



OFFICE OF CLIMATE, LICENSING & RESOURCE USE

- CLIMATE CHANGE UNIT

PROPOSED NEW ENTRANT VERIFICATION REPORT		NE2-010-R1
New Entrant Register Number	Verified NESA Priority ¹	Verified CHPSA Priority
NE2-010	8	Not applicable
Date:	Published for consultation 26 November 2010	
RE:	Application for a free allocation of EU allowances from Ireland's New Entrant Set Aside (2008-2012)	

Application Details	
Operator name:	Cushaling Power Limited
Installation name:	Cushaling Power Limited
Installation address:	Ballykilleen, Edenderry, County Offaly
GHG permit Register number:	IE-GHG166-02
Class of activity:	Combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations)
NESA application received:	31 March 2010
Letter (RFI) issued:	30 June 2010, 22 November 2010
Further information received:	05 August 2010, 16 September 2010, 04 November 2010, 22, 25 November 2010
Site Inspection:	16 September 2010
New entrant Proposed Start date:	30 July 2010 Gas Turbine 1 and 2 (first fire), 31 July 2010 Gas Turbine 3 and 4 (first fire), 13 September 2010 (commercial operation date)

Description of the development:

The new entrant application is in relation to a new power plant installation, Cushaling Power Limited which consists of two Pratt and Whitney Twinpac gas turbine (GT) units with a total permitted (planning permission) capacity of 116 MW_e and rated thermal input capacity of 321.9 MW_{th} (gas oil). The plant will be required to operate during peaking capacity. Cushaling Power Limited is a subsidiary of Bord na Mona.

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

Consents submitted:

Planning permission:

PL2/07/1691 On 12 February 2008, Offaly County Council granted permission to Bord na Mona plc for two electricity generation units each having a maximum power output of 52 megawatts. Each power unit will include an air inlet filter, a turbine generator set and auxiliary systems including control system and electrical equipment. On 10 June 2010 Offaly County Council issued a declaration under Section 5 of the Planning and Development Acts, 2000-2009. *"Offaly County Council, in exercise of the powers conferred on it by section 5(2) hereby decides that increasing the power output of electricity generating plant granted planning permission under PL2/07/1691 from 104 megawatts to 112.42 megawatts by altering a software setting in the plants computer control system and associated works on site is not development."* On 06 October 2010 Offaly Council confirmed in a letter that *"Edenderry Powers increasing of the Cushaling Peaking plants capacity to 116 mega watts (from 112.42) due to better than expected fuel efficiency is deemed not a material change and in accordance with section 5 declaration reference number Dec 10/5"*.

Licence to construct:

The Commission for Energy Regulation granted on 14 September 2009 Authorisation to Bord Na Mona plc for the construction of a **112 MWe** Open Cycle Gas Turbine generating station at Ballykillen, Edenderry, Co. Offaly. In a letter to Bord Na Mona dated 25 August 2010 the CER refers to a letter of 24 August 2010 from Bord Na Mona which *indicated that, following recent performance testing, the maximum plant output will be 116 MW*. The CER notes that *the plant has been built as per what was submitted in your authorisation application with the additional output due to better than expected performance. The CER notes the increased 116 MW output of the Cushaling Power units and has no issue with this.*

Grid Connection Agreement:

The EirGrid plc. Transmission Connection Agreement for a **116 MWe** generation facility located at Edenderry Co. Offaly signed on 25 March 2009 had acceptance confirmed by Eirgrid plc 7 April 2009.

Site Inspection:

Date of Site Inspection: 16 September 2010

Applicant Representatives: Mr Tom Egan
Mr Richard Neale

EPA Representatives: Ms Annette Prendergast

Basis for Priority on New Entrant Application Register: A valid application for a development was received on 31 March 2010.

Site Tour Observations: The two Pratt and Whitney Twinpac gas turbine (GT) units were noted to be in place.

Documentation Examined:

(i) Substantiated Valid Business Reason:

The Commission for Energy Regulation granted, on 14 September 2009, authorisation to Bord Na Mona plc for the construction of a **112 MWe** Open Cycle Gas Turbine generating station at Ballykillen, Edenderry, Co. Offaly. Bord na Mona plc and EirGrid plc entered into a Connection Agreement on 25 March 2009 for a **116 MWe** generation facility located at Edenderry Co. Offaly. These documents were submitted as part of the New Entrant application and examined by the EPA. A letter was viewed on-site, from the Department of

Communications, Energy and Natural Resources. The letter confirms ministerial approval with consent of the Minister for Finance for capital expenditure for the development of two 58 MW distillate fired OCGT peaking plants in Edenderry.

(ii) Substantiated New Entrant Start Date: First fire was achieved on 30 July 2010 for Gas Turbine 1 and 2 (substantiated by the Pratt & Whitney Power Systems Generator ED3 Grid Compliance Test Report Test Number B-44 Synchronize Generator to the Grid, viewed on site). First fire was achieved on 31 July 2010 for Gas Turbine 3 and 4 (substantiated by the Pratt & Whitney Power Systems Generator ED5 Grid Compliance Test Report Test Number B-44 Synchronize Generator to the Grid, viewed on site).

The commercial operation date of 13 September 2010 is confirmed in the Eirgrid temporary Operation Certificate viewed on-site. A copy of the temporary operation certificate extended until 23 November 2010 was submitted in a non confidential format on the 04 November 2010. The Permanent Operational Certificate, dated 22 November 2010, was submitted electronically on the 25 November 2010.

(iii) Basis for Projections:

At the time of the site inspection, the applicant proposed to calculate the emissions during commissioning based on actual gas oil fuel usage during commissioning. This was determined from invoiced fuel deliveries minus metered stock levels in the fuel storage tanks at the end of the commissioning period.

Documentation Examined: All gas oil invoices and gas oil delivery dockets, where invoices have not yet been received, were examined on-site. Raw data used to calculate the fuel stock level was examined on-site.

Detailed Calculation of Projected Emissions

Applicant methodology for calculation of projected emissions:

Projected emissions for the plant, including the commissioning phase were submitted on 04 November 2010.

Commissioning

The emission projections during commissioning for the Gas Turbines were based on a first fire date of 30 July and commercial operation date of 13 September. Emissions during the Commissioning Phase were determined based on actual fuel consumption of 1204.36 tonnes (calculated from 1,400,416 litres and density of 0.86 kg/l) as submitted on 04 November 2010. To calculate CO₂ a country specific NCV of 43.31 TJ/kt and a country specific emission factor of 73.3 t CO₂/TJ was applied for gas oil.

The CO₂ emissions during commissioning have been tabulated below:

45 days commissioning	Tonnes CO ₂
	3,823

In the operational phase (13 September 2010 until 31 December 2012) the applicant calculates CO₂ emissions based on the EPA guidance for assessors on the validation of projections in set-aside applications for the trading period 2008-12 (ETUPP6/01 22 April 2009). The calculations also use data provided by the CER in *Fixed Cost of a Best New Entrant (BNE) Peaking plant & Capacity Requirement 2011-SEM-10-053* and data from

Cambridge Economic Policy Associates *Cost of a BNE Peaking Plant for 2011 (12 May 2010)*.

The CER document states that the 2011 BNE is an Alstrom GT13E2 located in Northern Ireland and running on distillate. Operational assumptions are:

- Unit size 190.1 MW
- Run Hours 2%
- Load Factor 60%

According to the applicant section 4.3 of the document recommends that an operational hours value of 2.5% be used to compensate for start up overheads associated with a Distillate Unit. (However it is the opinion of the EPA that it appears from a review of section 4.3 of the document that the 2.5% refers to output degradation.)

The applicant assumes that the load factor of 60% should be adjusted as follows given that the BNE is 190.1 MW and the Cushaling Power units are 116 MW in total.

$(190.1 \times 60\%) = \text{actual average loading of } 114.06 \text{ MW}$

Therefore the load factor for Cushaling plant is $114.06 \times 100/116 = 98.33\%$

Calculation for a normal 365 day Year

$\text{tCO}_2 = \text{MW}_e \text{ output} / \text{Efficiency} \times \text{hours} \times \text{Capacity} \times \text{Distillate Emission Factor} / 277.778$

Where

277.778 = conversion factor MWh to TJ

Distillate Emission factor = 73.3 tCO₂/TJ

Hours = 219 (2.5% of 8760)

$\text{Tonnes CO}_2 = (((116/0.369) \times 219 \times 0.9833 \times 73.3) / 277.778) = 17,864$

For 2010 the operational days have been adjusted pro-rata to allow for the start of commercial operations on 13 September and therefore a total of 110 operational days in 2010. This is equivalent to 66 operational hours ($110 \times 24 \times 0.025$) and 5383.53 tonnes CO₂.

For 2012 (leap year)

$\text{Tonnes CO}_2 = (((116/0.369) \times 219.6 \times 0.9833 \times 73.3) / 277.778) = 17,912$

The table below summarises the applicant's projected tonnes of CO₂ from the installation. For 2010 commissioning emissions have been added to commercial operation emissions to give total 2010 emissions:

Applicant Total Projected tonnes CO₂/annum

2010	2011	2012
9,207	17,864	17,912

EPA methodology for calculation of projected emissions:

CO₂ emissions during commissioning are calculated as follows:

Actual fuel usage of 1,400,416 litres during commissioning was verified on-site based on fuel invoices and delivery dockets for 2,666,000 litres minus a measured closing stock of 1,265,584 litres. A fuel density of 0.86 kg/l (based on the Esso Gas Oil technical bulletin data) was applied to convert to tonnes (t) of fuel used. The current country specific net calorific value of 43.31 TJ/kt and emission factor of 73.3 t CO₂/TJ was applied to calculate CO₂ emissions as follows:

$1,400,416 \text{ litres} \times 0.86 \text{ kg/l} = 1204.36 \text{ tonnes}$ $1.20436 \text{ kt} \times 43.31 \text{ TJ/kt} \times 73.3 \text{ t CO}_2/\text{TJ} = \mathbf{3,823.38 \text{ t CO}_2}$
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CO₂ emissions during commercial operation (from 13 September 2010-31 December 2010, 2011 and 2012) are calculated as follows:

In accordance with EPA guidance for assessors on the validation of projections in set-aside applications for the trading period 2008-12 (*ETUPP6/01 22 April 2009*) the number of allowances for Peaking Plant will be calculated as for baseload plant with the following exceptions.

- The net operational efficiency will be based on the efficiency given in the "Fixed Cost of a New Entrant Peaking Plant for the Capacity Payment Mechanism".
- The capacity utilisation factor will be agreed between the EPA and the applicant.

The Best New Entrant Peaker for 2011, as per the CER/UR (*Decision Paper on Fixed Cost of a Best New Entrant Peaking Plant, Capacity Requirement & Annual Capacity Payment Sum for the Calendar year 2011*) is the Alstom GT13E2, using Distillate fuel.

The current "as new" ISO operational efficiency for the Best New Entrant is 36.9% as per "Costs of a Best New Entrant Peaking plant for the calendar Year 2011,12 May 2010" Cambridge Economic Policy Associates Ltd in association with Parsons Brinkerhoff.

The lifetime mean operational efficiency as per "All Ireland Project Single Electricity Market Fixed Cost of a New Entrant Peaking plant for the Capacity Payment Mechanism Final Decision Paper, 18 May 2007" is calculated as $(0.97 \times 36.9\%) = 35.793\%$.

A capacity utilisation factor of 1% has been deemed appropriate by the EPA based on recent verified emissions (2007-2009) of existing distillate peaking plants. This factor is slightly less than 1.2% (calculated from the operational hours of 2% and load factor of 60% for a BNE Peaking Plant contained in the CER/UR document).

The basis for the projections has been determined as follows:

$$\text{tCO}_2 = \text{MWe Output} / \text{Operational Efficiency} \times \text{Number of hours} \times \text{Capacity factor} \times \text{Emission factor for Gas oil} / \text{Conversion Factor}$$

Where:

MWe output = 116 MW

Operational Efficiency = 35.793% (i.e. 0.97×36.9) as detailed above

Capacity factor = 1%

Current country specific emission factor for gas oil (t CO₂/TJ) = 73.3

Conversion from MWh to TJ = 277.778

Example of BNE Calculation

$MW_e \text{ output } 116MW_e / (\text{operational efficiency } 0.35793) \times 8760 \text{ (hours in 365 day year)} \times (1\% \text{ capacity factor}) \times (\text{Country specific emission factor for gas oil } 73.3 \text{ tCO}_2/\text{TJ}) / (\text{conversion factor MWh to TJ } 277.778) =$

7,492 tonnes CO₂ for a 365 day year

For 2010 the operational days have been adjusted pro-rata to allow for the start of commercial operations on 13 September and therefore a total of 110 operational days in 2010. This is equivalent to 2,257.719 tonnes CO₂ from commercial operation in addition to 3,823.38 tonnes CO₂ arising from the commissioning period.

Projected CO₂ emissions arising from CCGT for 2010, 2011 (365 days) and 2012 (366 days) respectively are given for each year in the table below:

EPA total projected tonnes CO₂/annum for the installation:

2010	2011	2012
6,081	7,492	7,512

Recommendation

The new entrant set aside application is found to have the necessary consents in place and to have a substantiated start date (for both commissioning and commercial operation) as detailed above. The applicant actual gas oil consumption during commissioning has been verified. The approach, as recommended in the NAP, and detailed in the EPA guidance for assessors on the validation of projections in set-aside applications for the trading period 2008-12 (ETUPP6/01 22 April 2009) 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 NESAs and be based on the following Relevant Emission (tonnes CO₂/annum):

2008	2009	2010	2011	2012
0	0	6,081	7,492	7,512

Signed:

Maria Martin

Date: 26 November 2010

AP

Annette Prendergast

Inspector

Approved:

Maria Martin

Date: 26 November 2010

Dr Maria Martin

Senior Manager