EIA: Supplementary Environmental Information

Sandy Knowe Wind Farm Extension

SEI Chapter 2: Project Description (2023 Update)

Sandy Knowe Wind Farm Limited

October 2023

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Appendices

This report also is supported by the following Appendices associated with the 2022 EIA:

Glossary of Terms

Term	Definition
The Applicant	Sandy Knowe Wind Farm Limited
The Agent	ERG Holding UK Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations
The Proposed Development	The Sandy Knowe Wind Farm Extension
The Proposed Development Footprint	The area within which the Proposed Development will be located
The Proposed Development Site	The full application boundary including Sandy Knowe Wind Farm and Sandy Knowe Wind Farm Extension

List of Abbreviations

Abbreviation	Description
ECU	Energy Consents Unit
EIA	Environmental Impact Assessment
NTS	Non-Technical Summary
OBPRP	Outline Borrow Pit Restoration Plan
PMP	Peat Management Plan
SEI	Supplementary Environmental Information

2 Project Description (2023 Update)

2.1 Introduction

As described in SEI Chapter 1 Introduction, this chapter sets out the amendments to the Proposed Development which have been made either in response to consultee feedback on the application or as minor amendments to provide additional information/clarity on the Proposed Development.

This SEI chapter has been prepared by Atmos Consulting Ltd.

2.2 Development Description

2.2.1 Access Tracks

In the 2022 EIA, Volume 1 Chapter 3 Description of Development it is stated that where the presence of peat has been identified to be greater than 2m in depth, floating tracks are proposed to be used.

The section of floating track identified within the 2022 EIA Volume 2 Technical Appendix 8-2 Peat Management Plan (PMP) Section 4.1.2 is a c.100m section located between T27 and T28 over the deepest area of peat crossed by the proposed infrastructure as shown in Figure 8-6 of the 2022 EIA.

In SEI Chapter 3: Revised PMP the Applicant proposes the use of an additional area of floating track in the eastern section of the Proposed Development Site where T29 and T30 are located. This new floating track section will be c. 500 m in length providing a reduction of c. 3,000 m^3 of permanent peat excavation as detailed in SEI Chapter 3.

The total length of excavated track will be reduced from 3km to 2.5km when compared to the 2022 EIA (SEI Figure 2-1).

As discussed in the 2022 EIA, Chapter 3, prior to the commencement of site construction, detailed engineering specification for the access track design will be submitted to the planning authority as part of a Planning Conditions Compliance Statement, which will include Construction Method Statements for all aspects of construction.

As detailed in SEI Chapter 6 Other Considerations Section 6.2.3 the Applicant has also proposed the inclusion of an outdoor education trail. This trail will connect the existing walking trail (SEI Figure 6-2) to the proposed new access tracks for the Proposed Development, connecting to T30.

2.2.2 Borrow Pits

In the 2022 EIA, Volume 1 Chapter 3 Description of Development it is stated that the Proposed Development will utilise an existing borrow pit known as Borrow Pit D (BPD)(Reference 20/0809/FUL), for the excavation of on-site aggregate to be used in the construction of the Proposed Development and for peat reinstatement.

SEI Chapter 4 Outline Borrow Pit Restoration Plan (OBPRP) outlines that there remains sufficient accommodation space for all materials which are anticipated to be generated during the construction of the Proposed Development (Table 2-1).

Table 2-1: Accomodation Space and Borrow Pit Peat Reinstatement Depth

Status	Reinstatement Depth (Maximum)	Accommodation space (Minimum)
No further reworking of the pit	1.5m	c. 19,400 m^3
No further reworking of the pit	2m	27,500 m^3
Additional working (for example, reopening of the northwest corner of the pit subsequent to material stripping)	2m	c. 30,580 m^3

The location and extent of BPD is shown on SEI Figure 2-1.

Furthermore, a Revised PMP is provided in SEI Chapter 3 which outlines the restoration measures which are proposed to maximise the environmental benefits for peat reinstatement.

2.2.3 Habitat Management

The Applicant has sought to expand on the underlying principles of the EIA Volume 2 Technical Appendix 14-2 Outline Habitat Management Plan (OHMP) through the provision of a set of landscape planting principles and biodiversity enhancements set out in Chapter 5 of this SEI.

These improvements will be implemented by concentrating on both the Habitat Management Areas (HMAs) as shown in the 2022 EIA Figure 14-2-1 and the areas designated for peatland restoration, as outlined in SEI Chapter 3 Revised PMP and SEI Chapter 4 OBPRP.

Further detail regarding these enhancements can be found in SEI Chapter 5 Landscape Planting Principles and Biodiversity Enhancements.

2.3 Benefits of the Proposed Development

As a result of the changes to the infrastructure design outlined in Section 2.2 of this SEI Chapter, the Applicant has updated the input data used in the Scottish Government's Online Carbon Calculator to demonstrate the benefits of the Proposed Development.

Upon review of the 2022 EIA Volume 2 Technical Appendix 3-1 Carbon Calculator it has been noted that the capacity factor of 35% utilised for the assessment was based on the UK Energy Statistics (DUKES) 'Load factors for renewable electricity generation for 2020' (BEIS, 2021)). It is now known that it is more accurate to use the specific load factor for onshore wind energy as opposed to renewable electricity generation.

Therefore the Applicant has both recalculated carbon calculator outputs for the design of the 2022 Proposed Development and the 2023 SEI revisions to the Proposed Development by using an average load factor of the BEIS Digest of UK Energy Statistics (DUKES) (BEIS, 2023) for onshore wind generation from 2018-2022, 26.4%. It is expected that the electricity generated from the Proposed Development will be the region of 50,000 MWh per year.

The Carbon Calculator results of the SEI 2023 design as well as the changes to the input data are presented in SEI Appendix 2-1 (Reference **GFB5-9F1O-THPY v7**).

The recalculated Carbon Calculator results using the capacity factor of 26.4% for the 2022 Proposed Development design as well as the changes to the input data are presented in SEI Appendix 2-1 (Reference **GFB5-9F1O-THPY v8**).

These results are discussed in the following section 2.3.1 to 2.3.3 (inclusive), Table 2-2 and Table 2-3.

2.3.1 Carbon Losses

The manufacturing, construction and installation of the wind turbines and associated infrastructure has a carbon cost, and carbon losses are also generated by the requirement for extra capacity to back up wind power generation.

Carbon losses are also associated with the loss of soil organic matter that occurs through disturbance and excavation of peat during construction and drainage.

The Carbon Calculator does not allow for all reinstated peat be accounted for and as iterated in the Onshore Wind Policy Statement 2022 (Scottish Government, 2022) work is currently underway to assess the operation of the calculator to address this. As all reinstated peat is not accounted for, the excavated peat is treated as if it was lost. Therefore, the estimates of carbon losses are more conservative than is likely to be the case in practice.

Table 2-2 demonstrates that the SEI 2023 redesign will benefit the environment, resulting in a reduction in the expected total losses of carbon dioxide of 930 tCO2 eq. when compared to the EIA 2022 design. The majority of this reduction is due to the reduction in losses from soil organic matter due to the addition of floating roads which do not involve excavation.

Table 2-2: Total CO2 losses due to wind farm (tCO2 eq.)

Total CO2 losses due to wind farm (tCO2 eq.)	Design Iteration	Expected	Minimum	Maximum
Losses due to turbine life (eg. manufacture, construction, decomissioning)	SEI 2023	20,932	20,932	20,932
	EIA 2022	20,932	20,932	20,932
Losses due to backup	SEI 2023	16,348	16,348	16,348
	EIA 2022	16,348	16,348	16,348
Losses due to reduced carbon fixing potential	SEI 2023	592	169	3,299
	EIA 2022	638	184	3,511
Losses from soil organic matter	SEI 2023	3,870	47	15,100
	EIA 2022	4,647	383	16,804
Losses due to DOC & POC leaching	SEI 2023	694	16	7,453
	EIA 2022	802	23	8,140
Losses due to felling forestry	SEI 2023	0	0	0
	EIA 2022	0	0	0
Total losses of carbon dioxide	SEI 2023	42,436	37,512	63,132
	EIA 2022	43,366	37,870	65,735

2.3.2 Payback Period

The payback period is calculated by taking the total carbon cost (carbon emissions) associated with the Proposed Development and dividing that figure by the annual

carbon gains from displaced fossil fuel power generation and any site improvements. The shorter the payback period the greater benefit the Proposed Development will have in displacing GHG emissions associated with electricity generated by burning fossil fuels.

When taking into consideration the potential renewable energy generation, displacement and savings of carbon and carbon losses, the SEI 2023 redesign of the Proposed Development is expected, conservatively, to reduce the payback the carbon cost by 0.1 years compared to the 2022 EIA design using grid mix electricity generation (Table 2-3). This reduction represents the changes within the SEI 2023 redesign and equates to 11% of the proposed 40 year operational life of the Proposed Development compared to 11.25% of the 2022 EIA design.

As noted above, the Carbon Calculator is limited to considering displacement of energy generation exported to the electricity grid and although carbon intensive energy for heat and transport will be increasingly decarbonised by electrification and therefore effectively displaced by green electricity, the tool does not take account of this in calculating the payback period. Over the 40 year lifetime of the development as the electrification of the economy continues the overall displacement of carbon intensive energy by the Proposed Development would be expected to be higher than predicted in the model and therefore the payback time is expected to be shorter.

As such, conservatively, it is expected that the SEI 2023 redesign of the Proposed Development would make a positive contribution to offsetting carbon emissions after 4.4 years at which time it is estimated to be carbon neutral.

Table 2-3: Carbon Payback Time

Carbon Payback Time	Design Iteration	Expected	Minimum	Maximum
Coal-fired electricity generation (years)	SEI 2023	0.9	0.7	1.4
	EIA 2022	0.9	0.7	1.5
Grid-mix of electricity generation (years)	SEI 2023	4.4	3.6	7.3
	EIA 2022	4.5	3.6	7.6
Fossil fuel-mix of electricity generation (years)	SEI 2023	2.0	1.6	3.3
	EIA 2022	2.0	1.6	3.4

2.3.3 Electricity consumption

The benefit of displacement of emissions may also be described in terms of the number of equivalent homes to be supplied on an annual equivalence basis. The average domestic electricity consumption per household in Scotland is approximately 3.7MWh (3,700kWh) annually (BEIS, 2022). Given that the expected generation from the Proposed Development is 50,000MWh, the Proposed Development will therefore generate electricity equivalent to that required to power approximately 13,500 households in Scotland annually.

2.4 Conclusion

The changes to the design of the Proposed Development detailed in this SEI chapter will make a significant contribution to reducing Scotland's CO_2 emissions and contribute directly to the commitment to net-zero by 2045 and to efforts to reduce the extent and

rate of global climate change reflected in the ecological and climate emergency declared by Dumfries and Galloway Council in June 2019.

The Proposed Development will therefore, make a material contribution to reducing Scotland's CO_2 emissions, contribute directly to efforts to reduce the extent and rate of global climate change while also generating economic and social benefits.

2.5 References

BEIS (2021) Digest of UK Energy Statistics (DUKES) 2021. Available at https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes [Accessed on 25/10/2023

BEIS (2022) Subnational electricity consumption, Great Britain, 2005 - 2021. Available at https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics [Accessed on 25/10/2023]

Dumfries and Galloway Council (2019) Climate Emergency. Available at https://www.dumgal.gov.uk/article/21773/Climate-Emergency#:~:text=On%2027%20June%202019%20Dumfries,to%20declare%20a%20Climate%20Emergency.&text=There%20is%20a%20specific%20Council,to%20a%20carbon%20neutral%20region [Accessed on 25/10/2023]

Scottish Government (2022) Onshore Wind Policy Statement 2022. Available at: https://www.gov.scot/publications/onshore-wind-policy-statement-2022/documents/ [Accessed on 25/10/2023]