



OFFICE OF CLIMATE, LICENSING & RESOURCE USE

- CLIMATE CHANGE UNIT

NEW ENTRANT VERIFICATION REPORT

NE2-001-R2 FINAL

This report has been re-issued by the Technical Committee of the EPA and replaces NE2-001-R1 as issued by the EPA to the Operator on 1 April 2009.

Reason for Revision:

Technical Committee's consideration of the objections received from the Operator on 15 April 2009. The objections, supporting information and the Technical Committee's report are available on public file from the EPA offices.

New Entrant Register Number	Verified NESA Priority ¹	Verified CHPSA Priority
NE2-001	5 (based on the issue of the Foreshore Lease and Licence document on the 8 January 2009)	Not applicable
Date:	26 May 2009	
RE:	Application for a free allocation of EU allowances from Ireland's New Entrant Set Aside	

Application Details	
Installation name:	Aghada CCGT
Installation address:	Whitegate, Midleton, Co. Cork
GHG permit Register number:	IE-GHG162-01
Class of activity:	Combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations)
NESA/CHPSA application received:	13 March 2008
Letter (RFI) issued:	30 May 2008, 22 December 2008
Further information received:	27 June 2008, 7 November 2008, 8 December 2008, 13 January 2009, 26 February 2009, 12 March 2009
New Entrant proposed start date:	6 April 2009
Report NE2-001-R1 issued:	1 April 2009
Objection received:	15 April 2009

¹ The verified priority may change if applications currently ahead on the list are removed or if their priority changes.

Description of the development/increase in capacity:

The new entrant application is in relation to a new power plant installation, a combined cycle gas turbine plant (CCGT) of capacity 431.6 MW_e / 742.3 MW_{th}. This will use natural gas as its primary fuel and gas oil as an emergency reserve fuel. An emergency generator of capacity 2 MW_{th} and a fire pump of 1.2 MW_{th} capacity will also be installed. Both of these auxiliaries will operate on gas oil.

Consents submitted:

Planning permission: Granted on 29 October 2004 for a CCGT power plant with an output of 380-450 MW. Planning Register No: 04/5913

Licence to construct:

- The Commission for Energy Regulation granted on 29 March 2007 Authorisation to Construct to the ESB for the construction of a 430 MW CCGT generating station at Aghada Co. Cork. The agreement was made on 27 April 2007.
- An official of the Department of Agriculture, Fisheries and Food (DAFF) gave a consent to the ESB, in September 2007, to commence construction works on the power generating plant and associated sea outfall, pending finalisation of the formal Foreshore Lease and Licence document. Phased consents were sought and obtained from DAFF officers on the 4 August 2006, 29 June 2007, 18 September 2007, 20 November 2007 and the 7 January 2008. The Foreshore Lease and Licence document, as signed on behalf of the Minister and issued on the 8 January 2009 is considered by the EPA to be the qualifying consent.

Grid Connection Agreement: EirGrid plc. Transmission Connection Agreement for a 431 MW CCGT power plant at Aghada dated 24 April 2007. The connection date is April 2010, when works are completed to allow connection. There is a supplemental Agreement with EirGrid plc. issued on the 4 July 2007, which facilitates connection to the grid in January 2009 to allow back feeding and exporting from the Aghada CCGT through the existing station connection to the grid.

Site Inspection:

Date of Site Inspection:	11 November 2008
Application Representatives:	Mr Kevin O'Donoghue Mr. Dermot McDowell
EPA Representatives:	Ms Annette Prendergast
Basis for Priority on New Entrant Application Register: A valid application for a development was received within one month of the Final Allocation Decision being taken. Full planning permission was received on the 29 October 2004. The ESB applied to the Minister for Agriculture Fisheries and Food for a Foreshore Licence to enter into, use and occupy the Licensed area for the purpose of constructing, locating and operating the Facilities. The Minister agreed to grant a Foreshore Licence to the Licensee on the terms and conditions set out in the Licence. The Licence was made on the 8 January 2009.	
Site Tour Observations: The steam turbine, gas turbine and generator are all in place. The emission point A2-1 is under construction. The emergency generator A2-2 is in place.	

Documentation Examined:***(i) Substantiated Valid Business Reason:***

The Commission for Energy Regulation granted, on 29 March 2007, Authorisation to Construct to the ESB, for the construction of a 430MW CCGT generating station at Aghada Co. Cork. ESB Power Generation and EirGrid plc. entered into a Connection Agreement on 24 April 2007 for the connection of a 431 MW CCGT at Aghada Co. Cork to the ESB transmission system.

A supplemental agreement, as detailed above, facilities connection to the grid in January 2009. Both documents were submitted as part of the New Entrant application and examined by the EPA.

(ii) Substantiated New Entrant Start Date: 23 June 2009

Basis for Substantiation: Alstom Power Time Schedule Updated as of 9 February 2009, for the construction and commissioning of the CCGT, submitted on the 12 March 2009 outlines the date of the 23 June 2009 for Gas Turbine 1st fire start up to full speed. The time schedule also details that the contract is due to be totally finished, with a Commercial Operation Date of 31 October 2009.

(iii) Basis for Projections:

Projected emissions for various loads during the commissioning phase are based on a start up fuel consumption graph supplied by Alstom. The actual duration of each commissioning phase is based on estimates supplied by Alstom, included in their Master Time Schedule. The estimates for the gas consumption during commissioning stages are best engineering judgements by Alstom and the ESB, as are the durations of operation each day. Projected emissions for commercial operation are based on the committed fuel supply capacity of 19,000 MWh from the gas supplier and operational hours based on 24 hours a day 7 days a week.

Documentation Examined: Alstom Start Up Fuel Consumption Graph for Gas Operation, Alstom Master Time Schedule Level 2 and Alstom Detailed Level 3 schedules outlining dates for hot commissioning and commercial operation. Gas supplier and ESB Connection Agreement dated 19 April 2007 confirming fuel supply capacity of 19,000 MWh, projected CO₂ emissions calculation spreadsheet outlining all calculations in detail.

Detailed Calculation of Projected Emissions***Applicant methodology for calculation of projected emissions:***

Projected emissions for the CCGT plant during hot commissioning are based on estimated gas consumption for each of the main hot commissioning activities as detailed below. Initial projections for 2009 included two months of full commercial operations. However, projections for 2009 were revised downwards by the Operator following a delay in the commissioning process. The revised commissioning emission of 295,891 tCO₂, was based on the 'Maximum Hourly Quantity' (MHQ) of 849.7 MW of gas by 24 hours or parts thereof.

Yearly emissions for 2010, 2011 and 2012 are based on a 360 days a year of operation at a daily capacity of 19,000 MWh. The 'maximum' daily gas consumption (as stated by the applicant) is the gas supplier's daily committed capacity of 19,000 MWh. Tonnes of CO₂ are calculated using a natural gas emission factor of 181.751635 kg CO₂/MWh thermal, based on gross calorific value. This emission factor is the site-specific factor based on verified 2007 emissions at the existing ESB Aghada generating station.

Table 1: Applicant monthly projected commissioning emissions, submitted as part of the objection by the Operator on 15 April 2009.

Month	Commissioning Activity	Gas Consumption MWth (GCV)	t CO ₂
July - August	1 st fire and synchronising	30,589	5,560
August	Steam blow	42,825	7,783
September	Bypass operation, initial combined cycle operation, gas oil commissioning and gas oil operation.	209,942	38,157
October	Gas oil operation, CC testing, operational testing	309,012	56,163
November	Further testing, reliability run, Reliability run on gas and reliability run on gas oil.	456,472	82,965
December	Performance test, final plant checks, handover, commercial running	579,156	105,262

Example of November 2009 calculation by Operator

456,472 MWh*181.751635 (kg CO₂/MWh)/1000 (Convert kg to tonnes)
Projected CO₂ emissions for November are 82,965 t CO₂

Table 2: Operator's projected emissions as t CO₂/annum, submitted as part of the objection by the Operator on 15 April 2009.

2009	2010	2011	2012
295,891	1,229,330	1,229,330	1,232,698

EPA methodology for calculation of projected emissions:

The EPA also applies the Operator site-specific factor of 181.751635 kg CO₂/MWh (GCV), and 201.3199 kg CO₂/MWh (NCV). A conversion factor of 0.9028 is applied to convert from GCV to NCV. CO₂ emissions during commissioning are detailed below.

The connection agreement between the Operator and gas supplier stipulates a 'committed capacity' of 19,000 MWh. This 'committed capacity' is defined as the minimum amount of Primary Capacity at the off take point. The gas supplier may in any given hour supply up to a maximum of 849.7 MW of gas. However, the gas supplier is under no commitment to supply over and above 19,000 MWh in any given day.

EPA's understanding of the connection agreement is that 19,000 MWh is the guaranteed minimum (as opposed to maximum) that must be supplied to the generating unit by the gas supplier and while hourly rates may be greater than 19,000 MWh /24 hours, the daily amount of 19,000 MWh is highest qualifying daily gas consumption to be considered in the assessment of the projections from the Installation during commercial operations.

Commissioning Projections:

The use of the Maximum Hourly Quantity' (MHQ) of 849.7 MW of gas by 24 hours or parts thereof is not considered appropriate by the EPA. Therefore the 'committed capacity' figure of 19,000 MWh was used in the re-calculation of the 2009 projected emissions giving a figure of 275,682 tCO₂.

Table 3: Monthly EPA adjusted commissioning emissions

Month	Commissioning Activity	Gas Consumption MWth (GCV)	t CO₂
July - August	1 st fire and synchronising	28,500	5,180
August	Steam blow	39,900	7,252
September	Bypass operation, initial combined cycle operation, gas oil commissioning and gas oil operation.	195,603	35,551
October	Gas oil operation, CC testing, operational testing	287,907	52,328
November	Further testing, reliability run, Reliability run on gas and reliability run on gas oil.	425,296	77,298
December	Performance test, final plant checks, handover, commercial running	539,600	98,073
Example of November 2009 calculation by EPA 425,296 MWh*181.751635 (kg CO ₂ /MWh)/1000 (Convert kg to tonnes) Projected CO ₂ emissions for November are 77,298 t CO ₂			

Commercial Operating Projections:

CO₂ emissions during commercial operations (2010, 2011 and 2012) are calculated on the basis of the "Best New Entrant" (BNE) for a CCGT power plant (CER 2007) and as recommended in Ireland's National Allocation Plan for Emissions Trading 2008-2012 – Final Allocation Decision (March 2008).

The projections have been determined as follows:

Net electrical output MW/BNE efficiency for CCGT plant (54.7%)* number of hours per year (8760)* CER recommended capacity utilisation factor (90.87%)* Emission factor for natural gas, (201.3199 kg CO₂/MWh (NCV)).

To account for the fact that the gas supplier and Operator have a 'committed capacity' of 19,000 MWh (based on GCV) the BNE calculation has been adjusted to take account of this.

Example of BNE calculation:

19,000 MWh/24h * 0.9028 (convert to NCV) gives a 'committed capacity' thermal input of 714.7167 MW.

Net electrical output of 430 MWe/BNE efficiency of 54.7% = 786.106 MWth. Given that this figure exceeds the 'committed capacity' thermal input figure, the 714.7167 MW figure is used to calculate BNE projected emissions.

714.7167*8760*CER recommended capacity utilisation factor, (90.87%)* Emission factor for natural gas, (201.3199 kg CO₂ /MWh (NCV))/1000, (convert kg CO₂ to t CO₂).

Projected CO₂ emissions for the years 2010, 2011 are 1,145,369 t CO₂ per annum. 2012 is a leap year therefore an additional 24 hours is allowed for giving projected emission of 1,148,507 t CO₂.

Table 4: EPA projected emissions as t CO₂/annum:

2009	2010	2011	2012
275,682	1,145,369	1,145,369	1,148,507

Recommendation:

The new entrant set aside application is found to have the necessary consents in place and to have a substantiated start date as detailed above. The applicant gas consumption estimates during commissioning are judged to be reasonable. The approach as recommended in the NAP, based on a "Best New Entrant" (BNE) CCGT power plant (CER 2007), adjusted for the documented 'committed capacity', has been deemed appropriate by the EPA for the calculation of emissions during commercial operation. A valid business reason is available.

It is recommended that the new entrant set aside allocation be taken from NESA and be based on the following Relevant Emission.

Table 5: EPA derived Relevant Emission tCO₂/annum.

2008	2009	2010	2011	2012
0	275,682	1,145,369	1,145,369	1,148,507

The original report was prepared by Annette Prendergast, Inspector and approved by Dr. Maria Martin, Senior Manager on 1 April 2009. This revised report is based on the recommendations of the EPA Technical Committee report by Marc Kierans as approved by Laura Burke, Director of the Office of Climate, Licensing & Resource Use following a review of the Operator's objections.

Signed:

_____ Date: 26 May 2009

Marc Kierans

Inspector

Reviewed by:

_____ Date: 26 May 2009

Dr. Maria Martin

Senior Manager