Appendix 3 - Technical Response to Third Party Appeals

TECHNICAL RESPONSE IN RELATION TO A PROPOSED DATA CENTRE DEVELOPMENT AT CRUISERATH ROAD – FCC Reg. Ref.: FW22A/0308 & ABP Ref.: PL06F.318180

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November 2023

TABLE OF CONTENTS

INTRODUCTION

This appendix is a technical and environmental response to the third party appeals of the notification of decision of Fingal County Council (FCC) dated the 18th of September 2023 under Reg. Ref.: FW22A/0308 for development on a site at Cruiserath Road, Dublin 15. A planning application for the Proposed Development was registered with FCC on the 16th of December 2022. The technical response has been set out under a series of headings, corresponding with the main technical / environmental arguments outlined in the appeals. Arguments concerning planning and policy are addressed in the John Spain Associates response cover letter of this Appeal response (of which this document forms an appendix).

The headings under which the response has been formulated are as follows:

A1. Corporate Power Purchase Agreement as Mitigation
A2. Corporate Power Purchase Agreement and Assessment of Renewable Projects(s)
A3. Cumulative Assessment of other Data Centre Projects
A4. Accuracy of Climate Assessment, Conclusions on Climate Impact, and Consideration of Reasonable Worst Case
A5. The EU ETS and National Carbon Budget / Sectoral Emission Ceilings
A6. Consistency with Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended.
A7. Carbon Emissions During Construction
A8. Impact of Generators and Operating Hours of Generators
A9. Use of Renewable Diesel

As set out in the Planning Report (Section 1.7-1.9) which accompanied the application to Fingal County Council (FCC), the existing campus is owned and operated by Amazon Data Services Ireland Limited (ADSIL), the Irish entity of Amazon Web Services (AWS) which is part of the Amazon.com, Inc group of companies. The Proposed Development is to support AWS's customers in Ireland.

GENERAL SUMMARY OF RESPONSE TO CLIMATE ISSUES

Chapter 9 of the Environmental Impact Assessment (EIAR) undertook a detailed assessment of the predicted climatic impact of the Proposed Development and of the Overall Project (i.e. the Proposed Development and existing / permitted / potential future development on the wider landholding) in the context of the EU ETS (Emission Trading System). The Addendum to Chapter 9 submitted as part of the further information response built on Chapter 9 of the EIAR and was updated to incorporate the new IEMA Guidance - *Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition* (IEMA, 2022). The Addendum also framed the impact of the Proposed Development and Overall Project in the context of the recently published Sectoral Emission Ceilings.

The assessment has been undertaken with due regard to the EIAR Guidelines (EPA, 2022), However, as the EIAR Guidelines makes clear, in the absence of specific detailed guidance in the EIAR Guidelines (EPA, 2022) and Advice Notes (EPA, 2003), other applicable guidance should be used:

"*When more specific definitions exist within a specialised factor or topic, …., these should be used in preference to these generalised definitions*". (EPA, 2022)

Thus, the IEMA Guidelines (IEMA, 2022) are recognised throughout Ireland and the UK as the authoritative guidance body on greenhouse gas (GHG) and climate impact assessment. As IEMA, and in particular IEMA (2022), offers a much more specific and robust assessment of current climate impacts, this guidance document has been used in the current assessment.

The climate assessment of the Proposed Development in the Addendum to Chapter 9

of the EIAR (submitted as part of the Further Information response to Fingal County Council) is based on a number of inherently conservative and precautionary assumptions as outlined below:

- a range of design measures will be employed which will reduce Greenhouse Gas (GHG) emissions and are in line with "*best practice*" as outlined in the IEMA guidance (IEMA, 2022) including the installation of 285 Photovoltaic (PV) panels, rainwater harvesting, ensuring an annualized design power usage effectiveness (PUE) of 1.12, use of internal and external lightning using highly efficient low energy Light Emitting Diode (LED) luminaires, and the Proposed Development incorporates design provisions to facilitate district heating including heat distribution pipework up to the site boundary.

- a GHG emission rate of 100 gCO_2/kWh has been assumed for the national grid in 2030 which is higher than the SEAI[1] predicted 92.9 gCO_2/kWh for 2030,

- a net zero national grid is assumed to occur in 2050, whereas recent data from the ESB and UCC/MaREI suggests that this is likely to be achieved by 2040,

- the assessment assumed 100% operation of the entire Proposed Development in 2025. In reality, there will be a ramp-up period with 100% operation not occurring until mid-2027,

- the assessment assumed a continuous 100% operational load for the data centre development, however annual average load is likely to be closer to 80% (as outlined in the recent Department of Environment, Climate and Communications [DECC] publication "*Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings*" (DECC, 2022b)),

- the Proposed Development will replace existing and future computing and IT activities which have a higher GHG profile, with savings of up to 80%. Data Centre facilities such as the Proposed Development represent a significantly more efficient means of data storage when compared to the historic distributed model of on-site data storage by individuals and companies (or 'enterprise sites'). The GHG savings associated with this have conservatively not been quantified and are not included in the assessment.

- the committed mitigation (Corporate Power Purchase Agreement (CPPA) for new renewable energy) will mitigate any residual GHG emissions.

As outlined in the response to Item A1 below, CPPAs will be used as the appropriate mitigation measure to address residual GHG emissions on the path to net zero which is likely to be achieved by 2040 as outlined in the response to Item A4.

The precautionary approach of utilising CPPAs as a mitigation measure should also be noted. Given that the national grid will be likely to achieve net zero significantly

[1] Private communication from SEAI- dated 12th October 2023

From: [redacted]@seai.ie>
Sent: Thursday, October 12, 2023 11:45 AM
To: Avril [redacted] <[redacted]@awnconsulting.com>
Subject: RE: Future Carbon Intensity for Grid Electricity

Dear Avril,

Thank you for your email. Please find attached spreadsheet with a projection of electricity carbon intensity out to 2050.

This projections is based on the WAM-CAP23 scenario from our latest set of projections. This broadly assumes that the targets set in the latest 2023 Climate Action Plan will be achieved. Because the current focus of government policy is on the period to 2030, there is less detail on policies and measures that will be adopted from 2030 to 2050. This is reflected in the scenario shown, where there are still emissions from electricity generation out to 2050. In reality we expect further policies and measures to be developed later in the decade that will provide a pathway to a zero carbon electricity system by 2050.

Regards,
Mary

before 2050; it can be argued that even in the absence of CPPAs the pre-mitigation scenario could, in actual fact, be characterised as minor adverse, as the trajectory of GHGs emissions will align with the 1.5°C compliant trajectory and achieve net zero in advance of 2050 with the national grid predicted to obtain net zero by 2040 (ESB Networks, 2023).

However, taking a conservative and precautionary approach as summarised above, this led to an assessment of the predicted pre-mitigation impact (in the absence of any mitigation) of being ***moderately adverse, significant impact***. However, when the commitment to CPPAs is taken into account, it is clear that post-mitigation the impact of the Proposed Development will be ahead of the 1.5°C compliant trajectory as shown in Figure 7 of Item A4 below. Thus, contrary to the claims of the appellants, and in particular the appeal by Colin Doyle, the appropriate description of the post-mitigation impact of the Proposed Development is a ***minor adverse, non-significant impact*** as outlined in Section 8.0 of the Addendum to Chapter 9 of the EIAR

1.0 Item A1 - Corporate Power Purchase Agreement as Mitigation

1.1 Overview

This section addresses the arguments raised in various appeals in regard to the proposed Corporate Power Purchase Agreements (CPPA) which will be entered into for the energy use of the Proposed Development and whether the CPPA would constitute mitigation.

1.2 Summary of Key Appellant Points - Item A1

The appellants claim that any CPPA in respect of the Proposed Development is not proven to deliver renewable *"additionality"* and as such a CPPA cannot be appropriately considered as mitigation for the purposes of Environmental Impact Assessment.

1.3 Applicant Response To Item A1

Based on commitments made by the Applicant, FCC imposed a planning condition requiring a CPPA. The condition reads in full:

Prior to the commencement of development, the applicant shall submit for the written agreement of the Planning Authority details of a Corporate Purchase Power Agreement that the developer has entered into which demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy. The Agreement shall comply with the following:

a) The new renewable energy projects shall not be supported by government, consumer or other public subsidies;
b) The new renewable energy projects shall be located In Ireland and full details of these including consent details shall be provided;
c) The new renewable energy projects shall be provided by the applicant's group, that is Amazon.com, Inc.
d) The new renewable energy generation shall relate to energy that is not being generated at the date of grant of this permission.
e) The amount of electricity generated by the new renewable energy projects shall be equal to or greater than the electricity requirements of the data centres in operation at any given time.
f) The new renewable energy projects shall be fully operational prior to the commencement of operation of the data centres having regard to the phased nature of the Proposed Development."

As set out in the JSA response document under Amazon's publicly available Renewable Energy Methodology[2], Amazon works with energy companies around the globe to develop **new** renewable projects dedicated to serving their load, which is aligned with the CPPA Roadmap which states: "*Additionality and Avoiding Greenwashing: If CPPAs simply purchase certificates from projects that would have existed anyway, especially those that have already been funded under schemes supported by the PSO levy (REFIT schemes or the RESS), they may not contribute to additional decarbonisation, which would not achieve the benefits of such contracts for all electricity users and harm public trust. CPPAs for **new** non-subsidised or repowered projects should be prioritised.*" [Emphasis added]

The CPPA Roadmap itself notes that "*keeping RESS and CPPAs separate leads to clearer additionality for CPPAs*". The stipulation that any CPPA related to the Proposed Development would not be subject to any direct government financial subsidy, consumer, or public subsidy ensures that any renewable development subject to such a CPPA does not benefit from receipt of subsidy under the Renewable Electricity

[2] https://sustainability.aboutamazon.com/renewable-energy-methodology.pdf

Support Scheme (RESS), in line with the CPPA Roadmap. Condition 13(a) of the Fingal County Council decision captures the requirements set out in the CPPA Roadmap, requiring that:

"The new renewable energy projects shall not be supported by government, consumer or other public subsidies"

The Institute of Environmental Management and Assessment (IEMA) guidance document – *Pathways to Net Zero - Using the IEMA GHG Management Hierarchy* (Nov 2020) revised the IEMA GHG Management Hierarchy as shown in Figure 1 below to include CPPAs under the category of "substitution" within the Hierarchy:

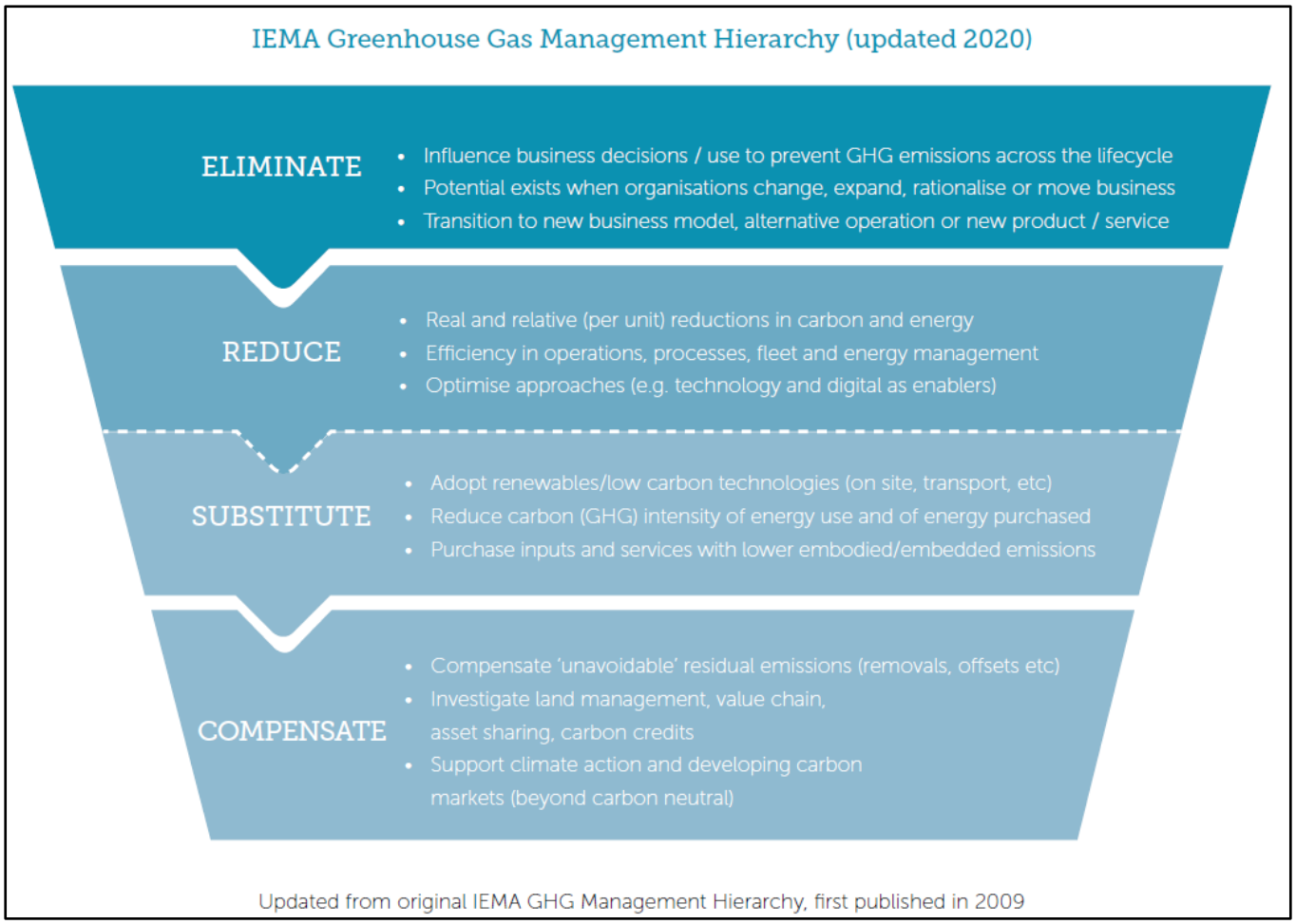

Figure 1 IEMA Greenhouse Gas Management Hierarchy (IEMA, 2020)

In relation to the use of CPPAs, the IEMA 2020 guidance states, on Page 5, the following (bold added):

"Purchased green electricity tariffs (also green gas) are increasingly being considered within net-zero approaches. In earlier versions of the Hierarchy these tariffs only appeared within COMPENSATE. This is still the case for market-based approaches that use certificates where additionality or quality thresholds are poor, or hard to substantiate. The hierarchy does now allow for higher quality energy tariff purchases within the SUBSTITUTE line, reflecting developing practice and some improved purchasing arrangements (e.g. ***higher quality procurement or quasi-investments via power purchase agreements****)."*

Thus, CPPAs are now recommended by IEMA (IEMA, 2020) as an appropriate project-specific "*Substitution*" mitigation measure alongside measures such as adopting renewable technologies and reducing the carbon intensity of energy used.

For further clarity on the position of IEMA regarding CPPAs and mitigation, the *IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition*

(IEMA, Feb 2022) has recently stated, on Page 9, that:

"GHG mitigation is best achieved by taking a planned and focused approach following the IEMA GHG management hierarchy principles."

1.4 Concluding Statement In Regard To Applicant Response To Item A1

In summary, CPPAs are fully in line with both National and EU Policy. In addition, the relevant IEMA guidance documents (IEMA, 2020, 2022) have specifically stated that CPPAs are an appropriate GHG mitigation which falls under the mitigation category of "*Substitution*" in the GHG Management Hierarchy, and the applicant has undertaken to provide such a CPPA for the Proposed Development. Thus, in line with the appropriate Environmental Impact Assessment (EIA) terminology, the impact of the Proposed Development, post-mitigation is a ***minor adverse, non-significant impact***.

2.0 Item A2 - Corporate Power Purchase Agreement (CPPA) and Assessment of Renewable Projects(s)

2.1 Overview

The EIAR and AA Screening Report have considered cumulative impact for projects within the zone of influence of the Proposed Development. Condition 13 which requires the applicant's group to enter into CPPA will result in new and future renewable energy (RE) project(s) being operational prior to commencement of operation of the Proposed Development (having regard to the phased delivery and operation of the Proposed Development). The location of the specific RE project or projects are unknown now and were also unknown at the time of the EIA undertaken by FCC. The potential cumulative impact of new and future RE project(s) is addressed below in as far as practicably possible, which is the requisite standard established by *Fitzpatrick v An Bord Pleanála*[3] in respect of a similar argument relating to potential future phases of data centre development on a wider landholding at Athenry in Co. Galway.

2.2 Summary of key appellant points

The Mannix Coyne appeal argues that Condition 13 applied by Fingal County Council in their decision to grant permission (which requires the applicant's group to enter into a CPPA in respect of the Proposed Development) represents a "*significant secondary project that would likely not arise but for the principal project and could be described as integral to the project in how the condition is to be discharged*". The appeal argues that the EIAR has not adequately assessed this 'integral' project. A similar argument is put forward by the John Conway and Louth Environmental Group appeal.

2.3 Applicants Response

Any new and future RE project will require a suite of assessments and permissions/consents prior to construction and subsequent operation. These will include but are not limited to EIA / EIA Screening at the time the application for the RE project is made. As the assessment of environmental impact for a project of this nature is site specific to the receiving environment in which the RE project is located, it is not feasible to undertake a detailed assessment of cumulative impact at this time. However, it is feasible to consider the likely cumulative impact based on considering typical construction and operation effects from other RE developments assessments. While there are many types of RE projects (wind and solar being the main two of potential relevance, with wind being the most relevant), the primary residual effects of an RE project after mitigation are typically:

- Construction: short-term nuisance due to construction traffic, construction impacts on land stability and water run-off quality, construction noise and dust and climate emissions, impact on cultural heritage, biodiversity and landscape.
- Operational Phase effects: noise emissions, landscape / visual impact, and land use effects.

Apart from potential climate effect (almost certain to be positive in the long term), all of the potential environmental impacts are generally local to the area in which the RE project(s) will be located. Mitigation will be required at a local level for effects identified during the planning application stage.

As outlined in Section 8.0 of the Addendum to Chapter 9 (Climate) of the EIAR, the predicted impact of the Proposed Development and the Overall Project (i.e. development on the wider landholding) is ***indirect, long-term, negative*** and ***minor adverse*** and in terms of climate, both the construction phase and operational phase of the Proposed Development and Overall Project will be not significant.

Based on the nature of the RE project(s), the climate impact of the proposed RE project

[3] [2019] IESC 23

is likely to be beneficial and contribute to the cumulative impact in a beneficial manner.

The RE project(s) related to the CPPA will not be local to the Proposed Development, which is located in an existing built-up area. As a result, there is no likely significant cumulative impacts between the Proposed Development and the future RE project(s) due to the high likelihood of a significant degree of geographical separation distance. The development of the RE project(s) will be subject to planning conditions by the relevant competent authority and will be obliged to comply with all applicable environmental and planning legislation.

2.4 Concluding Statement In Regard To Applicant Response To Item A2

All new and future RE project(s) to be enabled by the applicant via CPPAs will be subject to planning conditions and obliged to comply with environmental and planning legislation. All new and future RE project(s) will almost certainly be located a significant distance away from the site of the Proposed Development and thus there is no likely significant cumulative impacts between the Proposed Development and the future RE project(s). In relation to climate impact, where geographical location is not relevant in terms of GHG emissions, the impact of the proposed RE project(s) is likely to be beneficial and contribute to the cumulative impact in a beneficial manner.

3.0 Item A3 - Cumulative Assessment of other Data Centre Projects

3.1 Overview

This section addresses the arguments raised in various appeals in regard to the cumulative impact of the Proposed Development in combination with other Data Centre Projects.

3.2 Summary of Key Appellant Points - Item A3

The argument raised in the various appeals relates to the assessment of the cumulative effects associated with the development in combination with other data centre developments. The argument is raised that GHG emissions have cumulative effects at a global level which undermines the legitimacy of the assessment undertaken.

3.3 Applicant Response To Item A3

From a climate perspective, the Institute of Environmental Management and Assessment (IEMA) guidance note on "*Assessing Greenhouse Gas Emissions and Evaluating their Significance*" (IEMA, 2022) has noted, on Page 21, that:

"The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area of, for example, 10km would be included."

The guidance states, on Page 21, that when considering the cumulative assessment,

"All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being of "high" sensitivity to further emissions.

Effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other."

The guidance furthermore states, on Page 21 of IEMA 2022, in terms of contextualization of the GHG emissions:

"The contextualisation of GHG emissions …… should incorporate by its nature the cumulative contributions of other GHG sources which make up that context. Where the contextualisation is geographically - or sector-bounded (e.g. involves contextualising emissions within a local authority scale carbon budget, or a sector level net zero carbon roadmap), then the consideration of cumulative contributions to that context will be within that boundary."

Thus, the assessment of the Proposed Development evaluated direct operational climate impacts from the backup generators for the Proposed Development scenario and the masterplan of the Overall Project including a potential future phase of development. In addition, for the Proposed Development scenario and the masterplan of the Overall Project including a potential future phase of development, the indirect GHG emissions from the electricity supplied to the site was also evaluated.

In line with the contextualization of the GHG emissions outlined in IEMA 2022, the assessment outlined in the Addendum to Chapter 9 of the EIAR also considered the cumulative direct and indirect emissions both on an EU wide basis (as a percentage of the EU ETS) and in terms of the most relevant national target (as a percentage of the electricity Sectoral Emission Ceiling) for the baseline scenario, Proposed Development

scenario and the masterplan of the Overall Project.

Referring to the High Court's judgment in *Coyne* in relation to the indemnification provided by the ETS system in respect of particular types of GHG emissions:

211. *"I referred earlier to the description of the ETS in Milieudefensie. In an analysis of some present relevance, the Hague District Court also observed in that case that "The indemnifying effect of the ETS system means that – insofar as it concerns the reduction target of the ETS system – RDS[397] does not have an additional obligation with respect to Scope 1 and 2 emissions in the EU that fall under the system." The Hague District Court also observed that "the ETS system only covers a small part of the Shell group's emissions. Only for these emissions, RDS does not have to adjust its policy due to the indemnifying effect of the ETS system." The court's ultimate reasoning was more complex (as to shortfalls between what reductions ETS would achieve and overarching reduction targets it imposed on RDS).*

212. *However the only GHG emissions in issue in the present case – the Scope 2 emissions of electricity generation to power the Data Centre - are all covered by the ETS. In that light Milieudefensie can be seen to have adopted the reasoning urged in opposition to the Coynes in this case as to the significance of the ETS – which is described in Milieudefensie as the cornerstone of EU climate policy and as an important tool to cost-effectively limit CO2 emissions. Paraphrasing the Hague District Court, one would say that the indemnifying effect of the ETS system means that – insofar as it concerns the GHG cap of the ETS system – EngineNode does not have an additional obligation with respect to Scope 2 emissions of the Data Centre that fall under the system. For these emissions, EngineNode does not have to adjust its policy due to the indemnifying effect of the ETS system. It is not apparent to me that this observation is any the less valid because we are concerned with a prospect of development rather than with an existing enterprise*.

213. […] *it suffices in EIA of a particular project, in which its indirect and cumulative effects by way of electricity generation of CO2 emissions are at issue, to do as was done here. Namely to identify and quantify energy demand and energy used, to identify and quantify the nature and magnitude of nature and magnitude of GHG emissions likely to result from that energy use (recognised in the papers as up to 180mw and 1,577 GWh annually) and to examine and analyse their contribution to national GHG emissions of the electricity generation sector in the context of the ETS and national policy to transition towards renewable electricity generation.*[…]

214. *It does not appear to me that it is necessary, or even possible, to go further by way of an attempt to discern the cumulative effect of the project on future substantive climate change events, much less effect on a small number of individuals who, irrelevantly for this particular purpose as the effects will be caused elsewhere and occur on a global scale, happen to live beside the Data Centre. I confess to imagining that such an exercise, as to the effects by way of electricity generation of CO2 emissions due to this project (which, in EIA is always the issue – even as to cumulative effect) would be speculative to the point of uselessness. "*

Thus, the applicant has undertaken the cumulative impact assessment of the Proposed Development in a manner consistent with the appropriate guidance (IEMA, 2022), and there is no requirement for the assessment to focus in particular on (or assess the cumulative impact of) all other developments of a similar nature in the state (or a subset of those developments).

3.4 Concluding Statement In Regard To Applicant Response To Item A3

In conclusion, the assessment of the Proposed Development has been undertaken using the correct methodology as outlined in the most appropriate guidance document (IEMA, 2022) with the predicted impact being correctly contextualized in terms of the EU ETS and the electricity Emission Ceiling.

4.0 Item A4 - Accuracy of Climate Assessment, Conclusions on Climate Impact, and Consideration of Reasonable Worst Case

4.1 Overview

This section summarises the submitted EIAR and Further Information response in relation to climate impact assessment and provides recent additional data supporting the approach taken for the assessment demonstrating that the climate impact assessment for the Proposed Development and the overall project in the submitted EIAR and the Addendum to Chapter 9 of the EIAR (submitted with the Further Information response) was carried out in line with the relevant guidance and is based on the IEMA 2022 guidance titled "*Assessing Greenhouse Gas Emissions and Evaluating their Significance*".

As outlined in Section 2.0 of the Addendum to Chapter 9 of the EIAR, the assessment is based on a reasonable worst-case assessment, in line with the approach outlined in the IEMA Guidance - *Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition* (IEMA, 2022). It is clear that the impact of the Proposed Development is correctly assessed and, post-mitigation, classified as minor adverse.

4.2 Summary of Key Appellant Points - Item A4

The appellants have raised the following points in relation to the climate impact assessment. Various appeals argue that (apart from the use of CPPAs as mitigation, as dealt with above), the climate assessment included within the EIAR, as supplemented at Further Information stage, mischaracterised, and underestimated the impact of the Proposed Development. In summary, the following arguments are raised by the appellants in this regard:

A4.1 The appellants argue, the EIAR didn't take account of impact on the ceiling for Ireland's Electricity Sector. The appellants argue that as the development would result in additional emissions, the impact should be characterised as significant adverse rather than moderate adverse, as the IEMA guidance dictates this for developments which would not be aligned with the pathway to net zero.

A4.2 The appellants argue that the assessment should have addressed a reasonable worst case scenario, whereby all additional demand would have been met by way of additional conventional generation.

A4.3 The appellants argue that the Proposed Development would, immediately on operation, give rise to a new demand for 73MW of electricity which will be supplied through additional conventional (fossil fuel derived) generation.

A4.4 The appellants argue that as if the assessment were based on the assumption that conventional generation would be used, the resulting impact would be even more significant.

A4.5 The appellants argue that Table 1.10 of the AWN FI response incorrectly stated data as prior to mitigation, even though they reflect an assumed 80% renewable generation.

A4.6 The appellants argue that the predicted impact both before and after mitigation is understated, and that the predicted impact should not have assumed that 80% renewables penetration would be achieved.

A4.7 The appellants argue that if the scenario of the development being powered by conventional fossil fuel derived generation was calculated, the impact would be 8.8% for the project, and 26% for the overall site. While the assessment indicates the impact reducing to 'minor adverse' after mitigation, the same mitigation is heavily reliant on CPPAs, which it is argued will not in fact provide for "*additionality*". The appellants argue that therefore the impact should stay at moderate under the best case scenario, and major for the worst case (conventional generation) scenario.

4.3 Applicant Response To Item A4

The response to each of these items has been grouped as appropriate and addressed in turn below:

Points Raised – A4.1 – A4.4

Appeal item A4.1
The appellants argue that as set out in previous submission, the EIAR didn't take account of impact on the ceiling for Ireland's Electricity Sector. The appellants argue that as the development would result in additional emissions, the impact should be characterised as significant adverse rather than moderate adverse, as the IEMA guidance dictates this for developments which would not be aligned with the pathway to net zero.

Appeal item A4.2
The appellants argue that the assessment should have addressed a reasonable worst case scenario, whereby all additional demand would have been met by way of additional conventional generation.

Appeal item A4.3
The appellants argue that the Proposed Development would, immediately on operation, give rise to a new demand for 73MW of electricity which will be supplied through additional conventional (fossil fuel derived) generation.

Appeal item A4.4
The appellants argue that as if the assessment were based on the assumption that conventional generation would be used, the resulting impact would be even more significant.

Response To Points A4.1 – A4.4

The above items focus on the following argument from the appellants:

- that the Proposed Development will result in new unforeseen demand on the electricity grid,
- that the EIAR should have taken account of the impact it will have on the electricity sectoral ceilings,
- that the power for the Proposed Development will need to be provided by additional conventional generation and that the climate impact assessment should have been based on conventional fossil fuel generation.

As part of this response, it is demonstrated below that the Proposed Development:

- will not result in new unforeseen demand as there is an existing connection agreement in place since 2017 with that demand built into all forecasts, as such it will not affect sectoral ceilings or the predicted quantity of conventional (fossil fuel) generation.
- In addition to this, a CPPA for the power demand for the proposed project has been welcomed and conditioned under the Planning Authority's decision to grant permission (A similar approach and condition by the Board would be welcomed).
- The climate impact assessment for the Proposed Development and the overall project in the submitted EIAR and the Addendum to Chapter 9 of the EIAR was carried out in line with the relevant guidance and is based on the IEMA 2022 guidance titled "*Assessing Greenhouse Gas Emissions and Evaluating their Significance*". As outlined in Section 2.0 of the Addendum to Chapter 9 of the EIAR, the assessment is based on a reasonable worst-case assessment, in line with the approach outlined in the IEMA 2022 guidance and it is clear that the impact of the Proposed Development is correctly, post-mitigation, classified as *minor adverse*.

The Government's '*Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings*[4]' (2022) provides details of the "*analysis and research that informed the preparation of the Sectoral Emissions Ceilings.*" With respect to the Electricity Sector, demand growth was assumed in line with the median growth scenario projected by the EirGrid Generation Capacity Statement 2020-2029 – the median scenario was used as the "proposed scenario" to establish the Electricity Sectoral Emissions Ceiling. That demand growth forecasted in the 'Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings' (2022) is influenced by several factors including contracted data centre capacity (i.e. including the Proposed Development), the electrification of the transport sector and home heating.

The EirGrid Generation Capacity Statement for 2020-2029 set out a median overall demand of 1,250MVA for Data Centre and Large Industrial User Demand by 2029 (Table 5[5]). The current version of the EirGrid Generation Capacity Statement 2022-2032 shows an increase of 241MVA for Data Centre and Large Industrial User Demand by 2032 (Table 2.2[6]) – giving an median overall demand in 2031 of 1,491MVA.

While reflecting marginally lower demand (241MVA) than current EirGrid projections, the "proposed scenario" taken into account in developing the Sectoral Emissions Ceilings includes the growth of data centres with contracted demand such as the Proposed Development factored in.

The Climate Action Plan 2023 (CAP23) *"sets out the roadmap to deliver on Ireland's climate ambition.* ***It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings*** *that were agreed by Government in July 2022.* ***This will enable Ireland to meet 2030 targets*** *and be well placed to meet mid-century decarbonisation objectives which will also help deliver cleaner air, warmer homes and a better quality of life for Irish citizens."* [Emphasis added]

Specific to the Electricity Sector, CAP23 sets out that *"[a]mong the most important measures in* ***the plan is to increase the proportion of renewable electricity to up to 80% by 2030*** *and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030."* The 80% renewable electricity share of demand is worked back from the Carbon Budget, the associated Sectoral Emissions Ceilings and ultimately the demand projections that have been established for all Sectors. As set out above, those demand projections include the Proposed Development. [Emphasis added]

As the Proposed Development will be bringing forward renewables for contracted demand which is already accounted for within CAP23 it is clear that the commitment to deliver a CPPA in line with Condition 13 will adhere to and enhance the same efforts established under CAP23.

In addition, there is no current evidence that there will be an exceedance of the Sectoral Emission Ceiling. The recent DECC publication "*Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings*" (DECC, 2022) outlines the assumptions which have been used to derive the Sectoral Emission Ceilings. The "proposed scenario" (Figure 2) adopted by DECC takes into account the EirGrid Generation Capacity Statement for 2020-2029 which set out a median overall demand in 2029 of 1,250MVA for Data Centre and Large Industrial User Demand by 2029 (Table 5[7]).

[4] https://assets.gov.ie/236057/3ddf7b83-8ee8-4d62-b35e-d3dea38fa433.pdf
[5] https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Generation-Capacity-Statement-2020-2029.pdf
[6] https://www.soni.ltd.uk/media/documents/EirGrid_SONI_2022_Generation_Capacity_Statement_2022-2031.pdf
[7] https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Generation-Capacity-Statement-2020-2029.pdf

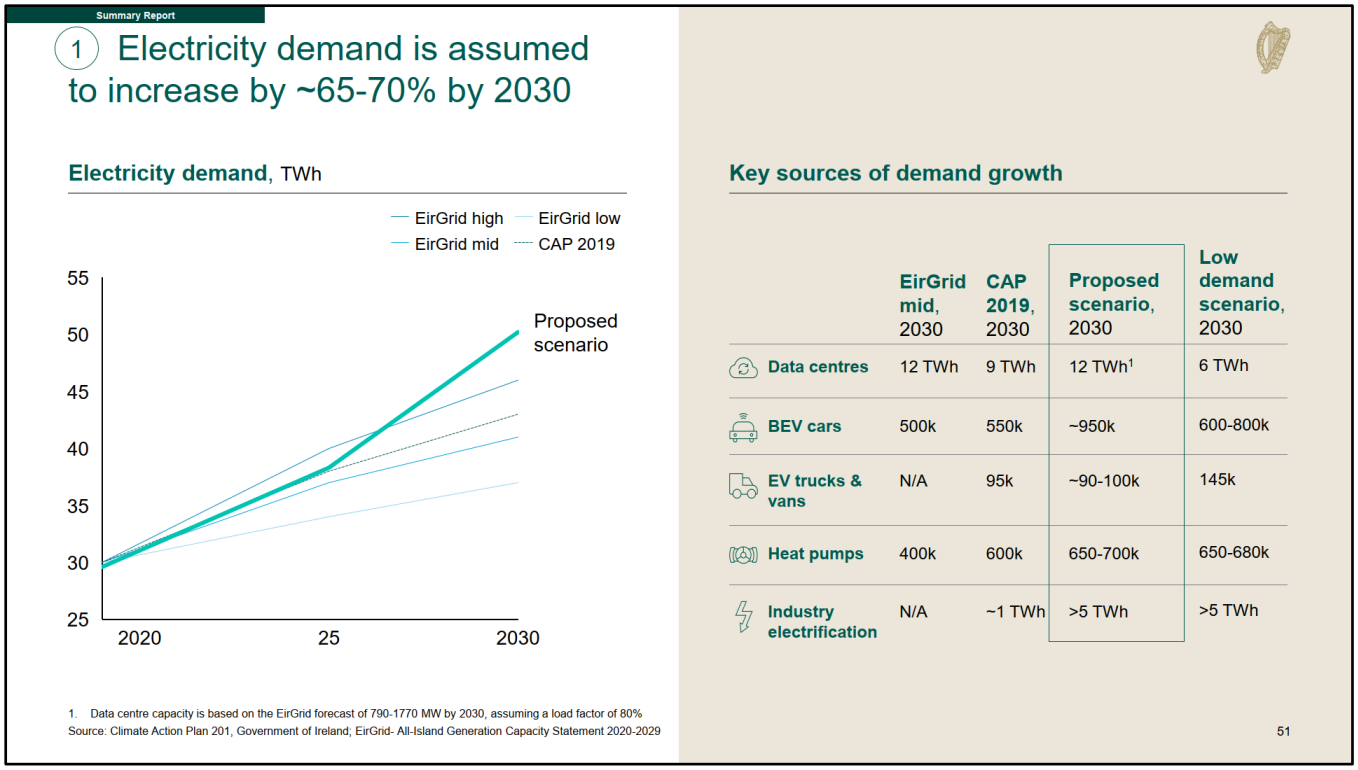

Figure 2 Electricity Demand Assumed In Establishing Sectoral Emission Ceilings (DECC, 2022)

With a growth rate of 65-70% in electricity demand by 2030 inherent in the DECC analysis (which includes the Proposed Development), the assessment undertaken for the Sectoral Emission Ceilings has concluded that the 2030 target of 3 Mtonnes of CO_2eq is attainable as shown in Figure 3 below.

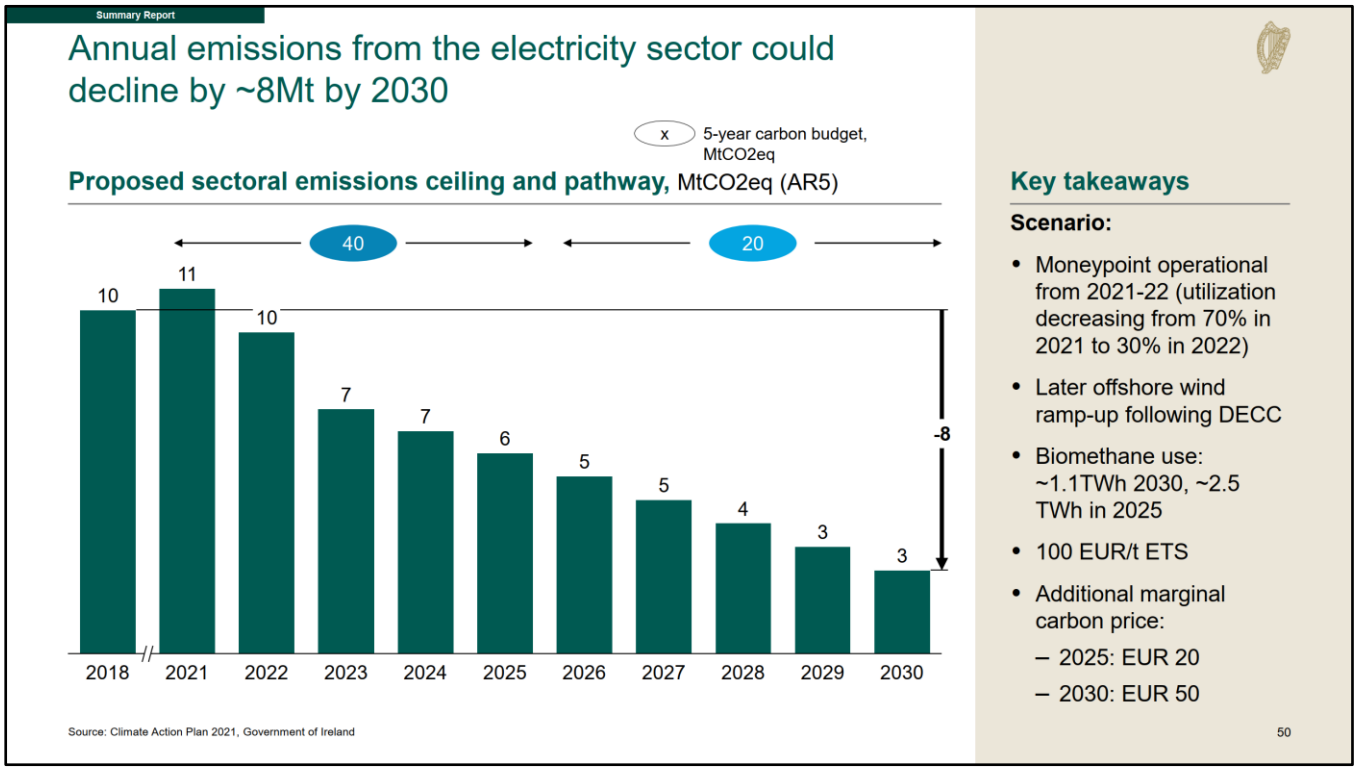

Figure 3 Proposed sectoral emissions ceiling and pathway 2018 to 2030 (DECC, 2022)

The EPA has recently reported that the 2022 energy industries GHG emissions have decreased from 10.26 Mtonnes in 2021 to 10.08 Mtonnes in 2022[8]. Comparing the 2022 reported data to the projected data undertaken for the Sectoral Emission Ceiling in Figure 3 indicates that the actual emissions are similar to the target value in 2022.

[8] https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/#

Thus, in the context of the Sectoral Emission Ceilings, and where the Proposed Development is included under existing electricity demand forecasts there is no evidence that the Proposed Development would contribute to an exceedance of the Emission Ceiling.

In relation to Appeal Item A4.2, shown below, a detailed rebuttal has been outlined in the paragraphs below:

> *Appeal item A4.2*
> *The appellants argue that the assessment should have addressed a reasonable worst case scenario, whereby all additional demand would have been met by way of additional conventional generation.*

The climate impact assessment undertaken in the Addendum to Chapter 9 of the EIAR was carried out in line with the IEMA Guidance - *Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition* (IEMA, 2022). It has been summarised below to demonstrate that the assessment is based on a reasonable worst-case assessment, in line with the approach outlined in the IEMA 2022 guidance and it is clear that the impact of the Proposed Development is correctly, post-mitigation, classified as minor adverse.

The assessment methodology undertaken, in line with IEMA recommendations, is as follows:

1. The scope and boundary of the GHG assessment was determined by reviewing the overall project scope and relevant guidance as listed above,
2. A detailed baseline review of GHG emissions for both the construction and operational stage was carried out,
3. The emissions calculation methodologies were determined for both the construction stage and the operational stage,
4. Data collection; Predictive calculations and impact assessments relating to the likely Construction and Operational Phase climatic impacts of the Proposed Development have been undertaken; During the assessment, IEMA recommend the use of a reasonable worst-case scenario rather than an absolute worst-case scenario,
5. Calculate/determine the GHG emissions inventory,
6. Consider mitigation opportunities and repeat steps 4 & 5. A schedule of mitigation measures has been incorporated, as outlined in Section 6.1, where required to reduce, where necessary, the identified potential climatic impacts associated with the Proposed Development,
7. define the significance criteria for the Construction and Operational Phases of the Proposed Development and the Overall Project.

1. Set the scope and boundaries of the GHG assessment

The scope and boundary of the GHG assessment for the operational phase of the Proposed Development will also include the permitted development and the Overall Project. The GHG assessment is based on the use of electricity to power the facility in addition to the back-up power supply/operation and testing/maintenance of the backup generators for 72 hours per year. In the event of a loss or removal of power supply, the back-up generators will be utilised to maintain power supply. The operational phase is proposed to commence in mid-2025 and ramp up operations and power usage until mid-2027. Given that the power supply for operations is from the electricity grid, the worst case scenario for GHG emissions is prior to grid decarbonization with the impact reducing as grid decarbonization progresses further. The GHG assessment is made prior to net zero carbon in the grid which is predicted conservatively to occur at 2050.

2. Develop the baseline

For 2021, baseline GHG emissions in Ireland are estimated to be 61.528 Mt CO2eq as shown in Table 1 below (reproduced from Table 1.5 of the Addendum to Chapter 9 of

the EIAR). The sector with the highest emissions is agriculture at 37.5% of the total, followed by transport at 17.7% and energy industries at 16.7%. In relation to energy the total emissions amount to 10,272 kilotonnes of CO2eq in 2021.

Category	Kilotonnes (kt) CO2eq	% of Total GHG Emissions
Waste	937	1.5%
Energy Industries	10,272	16.7%
Residential	7,040	11.4%
Manufacturing Combustion	4,593	7.5%
Commercial Services	817	1.3%
Public Services	663	1.1%
Transport	10,912	17.7%
Industrial Processes	2,460	4.0%
F-gases	738	1.2%
Agriculture	23,097	37.5%
Total	61,528	100%

Table 1 *GHG Emissions in Ireland 2021 (EPA, 2022b)*

3. Emission Calculation Methodology & 4. Data Collection

The recent *Coyne v An Bord Pleanála*[9] high court judgment addressed the existence of uncertainty and how account should be taken of that uncertainty with the relevant quotes from Paragraphs 125 – 127 shown below:

"125 As to "Assessing Significant Effects" the 2013 Guidance [2013 Guidance on Climate Change] states that many assessment approaches used in EIA have the capacity to address climate change. "There are, however, three fundamental issues that you should consider when addressing climate change and biodiversity: the long-term and cumulative nature of effects, complexity of the issues and cause-effect relationships and uncertainty of projections." There follows a consideration of all three issues, the premise of which is that EIA should address them. I would add that this premise must itself be premised on climate change having been scoped into the EIA as a likely significant effect.

126 The 2013 Guidance states that EIA, to properly address climate change, should take into account its complexity (including of causal relationships) and long-term direct and indirect impacts and consequences. EIA should describe the sources of, and characterise the nature of, uncertainty. Judging an impact's magnitude and significance must be context-specific. The contribution of an individual project to GHGs may be insignificant on the global scale but may be significant on the local/regional scale, in terms of its contribution to set GHG-reduction targets.

127 Finally, it is worth noting some of the "bullet points" tabulated in 2013 Guidance as "Critical challenges for addressing climate change ... in EIA":

- *Manage complexity. Consider the complex nature of climate change and biodiversity and the potential of projects to cause cumulative effects.*
- *Be comfortable with uncertainty, because you can never be sure of the future. Use tools such as scenarios (for example, worst-case and best-case scenarios) to help handle the uncertainty inherent in complex systems and imperfect data. Think about risks when it is too difficult to predict impact.*
- *Base your recommendations on the precautionary principle and acknowledge assumptions and the limitations of current knowledge.*
- *Be practical and use your common sense!*

[9] [2023] IEHC 412

The guidance also states that "considering a range of possible uncertain futures and understanding the uncertainties is part of good EIA practice and permits better and more flexible decisions.

In other words, it is no error to acknowledge and assess uncertainty and risk as best you reasonably can. Error may well lie in ignoring them."

A Reasonable Worst Case assessment has been made in line with IEMA guidance as follows:

Operational Phase Year 2025: Conservatively the assessment assumed that in Year 2025 the facility will operate at 100% of the power demand while in reality, the operation (and associated energy demand) of the facility will ramp up over a period of 2.5 years and thus will only reach full capacity in mid-2027.

The assessment assumed a continuous 100% operational load for the data centre development, however annual average load is likely to be closer to 80% (as outlined in the recent DECC publication "*Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings*" (DECC, 2022),

The GHG emission factor of electricity is based on current reported levels (Year 2021) with the assumption that the GHG emission factor will decrease in a linear fashion to reach 100 gCO2/kWh by 2030 in line with government policy as shown in Table 2 below (reproduced from Table 1.5 of the Addendum to Chapter 9 of the EIAR).

Year	Electricity[Note 1] (g CO_2 / kWh)
2025	237
2026	209
2027	182
2028	155
2029	127
2030	100

Note 1 Based on a carbon intensity of 348 g CO_2 / kWh in 2021 and assuming linear interpolation to 100 g CO_2 / kWh by 2030.

Table 2 *Carbon Intensity of Electricity From 2025 - 2030*

This is confirmed as a reasonable worst case value as the latest communication from the SEAI[10] has confirmed that the estimation for 2030 is currently 92.9 gCO2/kWh, as outlined in Table 3, and thus the emission factors used in the Addendum to Chapter 9 of the EIAR are conservative.

[10] Private communication from SEAI- dated 12th October 2023

From: [redacted]@seai.ie>
Sent: Thursday, October 12, 2023 11:45 AM
To: Avril [redacted] <[redacted]@awnconsulting.com>
Subject: RE: Future Carbon Intensity for Grid Electricity

Dear Avril,

Thank you for your email. Please find attached spreadsheet with a projection of electricity carbon intensity out to 2050.

This projections is based on the WAM-CAP23 scenario from our latest set of projections. This broadly assumes that the targets set in the latest 2023 Climate Action Plan will be achieved. Because the current focus of government policy is on the period to 2030, there is less detail on policies and measures that will be adopted from 2030 to 2050. This is reflected in the scenario shown, where there are still emissions from electricity generation out to 2050. In reality we expect further policies and measures to be developed later in the decade that will provide a pathway to a zero carbon electricity system by 2050.

Regards,
Mary

2022 National Energy Projections (NEP) electricity factors											
Scenario	Property	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2030
High WAM v3, CAP23	Emission intensity	gCO2/kWh	338.5	319.0	281.7	226.3	216.3	190.5	164.4	122.5	92.9

Table 3 GHG Emission Intensity 2022 - 2030 (SEAI, 2023)

Further conservative approaches in the reasonable worst case assessment are as follows:

- the power generation mix in 2030 is forecast by EirGrid to be 83% renewable rather than the assumed 80% renewable generation,
- It is assumed that net zero electricity would not be achieved until 2050, whereas recent data from the ESB and UCC/MaREI suggests that this is likely to be achieved by 2040 at the latest as outlined in "*Networks For Net Zero - Delivering the Electricity Network for Ireland's Clean Electric Future*" (ESB Networks, 2023).
- UCC / MaREI have also separately published the report "*Our Climate Neutral Future - Zero by 50*" (UCC / MaREI, 2021) which details how the energy system can achieve net zero by 2050 by using technologies, concepts and interventions will already exist today. As shown in Figure 5, the report predicts that the energy system will be dominated by renewable energy in 2050.
- Although the pathway may vary somewhat depending on future policy decisions, it is likely that net zero electricity (shown in green below in Figure 4) will be achieved by 2040 compared to the conservative assumption in the Addendum to Chapter 9 of the EIAR that net zero electricity would not be achieved until 2050. Thus, the GHG emissions in the Addendum to Chapter 9 of the EIAR should be viewed as a reasonable worst-case assessment in line with the IEMA guidance (IEMA, 2022).

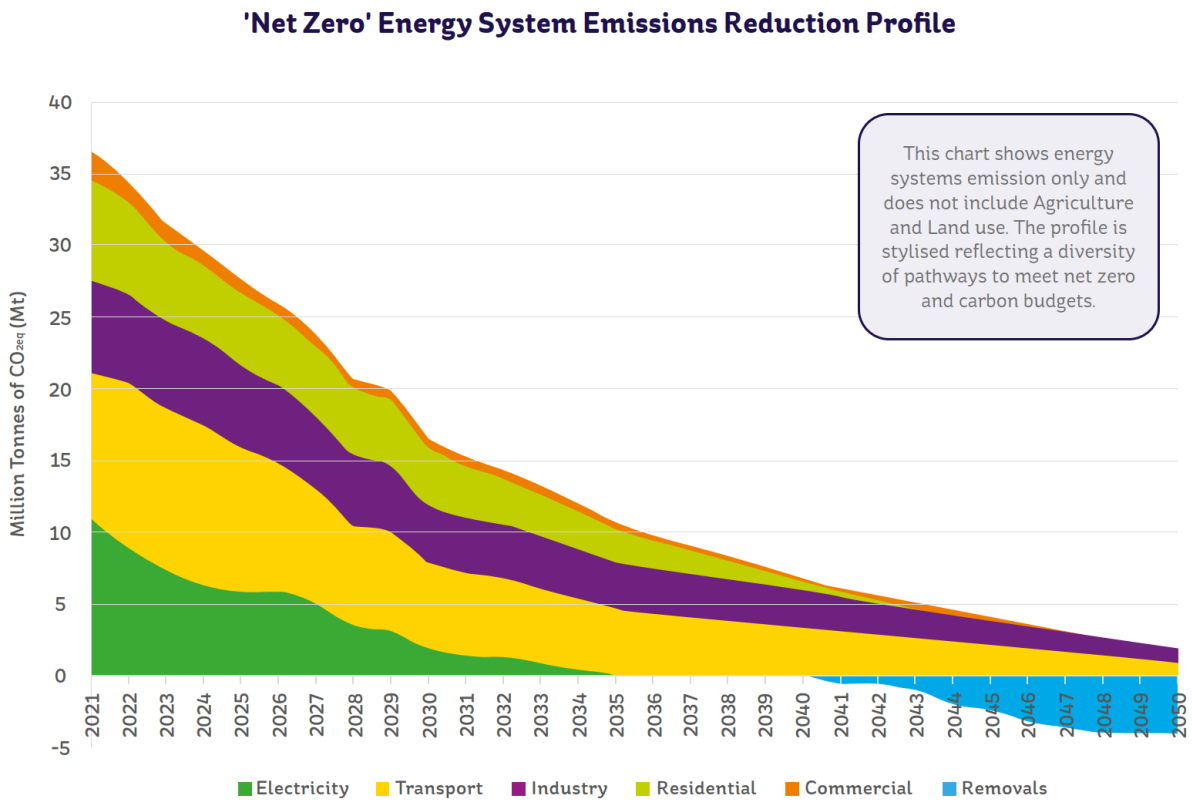

Figure 4 Net Zero Energy System Emissions Reduction Profile (UCC / MaREI) (ESB Networks, 2023)

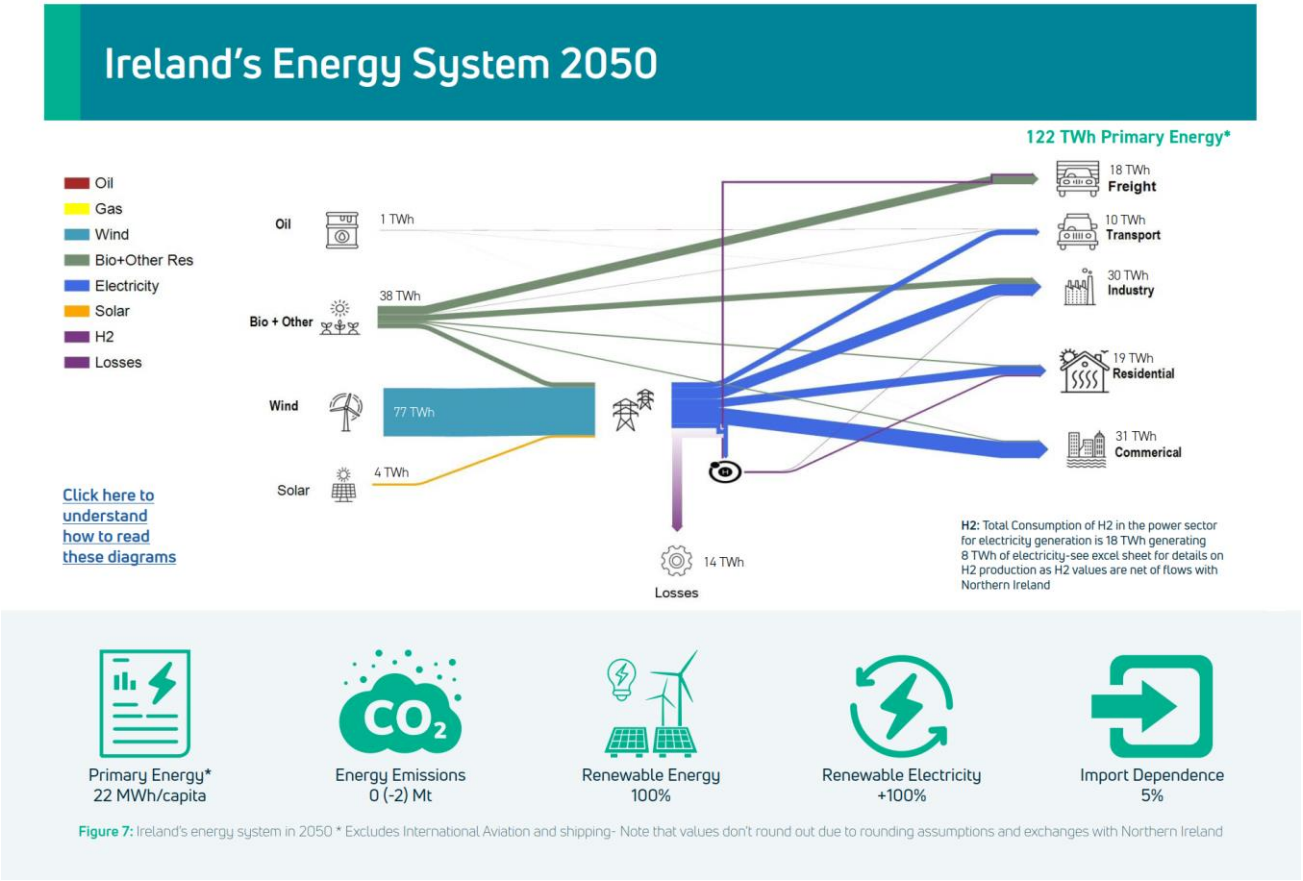

Figure 5 Ireland's Energy System 2050 (UCC / MaREI, 2021)

The assessment undertaken in the Addendum to Chapter 9 of the EIAR has been based on a reasonable worst-case assessment in line with the both the *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (EU, 2013) and *Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition* (IEMA, 2022). The reasoning for this conclusion is outlined below.

Firstly, the GHG emission factor of electricity is based on current reported levels (Year 2021) with the assumption that the GHG emission factor will decrease in a linear fashion to reach 100 gCO_2/kWh by 2030 in line with government policy. However, the latest communication from the SEAI has confirmed that the estimation for 2030 is currently 92.9 gCO_2/kWh, as outlined in Table 3, and thus the emission factor used in the Addendum to Chapter 9 of the EIAR is conservative.

A second assumption which is likely to be conservative is that it has been assumed in the Addendum to Chapter 9 of the EIAR that the electricity grid achieves net zero GHG emissions in 2050 in line with government policy. However, modelling by UCC/MaREI has recently outlined a net zero GHG emissions pathway for the National Grid which is achievable by 2040 (as outlined in "*Networks For Net Zero - Delivering the Electricity Network for Ireland's Clean Electric Future*" (ESB Networks, 2023)).

Therefore, contrary to the claims made in the third party appeals, the climate assessment within the EIAR and the EIAR Addendum submitted with the Further Information response was not based on overly optimistic assumptions, but in fact represented a conservative approach in line with the precautionary principle.

5. Calculate the GHG Emissions Inventory

The GHG associated with the operational stage of the Proposed Development was calculated by multiplying the power usage by the grid CO2eq values from Table 2 and is set out in Table 4 below. This table is as presented in the further information response submission but now includes an additional column with calculated GHG emissions based on the phased operational ramp up period from 2025 to 2027 and includes an

additional row for the year 2035.

Year	Proposed Development (73.1MW) – Addendum To Chapter 9 of the EIAR	Proposed Development (73.1MW) - Based on phased operational ramp-up period 2025-2027	Electricity[Note 1] (g CO2 / kWh)
2025	151,920	22,916	237
2026	134,561	77,161	209
2027	117,202	107,435	182
2028	99,843	99,843	155
2029	82,483	82,483	127
2030	65,124	65,124	100
2035	49,247	49,247	75

Note 1 Based on a carbon intensity of 348 g CO_2 / kWh in 2021 and assuming linear interpolation to 100 g CO_2 / kWh by 2030.

Table 4 *GHG Emissions For Proposed Development Scenario (Tonnes CO_2eq)*

GHG emissions, assuming a conservative CO_2eq emission rate of 100 gCO_2/kWh by 2030 and a net zero year of 2050, rapidly decreases over the period 2027 - 2035 leading to 49,247 tonnes CO_2eq in 2035 as shown in Table 4.

Furthermore in reality, the proposed facility will ramp up over a period of 2.5 years and thus will only reach full capacity in mid-2027. In addition, the assessment has been based on 100% operation at all times where in reality the long-term average for these facilities will be 80% of capacity (as shown in Figure 2 where EirGrid has assumed an 80% load factor for data centres).

The above demonstrates that a reasonable worst case approach has been taken in the climate impact assessment.

With respect to Appeal item A4.4 set out above, as noted previously the development in fact would not give rise to an immediate demand of 73MW, but rather the operation and demand associated with that operation from the development would ramp up over a period of c. 2.5 years.

Additionally, the unsubstantiated assertion that 100% conventional (oil, gas, coal) generation should be used to determine the GHG emissions from the facility will not reflect reality either in 2025 when operations will commence, 2027 when the GHG emissions from the Proposed Development peak, or in 2030 which is the target date for the first Electricity Emission Ceiling. Additionally, the assertion that the electricity supplied to the Proposed Development should be assumed to be 100% conventional (oil, gas, coal) generation is simply without merit and goes against all Government policies and follow-on Actions Plans. By 2030, the grid, based on the EirGrid analysis will be 83% renewables and thus the power supplied to the Proposed Development will be overwhelmingly renewable.

For the Permitted Development, the facility will use electricity from the National Grid. Thus, based on electricity from the National Grid for 8,688 hours per year and assuming backup generators usage for 72 hours per year and generator-testing, will consume 110.6MW of power. This equates to 970 GWh annually. This translates to approximately 229,855 tonnes of CO2eq per year (including generator testing) based on the likely 2025 electricity mix and approximately 98,533 tonnes of CO2eq per year (including generator testing) based on the likely 2030 electricity mix as outlined in Table 5 (as outlined in Table 1.7 of the Addendum to Chapter 9 of the EIAR).

Year	Permitted Development (Tonnes CO2eq)
2025	229,855
2026	203,590
2027	177,326
2028	151,061
2029	124,797
2030	98,533

Table 5 *GHG Emissions (CO2eq) For Existing Permitted Scenario (Tonnes CO2eq)*

6. Cumulative Impact assessment GHG Emissions and Cumulative Impact assessment with CPPA as mitigation

Mitigation measures will be implemented in line with "best practice" as outlined in IEMA (IEMA, 2022) as outlined below in Figure 6.

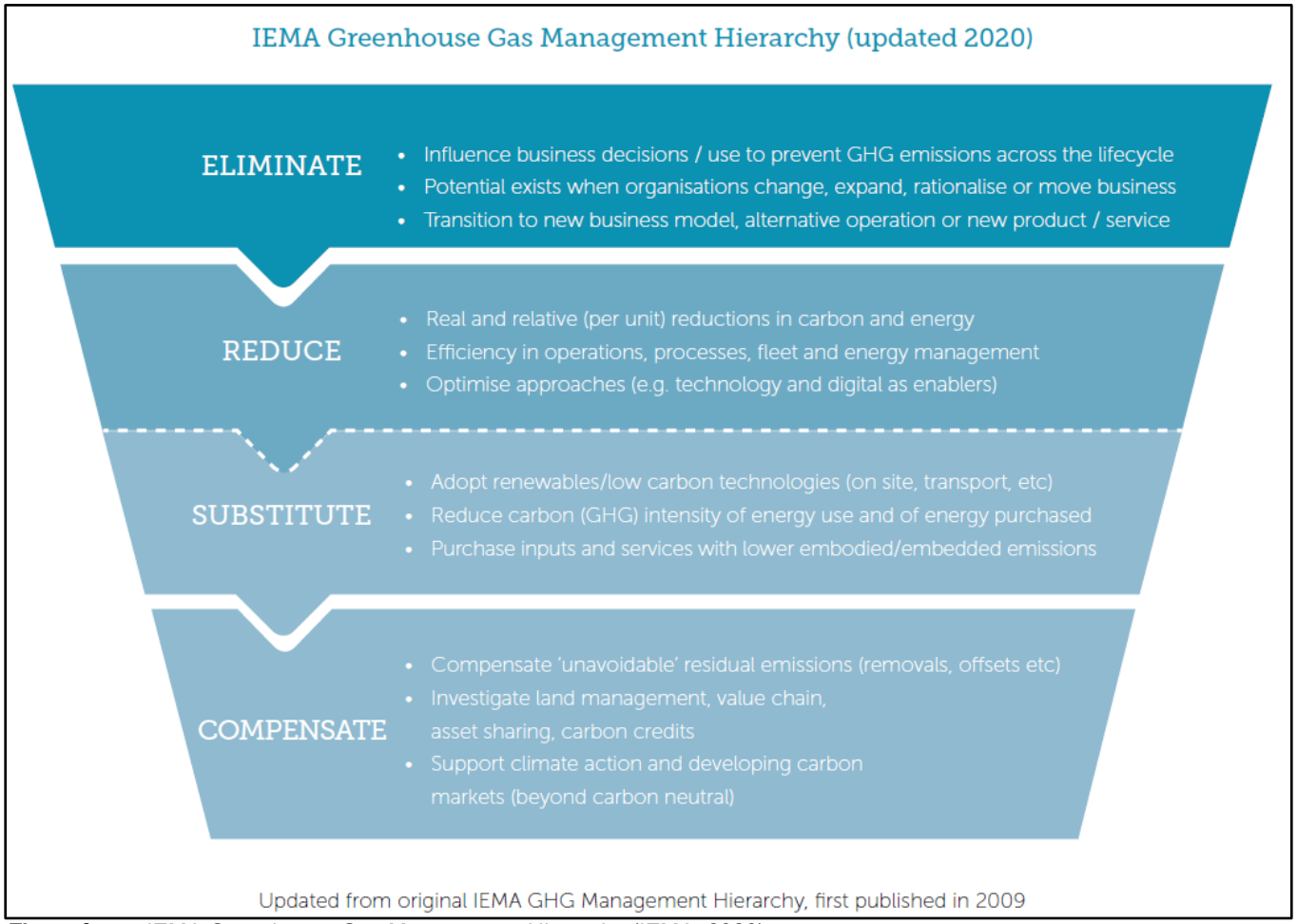

Figure 6 IEMA Greenhouse Gas Management Hierarchy (IEMA, 2020)

The objective of the mitigation measures outlined below is to ensure that GHG emissions are eliminated, reduced and substituted wherever possible during the operational phase of the Proposed Development and the Overall Project. The key mitigation measures which are relevant to GHG emission reductions are outlined below. These will mitigate GHG emissions to better than the 1.5deg C compliant trajectory and will in future years also contribute to reducing greenhouse gas emissions when it is accompanied by progressive decarbonization of the grid.

Condition 13 of the FCC planning decision requires a CPPA to be in operation prior to commencing operation as a substitute mitigation to GHG emissions and as directly related to the power demand for the Proposed Development has been quantitively assessed.

The following mitigations have been qualitatively assessed as mitigations to GHG emissions:

- The Proposed Development is designed to fully comply with the Climate Neutral Data Centre Pact. The Proposed Development has an annualised design Power Usage Effectiveness (PUE) of 1.12 and has a design water usage effectiveness (WUE) of 0.075 L/kWh as compared to the 0.4 L/kWh set under the Climate Neutral Data Centre Pact. PUE is the most commonly used metric to determine the energy efficiency of a data centre. Data centres need a range of auxiliary services, including cooling, to support the main 'work' of the IT systems, PUE measures the size of this 'overhead' energy used as a ratio to the energy used to power the computing equipment. Since PUE is a ratio, the closer the number is to 1.0, the more energy efficient the data centre. A survey of European data centres by 451 Research found "*European enterprises cited on average a PUE of 2.1* [11] as compared to a PUE of 1.3 set by the Climate Neutral Data Centre Pact and an annualised design PUE of 1.12 for the Proposed Development.
- The Operator has recently signed a supply agreement for renewable diesel (also referred to as hydrotreated vegetable oil or HVO) to their Irish Data Centers. As set out in this Appeal Response, it is expected that fuel for the Proposed Development will be renewable diesel.
- A PV array is proposed on each building E and F will consist of 285 PV modules, each of 300Wp, yielding a total peak power generated of 85.5kWp to match the lighting and IT electrical power requirements during the peak summer months for the administration & office of each building.
- A rainwater harvesting system will be used to ensure non-potable process water for cooling needs for the operational development are met with no reliance on the public water mains. The proposed buildings are designed to harvest rainwater for up to 100% of the annual process water requirements and includes 2170m3 of onsite water storage designed to maximise the storage and utilisation of rainwater, significantly reducing the annual water demand from the local supply.
- Facilitating district heating to a local user for heat or a future heat network – The Proposed Development incorporates design provisions to facilitate district heating including heat distribution pipework up to the site boundary. Please refer to Section 4 subsection *Co-Location or Proximity with Future-Proof Energy Supply* of the John Spain Associates response cover letter of this Appeal Response for further detail.
- Internal lighting shall be provided by highly efficient, low energy LED luminaires combined with presence detection controls or local switching where appropriate.
- The external lighting will make use of high efficiency, low energy LED luminaires. The lighting design has been optimized to reduce glare, spillage or other light nuisance to adjacent sites and/or public road.
- The data storage rooms are supplied with fresh air which is sufficient to cool the space for the majority of the annual running hours. For a small number of hours during the peak cooling season, adiabatic cooling is required. The system utilises fans to supply air directly from outside to the data storage rooms. The air is warmed as it passes across the IT servers located in the data storage rooms, and subject to external ambient conditions, the air is either recirculated or returned to atmosphere.
- The mechanical system has various modes of operation to provide efficient and reliable cooling to the data processing area. The mechanical system is monitored and controlled by an electronic building management system (BMS). The system monitors conditions and responds to reduce fan speeds and pump speed to maintain the operating point at the minimum necessary to meet the data storage room environmental conditions.
- All air supply and extract systems serving the data storage rooms are provided

[11] 451 Research - Improving datacenter efficiency in Europe – the role of PUE

with high efficiency direct drive fans. The EC direct drive fan is the most efficient fan solution available to facilitate demand control.

ASSESSMENT OF SIGNIFICANCE

When assessing significance, the 2010 IEMA Principles Series on Climate Change Mitigation & EIA (IEMA, 2010) defines three overarching principles:

- The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect;
- The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality); and
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such any GHG emissions or reductions from a project might be considered to be significant. The environmental limit is the global GHG emission budget that defines a level of dangerous climate change, and any GHG emission that contributes to exceedance of that budget or threatens efforts to stay within it can be considered as significant.

The 2020 Guidance (IEMA, 2022) document builds on those principles with three points:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects is a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. In relation to climate, the earth as a whole is a highly sensitive environment whilst the magnitude of impact is outlined below with the project being assessed against the recommended IEMA (IEMA, 2022) significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered:

- Major or moderate adverse impact (significant): A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero1 trajectory by 2050 or sectoral based transition to net zero targets, results in a significant adverse effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to nonsignificant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
- Minor adverse impact (not significant): A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not

significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.

- Negligible Impact (not significant): A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
- Beneficial Impact (significant): A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

The impact of the operational phase of the Proposed Development on climate was determined by an assessment of the direct (due to (worst-case) conventional diesel usage for the testing of back-up generators and in the event of a power failure) and indirect (associated with utility-supplied electricity) CO2 emissions over the period 2025 to 2030. The details and results of the assessment are provided in Section 7.2.2 of the Addendum to Chapter 9 of the EIAR. The change in the renewable fraction of electricity from the national grid with time has also been considered.

With a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, the net impact of the Proposed Development and the Overall Project is not significant. Given that the use of electricity to power the facility will achieve net zero by 2050 and the commitment to meet all interim fossil fuel derived GHG emissions associated with the Proposed Development by the purchase of Corporate Power Purchase Agreements (CPPAs) the predicted impact to climate is deemed to be ***indirect, long-term, negative and minor adverse***. The impact of the Overall Project, in line with the IEMA methodology (IEMA, 2022), is reduced to a ***minor adverse, non-significant*** impact.

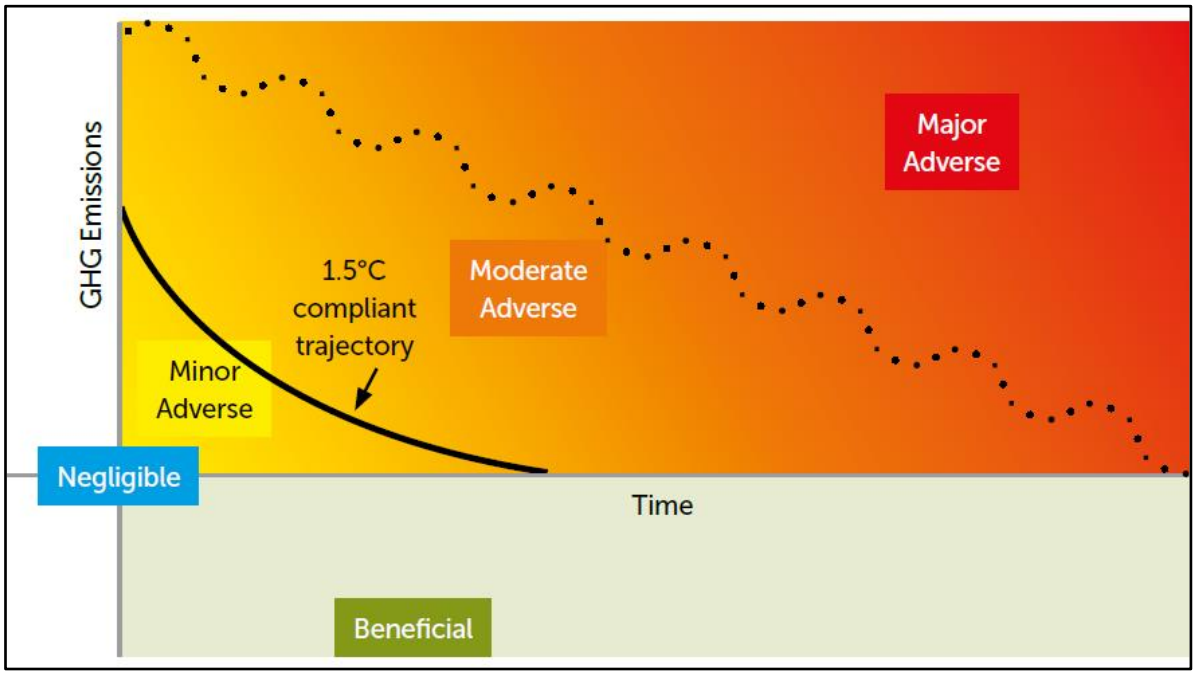

Figure 7 Diagram of Significance Criteria - GHGs Emissions vs Time To 2050 (IEMA, 2022)

Taking a conservative approach, when the CPPAs are taken into account, it is clear that post-mitigation the impact of the Proposed Development will be better than the 1.5°C compliant trajectory as shown in Figure 7 and thus the appropriate description of the

post-mitigation impact of the Proposed Development is a ***minor adverse, non-significant*** impact as outlined in Section 8.0 of the Addendum to Chapter 9 of the EIAR.

Appeal item A4.5
The appellants argue that Table 1.10 of the AWN FI response incorrectly stated data as prior to mitigation, even though they reflect an assumed 80% renewable generation.
&
Appeal item A4.6
The appellants argue that the predicted impact both before and after mitigation is understated, and that the predicted impact should not have assumed that 80% renewables penetration would be achieved.

Table 6 below (reproduced from Table 1.10 of the Addendum to Chapter 9 as submitted with the further information response) includes details of the Proposed Development and the Overall Project in the context of both the EU ETS and the electricity Sectoral Emission Ceiling.

Scenarios	% Of 2030 ETS Total[Note 1]	% Of Electricity Emission 2030 Ceiling[Note 2]	Significance (Prior to mitigation)	Significance (After mitigation)
Proposed Development	0.009%	2.2%	Moderate Adverse	Minor Adverse
Overall Project	0.028%	6.5%	Moderate Adverse	Minor Adverse

Note 1 ETS 2030 Total = 690.91 Million Tonnes CO_{2eq}
Note 2 Based on 5-year average 2026 - 2030
Table 6 GHG Emissions Associated With Each Scenario Compared To Sectoral Emission Ceiling & ETS

Table 6 shows the significance of the Proposed Development when compared to the Electricity 2030 Sectoral Emission Ceiling based on the approach set out in IEMA guidance (IEMA, 2022). The assessment is presented both prior to and post mitigation. As shown in Table 6, the impact of the Proposed Development prior to mitigation would be deemed to be a moderate, adverse impact. As outlined in Addendum to Chapter 9 of the EIAR, although the Proposed Development prior to mitigation is better than the "do-nothing" scenario of enterprise data centres, the impact would still be significant in the absence of appropriate mitigation. Also presented in Table 6 is the Proposed Development impact prior to and post mitigation.

As shown in Figure 8 below the power generation mix in 2030 will be likely 83% renewable rather than the assumed 80% renewable generation. The DECC publication "*Summary of Analysis to Support Preparation of the Sectoral Emissions Ceilings*" (DECC, 2022b) outlines the likely generation mix in 2025 and 2030 which has been used to derive the Sectoral Emission Ceilings. As shown in Figure 8 below, the power capacity mix will be dominated by renewables in 2030 accounting for 80-85% of the generation mix.

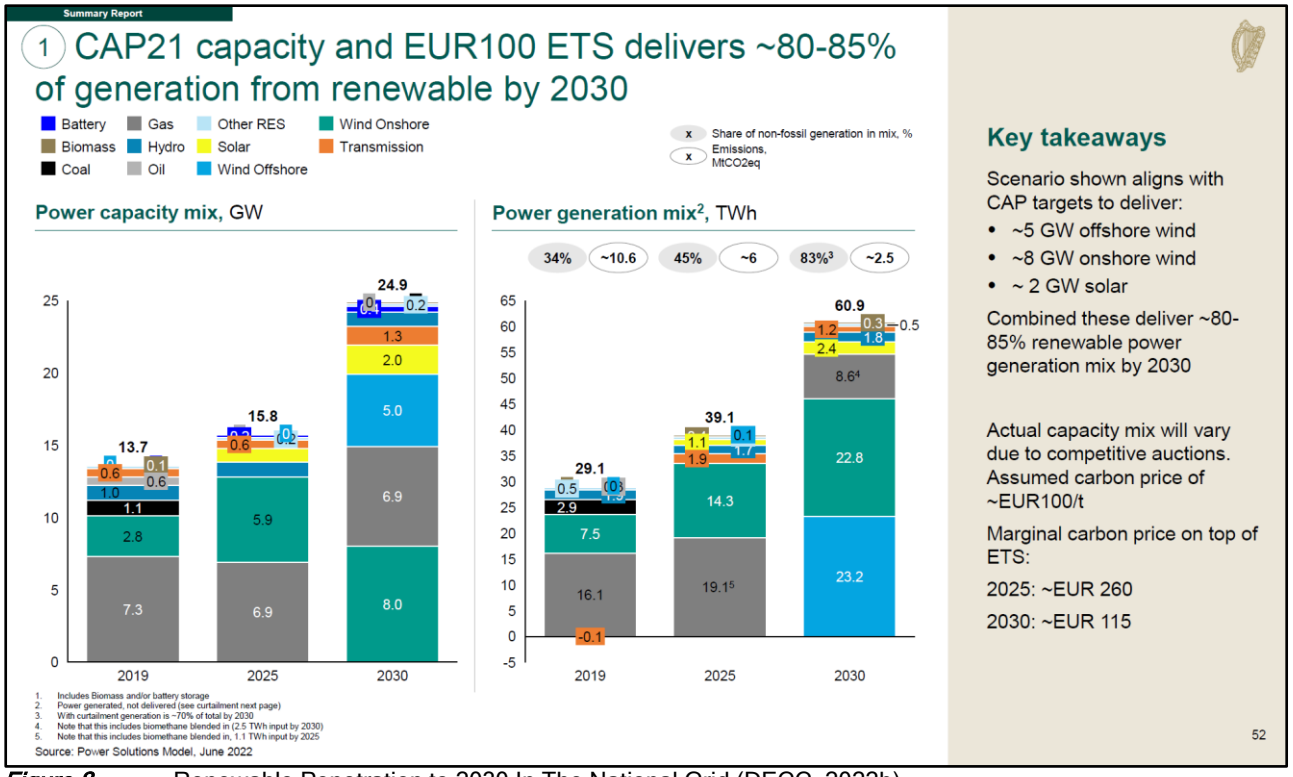

Figure 8 Renewable Penetration to 2030 In The National Grid (DECC, 2022b)

Probing deeper into the data in Figure 8 it should be noted that gas generation capacity will remain broadly similar between 2025 and 2030. However, by 2030 the amount of biomethane blended into natural gas will increase to 2.5TWh from 1.1TWh in 2025. Secondly, although the capacity of natural gas will remain largely unchanged, the utilisation of the gas generation stations will decrease significantly from 19.1 TWh to 8.6 TWh. In addition, the renewable fraction of the generation mix will increase from 45% in 2025 to 83% in 2030.

The percentage of renewables in the grid assumed for the purposes of the assessment is thus a conservative assumption on a reasonable worst case based on the data available and the interpretation of the relevant climate guidance (IEMA, 2020, 2022).

> *Appeal item A4.7*
> *The appellants argue that if the scenario of the development being powered by conventional fossil fuel derived generation was calculated, the impact would be 8.8% for the project, and 26% for the overall site. While the assessment indicates the impact reducing to 'minor adverse' after mitigation, the same mitigation is heavily reliant on CPPAs, which it is argued will not in fact provide for additionality. The appellants argue that therefore the impact should stay at moderate under the best case scenario, and major for the worst case (conventional generation) scenario.*

As outlined above the climate impact assessment was carried out on the basis of a reasonable worst case assumption which included for the appropriate percentage of renewables in the grid for each year of operation. As shown in Figure 8 above, the power generation mix in 2030 is forecast by DECC to be 83% renewable rather than the assumed 80% renewable generation confirming the approach of the climate impact assessment is appropriate. Using 100% conventional (oil, gas, coal) generation defies reality and totally ignores a plethora of Government policy and related initiates and Plans; ignores the extensive investment in renewable energy generation and power supply both within Ireland and within the power grids that Ireland is connected to; and does not consider the applicant's own renewable investments and record in recent years. Asking for 100% conventional (oil, gas, coal) generation as a basis for assessment is entirely incorrect and is not in line with a reasonable worst case scenario.

Condition 13 of the FCC decision to grant permission requires that the applicant's group enter into a CPPA for the energy use of the Proposed Development, thereby ensuring that

the development's energy use will be met with new renewable generation, ensuring that the new load added to the system is supported by new renewable energy so that achieving the goal of the Climate Action Plan requirement for 80% renewable electricity by 2030 is not made more challenging by this proposed development. In terms of the assertion that CPPAs do not provide "*additionality*", as outlined in detail in the Response to Item A1 and the wider Appeal Response, CPPAs are fully in line with both developing National and EU Policy. In addition, the appropriate IEMA guidance documents (IEMA, 2020, 2022) have specifically stated that CPPAs are an appropriate GHG mitigation which falls under the mitigation category of "*Substitution*" in the GHG management hierarchy.

Concerning the suggestion that the impact of the Proposed Development "*should stay at moderate under the best case scenario, and major for the worst case* (conventional generation) *scenario",* a review of the approach outlined in the Addendum to Chapter 9 of the EIAR clearly set out how the pre-mitigation impact of "moderate" and post-mitigation impact of "minor adverse" has been determined and is appropriate.

In line with EIAR Guidelines (EPA, 2022), "*When more specific definitions exist within a specialised factor or topic, …., these should be used in preference to these generalised definitions*". Thus, the IEMA Guidelines (IEMA, 2022) offer a much more specific and robust assessment of current climate impacts and thus has been used in the current assessment.

As outlined in Section 1.2.1 and Section 2.0 of the Addendum to Chapter 9 of the EIAR, the key consideration when assessing the impact of the project in terms of GHG emissions is:

"the crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050" (IEMA, 2022)

As these conservative assumptions are integral to the climate impact assessment which was documented in the Addendum to Chapter 9 of the EIAR and is summarised earlier in this section, the assertion that the "*predicted impact both before and after mitigation is understated*" is clearly mistaken and incorrect.

When assessing significance, the 2022 Guidance (IEMA, 2022) furthermore makes the following points, as outlined in Section 2.2 of the Addendum to Chapter 9 of the EIAR:

- Principle 1 - When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Principle 2 - Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Principle 3 - Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

As outlined earlier in this section and as outlined in Section 7.2.4 of the Addendum to Chapter 9 of the EIAR, in reference to Principle 3 of IEMA Guidance (IEMA, 2022), it is the intention of the Operator that further measures to reduce GHG emissions will be implemented in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022). Condition 13 of the FCC decision to grant permission requires that the applicant's group enter into a CPPA for the energy use of the Proposed Development, thereby ensuring that the development's energy use will be met with new renewable generation, which will ensure that the new load added to the system is supported by new renewable energy so that achieving the goal of the Climate Action Plan requirement for 80% renewable electricity by 2030 is not made more challenging by this proposed development As further detailed below, the Proposed Development's delivery of a CPPA(s) will ensure that the

new load added to the system is supported by new renewable energy so that achieving the goal of the Climate Action Plan requirement for 80% renewable electricity by 2030 is not made more challenging by the proposed development and any relevant update in the annual CAP review in CAP24.

IEMA (2022) states in regards to significance that:

"A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science based emissions trajectory of ongoing but declining emissions towards net zero." (IEMA, 2022)

In addition, IEMA (2022) states that (bold added);

"*Where embedded/committed mitigation is relied upon in the assessment of effects, the practitioner must form a clear judgement that this mitigation is:*

1. *Evidenced in the design for the project*
2. *A committed goal that is secured, e.g. forming part of the description of development,* ***a specific planning condition/requirement****, or a legal agreement*
3. *Realistic and achievable to deliver."* (IEMA, 2022)

Thus, the Applicant has received a specific planning condition/requirement (Condition 13) in regard to the proposed CPPA to ensure any residual GHG emissions are mitigated, and a similar planning condition would be accepted if applied by the Board.

Figure 8 above, taken from IEMA (2022), shows the significance criteria (major adverse, moderate adverse, minor adverse, negligible, beneficial) in the context of relative GHG emissions and timescale (out to 2050) with the bold line showing the 1.5°C compliant trajectory.

The unmitigated GHG emissions will peak in 2027 as outlined in Table 4 although, as the facility is dependent on the national grid, there will be a rapid decrease in GHG emissions as the renewables penetration the grid reaching 83% by 2030 as predicted by DECC in Figure 8.

However, as outlined in the response to Item A1, CPPAs will be used as the appropriate mitigation measure to address residual GHG emissions on the path to net zero which is likely to be achieved by 2040 as outlined in the response to Item A4.

It should also be noted the inherent conservative nature of this approach. Given that the national grid will be likely to achieve net zero significantly before 2050, it can be argued that even in the absence of CPPAs the pre-mitigation scenario is, in actual fact, minor adverse as the trajectory of GHGs emissions will align with the 1.5°C compliant trajectory and achieve net zero in advance of 2050.

However, taking a conservative approach, when the CPPAs are taken into account, it is clear that post-mitigation the impact of the Proposed Development will be ahead of the 1.5°C compliant trajectory as shown in Figure 7 and thus the appropriate description of the post-mitigation impact of the Proposed Development is a ***minor adverse, non-significant impact*** as outlined in Section 8.0 of the Addendum to Chapter 9 of the EIAR.

4.4 Concluding Statement In Regard To Applicant Response To Item A4

In response to the arguments outlined in A4.1 – A4.4, the response above has confirmed that the Proposed Development:

- will not result in new unforeseen demand as there is an existing connection agreement since 2017 and with that demand with that demand built into all forecasts, as such it will not affect sectoral ceilings or the predicted quantity of conventional (fossil fuel) generation.

- In addition to this, a CPPA for the power demand for the proposed project has been welcomed and conditioned under the Planning Authority's decision to grant permission (while a similar approach and condition by the Board would be welcomed).
- The climate impact assessment for the Proposed Development and the overall project in the submitted EIAR and the Addendum to Chapter 9 of the EIAR was carried out in line with the relevant guidance is based on the IEMA 2022 guidance titled "*Assessing Greenhouse Gas Emissions and Evaluating their Significance*". As outlined in Section 2.0 of the Addendum to Chapter 9 of the EIAR, the assessment is based on a reasonable worst-case assessment, in line with the approach outlined in the IEMA 2022 guidance and it is clear that the impact of the Proposed Development is correctly, post-mitigation, classified as minor adverse.

In response to the arguments outlined in A4.5 – A4.6, the response above has confirmed that the Proposed Development with regard to the approach to the % of renewables in the national grid was conservative. By 2030 the renewable fraction of the generation mix will increase from 45% in 2025 to 83% in 2030 based on the latest research (DECC, 2022b). Thus, the percentage renewables in the grid is thus a conservative assumption on a reasonable worst case based on the data available and the interpretation of the relevant climate guidance (IEMA, 2020, 2022).

In response to the arguments outlined in A4.7, the response above has confirmed that the climate impact assessment was carried out on the basis of a reasonable worst case assumption which included for the appropriate percentage of renewables in the grid for each year of operation. Using 100% conventional generation defies reality; totally ignores a plethora of Government policy and related initiates and Plans; ignores the extensive investment in renewable energy generation and power supply both within Ireland and within the power grids that Ireland is connected to; and does not consider the applicant's own renewable investments and record in recent years. Suggesting 100% conventional generation as a basis for assessment is entirely incorrect and is not in line with a reasonable worst case scenario.

5.0 Item A5 - The EU ETS and National Carbon Budget / Sectoral Emission Ceilings

5.1 Overview

This section addresses the arguments raised in various appeals in regard to the comparison of the impact of the Proposed Development with the EU Emissions Trading System (ETS) and with the National Carbon Budget / Sectoral Emission Ceilings.

5.2 Summary of Key Appellant Points - Item A5

The argument put forward by the appellants is that the application placed undue weight on the inclusion of the indirect emissions from the Proposed Development within the EU Emissions Trading System (ETS). It is contended that the application sought to overlook national climate targets and emissions ceilings by arguing that the 2021 and 2023 Climate Action Plans state that the emissions associated with the development would be subject to EU-wide rather than national targets. The Friends of the Earth appeal claims that Pages 44 and 45 of the AWN Further Information response incorrectly state that the indirect electricity emissions and direct emissions on site will be compliant with section 13.3.5 of the CAP23 by virtue of their requirement for GHG permits under the ETS. The appeal highlights that the EU ETS does not replace or take primacy over the national carbon budget.

5.3 Applicant Response To Item A5

Both national and EU legislations are relevant when assessing direct and indirect GHG emissions associated with the operation of the Proposed Development. In terms of their ultimate goals, both national and EU legislation have the same goal of net-zero / climate neutral GHG emissions by 2050. Not only are both national and EU legislation relevant but due weight was placed on both systems in the planning application and the assessment of climate impact.

In regards to the relevance of the EU ETS system, the *Coyne v An Bord Pleanála* [12] High Court judgment stated at Para. 213:

> "*it suffices in EIA of a particular project, in which its indirect and cumulative effects by way of electricity generation of CO2 emissions are at issue, to do as was done here. Namely to identify and quantify energy demand and energy used, to identify and quantify the nature and magnitude of nature and magnitude of GHG emissions likely to result from that energy use (recognised in the papers as up to 180mw and 1,577 GWh annually) and to examine and analyse their contribution to national GHG emissions of the electricity generation sector* ***in the context of the ETS and national policy*** *to transition towards renewable electricity generation"* (emphasis added)

The national climate objective is set out in Section 3 of the Climate Action and Low Carbon Development Act 2015, as amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 and is defined, under Paragraph 5(3)[1] as:

"The State shall, so as to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy (in this Act referred to as the 'national climate objective')."

At EU level the goal is set in the *Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), under Article 2 "Climate-neutrality objective":*

[12] [2023] IEHC 412

"Union-wide greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by that date, and the Union shall aim to achieve negative emissions thereafter".

From an EU perspective, the most relevant policy which will have relevance to the indirect GHG emissions from electricity is the EU Emissions Trading System (ETS) which has been in continuous operation in the EU since 2005 and is currently in its fourth trading phase (2021-2030). The European Commission has stated that:

"The EU ETS is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively. It is the world's first major carbon market and remains the biggest one."[13]

As outlined in the Addendum to Chapter 9 of the EIAR, the EU publication "*The EU Emissions Trading System in 2020: trends and projections*" (EU, 2020), notes that the European Union's energy system is decarbonising rapidly. The report states:

"*Total ETS emissions from stationary installations declined by 9.1% between 2018 and 2019, the largest drop in a decade, driven by a strong decrease in coal use for power production*" (EU, 2020)

Figure 1.1 of the Addendum to Chapter 9 of the EIAR is the most recent verified emissions from the ETS covering 2005 – 2021 confirming this trend is continuing. The European Topic Centre on Climate report entitled "*Trends and projections in the EU ETS in 2020*" (ETC, 2020) indicates that the reduction in GHG emissions is predicted to continue up to at least 2030 due to current policies in place. As shown in Figure 1.2 of the Addendum to Chapter 9 of the EIAR, both the energy industries and "other industries" are predicted to decrease significantly by 2030.

Thus, in relation to the Proposed Development, the key GHG emissions will be indirect emissions from electricity suppliers and these electricity suppliers are obliged to operate within the EU ETS and remain within the carbon allowance which has been allocated to them or purchase additional allowances under the cap and trade system.

The EU, in May 2023, published *Directive (EU) 2023/959 Amending Directive 2003/87/EC Establishing A System For Greenhouse Gas Emission Allowance Trading Within The Union And Decision (EU) 2015/1814 Concerning The Establishment And Operation Of A Market Stability Reserve For The Union Greenhouse Gas Emission Trading System*. As part of this Directive, the cap on emissions has been tightened again to reduce emissions covered by the EU ETS by 62% by 2030 compared to 2005.

Nationally, the key legislative measures which are relevant, as outlined in Section 9.5.2.2 of the EIAR are the Carbon Budget programme and the Sectoral Emission Ceilings. The Carbon Budgets were proposed by the Climate Change Advisory Council, approved by Government and adopted by both Houses of the Oireachtas and comprise three successive 5-year carbon budgets. The total emissions allowed under each budget were set out in Table 9.5 of the EIAR, as well as the average annual reduction for each 5-year period.

As outlined in Section 9.5.2.2 of the EIAR, the CAP 2021 provided that the economy-wide carbon budgets would be supplemented by sectoral emissions ceilings, setting the maximum amount of GHG emissions that are permitted in a given sector of the economy during each five-year carbon budget. The sectorial Emission Ceilings for 2030 were published in July 2022 and are shown in Table 9.6 of the EIAR. Electricity has a 75% reduction requirement by 2030 and an Emissions Ceiling of 3 $MtCO_2e$ in 2030.

The 2023 Climate Action Plan, under Section 13.3.5 EU Emission Trading System, states:

[13] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

"The EU ETS is an important measure for reducing industry GHG emissions.The Fit for 55 proposals for the reformed EU ETS will increase emissions reductions in this sector from the current 43% to 61%, in the period 2005 to 2030. Changes include a steeper annual reduction in the emissions ceiling and reductions in free allowances, alongside the corresponding introductionof a carbon border adjustment mechanism." (CAP23, page 155).

The 2021 Climate Act also refers to EU law under Paragraph 9(6D):

"Revision of carbon budgets

6D. (1) The Minister may revise a carbon budget in the circumstances set out in subsection (2), (4) or (5).

(2) The Minister may revise a carbon budget where—

(a) new obligations are imposed on the State under the law of the European Union or any international agreement referred to in section 2, or

(b) there are significant developments in scientific knowledge in relation to climate change."

Thus, both EU and national legislation are relevant and there is likely to be continual legislative overlap between both EU and national legislations as both parties move forward with the same goal of net zero / carbon neutrality by 2050.

The assertion that national legislation has been ignored at the expense of EU legislation is clearly incorrect. In both Chapter 9 of the EIAR and the Addendum to Chapter 9 of the EIAR, both relevant national and EU legislation has been reviewed. Furthermore, as outlined in Section 7.2.4 of the Addendum to Chapter 9 of the EIAR, both the Proposed Development and the Overall Project have been assessed in the context of both the 2030 ETS Allocation and in terms of the 2030 Electricity Sectoral Emission Ceiling. Thus, the assessment approach was based on considering both EU and national legislations and determining which target was more onerous in terms of impact of the Proposed Development. In this case, the Sectoral Emission Ceiling was a more onerous target, and the impact of the assessment was based on both the pre- and post-mitigation impact of the Proposed Development relative to the Electricity Emission Ceiling. Additionally, a CPPA for renewable energy located in Ireland is proposed for the project and hence will not be relying solely on ETS/GHG permits as mitigation.

5.4 Concluding Statement In Regard To Applicant Response To Item A5

All relevant national and EU legislation has been reviewed at length in the. EIAR and in the Addendum to Chapter 9 of the EIAR, The assessment approach was based on considering both EU and national legislations and determining which target was more onerous in terms of impact of the Proposed Development. In this case, the Sectoral Emission Ceiling was a more onerous target, and the impact of the assessment was based on both the pre- and post-mitigation impact of the Proposed Development relative to the Electricity Emission Ceiling. Additionally, a CPPA for renewable energy located in Ireland is proposed for the project and hence will not be relying solely on ETS/GHG permits as mitigation.

6.0 Item A6 - Consistency with section 15 of the Climate Action and Low Carbon Development Act 2015, as amended

6.1 Overview

This section addresses the concerns raised in various appeals that the Proposed Development would not be in keeping with section 15 of the Climate Action and Low Carbon Development Act 2015.

6.2 Summary of Key Appellant Points - Item A6

The argument put forward in the appeals is that the Proposed Development would not be in keeping with section 15 of the Climate Action and Low Carbon Development Act 2015, as amended and should be refused.

Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended states the following:

"(*1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with–*

(a) the most recent approved climate action plan,
(b) the most recent approved national long term climate action strategy,
(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and
(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

6.3 Applicant Response To Item A6

In contrast with the contention from the appellant that the Proposed Development is not in keeping with Section 15 of the 2015 Climate Act, as amended, the sections below set out in detail the reasoning as to why the Proposed Development is aligned with this section of the Act.

A6.1 the most recent approved climate action plan,

The 2023 Climate Action Plan (CAP) (Government of Ireland, 2022) provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting us on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. The plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP23 also detailed the required governance arrangements for implementation including carbon-proofing of policies and establishment of Sectoral Emission Ceilings and carbon budgets.

CAP23 has outlined the path towards the electricity target by 2030 of a 75% reduction in GHG emissions compared to 2018. The core measures are:

- Increasing the share of renewable electricity to 80%,
- Indicative Onshore Wind Capacity of up to 9GW,
- Indicative Offshore Wind Capacity of at least 5GW,
- Indicative Solar PV Capacity of 8GW.

CAP23 also outlines a suite of market incentives which will be developed to meet electricity demand with renewable energy generation including:

- "*Develop policies that support extra-large energy users to achieve carbon-free demand in Ireland so that electricity decarbonisation, demand efficiency and*

flexibility, and enterprise growth can go hand in hand. To include connection agreements; hybrid connections; non-firm connections where appropriate; onsite dispatchable generation; onsite storage; emissions reporting; and renewable PPAs in particular within the scope of this work;

- *In line with the Roadmap on Corporate Power Purchase Agreements, the SEAI, the CRU, and the System Operators, will work with Large Energy Users (LEUs) and enterprise development agencies to increase the demand flexibility of LEUs through enhanced reporting and matching of demand with usage of lower carbon energy sources, including increased transparency of emissions data, and regulatory incentives and disincentives".*

The CAP23 also refers to data centres in the context of the *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022)*. The CAP23 states, as outlined in Section 1.2.1 of the Addendum to Chapter 9 of the EIAR:

"In the short- to medium-term, new demand growth from large energy users, such as data centres, will have to be moderated to protect security of supply and ensure consistency with the carbon budget programme[30].

[30] https://enterprise.gov.ie/en/publications/government-statement-on-role-of-data-centres-in-enterprise-strategy.html"

The CAP23 refers to *'moderation of demand growth'*, and not to a complete moratorium on data centre development. In the context of the CAP23 and *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022)*, this proposal can be characterized as 'existing' demand rather than new unforeseen demand growth, given that there is an existing connection agreement to serve the development, which has been factored into EirGrid's energy projections and modelling since the connection agreement was signed in 2017.

The Government Statement effectively seeks to 'moderate' growth in demand from Data Centres, by narrowing the type of projects which will gain permission and be accommodated, via the principles contained therein. The Proposed Development meets each of those principles as outlined in Paragraphs 4.128 - 4.179 of the JSA cover letter to the Appeal Response.

In addition, as outlined in Section 10 of the Addendum to Chapter 9 of the EIAR, under Section 13.3.5 Emission Trading System, the CAP23 states:

"The EU ETS is an important measure for reducing industry GHG emissions. The Fit for 55 proposals for the reformed EU ETS will increase emissions reductions in this sector from the current 43% to 61%, in the period 2005 to 2030. Changes include a steeper annual reduction in the emissions ceiling and reductions in free allowances, alongside the corresponding introduction of a carbon border adjustment mechanism." (CAP23, page 155).

Thus, the indirect electricity emissions and the direct emissions from backup generators will both require greenhouse gas permits under the ETS in order to operateand thus the GHG emissions associated with the Proposed Development will be in line with Section 13.3.5 of the CAP23 which stresses the importance of the EU ETS in reducing industry GHG emissions.

Having regard to the foregoing, the proposal is in accordance with the provisions of CAP23.

A6.2 the most recent approved national long term climate action strategy,

In relation to 15.1(b) of the Act, as outlined in Section 10 of the Addendum to Chapter 9 of the EIAR, the Long-term Climate Action Strategy was published on the 28th April 2023. In relation to electricity, the Government has committed to the full decarbonisation of the

electricity system by 2050.

The Long-term Climate Action Strategy outlined the importance of (i) completing the actions in the Climate Action Plan, (ii) greater demand side management, (iii) better annual forecasting for the electricity and gas systems and (iv) security of gas supply infrastructure, particularly in the context of electricity generation.

The indicative pathway outlined in the Strategy for electricity includes:

- Build-out of renewable generation capacity, including onshore wind, offshore wind, and solar PV,
- Deployment of zero emissions gas to manage inter-seasonal variability,
- Upgrade of transmission and distribution networks to support significantly increased electricity demand in 2050.

In terms of electricity, the Long-term Climate Action Strategy states:

> *"Ireland will continue its efforts to decarbonise the electricity sector by taking advantage of its significant renewable energy resources in a way that is competitive, cost-effective and ensures the security of our electricity supply. By doing this, we will also decrease our dependence on imported fossil fuels. As Ireland decarbonises its energy system, demand for electricity will increase and total demand for natural gas will decrease. Ireland must ensure that its decarbonisation efforts are underpinned by security, and affordability, in how we access and use our energy resources"* (DECC, 2023).

In relation to the EU ETS, the Long-term Climate Action Strategy states that:

> "*A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions"* (DECC, 2023).

In relation to data centres, the Long-term Climate Action Strategy states that:

> "*Energy demand, including data centres, will be expected to operate within Sectoral Emission Ceilings and further signals will be required to locate demand where existing or future electricity grid is available and close to renewable energy generation. Research and development in energy storage and flexibility (such as a science challenge to industry) will be required to put Ireland on a pathway to net zero-carbon data centres*" (DECC,2023).

The Proposed Development is in line with this strategy as the electricity associated with the project, due to commitments in the CAP23, will reduce in line with national policy and in line with EU policy as outlined in the EU Climate Law (EU, 2021) which has outlined a legally binding target to obtain net zero GHG emissions by 2050. Furthermore, the development is located to avail of the existing electricity grid (including infrastructure delivered on site by the applicant), and is subject to an existing connection agreement.

In summary, the Proposed Development is in keeping with the Long-term Climate Action Strategy as the electricity will reduce in line with both national and EU policy to reach net zero by 2050.

A6.3 the most recent approved national adaptation framework and approved sectoral adaptation plans,

The National Adaptation Framework (NAF) (DOCCE, 2018) has outlined several actions to help ensure a targeted approach to achieving climate resilience into the future. These include:

- Putting in place revised governance and reporting arrangements,
- Formalising the status of existing guidelines,
- Formalising long term operational support for key sectors,
- Facilitating the establishment of regional local authority climate action offices,
- Increasing awareness around climate adaptation and resilience,
- Integrating climate adaptation into key national plans and policies.

The NAF further states that in terms of specific actions:

> *"These actions will need to be underpinned by supporting objectives for the Framework including, assessing key risks and vulnerabilities, developing indicators, better coordination of national research priorities, ongoing reporting at National, EU and international level, increased alignment with strategic emergency planning, and further analysis of the implications of climate change and adaptation for the private sector*." (DOCCE, 2018)

The NAF (DOCCE, 2018) defines climate proofing as:

> *"Climate proofing is concerned with protecting development investments and outcomes from the impacts of climate change. It reduces the vulnerability of projects by: Analysing the risk that climate change poses and taking steps to counteract then." (Page 98)*

The Electricity & Gas Networks Sector Climate Change Adaptation Plan (DOCCE, 2022) identified the key climate impacts for the energy sector as:

- Flooding / changes in precipitation / extreme events,
- Temperature rise,
- Sea level rise,
- Changes in wind energy content.

As outlined in Section 2.3 of the Addendum to Chapter 9 of the EIAR, climate proofing of the project was undertaken using the approaches outlined in the *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (EC, 2013) and *IEMA EIA Guide to Climate Change Resilience and Adaptation* (IEMA, 2020). Both documents outline a methodology for undertaking a risk assessment where there is a potentially significant impact on the project receptors due to climate change. The approach to the assessment is based on the following steps:

- Identify potential climate change risks to a project;
- Assess these risks (potentially prioritising to identify the most severe); and
- Formulate mitigation actions to reduce the impact of the identified risks.

Tables 1.1, 1.2 and 1.3 of the Addendum to Chapter 9 of the EIAR outlined the Likelihood Categories, Measure of Consequence and Significance Matrix respectively based on this approach.

Under Section 5.2.1 "*Impact of Climate Change on the Operational Phase*" of the Addendum to Chapter 9 of the EIAR, it was noted that climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. Changes in climate may lead to a variety of impacts including:

- Increased average temperatures will lead to a greater requirement for cooling of the data centre leading to greater energy use and associated GHG emissions;
- Increase rainfall will lead to a greater risk of flooding;
- Periods of drought may lead to reduction in water availability.

Section 5.2.1 of the Addendum to Chapter 9 of the EIAR noted that there is:

> *"the potential for flooding related impacts on site in future years due to climate*

changes as outlined in Section 3.1 in the absence of mitigation. Chapter 7 (Hydrology) of the EIAR has investigated the likelihood of flooding and has found that there is no current or predicted flood risk (either fluvial, pluvial or coastal) for the site. As outlined in Chapter 7 of the EIAR, the facility will be attenuated with a flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change to limit the surface water discharge from the site during extreme rainfall events.

Thus, in line with the methodology outlined in Table 1.1, Table 1.2 and Table 1.3 of Section 2.3 above, the impacts arising from extreme weather and flooding was assessedto be of low likelihood and with a moderate adverse effect leading to a finding of low risk and thus a non-significant impact."

Thus, the assessment of the Proposed Development has taken into account the relevant national and sectoral adaptation plans and is aligned with them.

A6.4 the furtherance of the national climate objective,

As outlined in Section 10 of the Addendum to Chapter 9 of the EIAR, in relation to 15.1(d) the national climate objective, the CAP23 has stated that:

"Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity-rich, environmentally sustainable and climate-neutral economy. The Act also provides for a reduction of 51% in GHG emissions by 2030, compared to 2018 levels.

Our statutory national climate objective and 2030 targets are aligned with Ireland's obligations under the Paris Agreement and with the European Union's objective to reduce GHG emissions by at least 55% by 2030, compared to 1990 levels and to achieve climate neutrality in the European Union by 2050." (CAP23, page 30)

The Proposed Development will address residual GHG emissions by way of CPPAs prior to the achievement of net zero electricity by the national grid. As noted by the IEMA 2022 Guidance, in relation to the use of CPPAs the IEMA 2022 guidance states the following (bold added):

"Purchased green electricity tariffs (also green gas) ***are increasingly being considered within net-zero approaches****. In earlier versions of the Hierarchy these tariffs only appeared within COMPENSATE. This is still the case for market-based approaches that use certificates where additionality or quality thresholds are poor, or hard to substantiate. The hierarchy does now allow for higher quality energy tariff purchases within the SUBSTITUTE line, reflecting developing practice and some improved purchasing arrangements (e.g. higher quality procurement or quasi-investments via power purchase agreements*)." (IEMA, 2022)

Thus, the IEMA guidelines have highlighted the usefulness of CPPAs as an appropriate net-zero approach in line with the furtherance of the national climate objective.

The Proposed Development furthers the national climate objective as the Proposed Development and Overall Project will operate within the EU ETS which is the cornerstone of the EU's objective to reduce EU-wide GHG emissions by at least 55% by 2030 (compared to 1990) and to achieve climate neutrality by 2050. As outlined in the EU Climate Law (EU, 2021) under the Item (13): "*The EU ETS is a cornerstone of the Union's climate policy and constitutes its key tool for reducing greenhouse gas emissions in a cost-effective way."*

A6.5 the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

As outlined in Section 10 of the Addendum to Chapter 9 of the EIAR, in regards to section 15.1(e) the objective of mitigating greenhouse gas emissions, the Proposed Development

has the following benefits which will help to mitigate greenhouse gas emissions:

I. The Proposed Development will replace activities which have a higher GHG profile. Data centre facilities represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or 'enterprise sites'). A study published in 2020 by Science Magazine, found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres.

II. Customers are able to support their own goals to become sustainable by moving to the cloud. The results of a recent study of US enterprise data centres by 451 Research[14] found the Operator's data storage facilities to be 3.6 times more energy efficient than the traditional alternative and achieved an 88% reduction in carbon footprint for workloads that moved from on-premises data storage to the Operator's, helping the Operator's customers to become greener in the cloud.

III. As outlined in Section 10 of the Addendum to Chapter 9 of the EIAR, a report from the international Energy Agency (IEA) entitled "*Data Centres & Data Transmission Networks"* (IEA, 2021)[15] found that while global internet traffic surged by more than 40% in 2020, this strong growth in demandfor data centre services continues to be mostly matched by ongoing efficiency improvements for data centre infrastructure as shown in Figure 9.

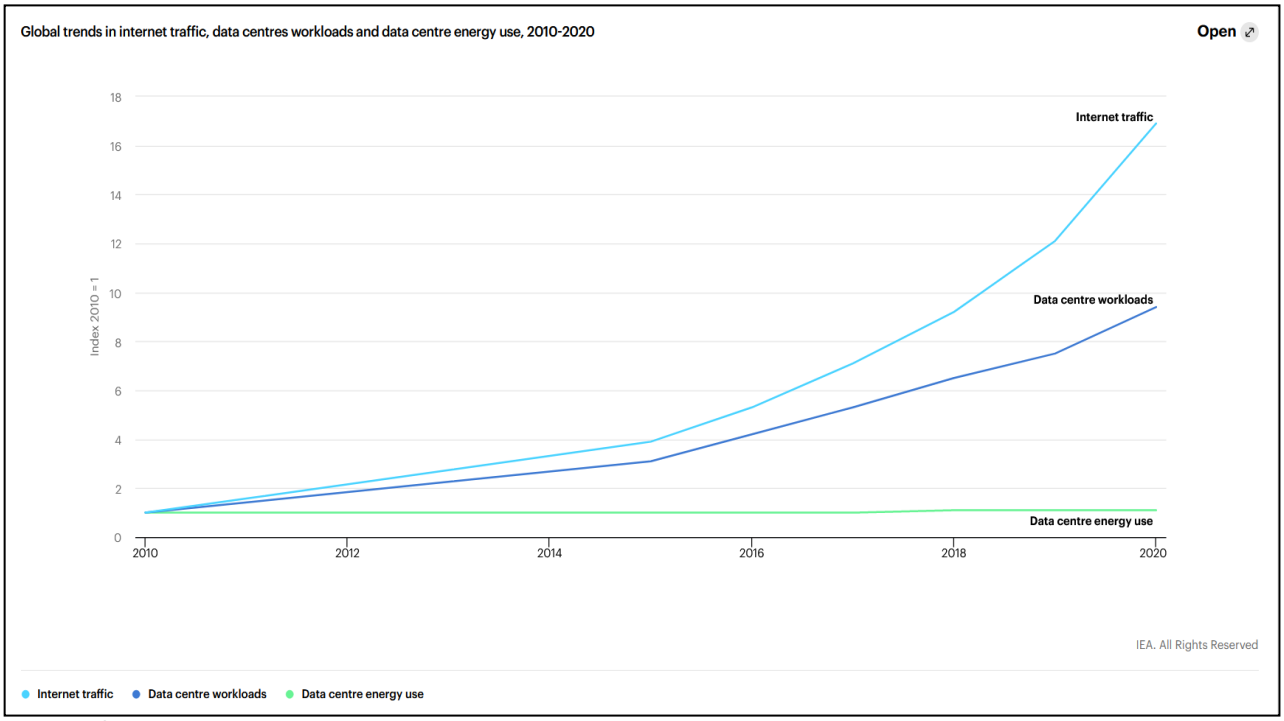

Figure 9 *Global Trends In Internet Traffic, Data Centres Workloads & Data Centre Energy Use,2010 - 2020 (IEA, 2021)*

IV. A range of design mitigation measures will be employed which is in line with "*best practice*" as outlined in IEMA (IEMA, 2022) including the following as previously outlined in the Addendum to Chapter 9 of the EIAR:

- A PV array proposed on each building E and F will consist of 285 PV modules, eachof 300Wp, yielding a total peak power generated of 85.5kWp.
- A rainwater harvesting system will be used to ensure non-potable process water for cooling needs for the operational development are met with no reliance on the public water mains.
- The Proposed Development is designed to fully comply with the Climate Neutral Data Centre Pact. The Proposed Development has an annualised design PUE of 1.12 as compared to the 1.30 set under the Climate Neutral

[14] https://assets.aboutamazon.com/b0/3e/b0fc6b8a4a85b38ac65a3fbc584c/11061-aws-451research-advisory-bw-cloudefficiency-eu-2021-r5-final-corrected-data.pdf
[15] https://www.iea.org/data-and-statistics/charts/global-trends-in-internet-traffic-data-centres-workloads-and-data-centre-energy-use-2010-2020

Data Centre Pact. In addition, the Proposed Development has a design WUE of 0.075 L/kWh as compared to the 0.4 L/kWh set under the Climate Neutral Data Centre Pact.

- Internal lighting shall be provided by highly efficient, low energy LED luminaires combined with presence detection controls or local switching where appropriate.
- The Operator has recently signed a supply agreement for renewable diesel (also referred to as hydrotreated vegetable oil or HVO) to their Irish Data Centers. Subject to commercial availability, it is expected that fuel for the Proposed Development will be renewable diesel.
- The Proposed Development incorporates design provisions to facilitate district heating including heat distribution pipework up to the site boundary. Please refer to Section 4 *Co-Location or Proximity with Future-Proof Energy Supply* of the John Spain Associates response cover letter of this Appeal Response for further detail.

V. Mitigation Measures will be implemented in line with "*best practice*" as outlined in IEMA (IEMA, 2022) as outlined below:

- A Corporate Purchase Power Agreement(s) will be entered into which demonstrates that the energy consumed by the development on site is met by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022).
- Amazon is committed to building a sustainable business for its customers and the planet. In 2019, Amazon co-founded The Climate Pledge, a commitment to reach net zero carbon emissions by 2040, 10 years ahead of the Paris Agreement. As part of that commitment, the company is on a path to powering its operations by 100% renewable energy by 2025, five years ahead of its original 2030 target.
- Amazon reached 90% renewable energy in 2022. This includes AWS data centres. As of January 2023, Amazon has announced over 400 renewable energy projects representing 20 gigawatts (GW) of clean energy capacity.
- In 2022, the electricity consumed in 19 AWS cloud computing regions, including their cloud region in Ireland, was attributable to 100% renewable energy.

In terms of "*adapting to the effects of climate change in the State*", this has been addressed under *"(c) the most recent approved national adaptation framework and approved sectoral adaptation plans".*

6.4 Concluding Statement In Regard To Applicant Response To Item A6

The Proposed Development is aligned with Section 15 of the 2015 Climate Act, as amended as detailed above.

Firstly, the indirect electricity emissions and the direct emissions from backup generators will both require greenhouse gas permits under the ETS in order to operate and thus the GHG emissions associated with the Proposed Development will be in line with Section 13.3.5 of the CAP23 which stresses the importance of the EU ETS in reducing industry GHG emissions.

Secondly, the electricity associated with the project, due to commitments in the CAP23, will reduce in line with national policy and in line with EU policy as outlined in the EU Climate Law (EU, 2021) which has outlined a legally binding target to obtain net zero GHG emissions by 2050.

Thirdly, the assessment of the Proposed Development has taken into account the relevant national and sectoral adaptation plans and the environmental assessment process has ensured that the Proposed Development is climate proofed.

Finally, a range of mitigation measures will be employed which will ensure that direct and

indirect GHG emissions associated with the Proposed Development are minimised with residual GHG emissions fully mitigated through a CPPA.

7.0 Item A7 - Carbon Emissions During Construction

7.1 Overview

This section documents the approach to the climate impact assessment for the construction phase.

7.2 Summary of Key Appellant Points - Item A7

The argument is put forward that the Carbon Assessment report prepared by HJL Architects and submitted as part of the Further Information response assessed items A4 and A5 of the assessment methodology only (relating to Transport and Construction), but that it ought to have assessed items A1 to A3 (relating to raw materials). On this basis, it is contended that the assessment underestimated the carbon associated with the development.

7.3 Applicant Response To Item A7

Construction Stage GHG assessment Scope and Boundaries

As outlined in section 5 of this document the climate impact assessment for the Proposed Development and the overall project in the submitted EIAR and the Addendum to Chapter 9 of the EIAR was carried out in line with the relevant guidance is based on the IEMA 2022 guidance titled Assessing Greenhouse Gas Emissions and Evaluating their Significance and has correctly concluded an impact of short-term, negative and not significant for the construction stage of the project. Cumulatively, the overall project will have a ***short-term, negative*** and ***not significant*** cumulative impact on climate as outlined in Chapter 9 of the EIAR.

The assessment of the construction phase of the Permitted Development, the Proposed Development and the Overall Project's impact on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities as documented in the EIAR and the Further Information response.

In determining the scope and boundary of the GHG assessment for the construction stage it is considered that at this preliminary stage of design, in line with IEMA guidance, a qualitive assessment would be most appropriate for the Construction phase given that the project is at a preliminary stage of design and detailed material quantities and specifications are not available. The qualitative assessment is in line with IEMA guidance which states that *'The challenge at the scoping stage is that there is often limited project information available from the design team at this early stage, resulting in a qualitative-based decision and professional judgement from the practitioner'.*

Baseline

In 2022, the total emissions of GHG emissions in Ireland was 60,760,000 tonnes across all sectors[16]. Given that the various activities will fall under both the EU ETS (such as cement manufacture, electricity, natural gas) whilst other activities will fall outside of this scope such as transport, import of materials etc. and will encompass several of the Sectoral Emission Ceilings, the relevant comparison should be the total GHG emissions in Ireland in any one year.

Emission Calculation Methodology & Data Collection

For the purpose of the qualitative climate assessment of the construction phase, it has been assumed conservatively that the construction of all buildings associated with the Proposed Development will occur at the same time – i.e. concurrently. This is a conservative assessment as the construction phase for the entire development is

[16] https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/#

estimated to take 3 years approximately (see Chapter 2 of the EIAR for further detail) and the Proposed Development will be constructed on a phased basis with Building E being constructed first, followed by Building F, and finally Building G. Construction works on one building will be nearing completion prior to works beginning on the next building.

GHG Emissions Inventory

The impact of the construction phase of the Permitted Development, the Proposed Development and the Overall Project on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities.

As outlined in Section 9.5.1.2 of the EIAR, construction traffic would be expected to be the dominant direct source of greenhouse gas emissions as a result of the construction of the Proposed Development. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management (IAQM) document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate.

Other climate impacts at construction stage were identified as:

- Soil will be generated as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure;
- Embodied carbon associated with the raw materials used in the construction of the Proposed Development including cement and steel will lead to indirect GHG emissions at the point of manufacture;
- Following completion of the building shell, commissioning of the mechanical and electrical equipment fitted within the building is undertaken;
- Infilling and landscaping will be undertaken. Spoil generated during site preparation will be re-used where possible;
- Temporary storage of construction materials and fuels; and
- Construction traffic accessing the site will emit air pollutants and greenhouse gases during transport.

As outlined in Section 4.1 of the Addendum to Chapter 9 of the EIAR, an assessment was undertaken of the likely carbon to be generated during the construction phase (entitled "1(e) A4 and A5 Carbon Assessment" by Henry J Lyons (HJL) which has been prepared as part of the further information submission). The assessment was carried out using OneclickLCA software in compliance with EN 15978 and Level(s) indicator 1.2, according to current best practice, conservative assumptions in combination with plausibility considerations and expert judgement.

Thus, based on the foregoing, a comprehensive qualitative assessment of the climate impact at construction stage was provided in the submitted EIAR and the Further Information response to Fingal County Council, along with a quantitative assessment of stages A4 and A5 submitted with the Further Information response (as specifically requested by the Planning Authority).

However, the Colin Doyle appeal states:

"Based on the quantities of concrete and steel listed in the report, and using typical factors for associated emissions, I calculate emissions of over 27,000 tonnes, which would be 664kgCO/m2, when added to the approx. 100/m2 for A4 and AS gives a total of 764 kg/m2. This is more than seven times the estimate by Henry J Lyons."

In direct response to the above appeal point, the GHG has been calculated for the building shell materials and construction phase and is contained in HJL report included in the appeal response (Appendix 4) and summarised below. The likely carbon to be generated during the construction phase of the building shell including materials (entitled "1(e) A1 to A3 Carbon Assessment" by HJL) has been prepared as part of the Response To Appeal submission with the summary results shown in Tables 2a and 2b.

Indicator	Unit	Product Stage (A1-A3)
GWP +20%	$kgCO_2e/m^2$	621.2
CGWP	$kgCO_2e/m^2$	517.7
GWP -20%	$kgCO_2e/m^2$	414.2
Notes	Impacts refer to the GWP of 1m 2 of GIA of the Shell & fitout of proposed data centre development at Cruiserath Road, Dublin 15 and ancillary buildings for module A1-A3 only.	

Table 2a. Results summary of baseline scenario

Indicator	Unit	Product Stage (A1-A3)
GWP +20%	kgCO2 e /m2	295.4
GWP	kgCO2 e /m2	246.2
GWP -20%	kgCO2 e /m2	197
Notes	Impacts refer to the GWP of 1m 2 of GIA of the Shell & fitout of proposed data centre development at Cruiserath Road, Dublin 15 and ancillary buildings for module A1-A3 only.	

Table 2b. Results summary of mitigation scenario

The floor area of the Proposed Development will be approximately 43,011 m^2. Thus, for the mitigated scenario with a GHG emission rate of 246.2 $kgCO2eq/m^2$ for the A1-A3 carbon assessment, the total GHG emissions will be approximately 10,589 tonnes CO2eq during the A1-A3 construction phase. As outlined in Chapter 2 of the EIAR, the construction phase will be approximately three years and thus the total emissions from construction should be spread over this time period. Thus, on an annual basis, the total GHG emissions during construction (A1-A5) for the shell and fit out will be approximately 3,530 tonnes CO2eq.

GHG Emissions Impact assessment and Mitigation Measures

Mitigation measures will be implemented in line with "best practice" as outlined in IEMA (IEMA, 2022) including Eliminate, Reduce, Substitute. The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the construction phase of the Proposed Development and the Overall Project by eliminating, reducing and substituting. As part of The Climate Pledge, Amazon and Amazon Web Services (AWS) are focused on increasing energy efficiency, expanding the use of renewable energy, and reducing the embodied carbon[17] of their infrastructure to reach net-zero carbon by 2040.

The mitigation measures which will be employed with regards to reducing embodied carbon emissions on the construction of the Proposed Development is outlined below:

- Low carbon products and manufacturers were specified where possible to reduce A1-A3 emissions.
- The upfront embodied carbon of concrete was reduced from baseline scenario by specifying concrete with 40% GGBS content in mitigation scenario.
- The embodied carbon of steel was reduced in the mitigation scenario in comparison to the baseline by specifying green steel with a high recycled content sourced from steel mills using electric arc furnace production processes. Unlike conventional steel produced from primary materials, coal, and gas, its suppliers are using up to 100% recycled content and are powered by electricity only, reducing embodied carbon up to 70%. The steel reinforcement bars of the mitigation scenario contain 97% recycled content for steel reinforcement bars, and steel is specified from low carbon manufacturers.

[17] https://www.aboutamazon.com/news/sustainability/aws-decarbonizing-construction-data-centers

- Replacing high carbon materials with lower upfront embodied carbon (A1-A3) material reduces the carbon generated through the materials wastage on site, resulting in less carbon generation during the construction stage (A5).
- Reducing on site material waste by 50% from the baseline scenario. The baseline material waste figure is as recommended by OneClickLCA for each material. The wastage values are set based on typical wastages and will vary based on construction processes, building and design.
- Reducing site operations and waste handling emissions by 50% by reducing on site fuel and electricity consumption by 50% from baseline scenario. This target is in accordance with published decarbonisation roadmaps by a tier one building contractor.
- Outlined actions to achieve a 50% reduction include use of low carbon renewable diesel instead of conventional diesel, elimination of combustion engine cars, and the implementation of energy efficiency innovations and management on site.
- All vehicles will be required to switch off engines when stationary (no idling);
- All vehicles will be serviced and maintained to ensure emissions are minimised;
- Where practicable, building materials will be sourced locally (within 20-25km) to reduce the embodied emissions associated with transport.

As a result of these mitigation measures, the GHG emissions will be reduced by over 52% in the A1-A3 product stage and over 45% during the A3-A4 construction phase compared to the baseline scenario.

As outlined in Section 4.1 of the Addendum to Chapter 9 of the EIAR, an assessment was undertaken of the likely carbon to be generated during the construction phase for A4-A5. The assessment found that for the mitigated scenario there was an associated GHG emission rate of 53.5 kgCO2eq/m^2 for the A4-A5 carbon assessment. Thus, based on the floor area for the Proposed Development of approximately 43,011 m^2, the mitigated scenario (with a GHG emission rate of 53.5 kgCO2eq/m^2 for the A4-A5 carbon assessment) leads to a total GHG emissions of approximately 2,301 tonnes CO2eq during the A4-A5 construction phase.

Combining the assessment for the construction phase of A1-3 with the construction phase for A4-A5 lead to a mitigated scenario for GHG emission rate of 299.7 kgCO2eq/m^2 for the A1-A5 carbon assessment. Thus, based on the floor area for the Proposed Development of approximately 43,011 m^2, the mitigated scenario (with a GHG emission rate of 299.7 kgCO2eq/m^2 for the A1-A5 carbon assessment) leads to a total GHG emissions of approximately 12,890 tonnes CO2eq during the A1-A5 construction phase.

As outlined in Chapter 2 of the EIAR, the construction phase will be approximately three years and thus the total emissions from construction should be spread over this time period. Thus, on an annual basis, the total GHG emissions during construction (A1-A5) will be approximately 4,297 tonnes CO2eq.

To put these emissions in context, it is necessary to compare the project emissions with the total GHG emissions in Ireland with the most recent year available, 2022.

In 2022, the total emissions of GHG emissions in Ireland was 60,760,000 tonnes across all sectors[18]. Given that the various activities will fall under both the EU ETS (such as cement manufacture, electricity, natural gas) whilst other activities will fall outside of this scope such as transport, import of materials etc and will encompass several of the Sectoral Emission Ceilings, the relevant comparison should be the total GHG emissions in Ireland in any one year. Thus, the total GHG emissions from each year of the construction phase will be equivalent to 0.0071% of total GHG emissions in Ireland.

Relative to the operational phase, each of the three years of the construction phase will be approximately 2.8% of the Year 2025 GHG emissions outlined in the Addendum to Chapter 9 of the EIAR. However, in contrast to the operational phase, most GHG emissions during the construction phase will not count towards the Electricity Sectoral Emission Ceiling but

[18] https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/#

will, as discussed above, relate to a range of emission sectors and also include GHGs arising from abroad.

7.4 Concluding Statement In Regard To Applicant Response To Item A7

In summary, the submitted EIAR and the Further Information provided a qualitative assessment of the climate impact of the construction stage in accordance with the relevant guidance. This was supplemented by a quantitative assessment (Stages A4 and A5) of the construction stage GHG emissions.

The current appeal response, in direct response to the grounds of appeal raised by Colin Doyle, includes an additional quantitative assessment of construction carbon impacts (A1-A3). Overall, for stages A1-A5, the construction phase impact of the Proposed Development is insignificant in the context of Ireland's GHG emissions over the period 2023-2027.

8.0 Item A8 – Impact of the Operating Hours of Generators and Impact On Air Quality

8.1 Overview

This section addresses the concerns raised in various appeals in relation to backup generators both in terms of the hours of operation and in terms of their potential impact in terms of human health.

8.2 Summary of Key Appellant Points – Item A8

The following arguments are raised in this regard of relevance to air quality & climate:

A8.1 The appellant argues that insufficient information has been provided to guarantee that the generators are for emergency use only. The appellants argue that EirGrid may require data centres to use on site generation during periods of grid constraint, and this could result in significantly higher usage levels than 72 hours. The appellant also argues that no information is provided to support the applicants claim that they expect to run the generators for less than 18 hours per year. The appeal contends that there is no guarantee that the IED licence for the wider site will be amended, to restrict the operation of generators to 72 hours or for monitoring of run hours.

A8.2 The appellant argues that the application is not clear whether the 72 hours operation quoted for the generators relates to all generators across the wider site, or if it relates to different generator units running at different times, amounting to 72 hours in total.

A8.3 The appellant argues that the assessment of impact from the backup generators on site (in particular in respect of NO_2) is insufficient. It is argued that the mitigation to ensure air quality standards are met has not been set out with sufficient clarity.

8.3 Applicant Response To Item A8

The relevant queries have been responded to in turn below.

A8.1 The appellant argues that insufficient information has been provided to guarantee that the generators are for emergency use only. The appellants argue that EirGrid may require data centres to use on site generation during periods of grid constraint, and this could result in significantly higher usage levels than 72 hours. The appellant also argues that no information is provided to support the applicants claim that they expect to run the generators for less than 18 hours per year. The appeal contends that there is no guarantee that the IED licence for the wider site will be amended, to restrict the operation of generators to 72 hours or for monitoring of run hours.

Response To A8.1

<u>Basis for Assumption of Generator Use:</u>

The following section has been prepared with inputs from the Applicant.

As set out in the AWN Consulting Further Information Response 1(c):

"the back-up emergency generators for the proposed development are to safeguard the continued provision of key online services which companies and individuals in Ireland access and rely on daily. In the event of a loss of power supply (e.g. temporary grid blackout) the emergency back-up generators will be utilised to maintain power supply. These generators are designed to activate and provide power to the data centre pending restoration of mains power. To ensure the emergency generators are ready in the event of grid power failure, the generators are tested periodically at

a frequency set out in the submitted EIAR in Section 9.2.3.1."

As with other mission critical facilities (such as airports, hospitals, centers for fire, police and public administration services), backup generators are designed to operate in response to power losses caused by **unplanned events** and **planned events**.

AWS serve developers and enterprises (Customers) of all sizes, including start-ups, government agencies, and academic institutions, through AWS, which offers a broad set of on-demand technology services, including compute, storage, database, analytics, and machine learning, and other services. Customers of AWS have corporate and regulatory obligations regarding information security and availability, and these obligations are subject to annual audits and reporting. AWS System and Organization Controls (SOC) Reports[19] are independent third-party examination reports that demonstrate how AWS achieves key compliance controls and objectives. The purpose of these reports is to help Customers and their auditors understand the AWS controls established to support operations and compliance. AWS Control Activity (CA) 5.10 ensures that "*Amazon-owned data centers have generators to provide backup power in case of electrical failure."* An example of how these control objectives are used by Customers is to demonstrate assurance of security, availability, confidentiality, and privacy set forth in the Trust Services Criteria Section 100, "2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy. The Trust Services Criteria control criteria utilized to evaluate and report on the suitability of the design and operating effectiveness of controls relevant to the Security, Availability, Processing Integrity, Confidentiality, or Privacy of an organization's information and systems. The Trust Services Criteria established by the Assurance Services Executive Committee (ASEC) of the American Institute of Certified Public Accountants (AICPA).

As set out above, backup generator usage can be required for a number of events:

Unplanned events: these can be caused by natural or human-caused hazards such as storms, floods, train derailments, operator/human-errors, general accidents and vandalism. The events include unusual and/or unforeseeable events that are outside of AWS' control (such as grid power outage, failure, overload, instability, load reduction requests, and load shedding event). They also include events that are within AWS' control such as essential maintenance and/or repair of critical equipment and infrastructure that forms part of the Data Centre's power distribution system (such as Medium Voltage breaker repair). These type of events can result in the operation of some or all of the back-up generators to maintain normal operational service.

Planned events: this includes planned maintenance and repair of infrastructure, planned infrastructure and equipment upgrades and component replacement (such as end-of-life replacement). It also includes routine testing of the back-up generators to ensure operational readiness in accordance with the applicable AWS testing regime that is in place from time to time. These type of events can result in the operation of some or all of the back-up generators to maintain normal operational service.

Example of unplanned events include, but are not limited to:

- Utility shuts down power to do emergency repairs on the utility's equipment. Power goes down without notice or with very short notice to AWS.
- Utility directs/requests AWS to come off grid supply because system conditions are such that area reliability would be compromised by maintaining service. Power goes down without notice or with very short notice to AWS.
- Storm/earthquake/other unforeseen disaster takes down power and AWS runs backup generators to provide power.
- AWS-owned/operated breaker ceases functioning properly and must be repaired. AWS must disconnect breaker from utility power and go on backup generators to provide power to data center while breaker is being repaired.

[19] https://aws.amazon.com/compliance/soc-faqs/

- Utility provides advance notice that it needs to do load checks along power lines and will turn off power to the substation. AWS runs generators during the time that utility turned off power to the substation.
- Electrical Line Up Element (e.g. Busbar, Unit sub transformer, LV breaker) Repair: Electrical system ceases functioning properly and must be repaired. Site must disconnect from utility power in order to repair it. Uses back-up generators to provide power to data centre while being repaired/replaced.

The frequency/occurrence of unplanned events ranges from events of low frequency (or return period) (such as every year) to very low frequency (every 20+ years). Unplanned events can take one to several hours to resolve, there is no guarantee that two similar unplanned events (e.g. repair of LV breaker) will take the same period of time, or that if an event (e.g. repair of LV breaker) occurs that it will not reoccur again within a specified timeframe. As set out in the Further Information Response, with numerous facilities across Europe and other locations, AWS sets internal design standards for their data centres. 72 hours / 3 days of generator use across a year is the internal standard modelled for generator use, unless local code, utility or regulators require, or where there is other localised data recommending a higher or lower number of hours – refer to below regarding the assessment of localised grid data for the Proposed Development. In Europe, AWS seek to apply this 72-hours across as many facilities to best-standardize our internal operational procedures and practices and those of our utility providers, plant and equipment maintenance vendors, and other processes needed to address the various situations where utility power is no longer available to our facility. With respect to the Proposed Development, 72-hours backup generator availability is a conservative worst case scenario considering the historic occurrence of events and an assessment of a future risks.

To demonstrate that this assessment is reasonable, it's comparable with industry standards. By way of example, American National Standards Institute (ANSI) and Telecommunications Industry Association (TIA) 942-A standard which requires 72 hours for Rated 3 Accreditation. Additionally, the regulatory requirement in Frankfurt, Germany require 96 hours of backup generator availability which is not dissimilar. The UK Environment Agency's draft guidance document '*Data Centre FAQ Headline Approach*' (version dated November 2022) references 72 hours as default assumption to be considered when modelling.

Regarding the appellants assertion on grid stability, the Commission for Regulation of Utilities (CRU) is Ireland's independent energy and water regulator The CRU's "*role in energy is to maintain security of supply, ensure efficient network delivery and promote competition and innovation in the generation and supply of electricity and supply of natural gas."* On 29 September 2021, the Commission for Regulation of Utilities (CRU) published a programme of work to increase generation capacity to provide additional stability and resilience to the Irish energy system over the following years. The *"programme of work was in response to EirGrid's identification of a potential capacity shortfall, if no action was taken, from 2021 to 2026*[20]*."*

The February 2023 update (footnote 19) from the CRU provides a detailed update on the programme of actions that are being undertaken to address security of supply concerns. In its update on capacity market auctions (where new generation supply contracts are awarded) the report details that a total of 1,471 MW of new generation capacity was awarded in the T-3 auction (January 2022) and that this new generation capacity will come online in October 2024. A further 381 MW of new generation capacity was awarded in the T-4 auction (March 2022) and this new generation capacity will come online in October 2025. Additionally, details are provided on the updated DSO Load Shedding Plan[21], which introduced a new provision to reduce demand from classes of large energy users (LEUs) (such as Data Centre operators) in the event of a System Emergency. The DSO Load Shedding Plan sets out a protocol for large energy users to utilise their onsite back-up generators – at the explicit request of ESBN/EirGrid – in order to reduce demand

[20]https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU202317_Electricity_Security_of_Supply_Programme_of_Work_Update_February_2023.pdf
[21] https://www.esbnetworks.ie/docs/default-source/publications/approved-dso-load-shedding-plan-01.10.2022.pdf

from the electricity grid. This frees up power, at times when the grid is under pressure, to meet demand elsewhere on the system. If AWS receive direction/requests from the Utility, we will be obligated to follow them in line with our connection agreement while observing all other relevant consents.

AWS, and some other large energy users, already provide such assistance, some AWS sites reduce power consumption and rely on backup generators for brief periods, when asked to do so by EirGrid. AWS are happy to facilitate such requests as part of EirGrid's efforts to maintain a stable and functioning electricity grid, as set out above, such requests are factored into the assumption of backup generator use modelled in the EIAR. As set out in the Further Information Response at 1(c), there no locally set standard for the number of hours generator use to be modelled, thus internal standards are used for modelling which include an assumption for unplanned events which impact the Proposed Development but are outside of AWS's control (such as grid power outage, failure, overload, instability, reduction, and load shedding event). The assumption for the durations of such events, to the extent possible, takes into account publications including EirGrid's Winter Outlook 2023/24[22] which states:

"The Expected Unserved Energy (EUE) figure would suggest that, on average, electricity consumers could potentially be without supply for up to 2 hours over the winter period. However, emergency protocols are in place with large energy users that would mitigate the impact on homes and businesses, where sufficient notice of an event can be provided (minimum of 1 hour). LOLE [Loss of Load Expectation] *and EUE are metrics used to measure the risk or likelihood of such an event happening. This does not necessarily mean that electricity consumers will be without supply for any period during the winter. In last year's Winter Outlook, the EUE figure suggested that consumers could be without power for 4 hours, yet consumers experienced no loss of power during the winter due to capacity issues. Based on information at the time of the data freeze, mid-December is expected to be the most onerous period from a capacity margin perspective."*

As set out above, the Winter Outlook 2022/23 had LOLE and EUE assumptions over twice that predicted for this Winter (2023/24). As set out in the EirGrid's Winter Outlook 2023/24, there are a number of assumptions which go in to creating such forecasts and that *"other conditions would have to be present or multiple and significant failures occur to cause a system-wide blackout".* As such, these unforeseen system emergency conditions do not form part of AWS's generator use assumption for the Proposed Development. At the Permitted Developments within the wider landholding (i.e. Building A, B & C), AWS have not exceeded 18 hours operation in line with the EPA guidance for the Operation of emergency generation plant by large energy users[23] since those buildings came into use Q3, 2020. Finally, it is understood (as set out in Electricity Security of Supply Programme of Work Update February 2023) that the risk of electricity generation gaps are short-term (2021-2026) in nature and in this regard we note that as set out in the above, the assessment assumed 100% operation of the entire Proposed Development in 2025. In reality, there will be a ramp-up period with 100% operation not occurring until mid-2027, which puts the operation of a large portion of Proposed Development beyond the reported security of supply concerns. While it is acknowledged that there is a "*potential capacity shortfall"* in the short term, the information above confirms that 72-hours backup generator availability for the Proposed Development is a conservative worst case scenario considering the historic occurrence of events and an assessment of a future risks.

The recent *Coyne v An Bord Pleanála*[24] High Court judgment addressed the existence of uncertainty and how account should be taken of that uncertainty with the relevant quotes from Paragraphs 125 – 127 shown below:

> *"125 As to "Assessing Significant Effects" the 2013 Guidance [2013 Guidance on Climate Change] states that many assessment approaches used in EIA have the capacity to address climate change. "There are, however, three*

[22] https://www.eirgridgroup.com/site-files/library/EirGrid/ROI-Winter-Outlook-Report_2023.pdf
[23] https://www.epa.ie/publications/licensing--permitting/industrial/ied/Advice-Note-on-large-scale-EG-operation-21122021.pdf
[24] [2023] IEHC 412

fundamental issues that you should consider when addressing climate change and biodiversity: the long-term and cumulative nature of effects, complexity of the issues and cause-effect relationships and uncertainty of projections." There follows a consideration of all three issues, the premise of which is that EIA should address them. I would add that this premise must itself be premised on climate change having been scoped into the EIA as a likely significant effect.

126 The 2013 Guidance states that EIA, to properly address climate change, should take into account its complexity (including of causal relationships) and long-term direct and indirect impacts and consequences. EIA should describe the sources of, and characterise the nature of, uncertainty. Judging an impact's magnitude and significance must be context-specific. The contribution of an individual project to GHGs may be insignificant on the global scale but may be significant on the local/regional scale, in terms of its contribution to set GHG-reduction targets.

127 Finally, it is worth noting some of the "bullet points" tabulated in 2013 Guidance as "Critical challenges for addressing climate change ... in EIA":

- *Manage complexity. Consider the complex nature of climate change and biodiversity and the potential of projects to cause cumulative effects.*
- *Be comfortable with uncertainty, because you can never be sure of the future. Use tools such as scenarios (for example, worst-case and best-case scenarios) to help handle the uncertainty inherent in complex systems and imperfect data. Think about risks when it is too difficult to predict impact.*
- *Base your recommendations on the precautionary principle and acknowledge assumptions and the limitations of current knowledge.*
- *Be practical and use your common sense!*

The guidance also states that "considering a range of possible uncertain futures and understanding the uncertainties is part of good EIA practice and permits better and more flexible decisions.

In other words, it is no error to acknowledge and assess uncertainty and risk as best you reasonably can. Error may well lie in ignoring them."

Concluding Statement In Regard To Applicant Response To Item A8.1

The assessment undertaken in the Addendum to Chapter 9 of the EIAR has been based on a reasonable worst-case assessment in line with both the Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EU, 2013) and Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition (IEMA, 2022). The reasoning for this conclusion is outlined below.

Firstly, the operation of backup generators is predicated on a number of different scenario types, broadly speaking planned and unplanned. In developing a modelling scenario for the Proposed Development, the Operator (AWS) has utilised their experience in operating data centres across multiple geographic regions, considering several different scenarios (events which require the temporary use of backup generators) which occur with varying levels of frequency (return periods) irrespective of location and those scenarios which are specific to local conditions/location.

Therefore, contrary to the claims made by the appellants, the climate assessment within the EIAR and the EIAR Addendum submitted with the Further Information response was not based on overly optimistic assumptions, but in fact represented a conservative approach to modelling and assessing the likely back-up generator operating scenarios.
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IED

The appellants claim that EU[25] (IED Directive) and UK[26] guidance should be referenced which the "applicant discounts". Respectfully, this is wholly inaccurate. As set out in the EIAR, Further Information Response and this Appeal Response, under Section 9.2.3.1 of the EIAR the air modelling is outlined which confirms that the assessment has been undertaken in line with the appropriate guidance from the EPA (Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)" (EPA, 2020)) and using the appropriate air dispersion model (USEPA approved AERMOD model). In addition, as expanded on further at Section 4.13-4.14 below an EPA-Industrial Emissions Directive (IE) licence will be applied for to facilitate the operation of the proposed development. Finally, the generators (Cummins G5) modelled in the EIAR for the Proposed Development are certified as compliant with the 2g TA LUFT (Technische Anleitung zur Reinhaltung der Luft) emissions standards (~2,000 mg/m3 of NOx at 5% oxygen and reference condition). Germany's TA LUFT standard is commonly referenced across Europe, including the UK Environment Agency's draft guidance document '*Data Centre FAQ Headline Approach*' (November 2022 version) to the permitting and regulatory aspects for Data Centre within the context of the Industrial Emissions Directive (IED). This EA guidance document considers 2g-compliant generator units to be BAT or Best Available Technology for emergency back-up power generation units.

Since the submission of this planning application, an IED license has been approved and now governs the permissible operation of back-up generators at the permitted developments, Buildings A, B and C, within the wider landholding of the Proposed Development Site. Specifically, regarding the operation of generators outside of standard generator testing/maintenance, Condition A.1.1 of the IED License (EPA Ref: P1182-01) states *"Generators shall not be operated for more than 72 hours annually. Generators shall not be operated at more than 90% load".*

With regard to the appellant's claim that there is no guarantee that IED licence will be amended to include the current development proposal it is noted that the applicant is committed to applying for an amendment to the existing licence to include the proposed development. The public notices for the application stated the following statutory wording:

"An EPA-Industrial Emissions Directive (IE) licence will be applied for to facilitate the operation of the proposed development."

Furthermore, in order to provide an additional degree of certainty, the applicant would be willing to accept a condition attached to any grant of permission by the Board to state the following:

*"Prior to the **operation** of the development, the Industrial Emissions Licence for the wider landholding shall be amended to include this development"*

As set out in Chapter 1.0 of the EIAR, the Proposed Development will require an EPA Greenhouse Gas (GHG) Emissions permit in accordance with the EPA Act 1992, as amended. A GHG Permit is in place for the back-up generators at Building A (Permit Register Number: IE-GHG197-10524-1). This permit has been amended to include additional back-up generators at Buildings B and C. Subject to grant of planning permission for the Proposed Development, it is intended that the permit will also be amended to include the additional back-up generators from the Proposed Development (Refer to Chapter 9 Air Quality and Climate). A GHG Permit requires annual reporting to address the appellants concern on monitoring of use.

[25] https://environment.ec.europa.eu/topics/industrial-emissions-and-safety/industrial-emissions-directive_en
[26] https://www.gov.uk/guidance/industrial-emissions-standards-and-best-available-techniques

A8.2 ***The appellant argues that the application is not clear whether the 72 hours operation quoted for the generators relates to all generators across the wider site, or if it relates to different generators.***

Response To A8.2

The worst-case scenario for the operation of the backup generators is as outlined in Section 3.0 Item 1 (B) of the Further Information response on page 6. In addition, the weekly testing of the generators and the maintenance testing, four times per year, of all generators has been assessed in Chapter 9 of the EIAR.

Thus, as outlined, the assessment is based on the operation of the project's backup generators for the Proposed and Permitted Development for 72 hours each per year as well as scheduled weekly testing and quarterly maintenance testing of all back-up generators from the permitted Buildings A, B and C and proposed Buildings E, F and G.

A8.3 **The appellant argues that the assessment of impact from the backup generators on site (in particular in respect of NO_2) is insufficient. It is argued that the mitigation to ensure air quality standards are met has not been set out with sufficient clarity. The appellant also argues there is insufficient consideration of impact of 'renewable diesel' on local populations in terms of health, including more vulnerable travelling community.**

Response To A8.3

Chapter 9 of the EIAR outlines in comprehensive detail the assessment of air quality from the Proposed Development. Under Section 9.2.3.1 of the EIAR the air modelling is outlined which confirms that the assessment has been undertaken in line with the appropriate guidance from the EPA (*Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)*" (EPA, 2020)) and using the appropriate air dispersion model (USEPA approved AERMOD model).

The modelling results were discussed in detail in Section 9.7.2.1 for the Do Nothing and Proposed Development scenarios with the Cumulative scenario discussed in Section 9.8.2 of the EIAR.

In relation to the Proposed Scenario Section 9.7.2.1 stated that:

> *"The NO_2 modelling results at the maximum location at and beyond the site boundary are detailed in Table 9.9 based on the operation of 97 of the 107 no. back-up diesel generations for 72 hours per year using the USEPA methodology outlined within the guidance document titled 'Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard' (USEPA, 2011) as well as considering scheduled weekly testing and quarterly load-banking of all back-up generators from the permitted Buildings A, B and C and proposed Buildings E, F and G in addition to a house generator in Buildings B, C, F and G. The Proposed Development Scenario also included emissions from eight existing emission points at the neighbouring BMS and Alexion facilities.*
>
> *The results indicate that the ambient ground level concentrations are within the relevant air quality standards for NO_2. For the maximum year modelled, emissions from the site lead to an ambient NO_2 concentration (including background) which is 62% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 82% of the annual limit value at the maximum off-site receptor."*

In Section 9.7.2.2 the air quality impact assessment concluded that:

*"The modelling assessment has found that ambient NO_2 concentrations as a result of the Do Nothing Scenario, the Proposed Development Scenario and the Cumulative Impact Scenario (see Section 9.8.2) are in compliance with the relevant ambient air quality limit values at all locations at or beyond the site boundary. The impacts to air quality from operation of the Proposed Development are therefore deemed **long-term** and **slight** in terms of significance and **negative** in terms of quality."*

As noted on the previous page, the use of 72 hours for air emission modelling is highly conservative and proposed a worst-case event with a very low probability of occurring, given the stability of the Irish transmission grid.

8.4 Concluding Statement In Regard To Applicant Response To Item A8.2 & A8.3

In summary, the air modelling assessment is based on the operation of the backup generators for the Proposed and Permitted Development for 72 hours each per year as well as scheduled weekly testing and quarterly maintenance testing of all back-up generators from the permitted Buildings A, B and C and proposed Buildings E, F and G and future development. Even under this very conservative assessment, ambient levels of NO_2 remain in compliance with the ambient air quality standards at all times.

9.0 Item A9 - Use of Renewable Diesel

9.1 Overview

This section addresses the concerns raised in various appeals in relation to the use of renewable diesel and whether it has associated GHG emission savings. The appellant also argues there is insufficient consideration of impact of 'renewable diesel' on local populations in terms of health, including more vulnerable travelling community.

9.2 Summary of Key Appellant Points - Item A9

The technical argument is put forward that the use of HVO for the generators on site is considered to be insignificant in terms of mitigation. It is also argued that the use of renewable diesel may not in fact represent a renewable fuel source, and notes that it was only committed to subject to availability.

The argument is also put forward that HVO is not a carbon neutral fuel, and that it will not be treated as a green fuel to meet the EU's 2030 renewable targets, subject to some exceptions.

9.3 Applicant Response To Item A9

Use of HVO in the Proposed Development

The air quality and climate assessment of the backup generators in the EIAR was based on conventional diesel as the backup fuel as a worst-case modelling scenario but stated that HVO would be used, subject to availability. Since the planning submission, AWS signed a supply agreement[27] in March 2023 with Certa to supply renewable HVO to their Dublin operations including the existing permitted development and the Proposed Development. AWS's supply agreement with Certa means that the backup generators for the Proposed Development will be supplied with HVO from the date of commissioning along with any subsequent refills due to generator use. In fact, all refills of AWS's existing generators in Dublin have been with HVO since October 2022

AWS recognise there are legitimate concerns with some mixes of renewable diesel, that's why AWS is helping to develop a global supply chain, working with local organisations like Certa in Ireland, and is investing in the procurement of HVO that only comes from renewable sources, with raw materials that are traceable to their origins and not derived from sources that would impact highly biodiverse areas. AWS's purchase criteria for HVO excludes the use of Palm or Soy Oil, AWS have confirmed that Certa's material safety data sheet excludes such materials. The Certa supplied HVO is sold under the HD+HVO label and a comprehensive document setting out its properties is available online[28]. All shipments are receipted against that standard.

This is supported by the data provided by Certa on the renewable diesel currently being procured by AWS. Unlike first generation biofuels, which are made from crops such as rapeseed and soy, Hydrotreated Vegetable Oil (HVO) is a second-generation biofuel which means it is made from pre-existing bio-waste products, primarily used cooking and vegetable oil from food industry waste. Manufactured from 100% renewable and sustainable waste, HVO is a paraffinic drop-in fuel designed as a direct replacement for conventional diesel. It meets the international fuel standard BS EN 15940, the specification for paraffinic diesel, and the Fuel Quality Directive 2009/30/EC Annex II.

Mitigation benefits of HVO

The European Environment Agency (EEA) has studied the environmental impact of HVO and has found that HVO has the advantage of lifecycle GHG emission reductions of

[27] https://www.aboutamazon.eu/news/sustainability/harnessing-the-power-of-plants-to-decarbonise-our-data-centres
[28] https://certaireland.ie/wp-content/uploads/2023/08/Certa-GD-HVO-Ebook-2023.pdf

greater than 75%[29] compared to fossil-fuel derived conventional diesel. The use of this fuel will contribute to Ireland achieving net zero GHG emissions by 2050 in line with Irish and EU targets. In fact the Certa HVO datasheet offers up to 90% reduced net CO_2 emissions and states that direct emissions from burning HVO are considered to be zero – or 'carbon neutral'.

In relation to human health, the emissions of NO_X from HVO have been compared to conventional diesel, based on studies from Cummins Power Systems. Cummins Power Systems have investigated the use of HVO in their C3000D5e (QSK78-G16) generators in order, *inter alia*, to determine their NO_X emissions in comparison to conventional diesel. The study, undertaken in 2020 and 2021, compared the use of 100% HVO at 25%, 50%, 75% and 100% loads with the results for 100% diesel at the same loads for a range of emissions including NO_X. The results of this study, for NO_X, are shown below in Table 7:

Parameter	Units	HVO Run - 2021				HVO Run - 2020				Conventional Diesel Run - 2020			
	% Load	25%	50%	75%	100%	25%	50%	75%	100%	25%	50%	75%	100%
NOx	mg/Nm^3	1569	1721	1912	2294	1737	1839	1964	2194	1744	1897	2048	2348

Table 7 Cummins C3000D5e HVO vs Conventional Diesel Test 2020 – 2021.

The results are summarised in Table 8 which shows that at every load HVO is approximately 2.3 – 4.1% lower in NO_X emissions, at loads between 50% and 100%, when compared to conventional diesel:

Parameter	Units	Maximum HVO Result (2020 - 2021)				Diesel Run - 2020				HVO NO_X Concentration Compared To Diesel (%)			
NOx	mg/Nm^3	1737	1839	1964	2294	1744	1897	2048	2348	99.6%	96.9%	95.9%	97.7%

Table 8 Percentage NO_X Relative Difference Between Cummins C3000D5e HVO and Conventional Diesel - Testing In 2020 / 2021.

In relation to SO_2, HVO has essentially zero sulphur and thus will have significantly lower emissions of SO_2 when compared to conventional diesel. Studies by Caterpillar on equivalent backup generators have found lower levels of particulate matter / smoke emissions[30] when using HVO.

The above improvements are backed up in the Certa datasheet, extracts of which are below :

(NOX and PM difference. % change. Diesel = 100%)

Diesel		HVO	
NOX	PM	NOX	PM
100	100	91	N/A

[29] ETC CM Report 2022/02 – Greenhouse gas intensities of transport fuels in the EU in 2020, Monitoring under the Fuel Quality Directive.
[30] Caterpillar – CAT175-20 50Hz Genset Hydrotreated Vegetable Oil 5/5/2022

Fuel	Gd+ HVO	DIESEL
Carbon-Neutral	YES	NO
Identical Energy Output (Variable & Fixed-Speed Engines)	YES	YES
Winter-Grade	YES	NO
Suitable for Diesel Engines	YES	YES
Renewable	YES	NO
Odourless	YES	NO
International Sustainability and Carbon Certification (ISCC) Scheme Approved	YES	NO
Meets international fuel standard BS EN 15940	YES	NO
Zero Direct Emissions	YES	NO
Reduced Need for Regular Testing	YES	NO

Fuel	Gd+ HVO	DIESEL
Shelf-Life (Years)	Up to 10	Up to 2
Cetane Number	70-90	50-60
Energy Output (GJ/Tonne)	44.00	42.79
Gel Point	-34°C	-8.1°C
Sulphur Content	<1	<10
C02 Emissions (gCO2e/MJ)	9.78	88.04
NOx Emissions (mg/km)	30.1	43.0
Stability from Oxidation	Excellent	Average

9.4 Concluding Statement In Regard To Applicant Response To Item A9

In summary, AWS has established a supply chain for HVO for their existing operations in Dublin that will be extended for the Proposed Development. The HVO sourced will be sustainable and will exclude the use of Palm or Soy Oil. The use of HVO to replace conventional diesel will lead to substantially lower GHG and SO_2 emissions and lower NO_X and PM emissions. On this basis, the arguments raised in the appeals in this regard are without merit.