016/17, these costs are reduced. Costs continue to build until network reinforcements via the NDP process are delivered across both Scotland and E/W boundaries.

In later years, England and Wales C&M generation becomes more prominent and costs for later years are more attributable to E&W constraints as the E&W C&M generation offsets Scotland to England flows. This can be shown in the following graph which shows the relative influence of Scotland and England and Wales C&M generation for the unconstrained network, i.e. assuming no transmission constraints.


Unconstrained volumes of Scottish / E/W C&M
TWh [GG]
30
25
20
15
10
5
0
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
2020/21
2021/22
2022/23
2023/24
Financial Year
Unconstrained volume of Scottish C&M , TWh
Unconstrained volume of E/W C&M , TWh

3.4 Demand met by C&M generation in unconstrained transmission network

The following graph gives a view of how successful C&M is forecast to be in meeting total National demand assuming no restrictions in output due to constraints. The decrease in 2023/24 is associated with the completion of a major component of wider works, which reduces the volume of generation categorised as C&M in that year.



Note: the figures shown above relate specifically to Connect and Manage generation (wind and other fuel types), not to all renewable generation, e.g. other generation which does not have advanced enabling dates ahead of wider works completion.

3.5 Comparison to Gone Green 2012 & Gone Green 2013

The Gone Green scenario has been designed to meet the environmental targets; 15% of all energy from renewable sources by 2020, greenhouse gas emissions meeting the carbon budgets out to 2027, and an 80% reduction in greenhouse gas emissions by 2050.

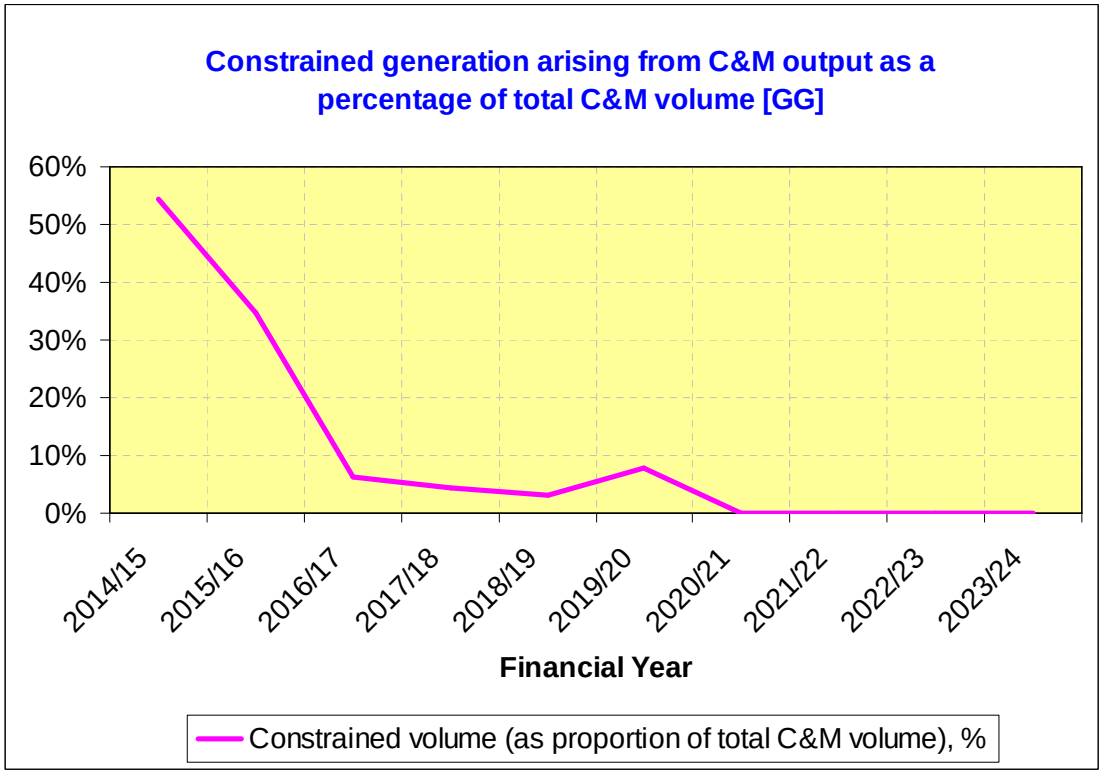
Electricity demand projections are lower in both scenarios than in our 2012 scenarios as a result of a number of improvements to our analysis methodology and a lower outturn demand in 2012. Future plant build (both renewable and thermal generation) is subject to considerable uncertainty, and Electricity Market Reform (EMR) will play an important role in delivering new build for renewable, nuclear and gas, through anticipated mechanisms such as Contracts for Difference (CfDs) and capacity payments. Lower electricity demand projections offset the impact of plant closures. Margins can be

maintained in the medium term at around 5% (on a de-rated basis) but this is dependent on new generation build and in both scenarios they dip below this level in the next few years. Gas generation capacity increases and the role of gas generation becomes more prominent as a back-up for intermittent generation.

Since we have updated our modelling, it becomes very difficult to compare and contrast forecasts. Key assumption changes between Gone Green 2012 and 2013 are:

- Updated heat rates based on historical analysis and brought in-line with SO incentive forecast assumptions.
- Updated wind BOA prices to more closely reflect actual submitted prices.
- Incorporation of new constraint boundaries

3.6 Volume of generation constrained as a proportion of total C&M generation

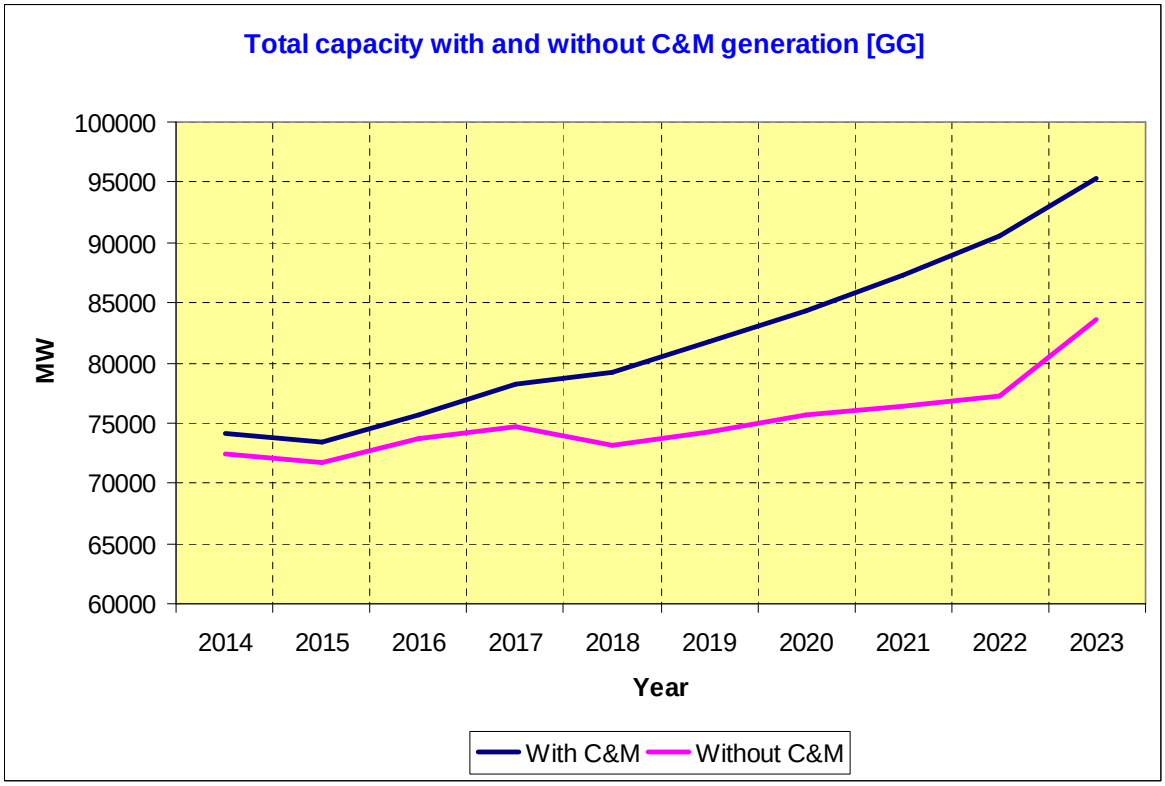


In the first two years of the scenario, forecast constrained generation volumes are a significant proportion of the total C&M volume. This is associated with:

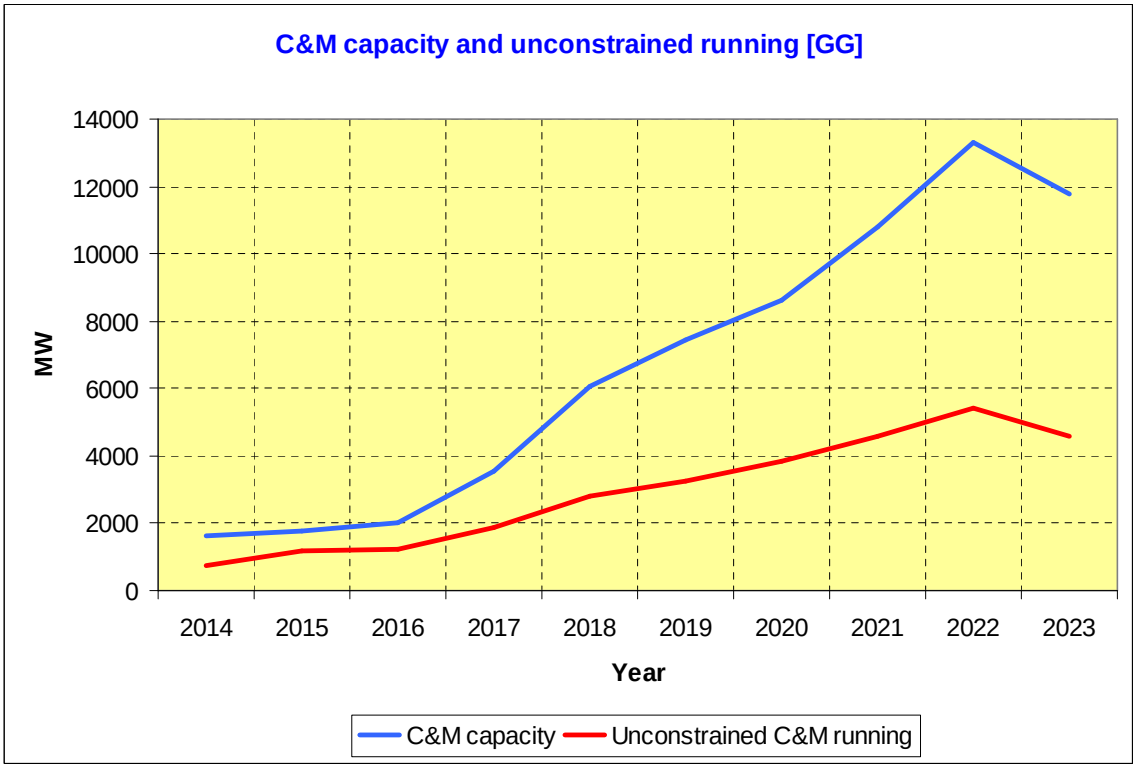
- the restriction in output attributable to the B7a – Upper North constraint prior to reinforcement works being completed.
- A relatively low volume of available C&M generation in these early years compared with overall congestion volumes.

In later years, the proportion of generation constrained as a proportion of output decreases. Due to transmission reinforcement occurring in discrete stages, there will always be increases and decreases in the proportion of C&M generation which is constrained as seen by the increase in later years.

3.7 Capacity of C&M generation within Future Energy Scenario GG2013

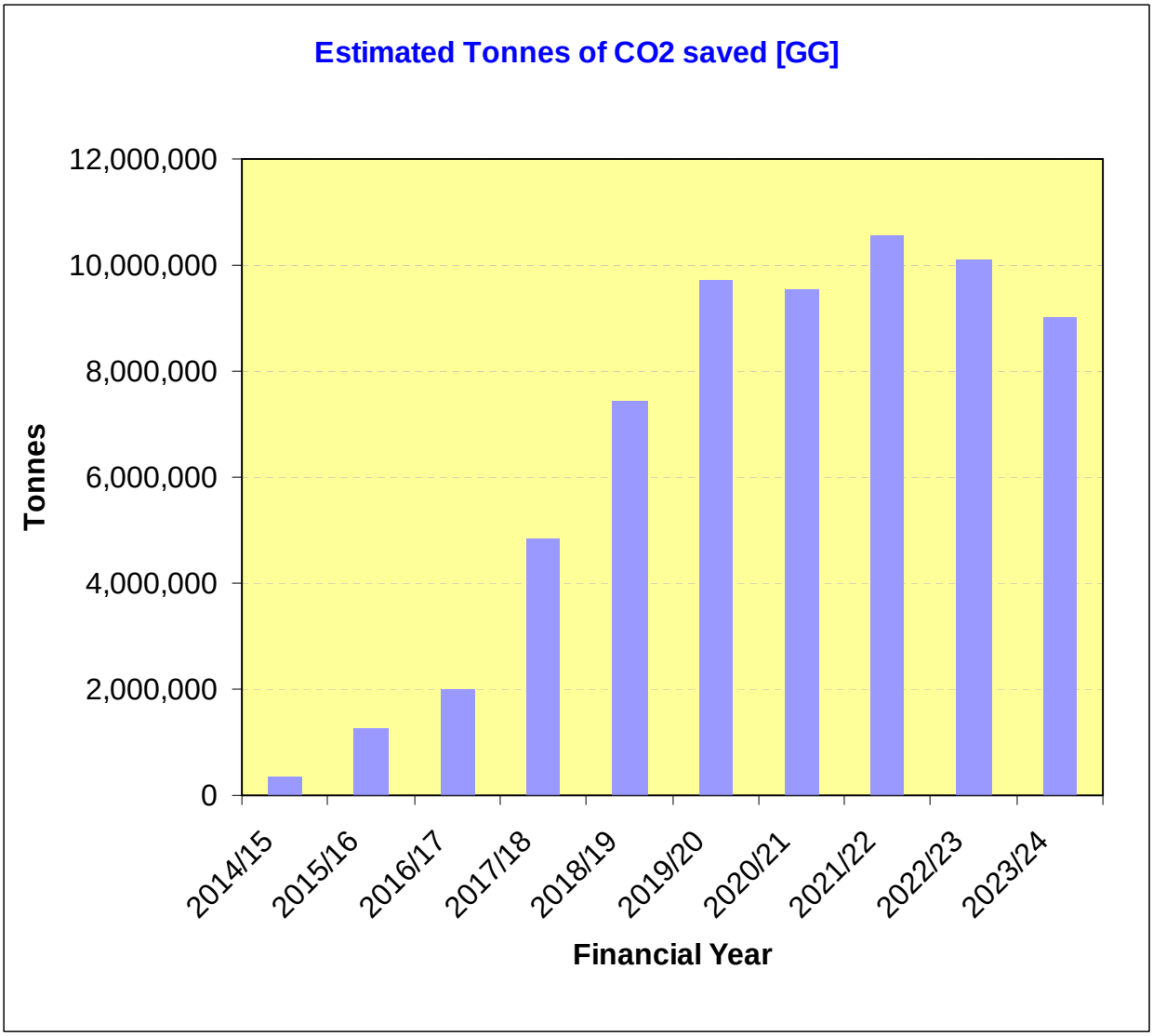


The above graph shows the forecast generation capacity in the Gone Green 2013 scenario with and without C&M generation. This aligns with earlier commentary highlighting the significant increase in C&M volumes in later years of the scenario compared with earlier years.



This shows a comparison of the total C&M capacity and the unconstrained C&M running i.e. the typical load factor of C&M generation. This again highlights the increase in C&M volumes in later years of the scenario, with corresponding increases in the unconstrained running of C&M.

3.8 Estimated carbon savings

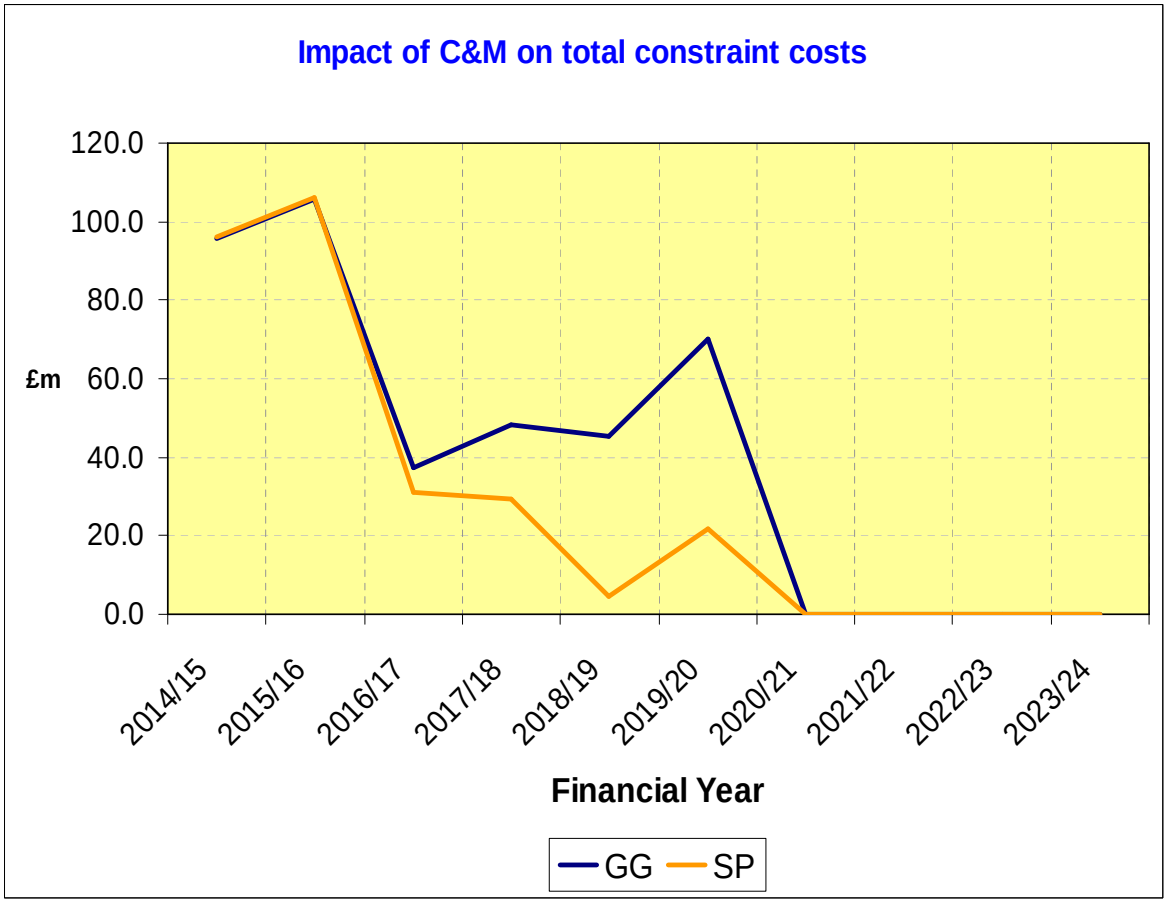


The above graph shows the forecast CO2 savings from the C&M regime over the next ten years.

In context, the CO2 savings of around 9-10 million tonnes for the last five years of the forecast period equate to the typical annual emissions from around 4 medium sized coal stations.

(Using an example of a 480MW medium sized coal plant with a load factor of 66% which runs all year round, the number of running hours is 8760 (24 hours x 365 days), this would equate to ~2.5 million tonnes of emissions of carbon dioxide (0.96 Tonnes/MWh x (66% x 480)MW x 8760 hours).
Therefore, 10 million tonnes of carbon is equivalent to the CO2 emissions from ~4 medium size coal units).

3.9 Comparison of total C&M costs for Gone Green and Slow Progression 2013 scenarios



The above graph shows the total costs for the Slow Progression scenario. The costs are significantly lower than Gone Green for most years except 2014/15 and 2015/16 where the costs remain high as a result of insufficient infrastructure in place to support the forecast flows across the B1 North West Export and B7a Upper North boundaries. As described in section 3.2 above, the impact of the Network Development Policy (NDP) is to remove any forecast constraint costs for 2020/21 onwards in the Slow Progression scenario in the same way as for the Gone Green scenario.

Summary of costs for GG and SP

Year	Total C&M costs	
	[GG], £m	[SP], £m
2014/15	95.8	95.8
2015/16	105.6	105.6
2016/17	37.4	30.8
2017/18	48.2	29.2
2018/19	45.5	4.7
2019/20	70.2	22.0
2020/21	0.0	0.0
2021/22	0.0	0.0
2022/23	0.0	0.0
2023/24	0.0	0.0

4.0 Contracted Generation and Acceleration of Connection Dates

The table below provides a summary of all projects with a signed C&M agreement split by Transmission Owner. The status denotes the following:

- "Future" relates to those projects which have entered into an agreement but are yet to connect and;
- "Connected" refers to those projects which have already connected to the network. A breakdown of each connected site can be found in Section 2.1 of this report.

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average Advancement (Years)
NGET	Future	Renewable	31	15,906	3
		Non Renewable	7	5,230	4
	Connected	Renewable	1	206	2
		Non Renewable	0	0	0
Total			**39**	**21,342**	**3**
SPT	Future	Renewable	52	6,833	6
		Non Renewable	0	0	0
	Connected	Renewable	4	384	10
		Non Renewable	0	0	0
Total			**56**	**7,217**	**6**
SHE	Future	Renewable	79	7,712	5
		Non Renewable	0	0	0
	Connected	Renewable	17	613	5
		Non Renewable	0	0	0
Total			**96**	**8,325**	**5**
Overall Combined TO Total			**191**	**36,884**	**5**

The "Average Advancement" describes the advancement (in years) that a customer could expect to achieve under the C&M regime, as opposed to the Invest & Connect regime. Under Invest & Connect projects would need to wait for wider reinforcement works required under the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) to be completed on the transmission system prior to connection. Whereas; under the C&M regime relevant generators only need to await the completion of "Enabling Works".

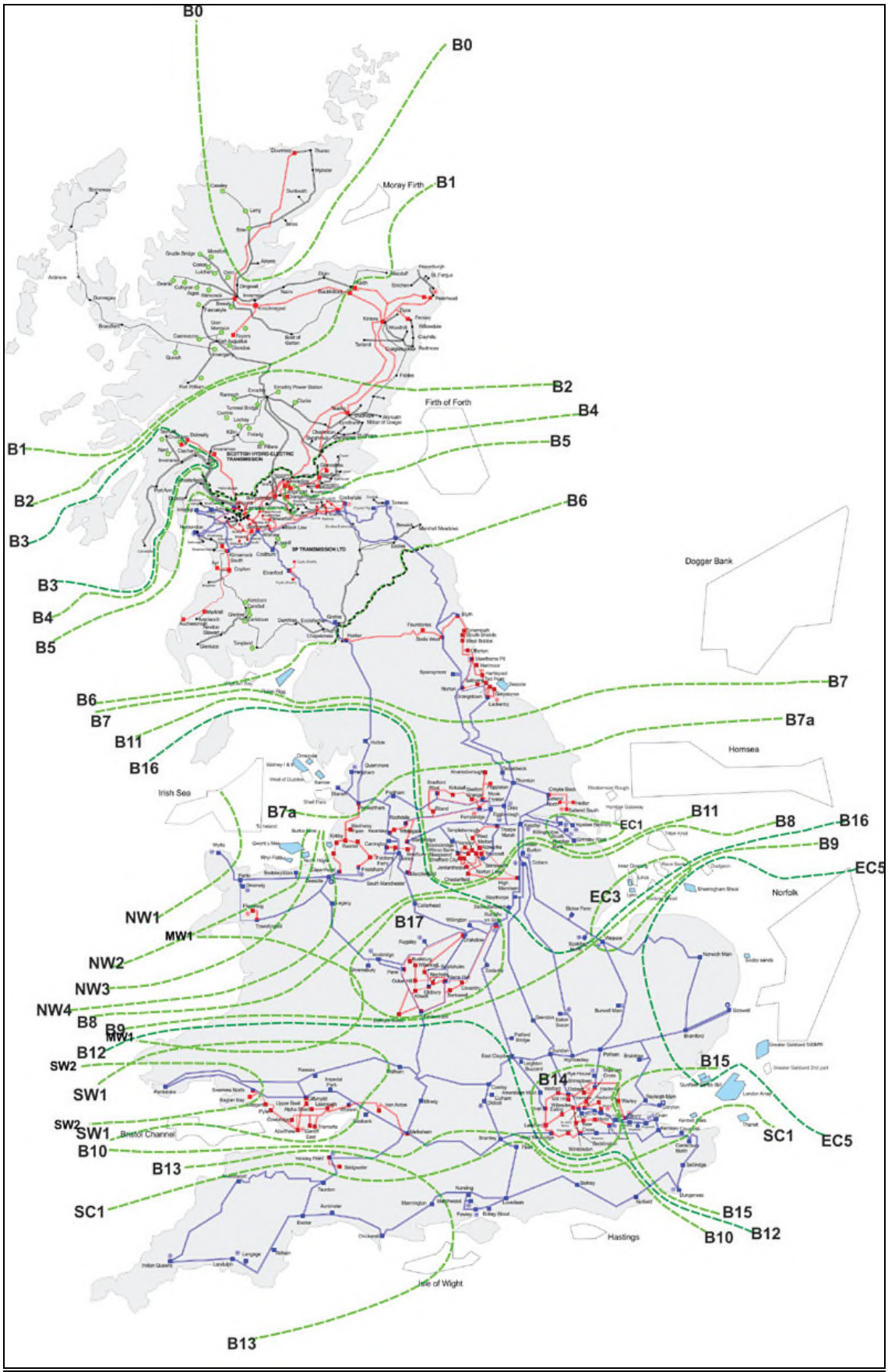
It is worth noting that the data which has been used to determine the average advancement value has been taken from customers' signed agreements which, in some cases (at the customers' preference), are later than the earliest connection date that could have been achieved.

Overall there are 191 projects which have a C&M agreement with a combined total capacity of approximately 37GW and an average advancement of 5 years.

Since the last report the number of projects which have now connected to the system has increased from 15 to 22. The number of customers entering into a contract has also increased from 148 "future" projects to 170, with a significant proportion of new customers seeking a connection in the SPT area.

Although the total number of projects has increased the total number of GW capacity has remained relatively static. This is because a small number of large capacity projects have terminated their contracts and a greater number of projects with smaller capacity have subsequently entered into an agreement.

Appendix A - Map of system boundaries studied



Report on the Connect and Manage Regime

Interim Outturn Report

Quarter 2: July 2014 – 30 September 2014.

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to the second quarter of Financial Year 2014/15 and serves as an interim statement pending the annual report issued at the close of April 2015.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity of 1.42 GW is an increase since the previous quarter due to the connection of Westernmost Rough.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	TNUoS Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	1	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	6	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	3	5	Dec 2011
Glendoe	Hydro	100	1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	1	1	Dec 2012
Rosehall	Onshore Wind	25	1	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	1	1	May 2013
Calderwater	Onshore Wind	32	6	7	May 2013
Camster	Onshore Wind	50	1	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	6	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	6	9	Oct 2013
Berry Burn	Onshore Wind	67	1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	5	6	Nov 2013
Lochluichart Windfarm Stage 1	Onshore Wind	51	1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	2	1	Dec 2013
Tullo II	Onshore Wind	25	1	1	Mar 2014
Westernmost Rough	Offshore Wind	205	8	15	Aug 2014
Total Contracted Capacity (MW)		1,420			

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Table 1: Connect & Manage Outturn Data Summary

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By TNoS Generation Zones 1	2	3	4	5	6	7	8	9 Other
Metered Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33	-
	2014-15	1,003	278	-	118	13	38	95	213	-	248	0
	2014-15 Q1	493	131	-	64	4	17	52	117	-	109	-
	2014-15 Q2	510	147	-	54	9	21	43	97	-	139	0
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	3,273	1,073	-	659	68	135	101	956	-	281	0
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousands of Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	0	-
	2014-15	861	263	-	106	11	27	139	191	-	116	8
	2014-15 Q1	429	125	-	67	4	13	66	104	-	50	-
	2014-15 Q2	431	139	-	39	7	14	73	86	-	66	8
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	2,742	918	-	631	58	95	163	753	-	116	8
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3	-
	2014-15	219	79	-	42	3	12	11	65	-	7	-
	2014-15 Q1	137	49	-	31	1	6	9	34	-	7	-
	2014-15 Q2	82	31	-	12	2	5	1	31	-	0	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	1,610	595	-	367	43	73	14	506	-	10	-
Constraint Costs Attributable to C&M units (£k)	2011-12	2,432	72	-	2,236	-	124	-	-	-	-	-
	2012-13	5,645	1,664	-	785	58	294	-	2,845	-	-	-
	2013-14	71,760	28,976	-	16,948	1,661	3,616	89	20,366	-	103	-
	2014-15	14,423	4,993	-	3,022	194	709	301	4,980	-	225	-
	2014-15 Q1	6,547	2,223	-	1,779	35	345	208	1,747	-	210	-
	2014-15 Q2	7,876	2,769	-	1,243	159	364	93	3,233	-	15	-
	2014-15 Q3	-	-	-	-	-	-	-	-	-	-	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	94,261	35,705	-	22,991	1,912	4,742	391	28,191	-	328	-

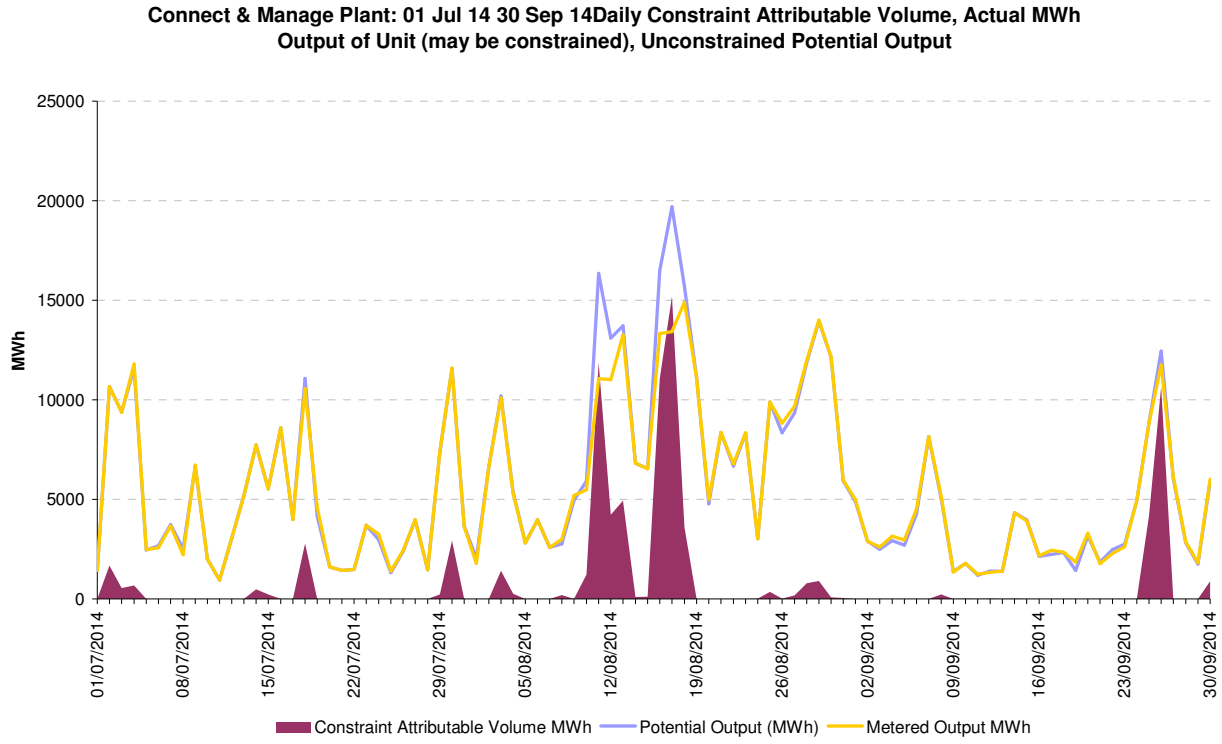
Costs and volumes for Quarter 2014 Q1 & Q2 are expected to be the lowest in the year due to the seasonal nature of the wind power driven generation that makes up most of the C&M fleet, and also drives much of the other generation in the vicinity of the C&M unit with which these units compete for transmission capacity.

2013 – 2014 Current Year and Last Quarter

Metered Output

As per Table 1, output from the C&M units in 2014 Q2 quarter was 510GWh, which is approaching three times that of the same quarter last year (178GWh), the increase being due to the additional capacity that has become operational in the intervening time and the natural variation in weather.

Of the metered output, 82GWh is attributable to system constraints. Metered output is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.



Constraint Costs

Constraint cost attributable to the C&M plant in the quarter was £7.9m against the forecast cost of £95.8m for the year. It should be noted that the majority of the costs are weather driven and are expected to occur in quarters 3 & 4. Constraint costs have increased slightly compared to the same quarter last year (£5.2m) however this is not commensurate with the increased output of C&M units (178GWh in Q2 2013/14 vs 510GWh in Q2 2014/15). This low correlation between increased output from C&M units and costs is largely due to changes in the background generation within Scotland. For instance the combined output of Longannet and Peterhead has reduced 30% between the two years.

As would be expected the costs attributed to Connect and Manage units are proportional to the volumes of constraint actions allocated. In line with this the constraint costs were highest between the 12th and 19th August due to a period of high winds in Scotland during which the output of windpower units flowing onto the transmission system had to be managed through actions to pullback generation in the region, including the C&M units themselves as indicated by the difference between the “Potential Output” (blue line) and the “Metered Output” (orange line) in the chart above. There were further high costs towards the end of September, however this was not as severe as experienced in August and there was little restriction to the C&M units themselves on this occasion.

Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run is estimated at 431,000 tonnes in the quarter bringing the total to 2.7 million tonnes since the beginning of the Connect & Manage regime.

Report on the Connect and Manage Regime

Interim Outturn Report

Quarter 3: October 2014 – 31 December 2014

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to the third quarter of Financial Year 2014/15 and serves as an interim statement pending the annual report which will be issued at the close of April 2015.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity of 1.42 GW remains the same as the previous quarter.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	TNUoS Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	1	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	6	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	3	5	Dec 2011
Glendoe	Hydro	100	1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	1	1	Dec 2012
Rosehall	Onshore Wind	25	1	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	1	1	May 2013
Calderwater	Onshore Wind	32	6	7	May 2013
Camster	Onshore Wind	50	1	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	6	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	6	9	Oct 2013
Berry Burn	Onshore Wind	67	1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	5	6	Nov 2013
Lochluichart Windfarm Stage 1	Onshore Wind	51	1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	2	1	Dec 2013
Tullo II	Onshore Wind	25	1	1	Mar 2014
Westermost Rough	Offshore Wind	205	8	15	Aug 2014
Total Contracted Capacity (MW)		1,420			

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Table 1: Connect & Manage Outturn Data Summary

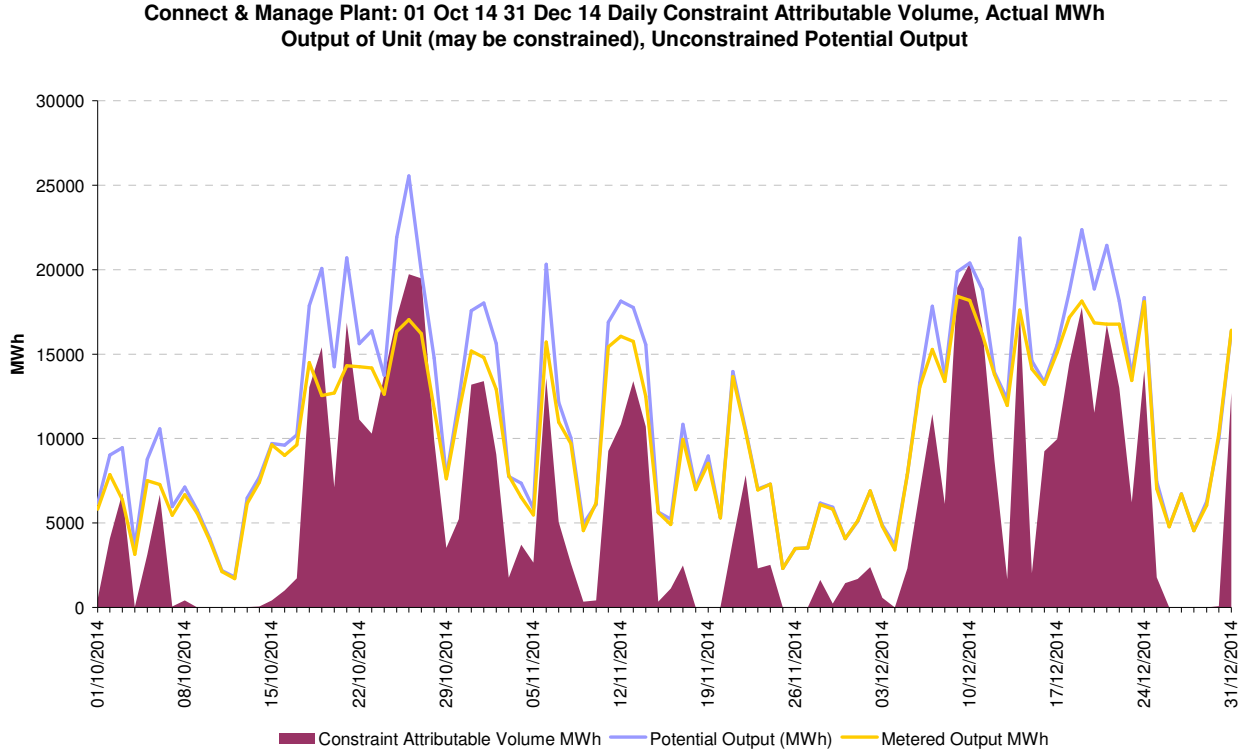
Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By TNoS Generation Zones 1	2	3	4	5	6	7	8	9 Other
Metered Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33	-
	2014-15	1,905	534	-	227	28	78	152	411	-	476	0
	2014-15 Q1	493	131	-	64	4	17	52	117	-	109	-
	2014-15 Q2	510	147	-	54	9	21	43	97	-	139	0
	2014-15 Q3	903	256	-	109	15	40	57	198	-	228	-
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	4,176	1,330	-	768	83	176	157	1,153	-	509	0
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousands of Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	0	-
	2014-15	1,617	480	-	220	21	50	184	376	-	265	20
	2014-15 Q1	429	125	-	67	4	13	66	104	-	50	-
	2014-15 Q2	431	139	-	39	7	14	73	86	-	66	8
	2014-15 Q3	756	217	-	114	11	23	45	185	-	150	12
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	3,498	1,135	-	745	69	118	207	938	-	266	20
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3	-
	2014-15	785	292	-	132	14	40	38	241	-	28	0
	2014-15 Q1	137	49	-	31	1	6	9	34	-	7	-
	2014-15 Q2	82	31	-	12	2	5	1	31	-	0	-
	2014-15 Q3	566	212	-	89	11	29	27	176	-	21	0
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	2,176	808	-	457	54	102	41	682	-	31	0
Constraint Costs Attributable to C&M units (£k)	2011-12	2,432	72	-	2,236	-	124	-	-	-	-	-
	2012-13	5,645	1,664	-	785	58	294	-	2,845	-	-	-
	2013-14	71,760	28,976	-	16,948	1,661	3,616	89	20,366	-	103	-
	2014-15	59,262	19,232	-	10,093	952	3,009	1,634	22,653	-	1,685	5
	2014-15 Q1	6,547	2,223	-	1,779	35	345	208	1,747	-	210	-
	2014-15 Q2	7,876	2,769	-	1,243	159	364	93	3,233	-	15	-
	2014-15 Q3	44,839	14,239	-	7,071	758	2,300	1,332	17,673	-	1,460	5
	2014-15 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	139,100	49,945	-	30,062	2,671	7,042	1,723	45,864	-	1,788	5

Comparison of Latest Quarter to History

Metered Output

As per Table 1, output from the C&M units in Q3 was 903GWh, which is approaching twice that of the preceding quarter (510GWh), and is also substantially higher than the same quarter in the previous year (581GWh). This is a reflection of the weather conditions and increasing installed capacity at the connected sites.

Of the metered output, 566GWh is attributable to system constraints versus 431GWh for the same quarter in the previous year. Metered output for the quarter being reported is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.

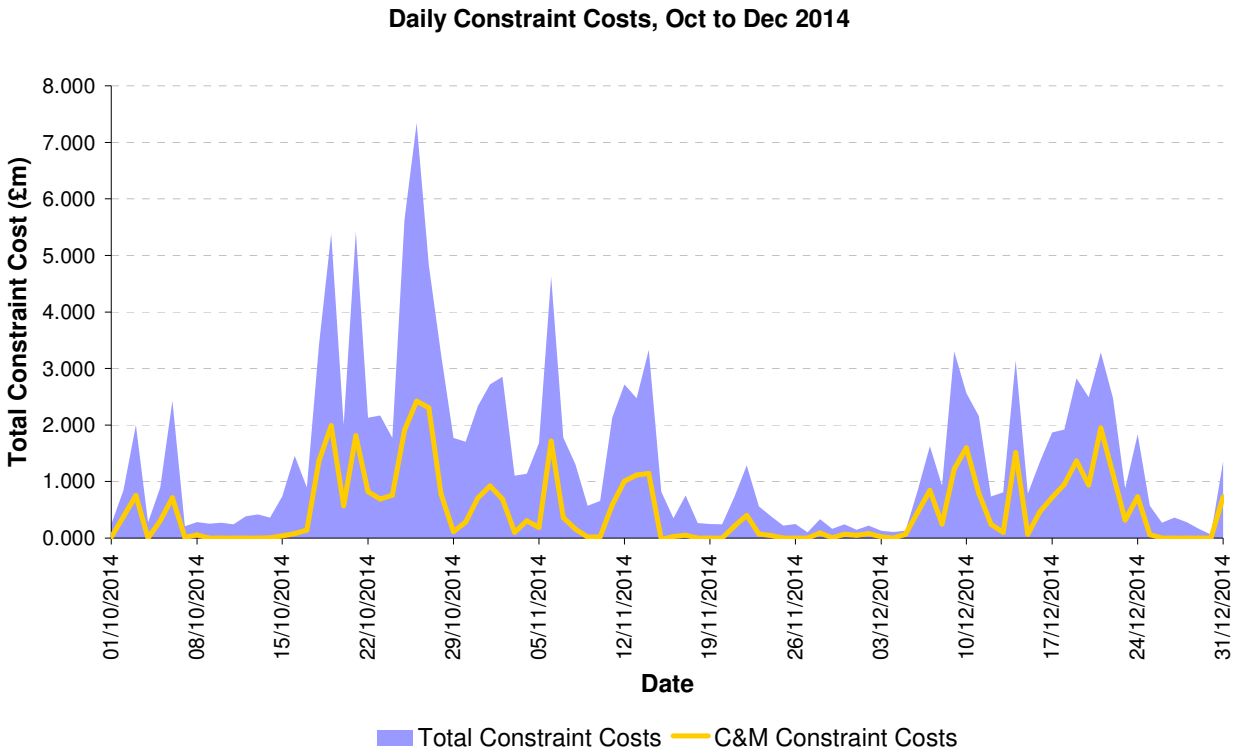


Constraint Costs

Constraint cost attributable to the C&M plant in the quarter was £44.8m which brings the total for 2014/15 to £59.3m for the year to date against the forecast cost of £95.8m for the year. As expected the costs have increased in Q3, reflecting the weather conditions prevalent at this time of year. In addition for Q3 2014/15 this has been exacerbated by outages to some key circuits, unavailability of intertrip solutions, and tight margins. The latter two factors mean that it has been more expensive to resolve constraints than may otherwise have been the case, whilst the first factor has meant an increase in the number of actions required.

Constraint costs have increased compared to the same quarter last year (£23.7m) however this is not commensurate with the increased output of C&M units (581GWh in Q3 2013/14 versus 903GWh in Q3 2014/15). This low correlation between increased output from C&M units and costs is largely due to changes in the background generation within Scotland with reduced output from conventional sources during the quarter compared to the previous year.

As would be expected the costs attributed to C&M units are proportional to the volumes of constraint actions allocated, as shown in the graph below.



Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (e.g. coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, is estimated at 756,000 tonnes in the quarter bringing the total to 3.5 million tonnes since the beginning of the C&M regime.

Report on the Connect and Manage Regime

Interim Outturn Report

Quarter 4: January 2015 – 31 March 2015

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to Financial Year 2014/15 and includes the summary of Q4.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity of 1.77 GW is an increase of 349MW compared to the last quarter with 554MW of new contracted capacity added in the year as a whole. This increase in the year has largely been driven by the connection of Westermost Rough and Humber Gateway offshore wind farms, with the latter connecting in Q4.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	T1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	T5	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	T1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	S1	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	T3	5	Dec 2011
Glendoe	Hydro	100	T1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	T5	1	Dec 2012
Rosehall	Onshore Wind	25	T5	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	T2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	T1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	T5	1	May 2013
Calderwater	Onshore Wind	32	S4	7	May 2013
Camster	Onshore Wind	50	T5	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	T1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	S1	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	R5	9	Oct 2013
Berry Burn	Onshore Wind	67	T1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	T2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	S5	6	Nov 2013
Lochluichart Windfarm Stage 1	Onshore Wind	51	T1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	T2	1	Dec 2013
Tullo II	Onshore Wind	25	T2	1	Mar 2014
Westermost Rough	Offshore Wind	205	P8	9	Aug 2014
Humber Gateway Offshore Wind Farm BMU 1	Offshore Wind	108	P8	9	Jan 2015
Humber Gateway Offshore Wind Farm BMU 2	Offshore Wind	111	P8	9	Jan 2015
Stroupster Wind Farm	Onshore Wind	32	T5	1	Feb 2015
Burn of Whilk Wind Farm	Onshore Wind	23	T5	1	Mar 2015
Strathy North Wind Farm	Onshore Wind	76	T5	1	Mar 2015
Total Contracted Capacity (MW)		1,769			

Note: New TNUoS Zones were introduced in 2013/14. For consistency with prior years this report summates to the pre-2013 zones.

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Connect and Manage Outturn

Table 1: Connect & Manage Outturn Data Summary

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By Generation Zones 1	2	3	4	5	6	7	8	9 Other
Metered Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33
	2014-15	3,163	940	-	355	48	130	192	671	-	827
	2014-15 Q1	494	131	-	64	4	17	52	117	-	109
	2014-15 Q2	512	148	-	54	9	21	43	97	-	140
	2014-15 Q3	965	299	-	109	15	40	57	198	-	248
	2014-15 Q4	1,192	361	-	128	20	52	41	260	-	330
	Total to date	5,433	1,735	-	896	103	228	198	1,414	-	860
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousands of Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	0
	2014-15	2,518	741	-	362	36	74	220	600	-	487
	2014-15 Q1	429	125	-	67	4	13	66	104	-	50
	2014-15 Q2	434	140	-	39	7	14	73	86	-	74
	2014-15 Q3	756	217	-	114	11	23	45	185	-	162
	2014-15 Q4	899	258	-	141	14	24	36	224	-	201
	Total to date	4,400	1,395	-	886	84	142	243	1,162	-	487
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3
	2014-15	1,395	555	-	246	27	70	60	406	-	31
	2014-15 Q1	138	49	-	31	1	6	9	34	-	7
	2014-15 Q2	82	31	-	12	2	5	1	31	-	0
	2014-15 Q3	568	213	-	89	11	29	28	176	-	21
	2014-15 Q4	607	261	-	114	13	29	22	164	-	3
	Total to date	2,786	1,071	-	571	67	132	64	847	-	34
Constraint Costs Attributable to C&M units (£k)	2011-12	2,432	72	-	2,236	-	124	-	-	-	-
	2012-13	5,645	1,664	-	785	58	294	-	2,845	-	-
	2013-14	71,760	28,976	-	16,948	1,661	3,616	89	20,366	-	103
	2014-15	99,717	31,336	-	17,644	1,543	5,165	2,441	39,810	-	1,778
	2014-15 Q1	6,840	2,514	-	1,778	38	330	215	1,756	-	210
	2014-15 Q2	7,908	2,801	-	1,243	159	364	93	3,233	-	15
	2014-15 Q3	45,101	14,287	-	7,212	759	2,319	1,363	17,695	-	1,465
	2014-15 Q4	39,868	11,734	-	7,411	586	2,153	770	17,126	-	89
	Total to date	179,555	62,048	-	37,613	3,261	9,199	2,530	63,021	-	1,882

Note: All quarters in 2014/15 have been recalculated in the table above based on the latest data available as at 15th April 2015. In addition the generation zone of some of the units has been updated.

Comparison to History

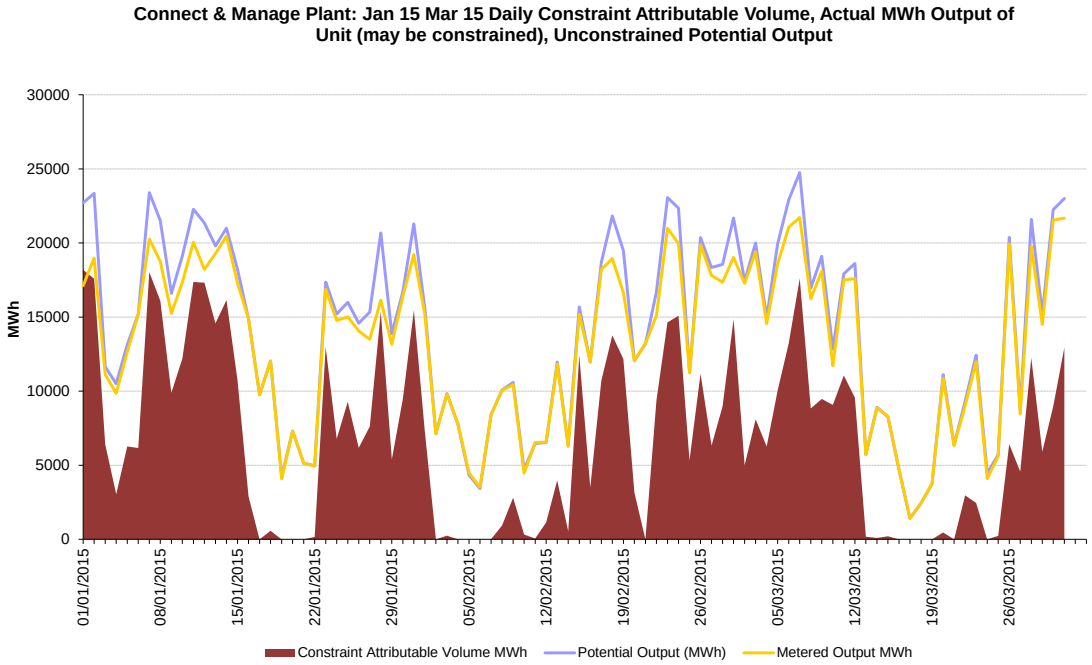
Metered Output

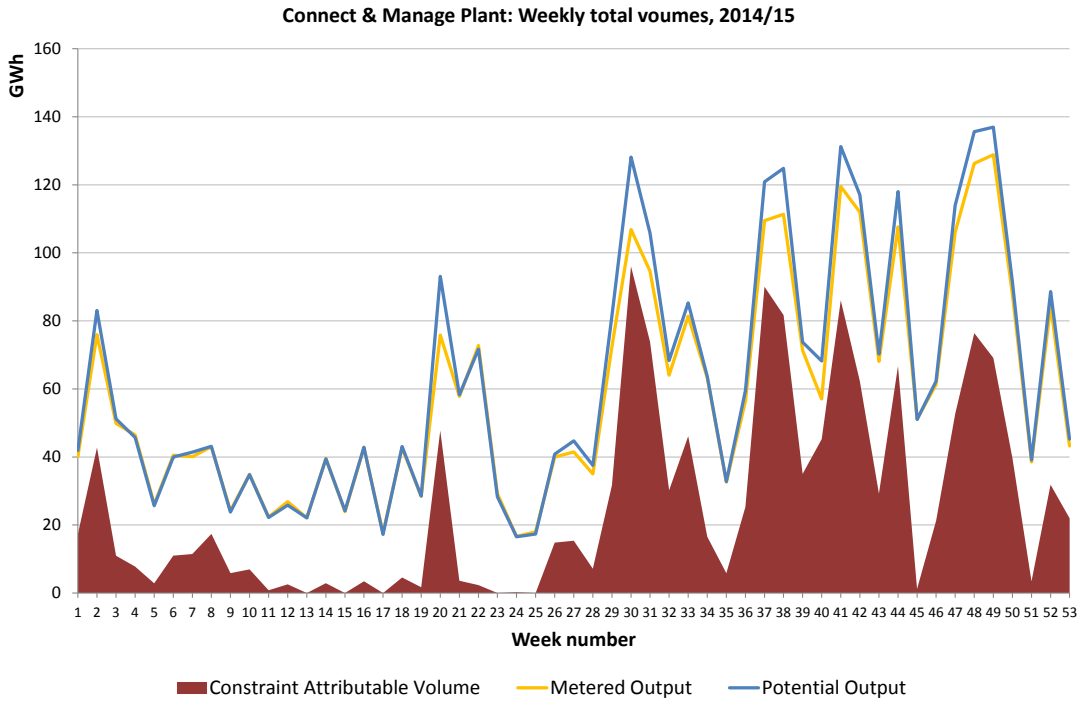
As per Table 1, output from the C&M units in Q4 was 1.2TWh and increase of some 227GWh compared to Q3. This is a reflection of the weather conditions and increasing installed capacity at the connected sites.

Of the metered output in Q4, 607GWh is attributable to system constraints versus 553GWh for the same quarter in the previous year. For the year as whole 1.4TWh of C&M output where attributable to system constraints compared to 1.2TWh in 2013/14. This is in part a reflection of where the new connections have been made with the large offshore units feeding into less congested regions than majority of the onshore units connected so far. In addition, increased output from C&M units within

zones 1 to 8 has been offset by reductions in other non-C&M generation output and increased transmission capacity as wider reinforcement works continue.

Metered output for Q4 is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.



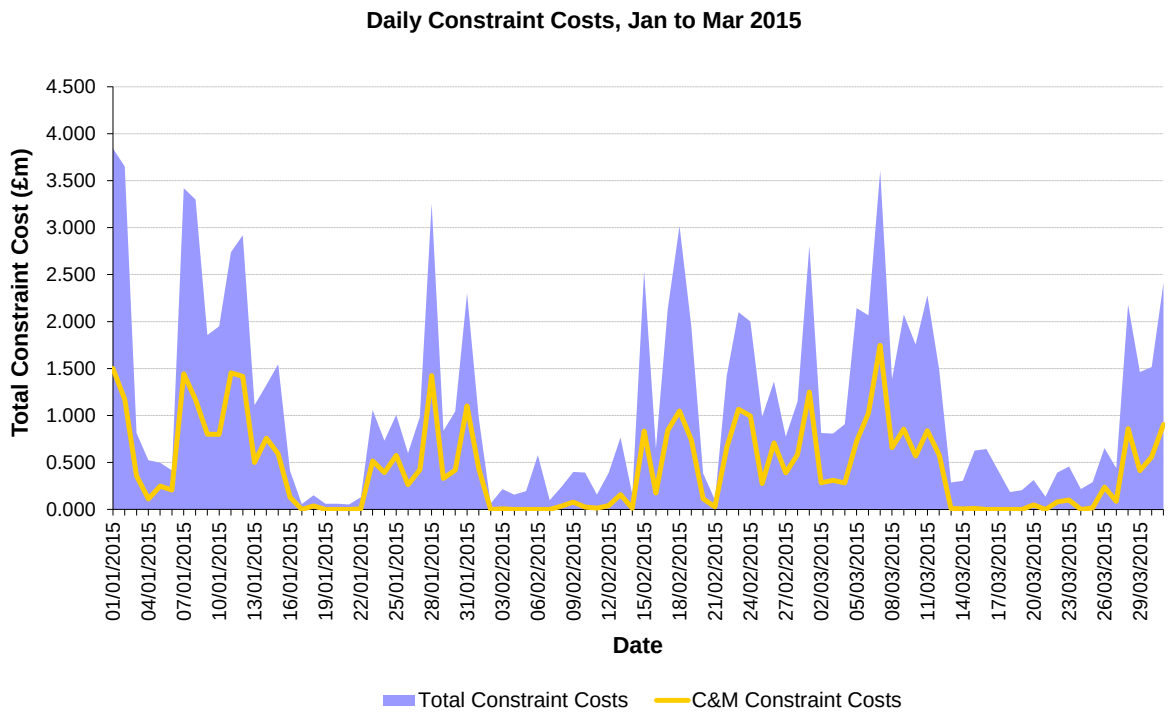


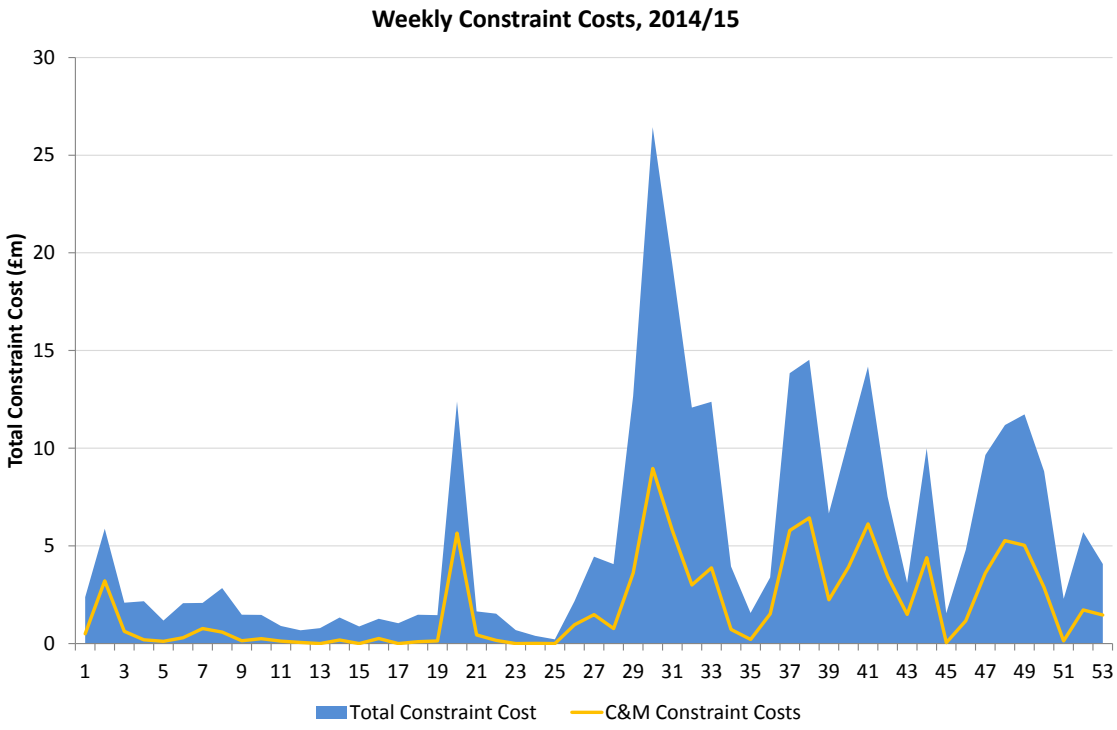
Constraint Costs

Constraint cost attributable to the C&M plant in the quarter was £39.9m which brings the total for 2014/15 to £99.1m against the forecast cost of £95.8m for the year. This quarter has seen higher output from C&M units and also an increase in the volume attributed to constraints however costs for managing this increase has reduced compared to the previous quarter. This is due to the location where some of the additional generation has connected not being within particularly congested zones and also the availability of cheaper replacement generation in Q4 compared to Q3.

For the financial year as a whole constraint costs attributable to C&M units have increased from £72m in 2013/14 to £99m in 2014/15. This is broadly in line with the forecast for the year. A large proportion of this increase has been attributed to C&M generation in zone 7 reflecting the cost of managing constraints in southern Scotland and between Scotland and England, into which these units feed, rather than those further north in Scotland which are unaffected by output from these units. This changing pattern of constraints reflects the outage programme of the year, generation background and the impact of reinforcement works completed in previous years.

As would be expected the costs attributed to C&M units are proportional to the volumes of constraint actions allocated, as shown in the graph below.





Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (e.g. coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, is estimated at 899,376 tonnes in the quarter bringing the total to 4.4 million tonnes since the beginning of the C&M regime.

Appendix A: Generation Zones

The generation zones used in this report correspond to the zones defined for TNUoS charges prior to 2013/14. From 2013/14 the TNUoS zones were redefined and additional zones added however this report retains the previous definitions in order to allow direct comparison to the historical C&M data.

Zones used in this report

Zone ID	Description
1	North Scotland
2	Peterhead
3	Western Highland & Skye
4	Central Highlands
5	Argyll
6	Stirlingshire
7	South Scotland
8	Auchencrosh
9	Humber, Lancashire
Other	Remainder of England & Wales

Connect & Manage Forecast Report April 2015

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1 Introduction

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 wider work 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.

The C&M regime supersedes the previous Interim Connect & Manage (ICM) regime, which was introduced in May 2009 pending the development of the enduring regime. All projects which were offered an ICM agreement have been transitioned to the C&M regime.

Further information relating to the regime and the previous Quarterly Reports on the Connect and Manage Regime can be found by using the following links;

Government response to the technical consultation on the model for improving grid access - July 2010

National Grid's Connect and Manage Guidance Document – March 2013

C&M Derogation reports for projects with a signed C&M Agreement

Recent Connect and Manage reports

1.2 About this Report

This present report provides an assessment of anticipated additional costs which might be incurred as a result of the derogation against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed ("Connect & Manage"). This is the first C&M report with 2014 Future Scenarios (FES) and associated boundary limits. Only the FES 2014 Gone Green scenario is assessed. The wider work reinforcements used are according to our Electricity Ten Year Statement 2014 (ETYS 2014) recommendations. This is also the first report using our in-house tool for long term constraint forecasts ELSI (Electricity Scenario Illustrator), where PLEXOS was used in past years.

Reports on the performance of plant currently connected under the Connect & Manage regime with regard to the last quarter of Financial Year 2014/15 and the whole year summary can be found in a separate report under above mentioned link. The next C&M Actuals Report is due to be published end of April 2015

2. Assessment of anticipated additional costs and benefits as a result of C&M

2.1 Introduction

The following section provides an assessment of the anticipated additional costs which are as a result of the derogations against requirements contained within the NETS SQSS as a consequence of the connection of generation in advance of Wider Transmission Reinforcement Works being completed ("Connect & Manage"). This is the first C&M forecast with 2014 Future Energy Scenarios and associated boundary limits.

The enduring Connect and Manage (C&M) regime was introduced by DECC to help meet climate change targets and ensure security of supply. However, it is also important to ensure that the additional cost of the regime is not excessive and National Grid can still demonstrate that it is meeting its obligation to run the system economically and efficiently.

C&M costs are complex to forecast due to the increasing level of uncertainty associated with how the market will meet future demand. Future closure of much plant will close in the future as a result of end of technical life and restriction on running (e.g. Large Combustion Plant Directive).

The forecasts of C&M costs have been steadily improved since the introduction of the regime. The following provides a high level description of the process for forecasting the additional costs as a result of C&M. This report uses the chapter 3 of the report published last year (2014) as a template. A direct comparison between these two reports can be undertaken to help understand the changes in forecast of impact of the regime in terms of costs and CO2 impact, and how much the transmission system may restrict the output of C&M plant and other associated impacts. However it must be noted that a different forecast tool was used for the present report which will be explained further in chapter 2.2.

National Grid has adapted its approach to the C&M forecast for longer term C&M connectees to take account the interaction of the Network Development Policy (NDP). While shorter term C&M connectees would likely result in a cost-uplift, in longer term timescales costs are still controlled by the NDP i.e. a decision to bring forward investment would be taken. To reflect this interaction with NDP, the forecast costs of C&M for GB are estimated to be zero from 2023/24 onwards. Further details can be found in chapter 2.4.3 of this report.

2.2 Model – Changes to last year

To be consistent with other National Grid obligations the model used for Connect & Manage forecast has changed. The forecasts for the past Connect and Manage Forecast reports were calculated with PLEXOS, which is now replaced with National Grid's in-house tool for long term constraint forecasts, called ELSI (Electricity Scenario Illustrator). ELSI is used for:

- RIIO Capex Programme (2010 – 2030).
- Network Development Policy and the annual publication of a critical licence obligation: Electricity Ten Year Statement (ETYS).
- Strategic Wider Works need cases.

ELSI, a Microsoft Excel based model, which utilises Visual Basic linear programming, is available for free from our website. Additionally, unlike most tools, ELSI adopts a transparent modelling approach, where all input assumptions and algorithms are always accessible to the user.
ELSI represents the GB electricity market, where the energy market is assumed to be perfectly competitive; i.e. there is perfect information for all parties, sufficient competition so that suppliers contract with the cheapest generation first and that there are no barriers to entry and exit from the market.
The electricity transmission system in ELSI is represented by series of zones that are separated by boundaries. The total level of generation and demand is modelled such that each zone contains a total installed capacity by fuel types (CCGT, Coal, Nuclear etc.) and a percentage of overall demand. In order for a system to balance, generation must equal demand. Level of zonal connectivity is defined in ELSI to allow the system to balance as a whole. The boundaries, which represent the actual transmission circuits facilitating this connectivity, have a maximum capability that restricts the amount of power which can be securely transferred to across them (This capability maybe an N-1or N-D capability, according to the operational standards applied to the boundary – this is a matter of input data).

ELSI models the electricity market in two main steps:
The first step looks at the short run marginal cost (SRMC[1]) of each zonal fuel type and dispatches available generation from the cheapest through to the most expensive one, until the total level of GB demand is met. This is referred to as the 'unconstrained dispatch'. At this point, the network (boundaries) is assumed to have infinite capacity.
The second step takes the unconstrained dispatch of generation and looks at the resulting power transfers across the boundaries. ELSI compares the power transfers with the actual boundary capabilities and re-dispatches generation where necessary to relieve any instances where power transfer > capability (i.e. a constraint has occurred). This re-dispatch is referred to as the 'constrained dispatch' of generation.
The algorithm within ELSI will relieve the constraints in the most economic and cost effective way by using the SRMC of each fuel type. The cost associated with moving away from the most economic dispatch of generation (unconstrained dispatch), to one which ensures the transmission network remains within its limits (constrained dispatch) is known as the constraint cost and is calculated using the bid and offer price of each fuel type.

ELSI models all 365 days of the year and is capable of multi-year simulations. ELSI categorises days into three seasons, namely spring/autumn, summer and winter. Each day is split into 4 periods which represent daily peak, plateau, pickup/drop-off and the night trough. Some data sets only require annualised assumptions, whereas others require seasonal and daily characteristics to model network constraints and associated costs.

The demand for each day has been derived from recent load data and scaled by forecast peak demand to model future years. A further difference between PLEXOS and ELSI is the use of different load duration curve. ELSI does not consider a load shift due to the use of heat pumps and electric vehicles as highlighted in the Future Energy Scenarios documents.

Wind availability is represented by sampling historic data across 12 wind zones. Transmission capability used for constrained models is represented by the ETYS boundaries. Interconnector operation is determined by marginal cost differences with remote systems (i.e. operation is cost minimised). Storage operation minimises daily operational costs given power and energy limitations and cycle efficiency.

Note that ELSI does not compute local constraints.

[1] Note that ELSI models SRMC (£/MWh) = Production (£/MWh) + Carbon emissions (£/MWh) + zonal adjuster (£/MWh)

2.3 Forecasting Process

The C&M constraint costs associated with the Future Energy Scenario “Gone Green 2014” are calculated assuming the connection dates of Connect & Manage units differ in two situations.

(a) Enabling works completed
(b) Wider works completed.

Both backgrounds use the network capabilities according to ETYS 2014 chapter 3 as well as reinforcement dates as optimised via NDP and recommended in ETYS chapter 4 respectively. Generation in “Enabling Works” background is set up according to FES2014 GG generation background. This generation background is also used for “Wider Works” background; however generation is pushed back to the completion dates of wider works as per NDP recommendations.

Generation is categorised as Connect and Manage between its enabling date and the wider works completion date. Once the wider works are complete, the generation is not considered as C&M capacity, beyond that point. Our cost forecasts are based on the difference in costs between the Enabling Dates scenario and the Wider Works scenario. This means that generation categorised as C&M is coming in and out of the assessment throughout the ten year forecast period.

National Forecast peak demand based on the Future Energy Scenarios presented in the Electricity Ten Year Statement (http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Electricity-Ten-Year-Statement/) is profiled across the country using historical profiles. Further details on how ELSI is modelled are described in the previous chapter.

To determine the constraint cost impact; a transmission network is added, with associated transmission boundary limits (ETYS2014). The flow of power across the boundaries must comply with the boundary limits. This will result in the “pull back” of generation where there is an export constraint and “push through” of more generation where there is an import constraint. There will be equal and opposite balancing actions outside the constrained areas to ensure National demand is met.

The cost of varying these outputs is then calculated based on the typical corresponding bid and offer prices for varying the output of this generation within the Balancing Mechanism. The difference in cost of the unconstrained and constrained models gives the constraint cost of “Gone Green 2014 – C&M connection at the date of completion of enabling works” [1].

The same generation background is taken, modifying the connection dates of C&M generation as per their wider works completion dates. The unconstrained and constrained models are then produced for the “Wider Works” scenario and the difference in costs between these two runs is the constraint cost of “Gone Green 2014 – C&M connection at completion of wider works” [2].

The assumed amount of available generation as a result of “Enabling Works” dates is greater and as a result, marginal plant will be displaced from the merit order to meet demand.

The difference in constraint costs of [1] and [2] gives the constraint costs of C&M.

The following Figure 1 is a high level diagram showing this process:

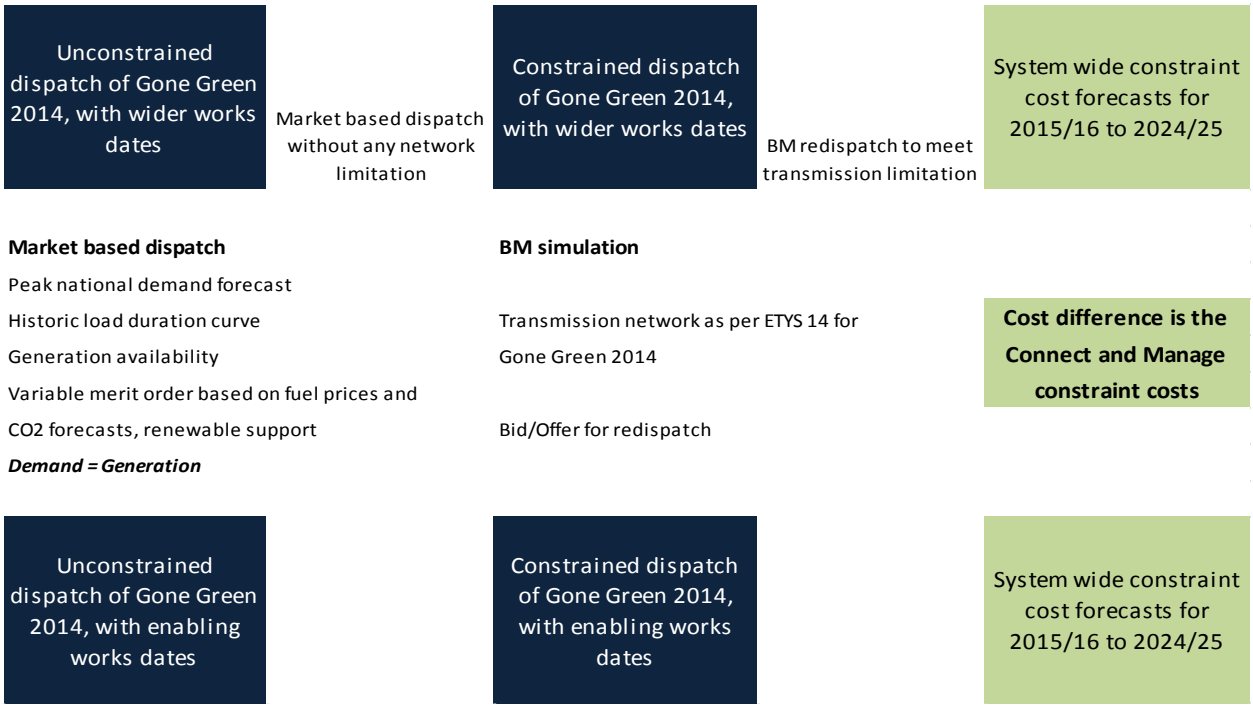


Figure 1 Process of Connect and Manage

The modelling approach does not consider the overall changes in market capacity and the associated impact on market behaviour and prices. It focuses primarily on the volume of C&M plant available in the future scenarios and the additional cost of resolving constraints during the periods that this C&M plant has connected to the transmission system but the wider reinforcement works required for compliant connections have not yet been completed.
In our approach, where lifetime derogation boundary costs exceed a specific limit, reinforcement works are advanced consistent with the general programme of work to provide a higher boundary limit earlier in the scenario timescale to achieve overall costs within an assumed cost limit. This approach reflects the situation that should occur in practice, where TSOs invest efficiently in their networks partly in response to higher constraint costs. Planned transmission investment should ensure that C&M costs decrease. In addition, a significantly higher volume of C&M in future years should lead to downward pressure on prices, which may cause other C&M projects to defer their connection to later years.

As the C&M generation connects, they will then be fully incorporated in all future scenarios and the system impact of these additional generation will evaluated in the application of National Grid's Network Development Policy (NDP), as discussed in section 2.4.2 below.

2.4 Impact of Connect & Manage Gone Green Scenario

2.4.1 Total Constraints Costs & Volume: GB Market

The charts in the following chapters show the forecast costs and volumes of C&M constraints for 2015/16 through to 2024/25. To provide a consistent basis for forecast the boundary capabilities are adjusted on a seasonal basis and do not take account of the impact of specific and individual maintenance outages. Individual outages and their impact on boundary limits are only known for 2015/16 and not for 2016/17 onwards. A more detailed and comprehensive view of the forecast costs is provided under our SO incentives for 2015/16. The reason for taking this approach was to provide an indicative view of the costs of Connect & Manage. Therefore BSIS (Balancing Services Incentive

Scheme) forecasts is used for calculating constraint costs of the first two years (2015/16 and 2016/17).

Points of note:

An approach adopted in previous years was the use of pre-agreed costs limits for individual constraint boundaries and the system as a whole. We have applied these cost limits to the C&M modelling to ensure that excessive costs are not incorporated into the output. We consider this a sensible approach to adopt given National Grid's licence obligation to plan and operate the system economically and efficiently, and this is also consistent with the Network Development Policy. If the lifetime derogation cost of a specific constraint boundary was forecast to be in excess of the cost of the next incremental boundary reinforcement, then these reinforcement works will be advanced to provide a higher boundary limit earlier then presently presented in our Electricity Ten Year Statement (ETYS). The costs shown reflect these adjusted limits for certain boundaries consistent with respecting lifetime derogation cost limits. These adjustments have only been made in the later years of the scenario to reflect the lead times associated with building new infrastructure.

2.4.2 Impact of Network Development Policy

In addition to the above approach, the impact of National Grid's Network Development Policy has also been taken into account in the cost assessment.

The RIIO price control introduced the Network Development Policy (NDP) for England and Wales where National Grid is the transmission owner. The NDP identifies the requirements for further transmission investment and considers the balance between the risks of investing too early in wider transmission reinforcements and the risks of investing too late, which include incurring inefficient congestion costs. The key output of the NDP is the identification of the appropriate action to take in the current year. This is selected through minimising the investment regrets against the credible range of future energy scenarios and sensitivities. The NDP provides a transparent process for the selection of transmission solutions and is presented in chapter 4 of our Electricity Ten Year Statement (ETYS). This will enable stakeholders to understand why decisions to build, and not to build, have been taken.

Assessing the balance of constraint costs vs investment:

When assessing whether to make an investment vs. an efficient level of constraint we are using both the SQSS to identify where there may be pinch points on the network and then a cost benefit analysis looking at the cost of the investment compared to the expected constraint costs. A decision on whether to invest, in one scenario only, would be based on the investment providing sufficient benefit to the transmission system such that the cost of the investment over its life time is cheaper than the cost of the constraints expected without the investment. We make a decision on the optimal year of the investment such that the ratio of cost of investment-cost of constraints is maximised.

Figure 2 shows the constraint costs for a "Wider Works" and an "Enabling Works" background. As described in chapter 2.3 wider work reinforcements are applied according to reinforcements as per ETYS2014. Taking the generation and demand background as per FES2014 GG and capabilities and reinforcement recommendation as per ETYS2014 the constraint costs for the "Enabling Works" are calculated with the results shown in Figure 2. The figure also shows constraint costs if generation connects to the grid when wider works have been completed ("Wider Works" background).
The first two years of the graph are calculated using the latest BSIS forecast numbers received from the Market Operation team of NGET SO. Those constraint forecasts for 2015/16 and 2016/17 are treated as "Enabling Works" constraint costs. Computing the "Wider Works" constraint costs "Enabling Works" numbers are scaled down proportionally according to ELSI Connect and Manage

runs, i.e. constraint costs for “Enabling Works” and “Wider Works” are calculated by means of ELSI for respective years and are used to scale BSIS numbers accordingly.

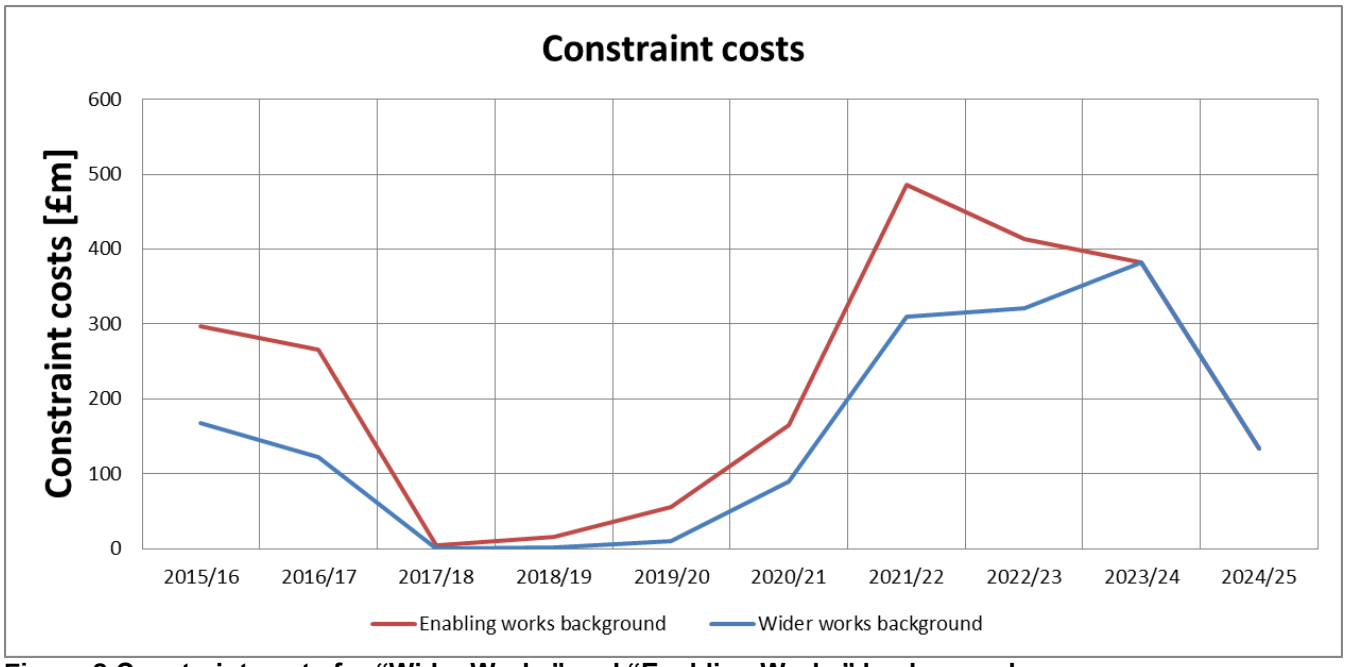


Figure 2 Constraint costs for “Wider Works” and “Enabling Works” background

The spike of both backgrounds in year 2021/22 is due to insufficient reinforcements at place in whole GB. Constraint costs are forecast to decrease upon delivery of major reinforcements in Scotland and East Coast region of England. That leads to constraint costs of both backgrounds being aligned from year 2022/23 onwards.

2.4.3 Impact of C&M on total constraint costs

The following chart shows the results of the process described in chapter 2.3 of this report. The difference in constraint costs between “Enabling Works” and “Wider Works” background shown in Figure 2 results in the impact of Connect and Manage on total constraint cost, which can be seen in Figure 3.
The impact of Connect and Manage of the first two years are received using the BSIS constraint costs of the previous chapter, which results in £129m and £142m for 2015/16 and 2016/17 respectively.

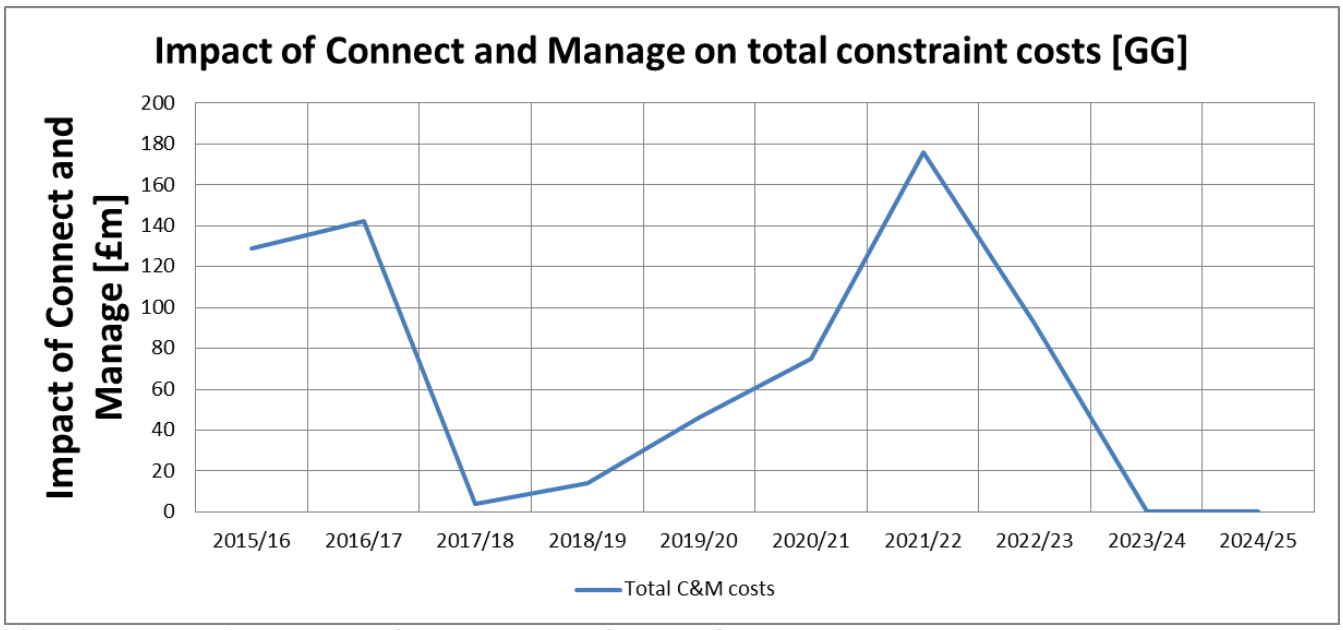


Figure 3 Impact of Connect and Manage on total constraint costs

Outturn C&M costs for 2014/15 are £99.1m. The drop of C&M costs in 2017/18 are predominantly due to commissioning of the Western HVDC Link which connects Scotland and England/Wales relieving pressure on B7a Boundary (Upper North – see Appendix A System Boundary Map). Costs continue to build due to new generation connected until network reinforcements via the NDP process are delivered across both Scotland and E/W boundaries. The maximum appears in 2021/22 with new wind and new gas power plants being connected in both Scotland and E/W. Upon delivery of network reinforcements in 2022/23 and in 2023/24 (Eastern HVDC Link 1 and 2 respectively) constraint costs attributable to C&M disappear.

In later years, England and Wales C&M generation becomes more prominent and costs are more attributable to E/W constraints as more new gas and new East Coast offshore wind connects to the grid. This can be seen in following Figure 4 which shows the relative influence of Scotland and England and Wales C&M generation assuming an unconstrained network (no transmission limitations).

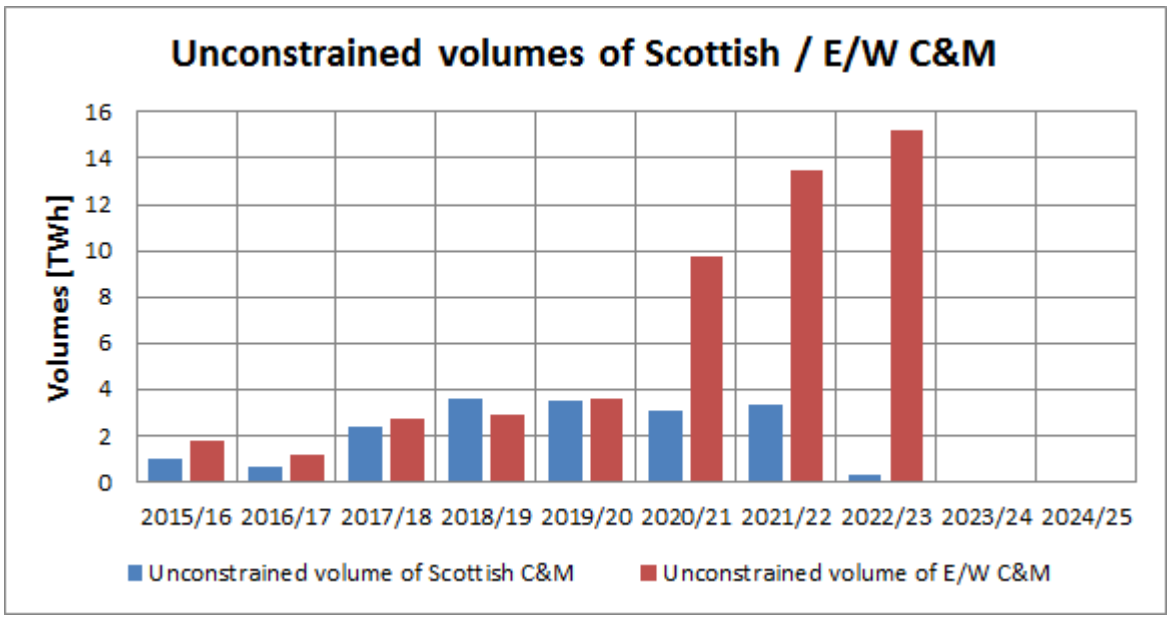


Figure 4 Unconstrained volumes of Scottish / E/W C&M

2.5 Demand met by C&M generation in unconstrained transmission network

The following graph in Figure 5 gives a view of how successful C&M is forecast to be in meeting total National demand assuming no restrictions in output due to constraints. The decrease in 2023/24 is associated with the completion of several wider works, which decreases the volume of generation categorised as C&M in that and the following year to zero.

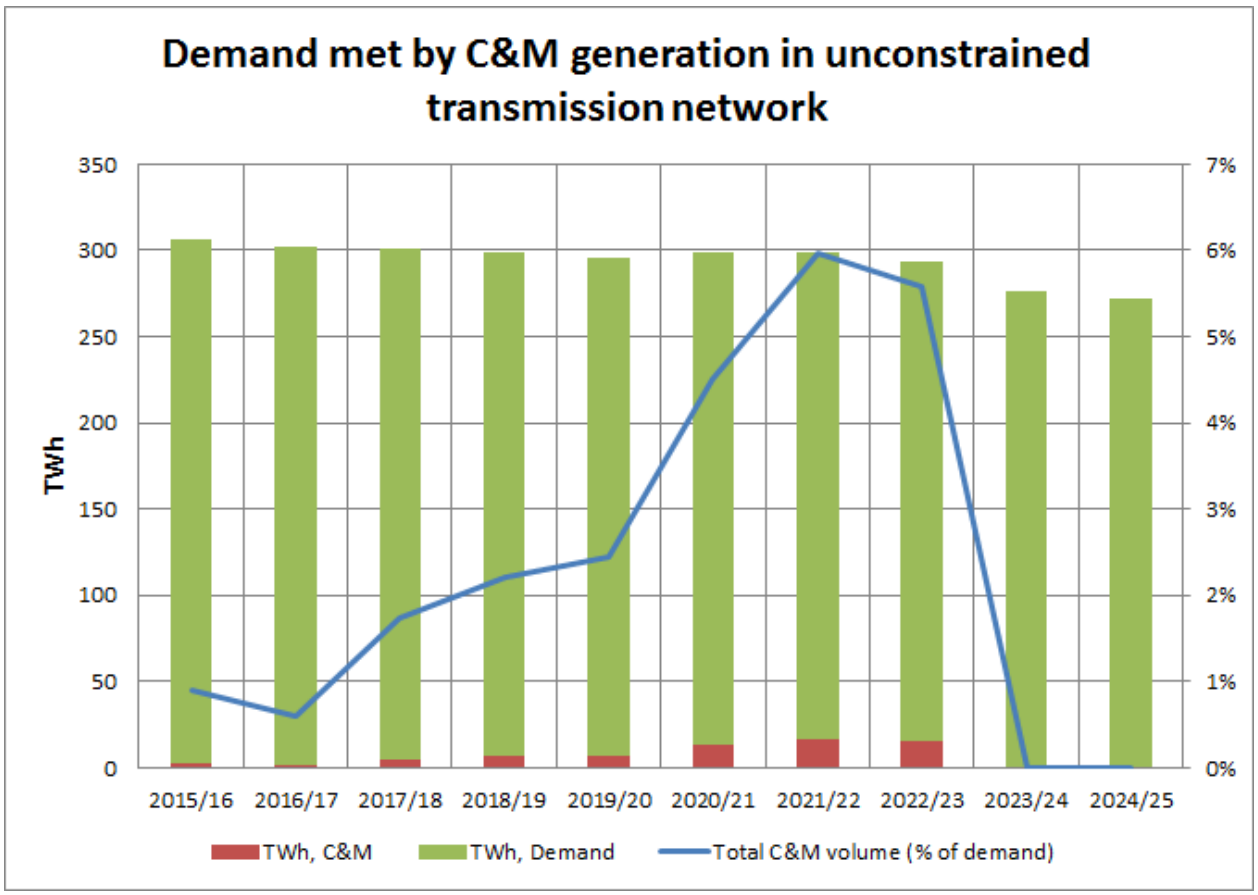


Figure 5 Demand met by C&M generation in unconstrained transmission network

The Total Demand figures vary quite differently compared to last year. This is due to the different tool used for this report as described in chapter 2.2.

Note: the figures shown above relate specifically to Connect and Manage generation (wind and other fuel types), not to all renewable generation, e.g. other generation which does not have advanced enabling dates ahead of wider works completion.

2.6 Comparison to Gone Green 2013 & Gone Green 2014

The Gone Green scenario reflects the environmental targets set by the government; 15% of all energy from renewable sources by 2020, greenhouse gas emissions meeting the carbon budgets out to 2027, and an 80% reduction in greenhouse gas emissions by 2050.

Since a different tool is used a comparison between the results for GG2013 and for GG2014 is difficult.

However, there are two major differences between the ELSI version which uses GG2013 and the one which uses GG2014. Firstly, the generation and demand background has changed. Secondly, ELSI

for GG2013 considered only embedded generation for Scotland, ELSI for GG2014 takes embedded generation for whole GB into consideration.

2.7 Capacity of C&M generation within Future Energy Scenario GG2014

Figure 6 below shows the forecast generation capacity in the Gone Green 2014 scenario with and without C&M generation. This aligns with earlier commentary highlighting the completion of wider works in 2023/24 and 2024/25 where no C&M generation occurs.

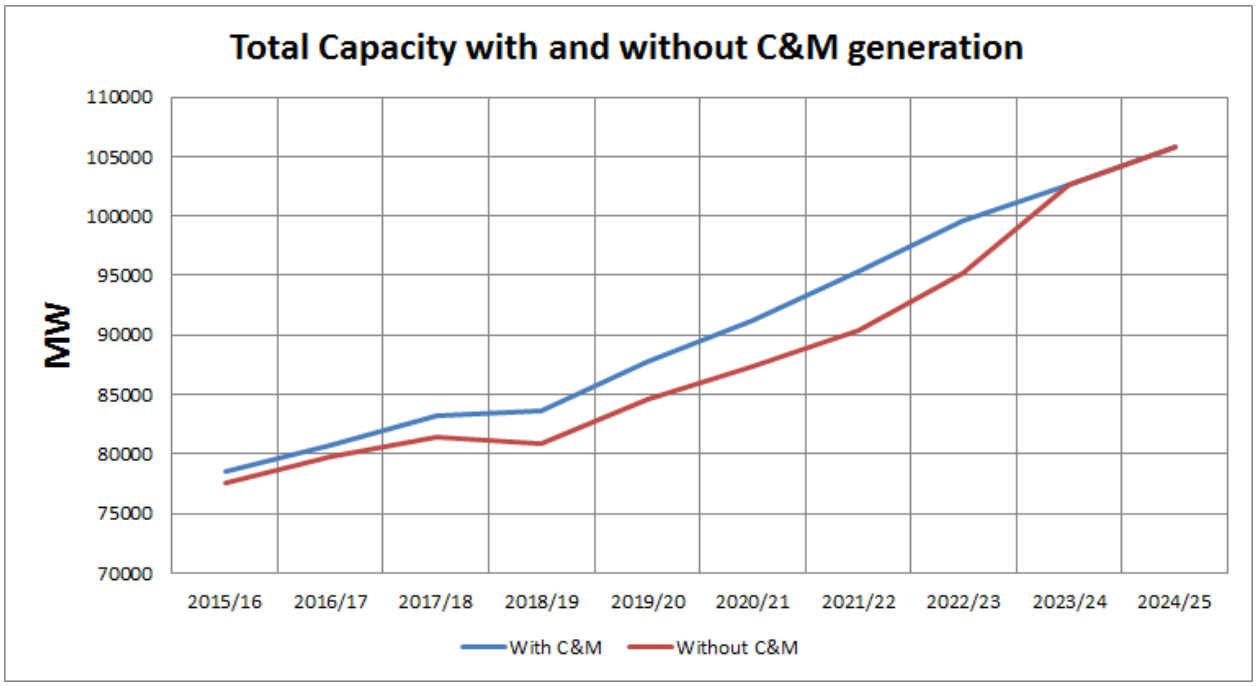


Figure 6 Total Capacity with and without C&M generation

The following Figure 7 compares the total C&M capacity and the unconstrained C&M running i.e. the typical load factor of C&M generation. This shows increase in the unconstrained running of C&M and again highlights decrease in later years due to the completion of respective wider works.

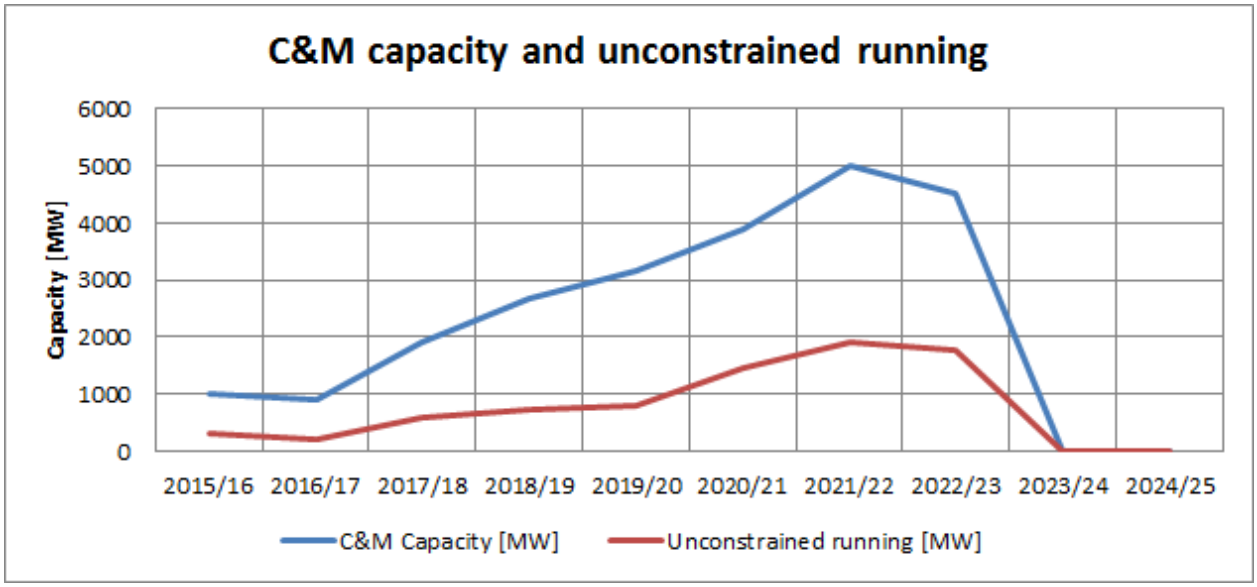


Figure 7 C&M capacity and unconstrained running

2.8 Estimated Carbon Savings

Estimated Carbon savings over the 10 year period due to connecting generation ahead of completion of wider works can be found in Figure 8 below.
It is worth noting that the scenario background has changed from Gone Green 2013 to Gone Green 2014, hence a direct comparison between the two reports is limited. More details on changes between the two scenarios are presented below.

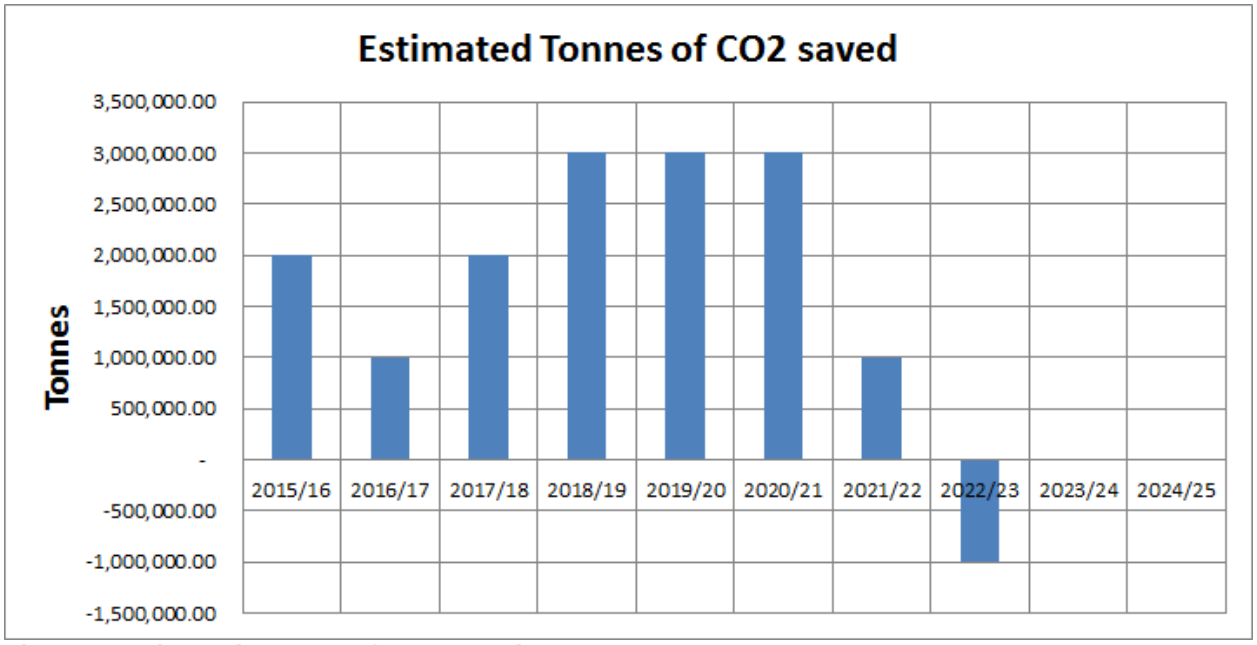


Figure 8 Estimated Tonnes of CO2 saved

During the years 2018/19 and 2020/21 savings are forecast to be between 2-3 million tonnes.

In context, the CO2 savings of around 2-3 million tonnes for those years of the forecast period equate to the typical annual emissions from around 1 medium sized coal stations.

(Using an example of a 480MW medium sized coal plant with a load factor of 66% which runs all year round, the number of running hours is 8760 (24 hours x 365 days), this would equate to ~2.5 million tonnes of emissions of carbon dioxide (0.96 Tonnes/MWh x (66% x 480)MW x 8760 hours). Therefore, 2.5 million tonnes of carbon is equivalent to the CO2 emissions from ~1 medium size coal units).

The negative savings in year 2022/23, i.e. higher CO2 emissions (instead of lower), are predominantly driven by 3GW of new Gas power (Tilbury C and Damhead Creek 2) and a lower wind profile compared to other years. The two gas power plants are forecast to increase CO2 emissions by 2.6Mt when they are connected ahead of wider work completion. This is also caused by Gas replacing European Interconnectors as Short Run Marginal Cost (SRMC) for Gas becomes comparatively lower than European price forecasts. European Interconnectors are modelled without carbon emissions being attached, i.e. Interconnectors would have contributed to more carbon savings.
Applying the wind profile of previous year (2021/22) could result in 0.4Mt CO2 saved.

Zero carbon savings can be seen in year 2023/24 and 2024/25 as Connect and Manage generators are forecast to be aligned with wider works reinforcements.

The significant reduction in carbon savings compared to the previous report is due to the change of scenarios. Gone Green 2014 consists of more wind, more gas and less coal generation which leads

to reduced CO2 output. The difference between Gone Green 2013 and 2014 can be seen in Table 1, showing up to 64% less coal capacity and up to 35% more wind capacity.

Table 1 Difference of capacity between GG2013 and GG2014

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Gas	-1%	-1%	2%	11%	16%	15%	21%	7%	10%	2%
Coal	-11%	-9%	-13%	-39%	-45%	-54%	-62%	-48%	-64%	-42%
Wind	35%	30%	22%	13%	10%	19%	23%	18%	16%	12%

That means having already more “clean” capacity in the background the potential for further savings will be limited. However, the overall total of carbon emissions will be lower in Gone Green 2014 compared to Gone Green 2013 scenario. Less CO2 will be emitted as more low carbon generation is forecast to be connected.

2.9 Comparison of total C&M costs for GG 2014 and GG Variant

It was agreed to compare the impact of Connect and Manage for the Gone Green 2014 scenario with a sensitivity considering reduced wind deployment. This sensitivity was modelled using a wind deployment similar to Slow Progression 2014 to obtain a likely range of constraint costs due to C&M.

The results for the impact of C&M are shown in Figure 9 below.
Please note that in the previous report the comparison was drawn between Gone Green 2013 and Slow Progression 2013.

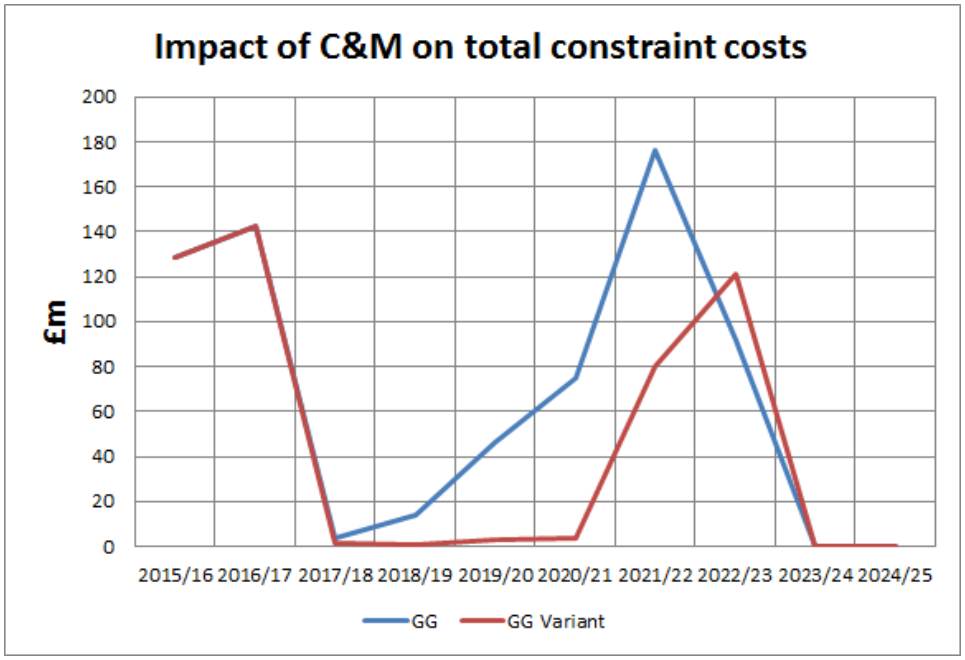


Figure 9 Impact of Connect and Manage for GG2014 and GG2014 Variant

Figure 9 shows the comparison of the impact of Connect and Manage between GG2014 and the GG2014 Variant described above. Constraint costs for the first two years were calculated using the BSIS forecasts as shown in previous chapters. In both scenarios the impact of Connect and Manage will drop to almost zero in 2017/18 after commissioning of the Western HVDC link. Compared to GG2014, impact of Connect and Manage in GG2014 Variant remains significantly smaller until 2020/21. Between 2021/22 and 2022/23 impact of Connect and Manage is forecast to increase again due to insufficient infrastructure in place to support the forecast flows across B7a Upper North boundary. The commissioning of the first Eastern HVDC link in 2022/23 takes off some pressure,

however it also can be seen that the impact of C&M in GG2014 Variant is higher than in GG2014. This is due to more gas power being constraint. In the following year, when the second Eastern HVDC will go live, the impact of Connect and Manage will drop to zero.
A summary table of constraint costs for GG2014 and the GG2014 Variant with reduced wind deployment, correlating with Figure 9 can be found below:

Table 2 Total Connect and Manage costs

Year	Total costs	
	GG2014 [£m]	GG2014 Variant [£m]
2015/16	129	129
2016/17	142	142
2017/18	4	1
2018/19	14	1
2019/20	46	3
2020/21	75	4
2021/22	176	80
2022/23	92	121
2023/24	0	0
2024/25	0	0

3. Contracted Generation and Acceleration of Connection Dates

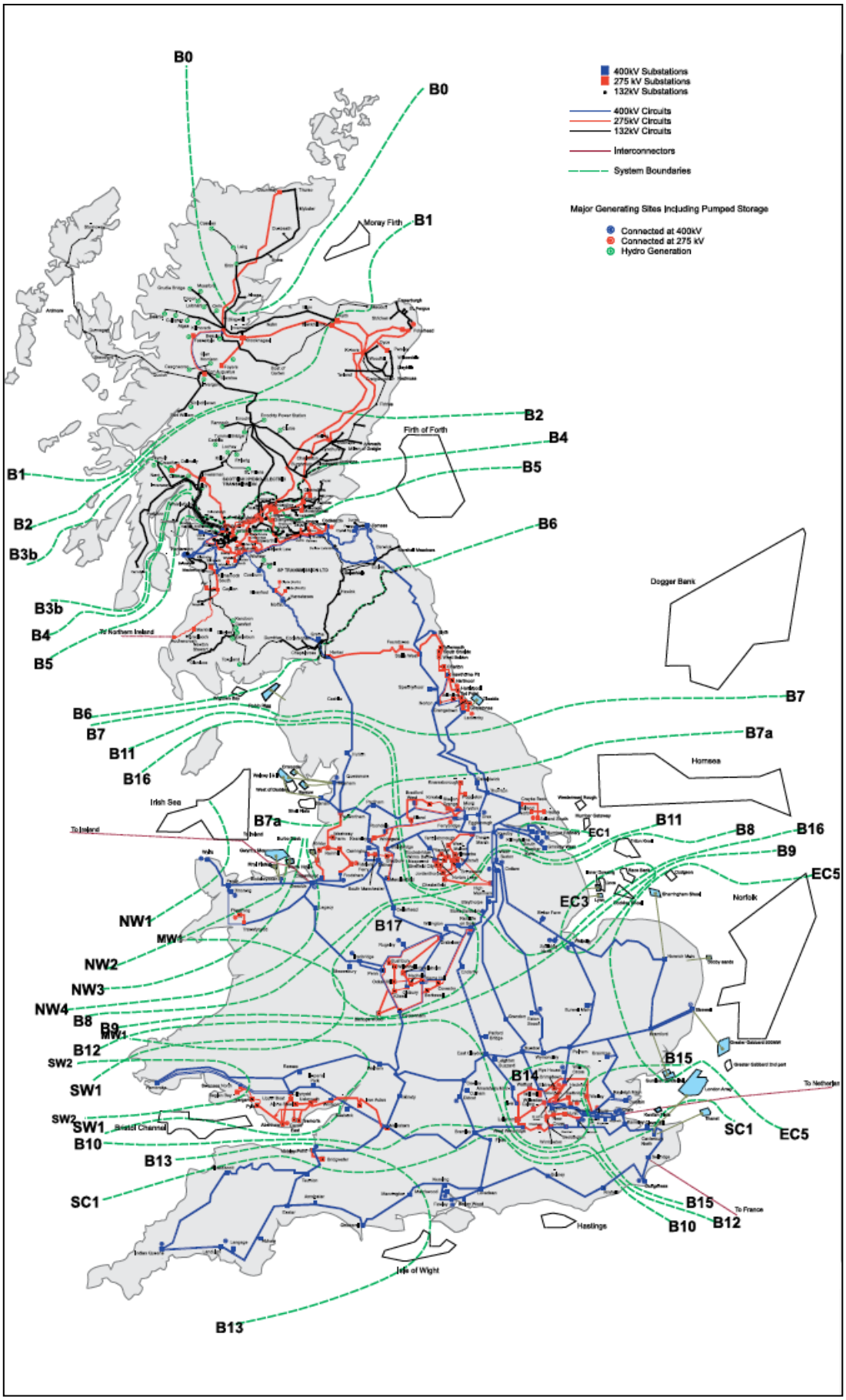
The table below provides a summary of all projects with a signed C&M agreement split by Transmission Owner.

- "Future" relates to those projects which have been offered an agreement but are yet to connect and;
- "Connected" refers to those projects which have already connected to the network. A breakdown of each connected site can be found in Section 2.1 of this report.
- "Average Advancement" describes the advancement (in years) that a customer could expect to achieve under the C&M regime, as opposed to the Invest & Connect regime. Under Invest & Connect projects would need to wait for wider reinforcement works required under the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) to be completed on the transmission system prior to connection. Whereas; under the C&M regime relevant generators only need to await the completion of "Enabling Works".

TO	Status	Renewable / Non Renewable	Number of Projects	Capacity (MW)	Average Advancement (Years)
NGET	Future	Renewable	38	18,715	3
		Non Renewable	9	7,184	5
	Connected	Renewable	3	631	2
		Non Renewable	0	0	0
Total			50	26,530	3
SPT	Future	Renewable	106	9,771	6
		Non Renewable	0	0	0
	Connected	Renewable	4	384	10
		Non Renewable	0	0	0
Total			110	10,155	8
SHETL	Future	Renewable	137	8,964	6
		Non Renewable	0	0	0
	Connected	Renewable	18	662	5
		Non Renewable	0	0	0
Total			155	9,626	5
Overall Combined TO Total			315	46,311	5

It is worth noting that the data which has been used to determine the average advancement value has been taken from customers' signed agreements which, in some cases (at the customers' preference), are later than the earliest connection date that could have been achieved.
Overall there are 315 projects which have been offered a C&M agreement with a combined total capacity of approximately 46 GW and an average advancement of 5 years.
Since the last report the number of projects which have now connected to the system has increased from 22 to 25. The number of customers requesting to enter into a contract is 132, with a significant proportion of applications coming from the SHETL area.
Compared to the last report a significant increase in connecting future generators can be seen. Previously only signed agreements were included however this has been changed to include all offers made, working in line with our Timely Connections Data.

Appendix A – Map of system boundaries studied



Report on the Connect and Manage Regime

Interim Outturn Report

Quarter 1: April 2015 – 30 June 2015

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to Financial Year 2015/16 and includes the summary of Q1.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity remains 1.77 GW as at the end of the last quarter. No new units are included in this report.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	T1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	T5	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	T1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	S1	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	T3	5	Dec 2011
Glendoe	Hydro	100	T1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	T5	1	Dec 2012
Rosehall	Onshore Wind	25	T5	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	T2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	T1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	T5	1	May 2013
Calderwater	Onshore Wind	32	S4	7	May 2013
Camster	Onshore Wind	50	T5	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	T1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	S1	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	R5	9	Oct 2013
Berry Burn	Onshore Wind	67	T1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	T2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	S5	6	Nov 2013
Lochluichart Windfarm Stage 1	Onshore Wind	51	T1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	T2	1	Dec 2013
Tullo II	Onshore Wind	25	T2	1	Mar 2014
Westermost Rough	Offshore Wind	205	P8	9	Aug 2014
Humber Gateway Offshore Wind Farm BMU 1	Offshore Wind	108	P8	9	Jan 2015
Humber Gateway Offshore Wind Farm BMU 2	Offshore Wind	111	P8	9	Jan 2015
Stroupster Wind Farm	Onshore Wind	32	T5	1	Feb 2015
Burn of Whilk Wind Farm	Onshore Wind	23	T5	1	Mar 2015
Strathy North Wind Farm	Onshore Wind	76	T5	1	Mar 2015
Total Contracted Capacity (MW)		1,769			

Note: New TNUoS Zones were introduced in 2013/14. For consistency with prior years this report summates to the pre-2013 zones.

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Connect and Manage Outturn

Table 1: Connect & Manage Outturn Data Summary

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By Pre 2013 TNoS Generation Zones 1	2	3	4	5	6	7	8	9	Other
Metered Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33	-
	2014-15	3,163	940	-	355	48	130	192	671	-	827	-
	2015-16	888	201	-	87	13	33	87	166	-	302	-
	2015-16 Q1	888	201	-	87	13	33	87	166	-	302	-
	2015-16 Q2	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	6,321	1,937	-	983	116	261	285	1,580	-	1,161	-
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousands of Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	0	-
	2014-15	2,518	741	-	362	36	74	220	600	-	487	-
	2015-16	721	159	-	104	11	21	62	152	-	213	-
	2015-16 Q1	721	159	-	104	11	21	62	152	-	213	-
	2015-16 Q2	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	5,122	1,554	-	991	94	163	305	1,313	-	700	-
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3	-
	2014-15	1,395	555	-	246	27	70	60	406	-	31	-
	2015-16	300	109	-	59	7	16	26	81	-	2	-
	2015-16 Q1	300	109	-	59	7	16	26	81	-	2	-
	2015-16 Q2	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	3,086	1,179	-	630	75	148	90	928	-	36	-
Constraint Costs Attributable to C&M units (£k)	2011-12	2,432	72	-	2,236	-	124	-	-	-	-	-
	2012-13	5,645	1,664	-	785	58	294	-	2,845	-	-	-
	2013-14	71,760	28,976	-	16,948	1,661	3,616	89	20,366	-	103	-
	2014-15	99,717	31,336	-	17,644	1,543	5,165	2,441	39,810	-	1,778	-
	2015-16	22,255	6,330	-	4,145	435	1,172	1,257	8,779	-	137	-
	2015-16 Q1	22,255	6,330	-	4,145	435	1,172	1,257	8,779	-	137	-
	2015-16 Q2	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	201,809	68,378	-	41,759	3,696	10,371	3,787	71,800	-	2,019	-

Note: The table above is based on the latest data available as at 20thJuly 2015 for 2015/16. Values for prior years have not been recalculated for this update.

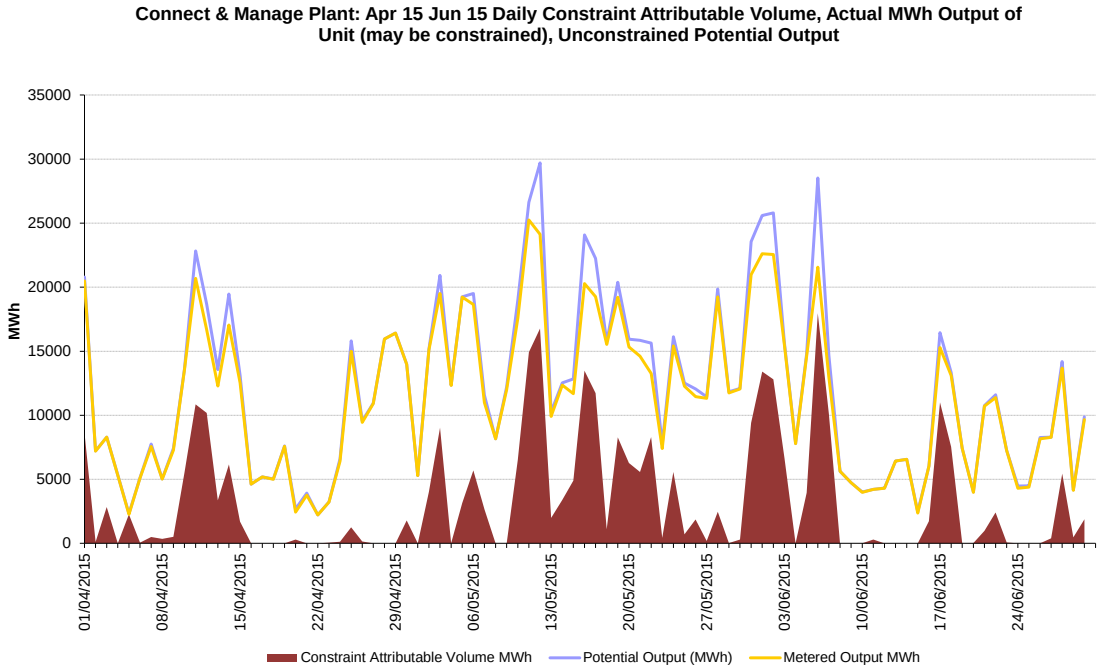
Comparison to History

Metered Output

As per Table 1, output from the C&M units in Q1 2015/16 was just short of 0.9TWh, a decrease of some 300GWh compared to Q4 2014/15 which reflects the environmental conditions during the spring and early summer. In comparison to Q1 2014/15 metered output has increased from the 0.5TWh in that quarter as a result of increased installed capacity, particularly the offshore units in zone 9.

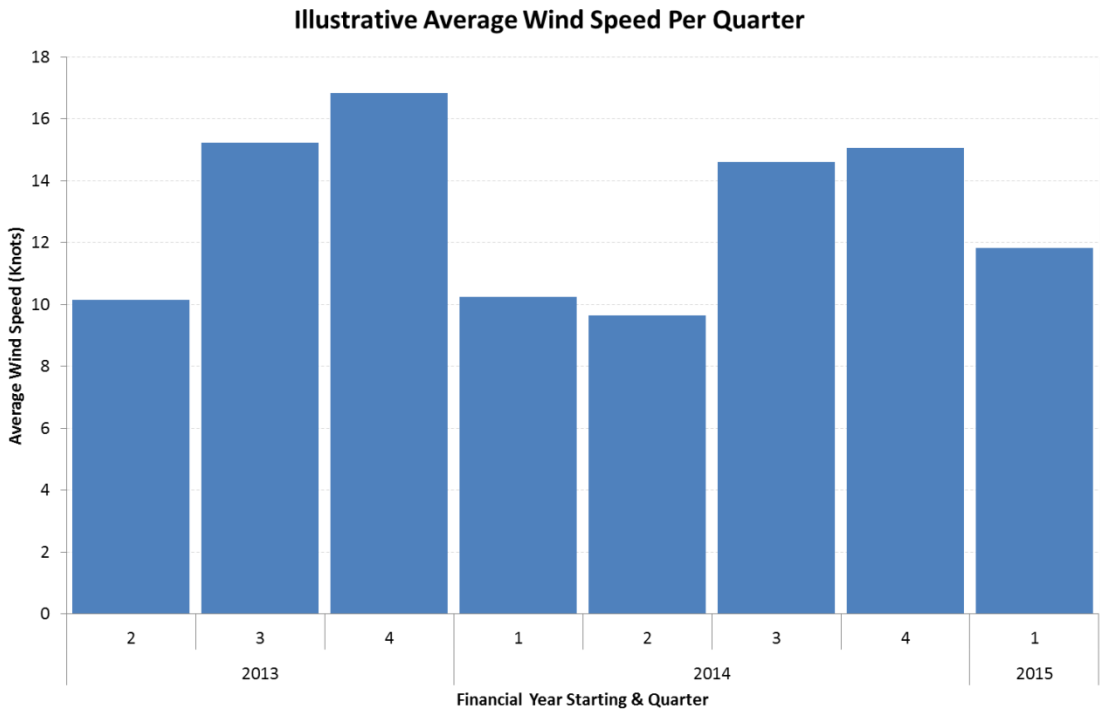
Of the metered output in Q1 2015/16, 300GWh is attributable to system constraints versus 138GWh for the same quarter in the previous year. This increase is from within the congested zones 1 and 7.

Metered output for Q1 is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.



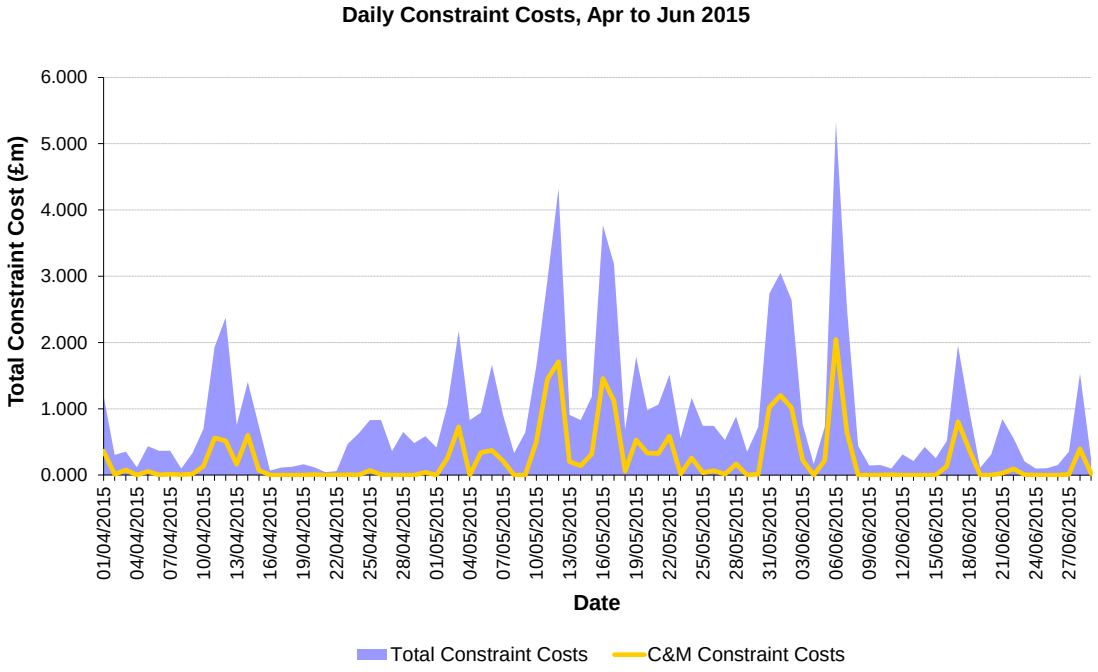
Constraint Costs

Constraint cost attributable to the C&M plant in the quarter w £22.5m with £129m forecast for the year. The total constraint costs during the period where £84.8m, which includes the costs resulting from C&M. The reduction in costs compared to Q4 2014/15 (£39.8m) is due to lower levels of wind during Q1 2015/16 as illustrated on the chart below.



As with previous years the C&M attributed costs are largely driven from zone 1 and 7 reflecting the concentration of generation within the North West of Scotland and the boundary between the Scottish and England transmission systems. Network reinforcements are continuing to take place to increase transmission capacity in both these regions.

As would be expected the costs attributed to C&M units are proportional to the volumes of constraint actions allocated, as shown in the graph below.



Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (e.g. coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, is estimated at 721,451 tonnes in the quarter bringing the total to 5.1 million tonnes since the beginning of the C&M regime.

Appendix A: Generation Zones

The generation zones used in this report correspond to the zones defined for TNUoS charges prior to 2013/14. From 2013/14 the TNUoS zones were redefined and additional zones added however this report retains the previous definitions in order to allow direct comparison to the historical C&M data.

Zones used in this report

Zone ID	Description
1	North Scotland
2	Peterhead
3	Western Highland & Skye
4	Central Highlands
5	Argyll
6	Stirlingshire
7	South Scotland
8	Auchencrosh
9	Humber, Lancashire
Other	Remainder of England & Wales

Report on the Connect and Manage Regime

Interim Outturn Report

Quarter 2: July 2015 – 30 September 2015

CONNECT & MANAGE OUTTURN REPORTING

This document reports on the performance of plant currently connected under the Connect & Manage regime with regard to Financial Year 2015/16 and includes the summary of Q2.

Connected C&M Generation

The table below shows generation projects which have been connected under C&M terms since 2010. The aggregate contracted capacity remains 1.77 GW as at the end of the last quarter. No new units are included in this report.

Project	Fuel Type	Contracted Capacity (MW)	ETYS Zone	Generation Zone	Connection Month
Fasnakyle G4	Hydro	8	T1	3	Oct 2010
Novar 2 Wind Farm Alness	Onshore Wind	32	T5	1	Oct 2011
Hill of Towie (Drummuir)	Onshore Wind	48	T1	1	Oct 2011
Whitelee Extension	Onshore Wind	238	S1	7	Dec 2011
Beinn an Tuirc 2	Onshore Wind	6	T3	5	Dec 2011
Glendoe	Hydro	100	T1	3	Apr 2012
Baillie Wind Farm Stage 1	Onshore Wind	25	T5	1	Dec 2012
Rosehall	Onshore Wind	25	T5	5	Dec 2012
Kildrummy Wind Farm	Onshore Wind	18	T2	4	Dec 2012
Cairn Uish (Phase 2)	Onshore Wind	41	T1	1	Feb 2013
Baillie Wind Farm Stage 2	Onshore Wind	28	T5	1	May 2013
Calderwater	Onshore Wind	32	S4	7	May 2013
Camster	Onshore Wind	50	T5	1	May 2013
Pentland Road Stage 1	Onshore Wind	14	T1	3	Jun 2013
Harestanes Stage 1	Onshore Wind	111	S1	7	Sep 2013
West of Duddon Sands Stage 1	Offshore Wind	206	R5	9	Oct 2013
Berry Burn	Onshore Wind	67	T1	1	Nov 2013
Gordonsttown Hill	Onshore Wind	13	T2	1	Nov 2013
Markinch Biomass CHP Plant	Biomass	3	S5	6	Nov 2013
Lochluichart Windfarm Stage 1	Onshore Wind	51	T1	1	Nov 2013
Mid Hill Wind	Onshore Wind	75	T2	1	Dec 2013
Tullo II	Onshore Wind	25	T2	1	Mar 2014
Westermost Rough	Offshore Wind	205	P8	9	Aug 2014
Humber Gateway Offshore Wind Farm BMU 1	Offshore Wind	108	P8	9	Jan 2015
Humber Gateway Offshore Wind Farm BMU 2	Offshore Wind	111	P8	9	Jan 2015
Stroupster Wind Farm	Onshore Wind	32	T5	1	Feb 2015
Burn of Whilk Wind Farm	Onshore Wind	23	T5	1	Mar 2015
Strathy North Wind Farm	Onshore Wind	76	T5	1	Mar 2015
Total Contracted Capacity (MW)		1,769			

Note: New TNUoS Zones were introduced in 2013/14. For consistency with prior years this report summates to the pre-2013 zones.

It should be noted that although all sites are connected to the NETS not all are fully operational. In particular wind farms can often take a period of time (of >1 year duration) to ramp up to full generation output. Most C&M generators are located in Scotland and their outputs are subject to transmission constraints within the Scottish network and at the Cheviot boundary while works are underway to reinforce those networks.

Metrics relating to the outturn of connected units are tabulated below (Table 1) and discussed in the following paragraphs.

Connect and Manage Outturn

Table 1: Connect & Manage Outturn Data Summary

Connect & Manage Outturn Summary	Financial Year (Apr-Mar)	National	By Pre 2013 TNoS Generation Zones 1	2	3	4	5	6	7	8	9	Other
Metered Output of C&M (GWh)	2011-12	126	7	-	116	-	3	-	-	-	-	-
	2012-13	442	120	-	108	1	26	-	188	-	-	-
	2013-14	1,702	668	-	317	54	69	6	555	-	33	-
	2014-15	3,163	940	-	355	48	130	192	671	-	827	-
	2015-16	1,962	437	-	144	25	56	145	266	-	889	-
	2015-16 Q1	1,029	203	-	87	13	33	87	166	-	440	-
	2015-16 Q2	934	234	-	57	12	24	58	100	-	448	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	7,395	2,173	-	1,040	127	284	343	1,680	-	1,748	-
Carbon Abatement due to running of C&M units (Avoided CO2) (Thousands of Tonnes)	2011-12	114	7	-	105	-	3	-	-	-	-	-
	2012-13	389	151	-	85	10	16	-	126	-	-	-
	2013-14	1,379	497	-	334	38	49	24	436	-	0	-
	2014-15	2,518	741	-	362	36	74	220	600	-	487	-
	2015-16	1,510	342	-	161	20	38	92	241	-	616	-
	2015-16 Q1	807	160	-	104	11	21	62	152	-	298	-
	2015-16 Q2	702	182	-	56	9	17	30	89	-	318	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	5,910	1,738	-	1,047	103	181	335	1,402	-	1,103	-
C&M Output Contributing to System Constraints (GWh)	2011-12	71	2	-	67	-	2	-	-	-	-	-
	2012-13	96	26	-	9	2	7	-	53	-	-	-
	2013-14	1,224	488	-	249	39	53	4	388	-	3	-
	2014-15	1,395	555	-	246	27	70	60	406	-	31	-
	2015-16	478	191	-	86	11	25	35	127	-	4	-
	2015-16 Q1	302	110	-	59	7	16	26	81	-	3	-
	2015-16 Q2	176	81	-	27	4	9	8	46	-	1	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	3,264	1,261	-	657	78	157	98	974	-	38	-
Constraint Costs Attributable to C&M units (£k)	2011-12	2,432	72	-	2,236	-	124	-	-	-	-	-
	2012-13	5,645	1,664	-	785	58	294	-	2,845	-	-	-
	2013-14	71,760	28,976	-	16,948	1,661	3,616	89	20,366	-	103	-
	2014-15	99,717	31,336	-	17,644	1,543	5,165	2,441	39,810	-	1,778	-
	2015-16	36,713	12,753	-	6,303	755	1,968	1,733	13,009	-	194	-
	2015-16 Q1	22,319	6,373	-	4,145	435	1,172	1,257	8,779	-	159	-
	2015-16 Q2	14,394	6,380	-	2,157	320	795	476	4,230	-	35	-
	2015-16 Q3	-	-	-	-	-	-	-	-	-	-	-
	2015-16 Q4	-	-	-	-	-	-	-	-	-	-	-
	Total to date	216,268	74,801	-	43,916	4,016	11,167	4,263	76,030	-	2,076	-

Note: The table above is based on the latest data available as at 14th October 2015 for 2015/16. Values for prior years have not been recalculated for this update.

Comparison to History

Metered Output

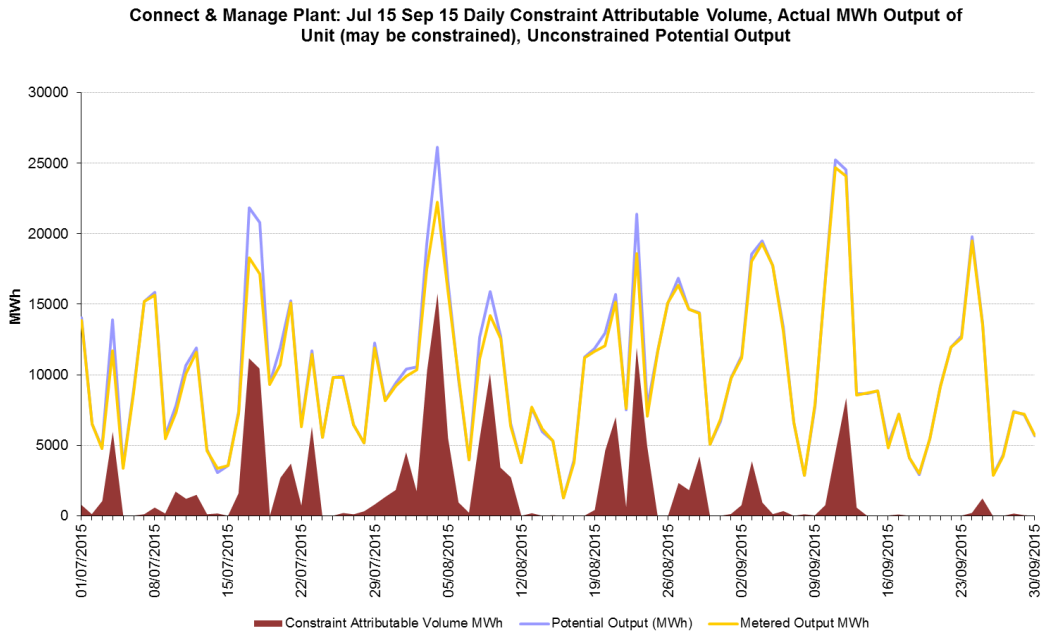
Updated data on the output of generation in Q1 has become available since the last report which has boosted overall output to 1TWh in this quarter. This update has mainly affected the output of the offshore units connecting in to England and as such this does not translate into a large change in the attributed costs for the quarter due to the lower levels of congestion on the network in this region.

Metered output in Q2 2015/16 was just over 0.9TWh, which can be considered broadly the same as Q1, but nearly double Q2 2014/15. This continues to be a result of increased installed capacity compared to the last year, particularly the offshore units in zone 9.

Of the metered output in Q2 2015/16, 176GWh is attributable to system constraints versus 82GWh for the same quarter in the previous year and 302GWh in Q1 2015/16. Although the overall output has been more than 400GWh higher in Q2 2015/16 than in the same quarter the previous year the allocation of this output to constraints has only increased by 94GWh. This is due to a large amount of this increase in output entering the system in the north of England where it encounters fewer constraints. Within Scotland a more modest increase in recorded output of 113GWh, of which 86GWh was in the north of Scotland, translated into 93GWh of the 94GWh overall change between the two years.

The reduction in volume allocated to constraints between Q1 and Q2 2015/16 was down to changes in where the generation entered the system between the quarters with Q2 output increasing in the north of Scotland and from the offshore wind units connecting in to England, however output across the rest of Scotland fell. Overall, recorded output fell 95GWh between the two quarters with a reduction in constraint attributed volume of 127GWh. The additional reduction in constraint attributed volume between the quarters is a result of the different outage patterns in place and where the energy entered the system avoiding localised constraints whilst sufficient network capacity was available to transport this energy through to England.

Metered output for Q1 is charted below, together with the estimated potential output that could have been achieved had no constraint actions been necessary, and also that part of the output which contributed to system constraints.

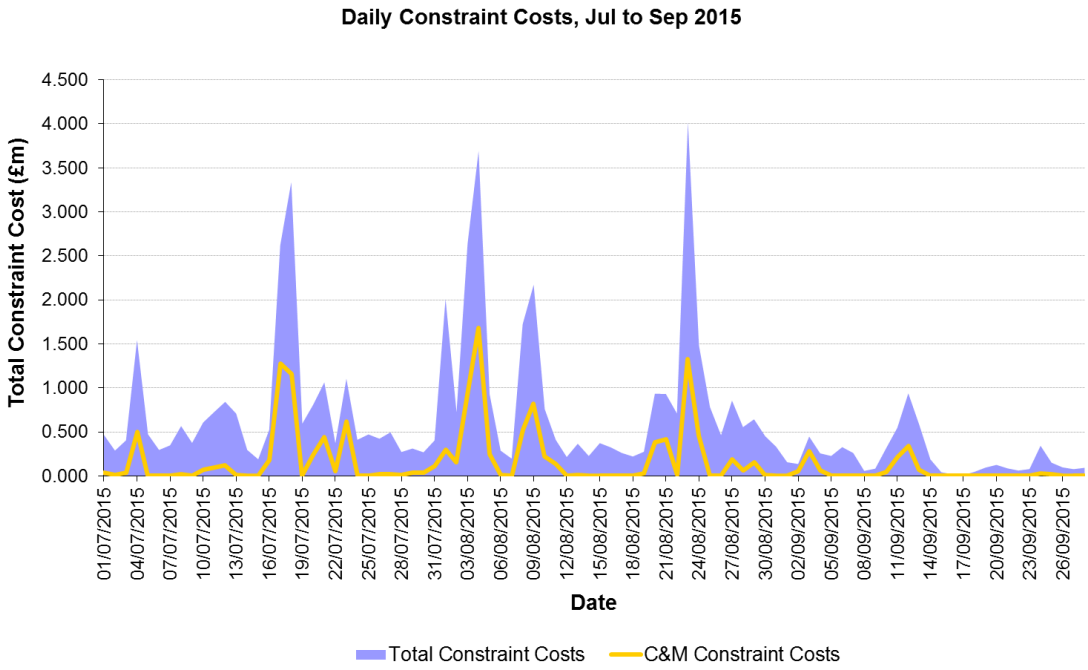


Constraint Costs

Constraint cost attributable to the C&M plant in the quarter was £14.4m, giving a cumulative total for the year so far of £36.7m with £129m forecast for the year. The total constraint costs during Q2 were £57.5m and £145.1m for the year to the end of Q2, both of which include the costs resulting from C&M. The reduction in costs compared to Q1 2015/16 (£22.3m) is due to the geographic changes in output in combination with the outage programme and non-C&M generation.

As with previous years the C&M attributed costs are largely driven from zone 1 and 7 reflecting the concentration of generation within the North West of Scotland and the boundary between the Scottish and England transmission systems. Network reinforcements are continuing to take place to increase transmission capacity in both these regions.

As would be expected the costs attributed to C&M units are proportional to the volumes of constraint actions allocated, as shown in the graph below.



Carbon Abatement

The carbon benefit (avoided CO2) calculations are based on our estimate of the conventional fuel (e.g. coal, gas) that is displaced by the output from the C&M units.

Table 1 shows that the estimated CO2 saved by output from the C&M units, as opposed to other generation which would otherwise have run, is estimated at 702,374 tonnes in the quarter. Combined with an updated figure of 807,168 tonnes in Q1 brings the total to 5.9 million tonnes since the beginning of the C&M regime.

Appendix A: Generation Zones

The generation zones used in this report correspond to the zones defined for TNUoS charges prior to 2013/14. From 2013/14 the TNUoS zones were redefined and additional zones added however this report retains the previous definitions in order to allow direct comparison to the historical C&M data.

Zones used in this report

Zone ID	Description
1	North Scotland
2	Peterhead
3	Western Highland & Skye
4	Central Highlands
5	Argyll
6	Stirlingshire
7	South Scotland
8	Auchencrosh
9	Humber, Lancashire
Other	Remainder of England & Wales