Proposed Ballynalacken Windfarm Project

Environmental Impact Assessment Report

Chapter 17: Population & Human Health

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Table of Contents

List of Figures

Figure No.	Figure Title	Location
Figure 17.1	Communities around the Ballynalacken Windfarm Project Site	End of Chapter 17
Figure 17.2	Local Population and Community	End of Chapter 17
Figure 17.3	Local Economy	End of Chapter 17
Figure 17.4	Tourism within the Study Area	End of Chapter 17
Figure 17.5	Carpark and Picnic Area Amenity on Cromwell's Road	End of Chapter 17
Figure 17.6	Other Projects considered for Cumulative Effects to Local Economy	End of Chapter 17

List of Appendices

Appendix No.	Appendix Title	Location
Appendix 17.1	Central Statistics Office Data	End of Chapter 17
Appendix 17.2	Human Health Baseline Data	End of Chapter 17
Appendix 17.3	Methodology for the evaluation of Population & Human Health	End of Chapter 17

Glossary of Terms

Term	Definition
Ballynalacken Windfarm Project	Ballynalacken Windfarm including 12 No. turbines, turbine foundations and hardstanding areas, Windfarm Site Roads, Internal Windfarm Cabling, Windfarm Control Building, Site Entrances, ancillary works at and for the windfarm, along with the Internal Cable Link, Tinnalintan Substation and ancillary works, and Ballynalacken Grid Connection and grid connection works to the Eirgrid Ballyragget Substation. The Project also involves works and activities along the turbine component haul route remote from the site, including the construction of a temporary Blade Transfer Area at HR8.
Electoral District (ED)	Defined by the CSO as the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census. There are 3,440 legally defined in the State.
National Economy	The economy of the Republic of Ireland. It encompasses the value of all goods and services manufactured within the country.
Local Economy	The economic system and range of economic activity in a local area that serves a local population.
Gross Domestic Product (GDP)	The measure of the value of total output of an economy in a given period.
Gross Value Added (GVA)	The measure of the values of goods and services produced in an area, industry or sector of an economy.
Induced Spending	Induced spending is the increased spending that is generated by increased incomes.

List of Abbreviations

Abbreviation	Full Term
AM	Amplitude Modulation
CSO	Central Statistics Office
ED	Electoral Division
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
GVA	Gross Value Added

CHAPTER 17 POPULATION & HUMAN HEALTH

EIAR 17.1 INTRODUCTION

EIAR 17.1.1 The Authors of this Chapter (Competent Experts)

The Health Impact Assessment has been prepared by Tara Barratt who has an MSc (DIC) in Environmental Technology (specialising in environmental epidemiology) and a BSc (Hons) in Geography from the University of Birmingham. Tara has nine years' experience undertaking health impact assessments, including assessing population and human health within EIA, is an Associate of the Institute of Environmental Management and Assessment (IEMA), and contributing author to IEMAs guidance on "Determining Significance for Human Health in EIA" and "Effective Scoping of Human Health in EIA".

Millie Potter is a contributing author, who has an MSc in Environmental Science and a BSc (Hons) in Geology and Physical Geography. Millie is a Practitioner member of the Institute of Environmental Management and Assessment, and has two years' experience of environmental impact assessment

It has been checked by Dr Andrew Buroni who has in excess of 24 years of health assessment. Andrew is acknowledged in much of the UK HIA Guidance, is a technical advisor to the WHO, sits on the IEMA health in EIA working group and their newly formed HIA competency panel. He lectures on the subject at the Sussex University Joint Medical School, provides local authority health assessment training for the Office for Health Improvement and Disparities (OHID) and Public Health Network Cymru, and has been requested by OHID to present UK best practice at the American Planning Association Conference this year (2024).

The socio-economic section has been prepared by Ciara Morley (Ph.D. and M.A. in Economics and Finance), Director at Morley Economic Consulting Ltd. Ciara Morley has more than 10 years' experience in economic research and consulting. Prior to setting up her own economic consultancy in 2020, she was a Manager with EY-DKM, and a Researcher with the ESRI. Ciara's main areas of research include socio-economic analysis, regional development, and Economic Impact Assessments, across a broad range of sectors.

EIAR 17.1.2 Overview of Population in the Local Environment

Local community/population and local economy relates to the people living in the area, and includes the demographic makeup, economic activity and social functioning of local communities.

The proposed Ballynalacken Windfarm site is located entirely in County Kilkenny between the towns of Ballyragget and Castlecomer and villages Ballinakill (County Laois), Ballyouskill and Attanagh. The surrounding area is typical of Kilkenny rural countryside with farmsteads and one-off housing located in the open countryside. The surrounding lands are predominantly used for grassland farming with some commercial forestry on higher ground.

The definition of health referenced in the recent Institute of Public Health Ireland Health Impact Assessment Guidance (IPH, 2021) is from the constitution of the World Health Organisation (WHO), which states that health is 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'. Health is determined not only by access to quality healthcare services and lifestyle choices but also by the social and economic conditions in which people live (IPH, 2009).

EIAR 17.1.3 Sources of Information

Consultation, desktop studies and fieldwork were carried out in order to gather information on the baseline environment.

Table 17-1: Sources of Baseline Information for Population & Human Health

Type	Source
Consultation	No Population or Human Health specific feedback received from statutory or other consultees Public Information Day, and feedback from local community See Chapter 3: Consultation for consultee responses.
Desktop	• Census of Population 2002 – 2022 and various volumes published by the CSO • CSO County Incomes and Regional GDP, various years • Fáilte Ireland data and publications relating to domestic and overseas tourism (South-East Region and Kilkenny), various years • ESRI, Quarterly Economic Commentary Summer 2023 • Kilkenny County Council Annual Report 2022 • Solas, Regional Skills South-East Q3 2023 • Desktop research of tourism in Kilkenny & Laois. Full list on Reference page at the end of the chapter. • Lenus the Irish Health Repository website Review of the other EIA Report Topic Chapters as follows: • Chapter 8: Water – (Water Supply) • Chapter 9: Air Quality & EMF • Chapter 10: Noise and Vibration • Chapter 11: Shadow Flicker • Chapter 12: Climate • Chapter 14: The Landscape • Chapter 16: Material Assets
Fieldwork	• Site visit to establish extent of settlement patterns, amenities and local businesses • No fieldwork was required to determine the human health baseline environment.

EIAR 17.1.4 Legislation, Regulations & Guidance Documents

The following strategies and plans have been taken into account in this EIA Topic chapter:

- Regional Spatial & Economic Strategy for the Southern Region of Ireland (2020);
- Kilkenny County Development Plan 2021-2027
- Laois County Development Plan 2021 - 2027

The following Guidelines have been taken into account in this EIA Topic chapter:

- *Guidelines on the information to be contained in Environmental Impact Assessment Reports,* EPA (2022);
- Health Impact Assessment Guidance: *A Manual, Institute of Public Health in Ireland* (2021)

EIAR 17.1.5 Methodology Used

The evaluation for Population & Human Health in Section EIAR 17.3 has been carried out in accordance with the EPA guidance document *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*, the ARVI approach for impact significance assessment developed under the EC IMPERIA LIFE11 Project, the *Manual on Health Impact Assessment Guidance* and the IEMA *Guide to Determining Significance for Human Health in EIA*. This methodology has been used to determine the importance and sensitivity of receptors, and the magnitude and significance of potential impacts. The methodology can be found in full in Appendix 17.3: Methodology for the evaluation of Population & Human Health.

EIAR Appendices: (included at the end of this Chapter)

Appendix 17.3: Methodology for the evaluation of Population & Human Health

EIAR 17.2 POPULATION & HUMAN HEALTH PART 1: SCOPING FOR SENSITIVE ASPECTS OF POPULATION & HUMAN HEALTH

The assessment of significant effects (or impacts) is an essential concept of the EIA Directive, and the primary objective of this EIA Report is to identify and evaluate the significant effects of the Project. Scoping has been carried out in accordance with the *Guidance on Scoping* (EC 2017) in order to focus the consideration of the impacts the Ballynalacken Windfarm Project may have on the environment to those which are significant or important enough to merit assessment, review and decision-making.

Scoping for the Environmental Topic – Population & Human Health has been carried out by the chapter authors, throughout the preparation of this Chapter, and includes scoping for the sensitive aspects of Population & Human Health (this Section EIAR 17.2), and later in this Chapter - scoping of impacts (see Section EIAR 17.3).

EIAR 17.2.1 Introduction to Scoping for Sensitive Aspects of Population & Human Health

The purpose of the scoping exercise, which comprises this Section EIAR 17.2, is to identify the relevant Sensitive Aspects (receptors) of Population & Human Health. In order to identify the relevant Sensitive Aspects, the scoping exercise is carried out as follows:

1. An examination is carried out, in Section EIAR 17.2.2, of the potential sources of impacts resulting from the Project and the pathways for Impacts which link the sources of impacts to the receptors (Sensitive Aspects) of the impacts;

2. The zone of influence of the Project, within which the impacts of the Project could occur, is set out, with justification for same. The zone of influence is also called the 'Study Area' herein. The zones of influence are set out in Section EIAR 17.2.3 for the various Sensitive Aspects which occur in the environment.

3. A scoping examination of Sensitive Aspects which occur within the Study Area(s) is carried out in Section EIAR 17.2.4. The scoping examination results in a Sensitive Aspect being either scoped-in for detailed evaluation in **Part 2: Sensitive Aspect Evaluation Section (i.e. Section EIAR 17.3)** of this chapter or scoped-out from further consideration, the rationale for scoping out is provided in Section EIAR 17.2.4.

EIAR 17.2.2 Scoping for Sensitive Aspects of Human Health

The Human Health part of the evaluation in this Topic chapter examines the results of several inter-related topic assessments. The impacts identified in the other EIA assessments are used as the basis for this Human Health source-pathway-receptor evaluation.

Sensitive Aspects and Impacts which are scoped out in the inter-related topic assessments (because, either there is an absence of an impact pathway or the potential impact rating is considered to be no greater than Neutral/Imperceptible), are also scoped out for assessment in this risk to Human Health evaluation.

EIAR 17.2.3 Identification of the Sources, Pathways and Receptors of Impacts

The evaluations within the EIAR identify potential impact sources and pathways between the Project and receptors (Sensitive Aspects) of the environment.

EIAR 17.2.3.1 Identification of Impact Sources

The 'source' is an origin of an impact and is associated with the Project. In order to identify the potential 'sources' of impact, the characteristics of the Ballynalacken Windfarm Project, i.e. the size and design, works, activities, use of materials and natural resources, and the emissions and wastes, associated with the construction, operation and decommissioning of the Project, as described in Chapter 5 of this EIA Report, have been examined, and it is considered that the following Project characteristics have potential to act as a 'source' of impact to the sensitive aspects of Population & Human Health:

Construction Stage Sources of Impact

- Construction contracts; purchasing of materials and services
- Construction Works and Activities
- Construction Traffic

Operational Stage Sources of Impact

- Landowner payments
- Community Benefit Fund
- Kilkenny County Council Commercial Rates
- Operating turbines,
- Operating substation and electrical equipment
- Climate Action

Decommissioning Stage Sources of Impact

- Works and activities to dismantle and remove turbines and to reinstate the windfarm site
- Traffic

EIAR 17.2.3.2 Identification of Impact Pathways

The 'pathway' is the means by which an impact can reach and affect a receptor. The characteristics of the baseline environment have been examined and it is considered that the following pathways could form a link between the Project (sources of impact) and the Sensitive Aspects (receptors):

- Financial transactions
- Roads
- Air
- Visibility

EIAR 17.2.3.3 Identification of Receptors

Any receptor in the environment which could be affected by a development is referred to as a 'Sensitive Aspect' in this EIA Report. The following Sensitive Aspects are relevant to the receiving environment and are subject to scoping in Section EIAR 17.2.3:

- Local Residents and Community
- Local Economy
- Tourism
- National Economy

The zone of influence in relation to these Sensitive Aspects is examined in Section EIAR 17.2.3 below, with a scoping exercise for each of the Sensitive Aspects presented in Section EIAR 17.2.4.

EIAR 17.2.4 Scoping of the Study Areas (Zone of Influence of the Project)

The scoping and evaluation focuses on the area or zone of influence around the Ballynalacken Windfarm Project within which the impacts of the Project could occur. This area/zone is referred to as the Study Area. The Study Areas for the Sensitive Aspects of the Population & Human Health environment are set out in the table below.

Table 17-2: Study Area of the Project in relation to sensitive aspects of the Population & Human Health environment

Sensitive Aspect	Ballynalacken Windfarm Project Zone of Influence/Study Area	Justification
Local Community Health & Wellbeing	**Water Supply** Groundwater abstractions 500m of construction works.	*– based on Chapter 8 study areas*
	Air Quality & EMF Air Quality - Construction Dust: Dwellings, community facilities and local walking routes within: o 250m from construction works areas; o 50m from those sections of public roads used by construction site vehicles transporting overburden or borrow pit rock within the windfarm site; o 50m from public roads used by construction vehicles or delivery vehicles, for the first 250m of the public roads from the Project site exit points. **Air Quality** - Ambient Air Quality & Construction Traffic Emissions: sensitive receptors (dwellings, schools, hospitals, community facilities etc.) within 200m of roads which will experience a significant change in traffic levels. **EMF:** Dwellings and community facilities within 100m of turbines, windfarm substation and underground cabling.	*– based on Chapter 9 study areas*
	Noise Noise Sensitive Locations (houses) within 2km of a proposed turbine and 500m from the proposed Tinnalintan Substation and located along roads subject to works.	*– based on Chapter 10*
	Shadow Flicker Sensitive Receptors (houses) within 1.5km of a proposed turbine.	*– based on Chapter 11*
	Climate Irish State.	*– based on Chapter 12*

	Visual Impacts 20km from the outermost turbines of the scheme.	*– based on Chapter 14*
National Economy	The Irish State	Includes GDP and Balance of Payments in the National Economy
Local Economy	Electoral Divisions (EDs): Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill	Includes EDs within which the development is located and surrounding urban areas containing local businesses and local labour force that could potentially be impacted by the Ballynalacken Windfarm Project.
Tourism	Electoral Divisions (EDs): Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill	Includes EDs within which the development is located. It is considered that tourism products within this Study Area have the greatest potential for impact from the Ballynalacken Windfarm Project. The Study Area also includes amenity sites in the wider area which are important tourism destinations.

EIAR 17.2.5 Scoping of Sensitive Aspects

Any receptor in the local environment which could be affected by a development is a Sensitive Aspect. The various sensitive aspects of the Population & Human Health environment are scoped in the table below for potential to be affected by the Ballynalacken Windfarm Project. The scoping examination results in a Sensitive Aspect being either scoped-in for detailed evaluation in **Part 2: Sensitive Aspect Evaluation Section (i.e. Section EIAR 17.3)** of this chapter or scoped-out from further consideration in line with the criteria described above at Section EIAR 17.2.1.

Table 17-3: Scoping of Sensitive Aspects

Sensitive Aspect	Is there a Pathway between the Project and the Sensitive Aspect?	Likely (or have potential) to be Significant?	Scope In/ Out	Scoping Result & Rationale *(scoped out only)*
Local Community Health & Wellbeing	Yes	Not significant – but of importance	Scope In	See Section EIAR 17.3.1 Part 2 Evaluation Note: Sensitive Aspects or impacts which are scoped out in the inter-related topic assessments (because, either there is an absence of an impact pathway or the potential impact rating is considered to be no greater than Neutral/Imperceptible), are also scoped out for assessment in this risk to Human Health evaluation.
National Economy	Yes	No	Scope Out	Scoped Out: The national economy relates to economic activity and employment over the territory of the entire State. In 2022, the Gross National Product (GNP) for Ireland amounted to €363 billion[1]. The financial transactions (positive) associated with the Ballynalacken Windfarm Project will represent 0.03% of the national economy. The positive impact will be neutral due to the very small scale of financial transactions in the context of the size of the national economy. The generation of renewable electricity will also result in the avoidance of some of the EU climate fines for Ireland, which is at risk of failing to meet it's 2030 climate action target. However, the contribution of the Ballynalacken Windfarm to the avoidance of this fine, while Positive, will not be noticeable in the context of the size of the national economy.
Local Road Users	Yes	No	Scope Out	Scoped Out: Addressed in Chapter 16: Material Assets
Local Economy	Yes	Not significant - but of importance	Scope In	See Section EIAR 17.3.2 Part 2 Evaluation
Tourism	Yes	Not significant – but of importance	Scope In	See Section EIAR 17.3.2 Part 2 Evaluation

[1] https://www.cso.ie/en/releasesandpublications/ep/p-ana/annualnationalaccounts2022/gdpandgrowthrates/

EIAR 17.3 POPULATION & HUMAN HEALTH PART 2: EVALUATION SECTION

This Evaluation Section examines the scoped-in Sensitive Aspects in greater detail, and comprises a baseline description and impact evaluation for each of the Sensitive Aspects, presented in the following order:

Section EIAR 17.3.1: Local Community Health & Wellbeing

Section EIAR 17.3.2: Local Economy & Tourism

EIAR 17.3.1 SENSITIVE ASPECT: LOCAL COMMUNITY HEALTH & WELLBEING

This detailed evaluation section for Local Community Health & Wellbeing is presented as follows:

- Section EIAR 17.3.1.1 – description of the baseline environment of the inter-related topics as identified in Section EIAR 17.2.4;
- Section EIAR 17.3.1.2 – evaluation of human health effects associated with changes in the determinants of health, which are outlined by the relevant inter-related topics; and
- Section EIAR 17.3.1.3 – evaluation of cumulative impacts.

EIAR 17.3.1.1 Baseline Environment - Local Community Health & Wellbeing

The context, characteristics, importance and sensitivity of the relevant topics are described in the subsections below. The trends and Do-Nothing scenario for these topics are also considered.

EIAR 17.3.1.1.1 Context and Characteristics of the Local Area

The proposed Ballynalacken Windfarm Project is located entirely within County Kilkenny equidistant between the Kilkenny towns of Ballyragget and Castlecomer. The area of the proposed development is predominantly rural and as such, there are not significant numbers of residential dwellings or community facilities in close proximity to the windfarm site. Agriculture is the predominant land use in the vicinity of the site along with commercial forestry.

The towns of Castlecomer and Ballyragget are located 4.3 km and 4.2 km to the west and east of the site respectively. In neighbouring County Laois, the village of Ballinakill is c.3.3km to the north of the turbines, while the small town of Durrow is c.6.8km to the northwest.

Residential dwellings, businesses and community facilities are concentrated in higher densities in Castlecomer and Ballyragget towns, which are the 4th largest and 8th largest towns in County Kilkenny, and in Durrow, County Laois. Residential dwellings, community facilities and business are also clustered in the villages of Ballyouskill, Attanagh and Ballinakill. Once-off residential properties are primarily located in ribbon style development along the local road network.

Local schools include primary schools in Ballinakill and Skehana and in the larger surrounding towns of Ballyragget, Castlecomer and Durrow. Post-primary schools are located in Heywood, Durrow, Ballyragget and Castlecomer.

The road network around the Project site comprises national, regional and local roads. The N77 links Kilkenny City to Portlaoise, and passes through the towns of Ballyragget and Durrow. The N78 links the N77 north of Kilkenny City to Athy in County Kildare and passes through the town of Castlecomer. Regional roads in the local area comprise the R694 which links Castlecomer to Freshford and passes through the town of Ballyragget, and the R432 which links Ballyragget to Abbeyleix and passes through the village of Ballinakill.

The main interaction posed by the project within Castlecomer Town is the transportation of turbine components through the town via the N78 and R694, and the transport of construction materials along the same route. The main interaction posed by the project within Ballyragget Town is the delivery of construction

materials through the town via the N77 onto either the R694 (to the windfarm) or the R432 (to the Tinnalintan/Moatpark area).

While amenities at the windfarm site location are limited to the use by a small number of walkers of Cromwell's Road (north of Ballymartin Crossroads), there are amenity and heritage locations within the wider community area - a section of the North Kilkenny Cycle Route passes along a local road connecting the settlements of Castlecomer and Ballyragget and is located c.1.2km south of the site at its nearest point. Several looped woodland walking trails are also located within Castlecomer Discovery Park and also around the town of Durrow.

The surrounding area also encompasses several cultural heritage features, which include churches, graveyards, castle remnants and stately demesne. One of the most notable is Heywood Gardens, an 18th Century demesne landscape comprising gardens, lakes, woodland and architectural features. Heywood Gardens, located north of the Laois – Kilkenny boarder, some 3.8km north of the site.

Cromwell's Road and the upland area of the windfarm site also provides scenic views over the River Nore valley below.

See Figure 17.1: Communities around the Ballynalacken Windfarm Project Site.

EIAR 17.3.1.1.2 Context of Local Environment in relation to Cross Factor Human Health Effects

EIAR 17.3.1.1.2.1 Local Water Supply (Chapter 8)

Chapter 8: Water evaluates the impacts of the construction of the Ballynalacken Windfarm Project on Water Supply. The baseline environment for Water Supply can be summarised as follows;

Surface Water Abstractions: The proposed Project is located upstream of three Public Water Supply abstraction points at Castlecomer, Ballyragget and Troysgate in County Kilkenny.

Groundwater Abstractions: In Chapter 8: Water the groundwater flow paths at the proposed Project site are considered to be short (~300m). The key development components of the Project from a local well perspective is, the turbine foundation locations and borrow pits, which require the deepest excavations within bedrock. There are no Uisce Éireann wells or Group Water Scheme wells located within 500m of wind turbines or of windfarm borrow pits. There are 10 no. private wells identified within 500m of wind turbines or borrow pits, 9 no. of which are used to supply water to livestock. The remaining well is used as residential drinking water but is located upslope of both the wind turbines and the borrow pits and unlikely to be affected.

In Chapter 8: Water, the impact of the construction of the Project, on the quality of the local Water Supply is assessed as no greater than Imperceptible. However, the quality of the Water Supply is of concern locally and therefore the secondary impact on local population health is examined further in this chapter.

EIAR 17.3.1.1.2.2 Local Air Quality & EMF (Chapter9)

Chapter 9: Air Quality & EMF evaluates the impacts on the local population of dust from the construction phase of the Project and Electromagnetic Field (EMF) emissions effects during the operational phase. The baseline environment for Air Quality and EMF levels can be summarised as follows;

Air Quality: In terms of air monitoring and assessment, the proposed development site is within Zone D, which represents rural Ireland (EPA, 2023). There is a generally good level of air quality in the area of the proposed development. Concentrations of nitrogen dioxide and dust are all predicted to be significantly below the ambient air quality standards.

There are 41 residential properties within 250m from construction works areas; within 50m from public roads used by construction site vehicles and; within 50m from public roads used by construction vehicles or delivery vehicles, for the first 250m of the public roads from the Project site exit points.

EMF: There are existing sources of EMF in the local environment – from overhead electricity and telephones wires, and from electrical equipment in all local houses, community facilities and businesses. A 100m study area was used to evaluate EMF from the wind turbines, underground cables, electrical buildings or the substation. There are no local houses or community facilities within 100m of any of the Ballynalacken Wind Turbines, Internal Windfarm Cablings, the Windfarm Control Building, Tinnalintan Substation or the met mast. There are 9 no. local residences within 100m of the Cable Link to Tinnalintan Substation (the closest being 53m to the south), and 14 no. local residences within 100m of the Grid Connection cable route (the closest being 10m away along the R432).

See Figure 17.2: Local Population and Community

In Chapter 9: Air Quality & EMF, the impact of construction dust on the local population is assessed as Imperceptible (post-mitigation) and the impact on the local population of EMF is assessed as Imperceptible. However these issues are of concern locally and therefore the secondary impact on local population health is examined further in this chapter.

EIAR 17.3.1.1.2.3 Noise and Vibration Considerations

Chapter 10: Noise and Vibration evaluates the noise and vibration impacts as a result of the proposed development at 159 no. Noise Sensitive Locations (NSL - Houses) within 2km of a proposed turbine and 500m from the proposed Tinnalintan Substation. The evaluation includes Construction, Operation and Decommissioning Phases of the development.

By way of summary:

- 54 No. NSLs are within 1km of a proposed turbine
- 50 No. NSLs between 1km and 1.5km of a proposed turbine
- 55 No. NSLs between 1.5km and 2km of a proposed turbine
- 10 No. NSLs within 500m of the proposed Tinnalintan Substation

The operational phase Noise and Vibration impact of the Project is assessed in Chapter 10: Noise and Vibration as Not Significant because the operation of modern turbines can be controlled, so as not to exceed any noise limits imposed by condition of planning grant. However there will be an increase in ambient noise locally and therefore the secondary effects on local population health is examined further in this chapter.

EIAR 17.3.1.1.2.4 Shadow Flicker Considerations

Chapter 11: Shadow Flicker evaluates the impact of the operating turbines at 72 no. local residences within 1170m of a proposed turbine, based on ten-times the proposed rotor diameter of 117m.

The operational phase Shadow Flicker impacts are assessed in Chapter 11: Shadow Flicker as Not Significant because the operation of modern turbines will be controlled so as not to exceed any shadow flicker limits imposed by condition of planning grant. While this is the case, due to stakeholder concerns regarding the health risk of shadow flicker on sensitive individuals, the secondary effects on local population health is examined further in this chapter.

EIAR 17.3.1.1.2.5 Climate Action

Chapter 12: Climate evaluates the contribution the project will have in the context of the Climate Action and Low Carbon Development (Amendment) Act 2021 (the Act) and the Climate Action Plan 2024 (CAP24).

It is assessed in Chapter 12: Climate that the energy production from the Project will have a Long-Term Significant Positive impact on the Irish State's efforts on climate action as committed to in the Act and in subsequent CAPs. Seventy-nine percent of Irish people surveyed by the EPA in 2023, say climate change should be either a "very high" or "high" priority for Government, with high overall support for a range of climate action policies (EPA, Feb 2024).

In this context, the secondary impact on local population health of Climate Action is examined further in this chapter.

EIAR 17.3.1.1.2.6 Local Views and Amenities

Chapter 14: Landscape evaluates the impact of the development on landscape character within 20km of the windfarm site, with particular focus on effects on receptors within 5km of the site. The evaluation considers views from local and regional roads, centres of population, designated scenic views and views from amenity areas. The views from within 5km of the nearest turbine are generally the most sensitive because they are likely to be more dominant within a local landscape context.

It is assessed in Chapter 14: Landscape that the impact on the perception of the landscape from within 5km of the Project will have an impact ranging between Moderate/Slight to Substantial/Moderate depending on proximity, viewing angle and topography.

The population health implications of the addition of turbines into the local landscape is included in this chapter. Both a negative perception - framed as the imposition of large infrastructure locally and/or a positive perception - visible generation of renewable energy and thus contribution to climate action, are evaluated for secondary effects on population health.

EIAR 17.3.1.1.3 Public Consultation on Climate Change/Climate Action Surveys

EIAR 17.3.1.1.3.1 2024 EPA Survey – Climate Change in the Irish Mind

In February 2024 the Environmental Protection Agency (EPA) published the results of the EPA's survey - Climate Change in the Irish Mind Wave 2[2] which showed that:

- Consistent with the previous study, findings show widespread agreement on many climate change attitudes and strong majority support for climate action.
- 81 percent of people in Ireland are worried about climate change and 75 percent think extreme weather poses a moderate or high risk to their community over the next 10 years, with increases in worry in relation to severe storms (74 percent) and extreme heat (54 percent).
- 89 percent report that climate change is important to them personally and 79 percent say climate change should be either a "very high" or "high" priority for Government, with high overall support for a range of climate action policies.
- Irish people think that climate action will increase economic growth and create jobs (56 percent), and actions to reduce climate change will improve quality of life in Ireland (74 percent).

[2] https://www.epa.ie/publications/monitoring--assessment/climate-change/Climate-Change-in-the-Irish-Mind-Wave-2-Report-1.pdf

EIAR 17.3.1.1.3.2 2023 Laois County Council Consultation for the Local Authority Climate Action Pan

In 2023, Turley Consulting ran a combined consultation exercise, designed to inform Laois County Council's CLLD Strategy, Local Economic and Community Plan and Local Authority Climate Action Plan (LACAP) during May 2023. Online surveys, stakeholder workshops and one-to-one engagement, and community workshops were undertaken. The main findings are listed below:

- the majority (74%) of respondents across the county as a whole were very concerned about climate change
- When asked what outcomes they would like to see as a result of the LACAP, all in groups with the exception of older people were most likely to call for support for the energy transition and energy efficiency, including support for businesses and domestic properties to install new measures for energy efficiency and renewable generation.
- Only our 'older people' in-group bucked this trend, with respondents in this group being most likely to call for a reduction in pollution of the air and watercourses
- survey found that the people of Laois are genuinely quite pessimistic about existing levels of support for climate goals
- When asked to describe the projects they would like to see to protect our planet, combat the effects of climate change and support sustainable development,
- The most popular theme among all our in-groups with the exception of older people, related to actions to support the energy transition and energy efficiency, particularly retrofit, renewables generation and transport electrification.
- Similarly, ideas relating to biodiversity and nature were very popular throughout, in particular habitat regeneration and reforestation with native trees
- By contrast, older people appeared to be most concerned with facilitating transport modal shift away from private cars.

for the Laois Climate Action Plan 2024 – 2029, found that 'A similar proportion of those responding (XX%) within this group also called for support for energy efficiency and to move towards greater reliance on renewable energy. Included among these comments are a number of individuals who called for greater investment in EV charging infrastructure".

It can be assumed that these sentiments are reflected in the local population also.

EIAR 17.3.1.1.4 Existing Sources of Impacts to Local Community Health & Wellbeing

The occurrence of existing environmental impacts in the areas on or around the location of the proposal have also been considered. There is no existing degrading of water supply, construction dust, operating turbine noise or shadow flicker or the presence of turbines in the immediate locality.

EIAR 17.3.1.1.5 Importance of Local Community health and wellbeing & Sensitivity to Change

Importance: In the absence of good physical, mental and social health and wellbeing, individuals and communities become limited in achieving their full potential. Therefore population health is of High importance.

Sensitivity to Change: Individuals are considered more sensitive if there is an existing burden of poor health within an area, or there is a dominantly older or younger demographic.

The age structure presented in Appendix 17.1 shows that the local population is generally of a similar demographic to the national average although there is a lower proportion of people aged 25-44 and a higher proportion of people aged 45+ than the national average.

In addition, the human health baseline presented in Appendix 17.2 shows that the local population have comparable physical health to the national average. Regarding mental health, levels of depression in the South East are comparable to the national average and in recent years, suicide rate is lower than the national average. Lifestyle and behaviour data shows lower levels of alcohol consumption and less obesity.

Overall, this suggests that the community surrounding the Ballynalacken Project is not more sensitive to environmental and socio-economic changes than the average population in Ireland. With reference to Table 2 in Appendix 17.3, for the purposes of the human health assessment, the sensitivity of the population is considered to be "Low".

EIAR Appendices: (included at the end of this Chapter)

Appendix 17.2: Human Health Baseline Data

EIAR 17.3.1.1.6 Evolution of the Baseline Environment (the 'Do-Nothing' scenario)

There will be no change to the baseline environment should the proposal not be constructed. There is planning already granted for a windfarm to the north east of the proposal (Pinewood Windfarm) and this windfarm can be expected to be constructed and operated in the medium term.

It is expected that Climate Change will continue to cause a worry to the majority of the population and increased demands to Government for Climate Action will be a continuing trend.

EIAR 17.3.1.2 Impact Evaluation – Local Community Health & Wellbeing

This Section comprises an evaluation of the likely significant impacts of the proposed Ballynalacken Windfarm Project on the receiving environment. Moderate, Slight, Imperceptible and Neutral Impacts are also taken into consideration.

The impacts are presented/evaluated as follows:

a) Significant Impacts which are likely or have potential to occur, are subject to detailed evaluation;

b) Moderate or Slight Impacts, which are likely or have potential to occur, are subject to detailed evaluation;

c) Non-significant impacts of local concern or considered important enough to merit detailed evaluation;

d) Neutral or Imperceptible Impacts are scoped out from detailed evaluation, and a short evaluation is provided in the table below. Unlikely Impacts are also scoped out.

Table 17-4: Impacts to Local Community Health & Wellbeing

Likely/Potential Impact	**Evaluation**
Non-significant impacts considered important enough (or of local concern) – see detailed evaluation	
Construction Phase: Secondary Impact of Water Supply Impacts on Health & Wellbeing	Neutral Impact – see Section EIAR 17.3.1.2.1
Construction Phase: Secondary Impact of Air Quality Impacts on Health & Wellbeing	Neutral Impact – see Section EIAR 17.3.1.2.2
Operational Phase: Secondary Impact of EMF Impacts on Health & Wellbeing	Neutral Impact – see Section EIAR 17.3.1.2.3
Construction & Operational Phase: Secondary Impact of Noise Impacts on Health & Wellbeing	Not Significant – see Section EIAR 17.3.1.2.4
Operational Phase: Secondary Impact of Shadow Flicker Impacts on Health & Wellbeing	Neutral Impact – see Section EIAR 17.3.1.2.5
Operational Phase: Secondary Impact of Landscape and visual Impacts on Health & Wellbeing	Neutral Impact – see Section EIAR 17.3.1.2.6
Operational Phase: Secondary Impact of Climate Impacts on Health & Wellbeing	Not Significant (positive) – see Section EIAR 17.3.1.2.7
Neutral or Imperceptible Impacts, or where no impact is likely to occur – evaluation below	
Construction and Operational Phases: Vulnerability of the Project to Major Accidents	No Likely Impact: As per EIAR Section 5.11: Vulnerability to Major Accidents, Natural Disasters and Climate Change: There are no Seveso sites in proximity to the Ballynalacken Windfarm Project, the nearest being Grassland Fertilizers on the outskirts of Kilkenny City, which is c.16km from the windfarm site, and therefore it is considered that the Ballynalacken Windfarm Project **is not vulnerable to Major Accidents** due to separation distances from Seveso sites. Furthermore, the Ballynalacken Windfarm Project itself will not cause a Major Accident from the use of Dangerous Substances during construction and operation, because of the minimal volumes of such substances which will be used on site - limited to petrol and diesel used by vehicles; oils and grease/lubricants required by the wind turbines and at the substations during operation; and very small amounts of SF6 gas which will be used for the switch gear inside the Tinnalintan Substation and at the existing EirGrid Ballyragget Substation during operation.

Construction and Operational Phases: Vulnerability of the Project to Natural Disaster – flooding, extreme winds or temperatures, wildfires, landslip	No Likely Impact: As per EIAR Section 5.11: Vulnerability to Major Accidents, Natural Disasters and Climate Change: When the likelihood and the consequence of a potential flooding or land slippage disaster occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined. In relation to on-site personnel, other people living and working in the locality, and downstream water quality, an extreme weather, flooding or land slippage event would be classed a '**normal emergency**' - based on a likelihood rating of *Extremely Unlikely* and a consequence rating of *Minor/Limited*. In relation to unrelated disasters in the locality: Should a disaster occur, unrelated to the Project and not affecting the Project, but occurring within in the locality – the use of weather forecasting, and the monitoring of the construction works by the Environmental Clerk of Works, monitoring of the operating windfarm by the Operations Manager, provision of point of contact details to key stakeholders, and the ability to control the operational turbines and substations remotely, will ensure that the Project will not make the consequences of the unrelated event worse.
Operational Phase: Ice throw from turbine blades	Neutral: Under certain weather conditions, ice, white frost or snow can build up on the rotor blades of turbines. This usually happens when there is high air humidity, rain, or snow while temperatures are around zero degrees Celsius. Ice formation occurs when water droplets freeze on the blade surface. White frost build-up occurs when the moisture particles in the air are already frozen; the rotor blades pick up these particles which then adhere to the blade surface. Ice and white frost build-up can reduce a turbine's efficiency and increase the strain on the material, particularly due to imbalance. In addition, ice deposits may represent a hazard to people in the vicinity of the turbine when they begin to melt and drop away.Ice build-up most frequently occurs at temperatures between – 1˚C and -4 ˚C. It does not usually occur at temperatures above + 10˚C and below - 7˚C. The available air humidity is too low at temperatures below - 7˚C. The presence of ice can be detected by the turbine control system and remedial action would be taken depending on the specific site requirements. Ice detector systems use sensors on top of the tower and/or at the base to measure the outside temperature and then to determine the presence of icy conditions. Then, because the presence of ice reduces the efficiency of the blades and thus the power output, the turbine control system can be set to detect a drop in production in conjunction with suitable icing conditions. Limit values of the control system can be set within defined parameters to further optimise the responsiveness of the ice detection system. The control system can be set to shut down the affected turbines within a narrow tolerance range i.e., before the thickness of the ice layer becomes a hazard to the dynamic loading of the rotor blade. The time required to de-ice the blades is then calculated based on the outside temperature. During this period, the turbine does not start up automatically. When the ice has melted and before manual start up, a visual inspection of the blades can be carried out to check that any ice that formed has fallen directly and safely to the ground. Ice detection systems will be deployed at Ballynalacken Windfarm, which will protect windfarm personnel, local landowners and the general public from any hazard of ice throw.
Construction Phase: Risk of, turbine/blade collapse, substation	Imperceptible During operation, under normal circumstances, there is no danger to people or animals on a wind farm site. There will be no fences around the turbines and the farm boundary fences and gateways will be maintained. Access to the turbines is gained through a door at the base of the tower. This will be locked at all times when unattended. The substation compound will also be securely locked and fenced. The components of a wind turbine are designed to last 25 years and are equipped with a number of safety devices to ensure safe operation during their lifetime. Modern turbines have two independent fail-safe mechanisms to stop the turbine. The aerodynamic breaking system is the main braking system, with mechanical brakes as a backup system. This is additional to the yawing and blade pitch mechanisms, which protect the blades from very strong winds by turning and allowing the wind to flow over the blades with least resistance. At the design stage the blades are tested statically by applying weight to

	bend the blades and dynamically by testing the blades ability to withstand fatigue from repeated bending (more than 5 million times). The rigorous safety checks imposed on the turbines during design, construction and commissioning should ensure that the risks to humans will be negligible. The health and safety record of the wind industry internationally is exceptionally good. The operation of a wind farm has practically no potential for severe accidents to the general public. Regular safety audits of control measures in place on the site will be conducted during the operational phase to ensure that these control measures are effective at reducing risk to persons and property.

EIAR 17.3.1.2.1 Secondary Impact of Water Supply Impacts on Health & Wellbeing

The impacts during construction on Surface Water Abstractions (public supply) in the area is assessed in Chapter 8; Section EIAR 8.3.3.2. There are 3 No. abstraction points at Troyswood Kilkenny, Ballyragget and Castlecomer. The impact is assessed as Neutral at all 3 No. abstraction points, due to the separation distance between the main windfarm construction works areas and these abstraction points.

The impacts during construction on Ground Water Abstractions (private wells) in the area is assessed in Chapter 8; Section EIAR 8.3.3.2.1. The residual impact on groundwater during construction (post-mitigation) is assessed as Neutral, due to the geological/hydrogeological setting and proven mitigation measures and effective best practice measures which will avoid and minimise the risk of contaminant release.

On the basis that any potential impact on surface water abstractions (public supply) and ground water abstractions (private wells) is considered to be imperceptible, it is assessed that the secondary impact on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

EIAR 17.3.1.2.2 Secondary Impact of Air Quality Impacts on Health & Wellbeing

The impacts on air quality locally of construction dust and NO_x are assessed in Chapter 9; Section EIAR 9.3.1.

Dust: An increase in airborne dust can cause dust soiling effects to property and has the potential to impact the wellbeing of local residents through annoyance. However, as stated in Chapter 9, following the implementation of relevant mitigation measures (described in full in Chapter 19: Mitigation and Monitoring Arrangements of this EIA Report), the Residual Impact Significance from the increase in airborne dust is assessed as being Short-term, localised, negative and imperceptible.

On the basis that the generation of dust emissions would be managed at the source to mitigate the residual impact, it is assessed that the secondary impact on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

NO_X: The production of clean renewable energy as a result of the proposed development will result in NO_X emissions savings by decreasing the amount of power produced by burning fossil fuels and subsequent air emissions. The proposed windfarm development will result in an estimated saving of 57.2 tonnes NO_X per annum. This is equivalent to 0.14% of the 2020 – 2029 NO_X national emission ceiling set out under EU Directive 2016/2284. Over the predicted 35-year lifespan of the development this will equate to a total of 2,002 tonnes NO_X savings. This will have a long-term, slight, positive impact to air quality.

While the operational impact on air quality would be positive, the benefits are diffuse across the region/Ireland and do not directly or materially improve local air quality. As a result, it is assessed that the secondary impact on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

EIAR 17.3.1.2.3 Secondary Impact of EMF Impacts on Health & Wellbeing

Electromagnetic Fields: The proposed windfarm comprises a 110kV underground grid connection, 3.86km in length, which will be transmitted from the Windfarm Control Building to a new 110kV substation to be built at Tinnalintan townland.

Public exposure guidelines are provided by ICNIRP, whereby the reference level for electric and magnetic fields is 5000V/m and 100µT, respectively, and are set to be protective of human health.

While not an Irish entity, the former UK Department of Energy and Climate Change (DECC) published a voluntary Code of Practice (CoP) titled “Power Lines: Demonstrating compliance with EMF public exposure guidelines” which details the recommended approach for demonstrating compliance with adopted public

exposure guidelines. The CoP states that compliance with the public exposure guidelines is assumed for transmission infrastructure operated at 132 kV or less, without the need for more detailed assessment.

While this is the case, EMF modelling has been undertaken in Chapter 9: Air Quality and EMF. In summary, the worst case magnetic field from any part of the proposed windfarm at the closest house (Grid Connection, 10m distance) will be 0.099µT. There would be no measurable electric fields emitted above ground level on the basis that the cable sheath and fill material above the cables shields the electric field. In the context of the ICNIRP 1998 EMF public exposure guidelines for electric fields (5000V/m) and magnetic fields (100µT), the increase associated with the proposed development is Imperceptible.

On the basis that EMF levels would remain substantially within public exposure guidelines which are set to protect human health, it is assessed that the secondary impact on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

EIAR 17.3.1.2.4 Secondary Impact of Noise Impacts on Health & Wellbeing

Noise from Construction or Decommissioning Works; The application of standard construction techniques including binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that construction noise is kept to a minimum. Given the distances between the main construction works and nearby NSLs, and considering the temporary nature of the construction phase, construction related noise and vibration sources are not considered to be excessively intrusive; in all instances, the predicted noise levels at the nearest NSLs do not exceed the relevant construction noise criteria (65 dB $L_{Aeq,1hr}$ during daytime periods), which is set to be protective of the environment and human health. It is assessed that the secondary impact on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

Noise from Operating Turbines: Increases in noise have the potential to cause annoyance (during daytime periods) and sleep disturbance (during night time periods). Operational noise limits defined in Chapter 10: Noise and Vibration have been set in the context of the quiet baseline environment and are protective of the environment and human health.

The operation of the proposed windfarm will change the sound profile in the locality for proximate houses. These houses are identified as Noise Sensitive Locations (NSLs) in Chapter 10: Noise and Vibration. There are;

- 54 No. NSLs are within 1km of a proposed turbine
- 50 No. NSLs between 1km and 1.5km of a proposed turbine
- 55 No. NSLs between 1.5km and 2km of a proposed turbine
- 10 No. NSLs within 500m of the proposed Tinnalintan Substation

However, in summary the noise from the operating Ballynalacken Windfarm turbines and operating substation is assessed as Not Significant because noise can be controlled on modern turbines to within permitted levels, which are set to be protective of the environment and human health – including those who are most sensitive to noise.

To further assess the secondary impact of the change in the sound profile, a literature review was conducted into the effects of noise from operating wind turbines, including from amplitude modulation (AM) and infrasound.

Relating to wind turbine noise generally, several national studies have been undertaken to investigate potential health impacts, the results of which have informed position statements on the matter. Specifically, both the National Health and Medical Research Council (NHMRC) in Australia (NHMRC, 2015) and Health Canada (Health Canada, 2014) both concluded that there is no consistent evidence that exposure to wind turbine noise causes adverse human health effects.

AM is the variation in the noise produced by wind turbines as their blades rotate. While it has been found that AM increases annoyance when present and strong AM can adversely affect deep sleep (Maijala et al., 2021; Morsing et al., 2018), van Kamp & van den Berg (2017) concluded that annoyance increased with modulation frequency, with an expected highest sensitivity for modulated sounds at 4 Hz. However, it was also found that large, modern wind turbines (2 MW or more) do not reach this frequency and instead modulate their sound at a frequency close to 1 Hz. As Ballynalacken Windfarm would consist of 12 turbines with a total capacity of c.52 MW, or an individual capacity of 4.3 MW per turbine, it is unlikely that operation of Ballynalacken Windfarm would cause levels of AM that are associated with high levels of annoyance or sleep disturbance.

Infrasound is a range of sound that is below 20 Hz and is often inaudible to humans. With respect to this, the WHO (WHO, 1995; van Kempen, Casas, Pershagen, & Foraster, 2018), UK Health Protection Agency (HPA, 2010) and Australian Medical Association (Australian Medical Association, 2014), all concluding that there is no evidence to suggest that exposure to infrasound below the hearing threshold levels is capable of causing adverse health effects.

Several academic studies have also looked into the effects of simulated wind turbine infrasound and sham infrasound (speakers being present but not generating infrasound) on physical symptoms, annoyance levels and sleep quality. These studies all report the same findings: that no differences in reported symptoms were observed between groups exposed to real infrasound and those exposed to sham infrasound (McCunney *et al*., 2014; Maijala *et al*., 2021; Marshall *et al*., 2023).

Specific health outcomes of concern associated with changes in noise exposure raised during public consultation include tinnitus, cancer, dementia and effects on people with autism.

It has been suggested that tinnitus (in addition to other symptoms such as vertigo, migraines and sleep deprivation) are caused by exposure to infrasound and low frequency noise produced by wind turbines, and is a core symptoms of what is known as 'wind turbine syndrome', a term originally coined by Pierpont which relates to an alleged medical condition experienced by some people who live in proximity to wind turbines. However, wind turbine syndrome remains unproven and there is no clear or consistent evidence of such effects (McCunney, et al., 2014), and has not found general acceptance within the scientific community (Farboud, Crunkhorn, & Trinidade, 2013), where symptoms can be attributed to annoyance and stress associated with adverse perceptions of wind turbines (Chapman, St George, & Waller, 2013). As such, until this effect is fully understood, it is impossible to conclude that wind turbine noise does not cause any of the symptoms described (Farboud, Crunkhorn, & Trinidade, 2013).

In relation to cancer and dementia, a systematic review was commissioned by Defra to consider how the evidence base has changed following the reviews undertaken to inform the WHO Environmental Noise Guidelines (published in 2019) (Clark, Crumpler, & Notley, 2020). In relation to cancer, most studies examined road traffic noise, and some studies also considered railway noise or aircraft noise. No studies were available to examine the impacts of wind turbine noise on cancer health outcomes. Similarly, the only studies able to be examined in relation to dementia were from road traffic noise. Overall, the Clark *et al*. (2020) conclude that in relation to wind turbine noise specifically, the conclusions remain limited by the low number of studies for many outcomes, and the quantification of health effects for other noise sources including wind turbine noise remains a research priority.

People with autism are generally considered to be more sensitive to changes in the noise environment, whereby a typical response from those who experience over-stimulation include avoidance behaviours such as covering the ears or eyes, compensating behaviours of unusual body movements or vocalisations, and an apparent fixation on irrelevant but possibly comforting stimuli. Howell *et al*. (2015) specifically refer to impacts on sleep disturbance associated with low frequency noise for those with autism, and how the relative

sensitivity of these individuals may increase impacts, noting that further research is needed on understanding the mechanisms of how people with autism are affected by sound. While this is the case, as stated in Chapter 10: Noise and Vibration, there is a significant body of evidence to show that infrasound and low frequency noise associated with wind turbines will be below perceptibility thresholds and typically in line with existing baseline levels of infrasound within the environment.

Overall, the available health evidence base does not establish any clear or consistent association between noise from wind turbines and human health (including from exposure to AM, infrasound and low frequency noise). As such, and on the basis that noise will be controlled to within permitted levels, it is assessed that the secondary impact on local population health is low. **In the context of a low sensitivity, there would be a minor adverse significance of effect (not significant).**

EIAR 17.3.1.2.5 Secondary Impact of Shadow Flicker Impacts on Health & Wellbeing

Shadow Flicker from Operating Turbines: Shadow flicker is the flickering effect caused when rotating wind turbine blades periodically cast shadows through constrained openings such as the windows of neighbouring properties under certain meteorological conditions. The main health concern associated with shadow flicker is the risk of seizures in those people with photosensitive epilepsy.

The operational phase Shadow Flicker impacts are assessed in Chapter 11: Shadow Flicker, whereby it is concluded that prior to any mitigation, shadow flicker above 30 min/day and/or 30 hr/year could occur at 43 no. sensitive receptors under certain meteorological conditions.

However, modern turbines such as those proposed for the Ballynalacken Windfarm can be fitted with shadow flicker control modules that can control the amount of shadow flicker that can occur at a given sensitive receptor. As stated in Chapter 11: Shadow Flicker, regardless of any planning condition attached to a planning grant, the Shadow Flicker Control Module can be set to eliminate shadow flicker completely from a turbine impacting a given receptor (house). The developer commits to use this setting at the relevant turbine/s should there be a complaint about shadow flicker effect from a residence within the 1170m Shadow Flicker Study Area (10-rotor diameters). Deployment of this module will turn off the turbine or turbines if the defined parameters for shadow flicker events, at a given receptor is predicted to occur. This will eliminate shadow flicker at the affected sensitive receptor.

As an additional mitigation measure, a report on the operation of the Shadow Flicker Control Module and compliance with any planning condition limiting shadow flicker occurrence will be prepared and submitted to the Local Authority annually after 1-year of operation.

With reference to Table 1 in Appendix 17.3, a hazard source by itself (in this case, shadow flicker) does not constitute a health risk. It is only when there is a hazard source, a receptor and a pathway of exposure that there is any potential risk to human health. In this case, the pathway of exposure will be controlled by the Shadow Flicker Control Modules to eliminate exposure to shadow flicker completely, and any potential health risks (including photosensitive epileptic seizures).

On the basis that shadow flicker will be eliminated through the installation of Shadow Flicker Control Modules, it is assessed that the secondary impact on local population health of shadow flicker effect locally is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

EIAR 17.3.1.2.6 Secondary Impact of Landscape and visual Impacts on Local Community Wellbeing

In Chapter 14: Landscape it is assessed that the landscape impact in the vicinity of the proposed turbines (within 5km) varies from **Moderate/Slight to Substantial/ Moderate** depending on proximity, viewing angle and topography. The secondary impact on local population health will be subjective in nature and can be considered from a negative perspective - imposition of large infrastructure locally and/or a positive perspective - climate action. This is supported by research; McCunney *et al*. (2014) report that participants

who have a negative attitude towards the visual effect of wind turbines on the landscape scenery report higher levels of annoyance to wind turbine noise.

Overall, while there is potential for dissatisfaction, and associated adverse impacts on wellbeing from the operational Ballynalacken Windfarm project, over time the wind turbines would become part of the landscape and any adverse perceptions are likely to improve. As a result, the secondary impact of the addition of large infrastructure to the landscape on local population health is negligible. **In the context of a low sensitivity, there would be a negligible significance of effect.**

EIAR 17.3.1.2.7 Secondary Impact of Climate Impacts on Health & Wellbeing

The primary impacts associated with climate change include increased temperatures, increased atmospheric CO_2, sea level rise and increased incidence of extreme weather events. These primary impacts affect several environmental functions (such as water availability, salinization, varying crop yields, wildfires, ozone/PM concentrations, and migration patterns) which could plausibly alter the prevalence of a range of population and health outcomes.

In Chapter 12: Climate it is assessed that over the lifetime of the Ballynalacken Windfarm Project (35 years), the production of renewable electricity will result in total GHG emissions savings of 35,700 tonnes of CO_2e each year and once initial emissions from the construction of the development are offset (within 7.4 months of production). The annualised GHG saving equates to 0.06% of Ireland's total 2023 GHG emissions of 60.62 $MtCO_2e$ or 1.2% of the 2030 Electricity sector carbon budget of 3 $MtCO_2e$.

Institute of Environmental Management & Assessment significance (IEMA, 2022) states that where the fundamental reason for a proposed project is to combat climate change (e.g. a wind farm) and this beneficial effect drives the project need, then it is likely to be significant. Considering the significance criteria set out in Chapter 12, the impact of GHG emissions from the proposed Project align with Ireland's GHG trajectory to net zero by 2050 as per TII Guidance (TII, 2022), this is therefore considered a **Significant, Positive, Long-Term impact to climate**. This project will assist in the CAP24 goal of producing up to 80% renewables for the grid.

While the operational impact on climate change would be positive, the benefits are diffuse nationally/globally and require collective action for any material change. While the proposed development would contribute positively to climate change action, overall improvements in climate change are therefore uncertain. Furthermore, it is more likely that global and collective climate action would prevent the worsening of climate change (and associated population health outcomes), rather than improve our climate in a way which directly improves population health outcomes.

However, as outlined in Section 17.3.1.1.3.1, on the basis that 79% of the Irish population surveyed (EPA, 2024) say climate change should be either a "very high" or "high" priority for Government (EPA, 2024), the delivery of the Ballynalacken Windfarm project may improve perception of climate change action, with associated wellbeing benefits to those locally. This public feedback is also reflected in the findings of neighbouring County Laois public consultation surveys for their Climate Action Plan (Turley, 2023).

As a result, it is assessed overall that the secondary impact of significant and positive climate actions on local population health is low. In the context of a low sensitivity, there would be a minor beneficial significance of effect (not significant).

EIAR 17.3.1.2.8 Mitigation and Monitoring Measures

Mitigation measures adopted as part of the construction and operation of the Ballynalacken Windfarm Project focus on precursors to health and wellbeing outcomes, thereby providing an opportunity for intervention to prevent any adverse impacts. These design mitigation measures have been taken into consideration in the main assessment provided in Section EIAR 17.3.1.2.

Although it is evaluated that there will be no significant effects on population health from the construction or operation of the proposal, the following additional Project mitigation/monitoring measures will reduce any adverse effects of the construction and operation of Ballynalacken Windfarm.

Construction Phase Mitigation Measures relevant to population health include:

- MM49: A Community Liaison Officer (CLO) will be appointed. The CLO will liaise with and keep the local community up-to-date with relevant construction work schedules, through the use of signage at selected Site Entrances, letter drops to nearest neighbours and through the Project website which will be kept up-to date. The CLO will be the point of contact for local residents for matters relating to noise and vibration. The Environmental Clerk of Works will liaise with the CLO and will be the point of contact between the contractor/developer and the Local Authority regarding any matters relating to noise or vibration from the construction works.
- SM02 & SM16: The Environmental Management Team will carry out regular pre-construction and during construction surface water quality monitoring and recording in accordance with the Surface Water Management Plan.
- SM23: Dust monitoring within 100m of the site boundary will be carried out by the construction contractor and the Environmental Clerk of Works.
- MM46: To ensure that local roads are kept clean and site roadways are clear of mud, a road sweeper and dry wheel washes will be used.
- MM47: Any loads of material which have the potential for dust emissions (such as aggregate) will be covered during transportation.
- MM48: Construction operations shall generally be restricted to between 0700-1800hrs Monday to Friday, and 0700-1400hrs on Saturdays.
- SM25: Monitoring of noise and vibration will be carried out at a number of nearby residences during critical periods of the construction works.
- MM51: Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down or throttled back to a minimum when not in use, and if any plant/machine is required to operate before 07:00hrs or after 19:00hrs, then it will be surrounded by an acoustic enclosure or portable screen. The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produces by on-site operations. All vehicles and plant will be fitted with effective exhaust silencers. Noise dampeners will be fitted where required.
- MM34: Road traffic speed limits of 30km/hr along L5840, L5845 and L58442 and of 15km/hr along on-site roads throughout project Construction, Operational and Decommissioning phases.

Operational Phase Mitigation Measures relevant to population health include:

- OMM01: Operational phase monitoring of downstream water quality monitoring will be carried out by the Asset Manager.
- OMM17: A noise curtailment strategy will be developed and implemented to ensure that the operating windfarm complies with the prescribed operational noise criterion. Noise reduction control modules will be installed in the turbines and will be activated to ensure that permitted levels are not exceeded during operation.
- OMM18: In the event of a complaint which indicates potential amplitude modulation (AM) associated with turbine operation, the windfarm operator will employ an independent acoustic consultant to assess the level of AM experienced by the complainant in accordance with the methods outlined in the Institute of Acoustics (IOA) Noise working Group (Wind Turbine Noise) Amplitude Modulation Working Group (AMWG) namely, “Institute of Acoustics IOA Noise Working Group (Wind Turbine Noise) Amplitude Modulation Working Group Final Report: A Method for Rating Amplitude Modulation in Wind Turbine Noise (9 August 2016)” or subsequent revisions. The measurement

method outlined in the IOA AMWG document, known as the 'Reference Method', will provide a robust and reliable indicator of AM and yield important information on the frequency and duration of occurrence, which can be used to evaluate mitigation requirements. The mitigation measures, if required, will consist of the implementation of operational controls on specified turbines, which will curtail or stop the relevant turbines under specific operational conditions, so that OAM at noise-sensitive locations is eliminated.

- OMM19: The wind turbines will be fitted with a Shadow Flicker Control Module to ensure that permitted levels are not exceeded or shadow flicker is eliminated if required, during operation.
- OMM20: A new berm and hedgerow will be planted on the northern side of the substation compound to provide noise and visual screening of the new substation compound.
- OMM22: Remedy/offsetting will be provided through the development of an interactive database which will enable members of the local community to record folklore and other intangible cultural heritage of the local area around the Ballynalacken Windfarm Project. This database will be available to the public, for example through the local libraries and online, the data will be checked before being made publicly available, and the database will be demonstrated in the local schools, community centres and with local heritage groups. The windfarm owner will fund the ongoing maintenance of this database.
- OMM23:
- OMM24: A Community Liaison Officer to be appointed for the duration of the operational phase as the point of contact for the local community.
- OMM25: The community benefit fund will be managed in accordance with the *Good Practice Principles Handbook for Community Benefit Funds* (DECC, 2021). The Promoter of the project will initiate engagement with the local community post consent and prior to the commencement of construction works. A committee will be formed to oversee the distribution of the Community Benefit Fund. This committee will include the Promoter, an administrator, the Community Liaison Officer and members of the local community who have volunteered to serve on the Fund Committee.
- OMM27: A viewpoint/picnic area will be provided at Site Entrance No. 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. This will afford a safe place to enjoy Viewpoint V19 "View west towards the Slieve Bloom Mountains on road no's LS5840 and LS5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)" as described in Kilkenny City and County Development Plan 2021 - 2027. The proposed Ballynalacken Windfarm turbines will be behind the viewer and therefore not visible within the Viewpoint V19 viewshed west (see Figure 17.5, at the end of this chapter).

Decommissioning Phase Mitigation Measures relevant to population health include:

- DMM10: All plant and machinery which will be used during construction will be fit for purpose and in good working order prior to mobilisation to works areas.
- DMM11: Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down or throttled back to a minimum when not in use. The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations. All vehicles and plant will be fitted with effective exhaust silencers. Noise dampeners will be fitted where required.
- DMM12: Decommissioning operations shall generally be restricted to between 0700-1800hrs Monday to Friday, and 0700-1400hrs on Saturdays.
- DMM13: A Community Liaison Officer (CLO) will be appointed and will be the point of contact for local residents for matters relating the decommissioning works, noise and transportation timing.

EIAR 17.3.1.2.9	Residual Impact

Overall, it is evaluated that the residual secondary impact on Local Community Health & Wellbeing, will not be significant in all instances.

There would be an imperceptible impact during construction on water supply at the 3 No. abstraction points identified, with an associated negligible (Neutral) effect on Local Community Health & Wellbeing. Similarly, the impact on dust emissions during construction would also be imperceptible, with an associated negligible effect on local community health.

There would be a long-term positive impact on air quality during operation due to NO_X savings. However, as these benefits would be diffuse across the region/Ireland, the resultant effect on local population health would be negligible (Neutral).

This is also the case with the benefits on local population health from positive impacts on climate change. While the proposed development would contribute positively to climate change action, the benefits are diffuse nationally/globally and require collective action for any material change. However, the delivery of the Ballynalacken Windfarm project may improve perception of climate change action, with associated wellbeing benefits to those locally and would result in a minor beneficial effect on local population health (Imperceptible, positive impact).

During operation, there is the potential for changes in exposure to EMF. Due to the underground nature of cables and grid connection infrastructure, there would be no change in exposure to electric fields. The change in exposure to magnetic fields would be minor and would remain substantially within public exposure guidelines which are set to be protective of health. Therefore, the resultant effect on local population health would be negligible (Neutral).

Noise from operational turbines would remain within permitted levels which are set to be protective of human health. The potential effects from AM and infrasound have also been considered, where it is concluded that there would be no potential for adverse effects due to the size of the turbines proposed. Overall, the effect on local population health from changes in the noise environment is considered to be minor adverse (Imperceptible/Not Significant).

Concerns associated with the potential for photo epileptic seizures from shadow flicker have been raised. Similar to the above, it is concluded that the effect on local community health and wellbeing from shadow flicker is negligible (Neutral) due to the installation of Shadow Flicker control modules on all turbines which will be deployed if a complaint about shadow flicker effect from a residence within the 1170m Shadow Flicker Study Area (10-rotor diameters) is made. Deployment of this module will turn off the turbine or turbines if the defined parameters for shadow flicker events, at a given receptor if shadow flicker predicted to occur. This will eliminate shadow flicker at the affected sensitive receptor.

With regards to landscape impacts, the secondary impact on local population health would be subjective and very much dependent on attitudes towards onshore wind projects and renewable energy in general. While there is potential for dissatisfaction, over time the wind turbines would become part of the landscape and any adverse perceptions are likely to improve. As a result, it is considered that the effect on local community health and wellbeing would be negligible.

EIAR 17.3.1.3 Cumulative Impact on Local Community Health & Wellbeing with Other Projects & Activities

EIAR 17.3.1.3.1 Introduction to the Cumulative Evaluation

The Ballynalacken Windfarm Project (*whose effects range from Neutral to Not Significant, as per Section EIAR 17.3.1.2*) is examined hereunder for potential to have cumulative effects on Local Community Health & Wellbeing with other existing and permitted projects and projects advanced in the planning system. These projects are referred to as 'Other Projects' herein.

A Cumulative Study Area is set out below and Other Projects located within this Study Area are identified and examined for in-combination effects with the Ballynalacken Windfarm Project. The potential for off-site and secondary consequential development is also considered.

EIAR 17.3.1.3.2 Cumulative Study Areas

The study area for the topics examined in this chapter for effects on Local Population is 5km. Other windfarms within 10km are considered for this cumulative study. This will capture sensitive receptors at the edge of the Project alone study area.

EIAR 17.3.1.3.3 Scoping of Other Projects & Activities for Cumulative Impacts

Firstly, other windfarms which occur or are approved within 10km were identified. These other windfarms were then examined in relation to whether they were (a) already in existence; (b) under construction; or (c) authorised but not commenced. The geographical and timeframe boundaries of likely cumulative impacts were also taken into consideration.

There is no constructed windfarm within 10km of the proposed Ballynalacken Windfarm Project.

Pinewood Windfarm is the only approved but not constructed windfarm project, within 10km of the proposal. The nearest Pinewood Windfarm turbine to the Ballynalacken Windfarm proposal is 4.1km to the north-east. Pinewood Windfarm is included for cumulative assessment.

EIAR 17.3.1.3.4 Cumulative Impact with Pinewood Windfarm

Water Supply & Air Quality: Due to the separation distance between Ballynalacken Windfarm Project and the Pinewood Windfarm project, there is no potential for **cumulative Water Supply or Air Quality effects to occur during construction (No Cumulative Effects)**.

Noise & Vibration, Shadow Flicker: If both windfarms are constructed there will be a cumulative operational Noise & Vibration and Shadow Flicker impact. Planning conditions regulating Noise and Shadow Flicker effects mandate levels of cumulative effect with other windfarms in the area. Therefore the assessment for the secondary effects on health from the Noise and Shadow Flicker impact from the windfarm alone, also apply to the cumulative of Ballynalacken Windfarm with Pinewood Windfarm (rating **minor adverse for operational noise (Not Significant Cumulative Impact); and negligible for shadow flicker (Neutral cumulative impact**).

The impact on Local Community Health & Wellbeing of **Climate Action** locally is assessed as minor beneficial (not significant). **This positive effect will be increased by the additional of another windfarm locally, evaluated as Cumulatively Imperceptible Positive**.

The impact on Local Community Health & Wellbeing of **Landscape** impacts is assessed as negligible. On the same basis, the addition of Pinewood Windfarm will not noticeably increase these effects, and it is considered that the together t**he cumulative effect remains negligible (Neutral).**

EIAR 17.3.2 SENSITIVE ASPECT: LOCAL ECONOMY & TOURISM

This detailed evaluation section for Local Economy & Tourism is presented as follows:

- Section EIAR 17.3.2.1 - description of the baseline environment of Local Economy & Tourism;
- Section EIAR 17.3.2.2 - evaluation of the impacts of Ballynalacken Windfarm Project on Local Economy & Tourism; and
- Section EIAR 17.3.2.3 – evaluation of cumulative impacts.

EIAR 17.3.2.1 Baseline Environment – Local Economy & Tourism

The context, characteristics, importance and sensitivity of *Local Economy & Tourism* are described in the subsections below. The trends and likely evolution (i.e. Do-Nothing scenario) for this Sensitive aspect are also considered.

EIAR 17.3.2.1.1 Baseline Context and Character of Local Economy in the Study Area

The study area for the Local Economy in relation to the Ballynalacken Windfarm Project covers the six EDs, namely Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill. These EDs contain local populations, local businesses and local labour force that could potentially be impacted by the Ballynalacken Windfarm Project. The EDs are identified on Figure 17.3: Local Economy.

The proposed Ballynalacken Windfarm Project is located entirely within County Kilkenny equidistant between the towns of Ballyragget and Castlecomer in County Kilkenny, the villages of Ballyouskill and Attanagh also in County Kilkenny, and the village of Ballinakill in County Laois

Population: According to Census 2022[3], the population of the Ballynalacken Windfarm Project Study Area was 7,080 persons. Population growth in the area has been positive, but low, compared to the national average, over the past 20 years. Across the six EDs, the population has increased by 14% since Census 2002, with much of this growth recorded in the early 2000s. This compares to a national average population growth of just over 30% in the same period. This difference reflects the relatively rural characteristics of the study area. Ballyragget recorded the strongest growth over this time, seeing its population increase by 25%. Similar strong growth was recorded in Ballinakill (23%), followed by Durrow (19%), Attanagh (15%), Kilmacar (14%), and Castlecomer (4%). The population of the Study Area accounts for 5% of the total population of County Kilkenny, and 2% of the total population of the South-East. The Study Area is typical of a rural upland area in Ireland and is sparsely populated, with a population density (47 persons per sq km) below the national average (73 persons).

Gross Value Added (GVA): CSO data for incomes and the economy is available at a regional level, rather than at a county or sub-county level. The Ballynalacken Windfarm Project Study Area is in the South-East Region which comprises Carlow, Kilkenny, Waterford and Wexford. In 2022, the latest year for which preliminary data is available, GDP per person in the South-East Region stood at €42,966, below the national average of €98,986. Preliminary GVA per person in the Study Area was also lower than at a national level - €40,700 and €93,766 respectively.[4] Based on Census 2022 population levels for the Ballynalacken Windfarm Project Study Area (7,080 persons), the size of the local economy is estimated to be €288 million in GVA terms.

[3] CSO Census of Population 2022
[4] https://www.cso.ie/en/releasesandpublications/ep/p-cirgdp/countyincomesandregionalgdp2021/data/

Key Employment Sectors: According to Census 2022[5] (latest available), Professional Services and Commerce and Trade are two of the main employment sectors in the Study Area. Given the reliance on cars to commute to work, the high proportion commuting up to 30 minutes to work, it is likely that much of the local population is accessing employment opportunities in nearby urban areas, notably Kilkenny City, Carlow town, and Portlaoise. Agriculture and Forestry is an important sector of employment in the Study Area, accounting for 8% of the workforce. This compares to 7% at a regional level and 4% at a national level.

EIAR Figures: (included at the end of this Chapter)

Figure 17.3: Local Economy

EIAR Appendices: (included at the end of this Chapter)

Appendix 17.1: Central Statistics Office Data

EIAR 17.3.2.1.2 Baseline Context and Character of Tourism in the Study Area

The study area for Tourism in relation to the Ballynalacken Windfarm Project covers the six EDs identified in Table 17-2. These EDs contain local tourism products that could potentially be impacted by the Ballynalacken Windfarm Project. In addition to this, the nationally important tourism sites of Kilkenny Castle and Castle Parklands, and St. Canice's Cathedral and Round Tower located in Kilkenny City have also included for assessment.

Tourism: Within the South-East Region, County Kilkenny ranks third in terms of Irish resident trips and spend, with the county recovering relatively strongly following the various Covid-19 lock-downs that impacted tourism and leisure activities. In 2022, €2,930 million was generated via domestic tourism – 13% of the domestic tourism revenue generated in the South-East Region.[6] In 2019 (latest available), the South-East Region attracted 6% of total overseas tourism in Ireland, accounting for 44% of tourism revenue (overseas and domestic) generated within the region.[7]

For both domestic and overseas tourists, hiking and cross-country walking was the most popular activity by a significant margin in 2022. There are five walks and trails identified within the Ballynalacken Windfarm Project Study Area. The Heywood Gardens Loop is a 6.3km loop trail near Ballinakill, County Laois, the Ardra Loop Walk and Captains Walk are in close proximity to each other, just outside Castlecomer town, while the Dunmore Loop and Durrow Leafy Loops walks are both located in Durrow, Co. Laois. There are two new walking routes proposed for the Study Area: walking route LCW 42 from Ballacolla to Castle Durrow and a new walking route in Ballinakill[8].

Cycling trails within the Study Area include the North Kilkenny Cycle Route which follows the R694 and L5853 from Ballyragget to Castlecomer, passing c.500m from the Ballynalacken Windfarm Project at its closest point, and the Laois Cycle Trail 2B, Laois Cycle Trail C and Abbeyleix-Durrow Cycle Trail which all pass through

[5] CSO Census of Population 2022

[6] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/2022-key-tourism-facts.pdf?ext=.pdf

[7] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/KeyTourismFacts_2019.pdf?ext=.pdf

[8] https://laois.ie/wp-content/uploads/10-1-Walking-Trails-Map.pdf

Durrow. A cycle route from Kilkenny to Portlaoise has also been proposed as part of the National Cycle Network Plan[9] which would pass through the Study Area on its route via Ballyragget and Abbeyleix.

In addition, there are a number of proposed new walking and cycling routes in Castlecomer, including a dedicated bike trail within the Castlecomer Discovery Park[10], plans to develop the disused railway line into a pedestrian/cycle route[11] and various pedestrian links which should also provide cycle lanes within Castlecomer town[12].

The Laois Heritage Trail includes stops at a variety of built heritage sites around County Laois, including Heywood Gardens and the heritage towns of Durrow, which are located within the Ballynalacken Windfarm Project Study Area.

The Laois County Development Plan 2021-2027 lists two scenic views, 022 and 023, both of which look from Heywood Demesne in the direction of Ballymartin Hill and proposed Ballynalacken Windfarm.

There is limited tourist accommodation within the Study Area with much of it located in the Durrow ED. There are c.12 properties listed on Airbnb located in the Study Area, c.3 B&B residences, as well as 3 no. hotels, Avalon House Hotel Castlecomer and Castle Durrow.

A camping site (Hi-Field Wild Camping) is marked on Google Maps, on the western boundary of Cromwells Road, however site visits to this location confirmed that while an area has been excavated, this camping site does not exist and there are no proposals in the planning system for a campsite at this location. For this reason, Hi-Field Wild Camping is scoped out from further evaluation herein.

There are a number of activities located throughout the Study Area, the majority of which are located in the main towns and villages. Castlecomer Discovery Park, an activity centre in Castlecomer located c.4.7km south-east of the Ballynalacken Windfarm Project Site, attracted 171,532 visitors in 2022[13].

Heywood Gardens, developed in the 18th century near Ballinakill, consists of 50 acres of gardens, lakes, woodland and architectural features, with walks and scenic views throughout the estate. Ballinakill also contains Gills Pond, a popular angling location, and Mass Lough, a scenic lake south-east of the village.

While not within the Study Area, Kilkenny Castle & Castle Parklands and St. Canice's Cathedral and Round Tower are located in Kilkenny City, c.17km south of the Ballynalacken Windfarm site. According to Failte Ireland Kilkenny Castle Parklands attracted 1,418,171 visitors in 2022, while St. Canice's Cathedral saw 25,000 visitors that same year. Kilkenny Castle Parklands is the most visited 'Free to Enter' visitors site in the Country.

See Figure 17.4: Tourism within the Study Area

EIAR 17.3.2.1.3 Importance of Local Economy and Tourism & Sensitivity to Change

Importance: The local economy is key to Population well-being and sustains and underpins the structures of society. Through economic activity and employment, the local economy generates incomes for the population, which enables individuals and families to prosper and achieve their social aspirations, all of which

[9] https://www.gov.ie/pdf/?file=https://assets.gov.ie/280482/50bf7376-dc20-4606-9898-7f307414e083.pdf#page=null
[10] https://kilkennycoco.ie/eng/your_council/council_meetings/kilkenny_county_council_ordinary_meetings/2023-council-meetings/tourism-development-strategy.pdf
[11] https://multimedia.kilkennycoco.ie/2021/townplans/castlecomer/mobile/index.html
[12] https://kilkennycoco.ie/eng/services/planning/development-plans/local-area-plans/castlecomer_local_area_plan/castlecomer-local-area-plan-20181.pdf
[13] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/visitor-attractions-survey-2022.pdf?ext=.pdf

is important in creating sustainable local communities. These issues are particularly important at a local level for a predominantly rural area, where the range of economic opportunities is limited compared to larger more urban areas.

The importance of tourism is considered to be Medium.

Sensitivity to Change: Population growth within the Ballynalacken Windfarm Project Study Area, has typically been low over the past 20 years. For example, population levels declined by 1% - 3% in Attanagh, Ballyragget, Kilmacar, and Durrow between Census 2011 and Census 2016, while the population of Castlecomer ED declined by 5% between Census 2006 and Census 2011. These declines were in the context of relatively strong regional and national population growth over the same period and may point to limited economic opportunities within the Study Area. Notwithstanding that, the relatively small population of the Study Area means the sensitivity of the local economy is considered to be Low.

Due to the relatively small tourism offering in the Study Area, the sensitivity is considered to be Low.

EIAR 17.3.2.1.4 Evolution of the Baseline Environment (the 'Do-Nothing' scenario)

Trends in population, employment and disposable incomes: Census and CSO data relating to population and standard of living provide insight into key trends in the Study Area. Five of the six EDs contained in the Study Area recorded population growth of 1% - 5% between 2016 and 2022. This is lower than the national average (8%) and reflects the rural nature of the area. Durrow ED was the one exception, recording growth of 10% over the period. CSO population forecasts estimate that the State's population will increase to 6 million (27%) out to 2051.[14] Assuming the local population grows broadly in line with the national growth rate, the population of the Ballynalacken Windfarm Project Study Area will increase to 8,800 by 2051, an increase of 1,720 people.

Personal disposable income in the South-East has trended upwards since 2016 and, as of 2021 (latest available) is 28% higher than the recessionary levels recorded in 2012. Household disposable income in the region has followed a similar trend – up 42% on 2011.[15]

The South-East Region accounts for 9% of total employment in Ireland. In the 12 months to Q3 2023, the unemployment rate in the region declined from 7.4% to 4.9%.[16] Full employment is typically achieved when the unemployment rate reaches 5%[17] - this means that everyone who wants a job can find a job. The figures for Q3 2023 indicate full employment at both a regional and national level.

The Ballynalacken Windfarm Project will be operated on a permanent basis. It is expected that over the operational phase of the Windfarm, the local population will grow in line with, albeit possibly at a slower rate, the national average. It is also expected that GVA per person, and consequently the socio-economic circumstances will continue to improve over the long-term. It is assumed that the baseline environment will not have materially changed by the time of the construction or operation of the development.

[14] https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2017-2051/populationprojectionsresults/#:~:text=Under%20the%20M3F1%20variant%20the,due%20to%20net%20inward%20migration.
[15] https://www.cso.ie/en/releasesandpublications/ep/p-cirgdp/countyincomesandregionalgdp2021/data/
[16] https://www.solas.ie/f/70398/x/af92c98fbc/regional-infographics_southeast_.pdf
[17] https://data.oireachtas.ie/ie/oireachtas/parliamentaryBudgetOffice/2023/2023-03-30_pbo-note-on-introduction-to-the-irish-economy-unemployment_en.pdf

Trends in Tourism: Tourism data indicates that the sector continues to rebound following the Covid-19 pandemic. Visitor volumes through the first half of 2023 were up in every region in most sectors compared to 2022, broadly driven by improvements in overseas tourism.[18] Despite concerns on the impact of inflation – both in terms of operating costs and consumers' purchasing power, tourism operators do anticipate continued growth in the sector through 2024, a trend which would invariably benefit the host economy.

The latest overseas visitor statistics[19] confirm that cross country walking, hiking and cycling is a continuing upward trend amongst domestic and overseas visitors. These activities accounted for 86 per cent of the activities engaged in by overseas visitors in 2019 (latest available) and 76 per cent of domestic visitors in 2022.

Driver of Change - Climate change: The Irish Government has taken earnest steps in recent years to mitigate the worst impacts of climate change. Commitments have been set to halve greenhouse gas emissions by 2030 and achieve net zero no later than 2050.[20] With one of the highest rates of greenhouse gas emissions per capita in the OECD[21], and in Europe, the pathway to achieving these targets is not straightforward. Certain sectors, such as agriculture, transport, energy industries and the residential sector are amongst the highest emitters[22] of greenhouse gases, and thus will be required to carry a greater burden in terms of Ireland's transition to a low carbon economy.

There remains a strong reliance on non-renewable sources in Ireland's electricity generation. Between 2020 and 2021, the use of oil and coal as energy inputs into electricity generation more than tripled, increasing the carbon intensity of Ireland's electricity by 12.5%.[23] The efficiency of Ireland's electricity supply (i.e., the proportion generated from renewable sources) has, however, improved over the last two decades linked, in some part, to the generation of wind energy which accounted for the generation of 35% of Irelands electricity usage in 2023.

The Ballynalacken Windfarm Project aligns with targets set in the Climate Action Plan 2024 to accelerate the actions required to respond the climate crises. The scheme is predicted to produce approximately 140,000,000 kWh which is enough to supply 31,021 houses annually with the average domestic electricity needs[24]. This amount of electricity has the potential to offset 35,700 tonnes of CO_2e per annum – equivalent to 2,915ha of forestry, or 19,820 diesel/petrol cars switching to electric vehicles (see Section EIAR 1.6.2.1.1 of Chapter 1).

Greater investment in sustainable renewable energy sources will help to achieve a key priority of Government to improve air quality in line with World Health Organisation (WHO) Air Quality Guidelines (AQC) by 2040,[25] along with broader targets inherently linked to sustainability, health and wellbeing. While, at a local level, the health and wellbeing benefits associated with an individual project are considered imperceptible, at a

[18] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/report-barometer-may-2023.pdf?ext=.pdf

[19] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/KeyTourismFacts_2019.pdf?ext=.pdf

[20] https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/

[21] dfa.ie/media/missions/prepparis/OECD-Environmental-Performance-of-Ireland.pdf

[22] Latest emissions data | Environmental Protection Agency (epa.ie)

[23] https://www.seai.ie/publications/Energy-in-Ireland-2022.pdf

[24] Based on SEAI data of 4,513 kWh annually per household in 2022. https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/residential/

[25] https://www.gov.ie/en/publication/927e0-clean-air-strategy/

national level, the Ballynalacken Windfarm Project will mark another step in the transition to a low and zero carbon society.

If the Ballynalacken Windfarm Project does not proceed, the baseline environment will only change in line with the trends identified here.

EIAR 17.3.2.2 Impact Evaluation – Local Economy & Tourism

This Section comprises an evaluation of the likely significant impacts of the proposed Ballynalacken Windfarm Project on the receiving environment. Moderate, Slight, Imperceptible and Neutral Impacts are also taken into consideration.

The impacts are presented/evaluated as follows:

a) Significant Impacts which are likely or have potential to occur, are subject to detailed evaluation;

b) Moderate or Slight Impacts, which are likely or have potential to occur, are subject to detailed evaluation;

c) Non-significant impacts of local concern or considered important enough to merit detailed evaluation;

d) Neutral or Imperceptible Impacts are scoped out from detailed evaluation, and a short evaluation is provided in the table below. Unlikely Impacts are also scoped out.

Table 17-5: Scoping of Impacts

Likely/Potential Impact	Evaluation
Moderate or Slight Impacts, which are likely or have potential to occur - see detailed evaluation	
Operational Phase: Improvements in County Budget due to Commercial Rates (positive impact)	Section EIAR 17.3.2.2.1
Operational Phase: Decrease in local property value	Section EIAR 17.3.2.2.4
Operational Phase: Secondary impact on walking & cycling routes tourism from the presence of a windfarm in the landscape	Section EIAR 17.3.2.2.5
Operational Phase: Secondary impact on scenic routes tourism from the presence of a windfarm in the landscape	Section EIAR 17.3.2.2.6
Operational Phase: Secondary impact on amenity areas tourism from the presence of a windfarm in the landscape	Section EIAR 17.3.2.2.7
Non-significant impacts considered important enough (or of local concern) – see detailed evaluation	
Construction Phase: Gross value added to businesses & employment opportunities (positive impact)	Section EIAR 17.3.2.2.2
Construction & Operational Phases: Strengthening the Local Economy (positive impact)	Section EIAR 17.3.2.2.3
Neutral or Imperceptible Impacts, or where no impact is likely to occur – evaluation below	
Local Economy	
Construction Phase: Business disruption	Imperceptible Impact: There are no businesses in close proximity to the Ballynalacken Windfarm site. The temporary removal and replacement of overhead lines in Castlecomer town to facilitate transport of the turbine blades (HR9 & HR10) is not expected to cause disruption to local businesses with the rerouting of services to affected businesses within the town. It is proposed to deliver turbine components during off-peak hours, minimising disruption to local businesses. Increased journey times as a result of haul route works on the public road network between the towns of Castlecomer and Ballyragget are not expected to cause significant disruption to businesses due to the very short duration of works (2 days each at HR10,

	HR11), the availability of alternative routes and the maintenance of traffic flow through the use of flagmen and stop/go systems.
Construction Phase: Loss or reduction in farm incomes	Neutral Impact: There will be some lands unavailable for use during construction works, however, due to the relatively small areas involved, spread over 21 landholdings, with payment of lease agreements considered to offset this impact.
Decommissioning Phase: Gross value added to businesses & employment opportunities	Neutral Impact. The decommissioning phase if any, will be of a short duration (approx. 4 months) with a small number of personnel involved and therefore any induced spending likely to be imperceptible.
Tourism	
Construction Phase: Reduction in tourism revenue	No Likely Impact: For construction stage impacts and operational stage noise impacts – Due to no potential for impacts, no interruption to tourism products. Any increases in ambient dust and noise during the construction phase is limited to the works area and c.500m of roads from the site entrances. There are no tourism assets along the local road haul routes L58451, L5845, L5846 and L5840 in the vicinity of the windfarm site, and the L58442 along the Internal Cable Link route in the Tinnalintan area, while works at the Blade Transfer Area (HR8) are of small scale and temporary duration.
Operational Phase: Impact on local accommodation tourism from the presence of a windfarm in the landscape	No Likely Impact: Currently, the closest accommodation service is an Airbnb property, located c.1.7km south of the closest turbine. Due to the short-term use of accommodation services by visitors there is no potential for significant effects on this service.
Decommissioning Phase: Reduction in tourism revenue or reduction of quality of tourism asset	Unlikely Impact: Decommissioning works will be temporary and moving from one turbine hardstanding area to the next, with low additional volumes of traffic on the local and regional roads. Taking into account the separation distance to local tourism assets, it is considered unlikely that any reduction in tourism revenue or asset quality would occur.

EIAR 17.3.2.2.1	**Improvements in county budget due to commercial rates**		
Sensitive Aspect:	Local Economy		
Sensitivity:	**Moderate** (as per Section EIAR 17.3.2.1)		
Impact Source(s)	Commercial rates revenue		
Impact Pathway(s)	Financial transactions		
Project Stage	Operation Phase		

Overview of Impact (general):

Additional revenue to Kilkenny County Council through rate payments as a result of the project.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

It is estimated that the Ballynalacken Windfarm Project will generate c.€800,000 of commercial rates per annum over the 35-year operational phase. This would represent 4% of the overall commercial rates collected by Kilkenny County Council[26]. At these levels, it is expected that there would be a noticeable positive effect to the local population in the Study Area from increased or improved county services which may arise as a result of the increased rate payments.

The magnitude of the additional commercial rates to Kilkenny County in the context of the County budget (4%) is assessed as Low.

Impact Magnitude	**Low**	**Impact Significance:** ***(pre-mitigation)***	**Slight (positive)**
Mitigation and Monitoring Measures: None required – Positive effect			
Residual Impact Significance *(post-mitigation)*:			**Slight (positive)**

[26] https://kilkennycoco.ie/eng/your_council/about-the-council/annual-reports/annual-report-2022.pdf

EIAR 17.3.2.2.2	**Gross value added to businesses & employment opportunities**
Sensitive Aspect:	Local Economy
Sensitivity:	**Low** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Construction contracts, purchasing of materials and services, landowner payments
Impact Pathway(s)	Financial transactions
Project Stage	Construction Phase

Overview of Impact (general):

The purchase of goods, materials and services, and employment in the Study Area will increase GVA to business and employment opportunities. There will also be secondary induced spending in the local economy.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

The Ballynalacken Windfarm Project capital costs are estimated to amount to €106 million. Of this:

- c.€5 million likely to be spent locally on stone and concrete from either/both Abbeyleix or Dunmore
- c.€1 million to be spent locally across Castlecomer, Ballyragget, Ballinakill, Durrow, Kilkenny and Abbeyleix on accommodation, fuel, canteen supplies and hardware supplies during the construction phase.

c.160 persons will be working directly on the project over the course of the construction phase. It is unknown how many will be employed from the local population, but any additional spend by employees within the study area is unlikely to have a noticeable effect on the local economy.

The additional GVA generated, c.€6 million, is equivalent to approximately 2% of the overall size of the local economy in the Ballynalacken Windfarm Study Area, which is expected to be €308 million, in the year of construction.

The magnitude of the additional GVA generated in the local economy (2%) is assessed as Low.

Impact Magnitude	**Low**	**Impact Significance: *(pre-mitigation)***	**Imperceptible (Positive)**
Mitigation and Monitoring Measures: None required – Positive Effect			
Residual Impact Significance *(post-mitigation)*:			**Imperceptible (Positive)**

EIAR 17.3.2.2.3	**Strengthening the local economy**
Sensitive Aspect:	Local Economy
Sensitivity:	**Low** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Maintenance contracts, purchasing of materials and services, landowner payments, Community Benefit Scheme
Impact Pathway(s)	Financial transactions
Project Stage	Operation Phase

Overview of Impact (general):

An increase in gross value added (GVA) to business and employment opportunities in the Study Area due to the purchase of materials and services, employment, and payments to landowners which will result in secondary induced spending in the local economy. Additional revenue to the local community and subsequent development of community projects through the Community Benefit Scheme payment.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

The impact, while positive, will be low. During the operational phase of the Ballynalacken Windfarm Project, it is anticipated that c.10 persons employed – 1 site caretaker (local), 7 turbine maintenance workers, and 2 managers. The impact will be neutral given the size of the Study Area.

During the Operation Phase c.€4.2 million (annual average) will be spent on management, operation and maintenance, and materials for turbines. Of this:

- c.€12,000 per annum is local purchases on accommodation, fuel, food and hardware supplies
- c.€50,000 per annum is for local maintenance of roads and electrical equipment.

Financial contributions will be made to the local population via landowner payments and the Community Benefit Scheme. On average, this equates to c.€1 million annually for 35 years – 0.4% of the overall local economy:

- Lease payments totalling €700,000 annually will be paid to landowners involved in the Ballynalacken Windfarm Project
- c.€280,000 annually on the Community Benefit Fund

The magnitude of the additional GVA generated in the local economy (2%) is assessed as Low.

Impact Magnitude	**Low**	**Impact Significance:** ***(pre-mitigation)***	**Imperceptible (Positive)**

Mitigation and Monitoring Measures: None required – Positive effect. However, the following measures are noted:

OMM24	A Community Liaison Officer will be appointed for the duration of the operational phase of the windfarm and will act as a point of contact for the local community.
OMM25	A committee will be formed to oversee the distribution of the Community Benefit Fund. This committee will include the Community Liaison Officer and members of the local community.

Residual Impact Significance *(post-mitigation)*:	**Imperceptible (Positive)**

EIAR 17.3.2.2.4	**Decrease in Local Property Prices**
Sensitive Aspect:	Local Economy
Sensitivity:	**High** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Presence of wind turbines in an area
Impact Pathway(s)	Financial transactions
Project Stage	Operation Phase

Overview of Impact (general):

Potential or perceived reduction in demand or appeal for houses in the vicinity (within 1km and within 2km) of a proposed, new or established turbine or windfarm, resulting in a decrease in property prices. There are 54 houses within 1km and a further 105 houses between 1 and 2km from the windfarm. 17 no. of these properties relate to landowners involved in the Project.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

Indirect/secondary negative impacts on house prices in the vicinity (within 1km and within 2km) of a proposed, new or established turbine or windfarm have not been reliably established by state bodies or NGOs because where the operational impacts of the windfarm e.g. noise and shadow flicker are within allowable limits the matter of house resale values are subjective.

House prices are affected by multiple factors - supply and demand, availability of credit and low interest rates and economic cycles including downturn in employment. In the long term, it is considered that Climate Change will have profound impacts on economic stability with the economic consequences of extreme weather events, biodiversity loss and ecosystem collapse and increasing natural resource shortages causing shocks to the global economy. House prices will likely fluctuate in response.

On the positive side, it should be noted that there will be a considerable Community Benefit Fund linked to the operational phase of Ballynalacken Windfarm of €280,000 per annum distributed locally. Part of this Fund will be paid directly to near neighbours to reflect their proximity to the turbines. This can be considered an additional income attaching to the property. Also the fund will improve community services, arts and cultural funding locally, making the area in general more attractive to prospective buyers.

As detailed above, house resale values are multi-factorial and affected by many and diverse variables which cannot be reliably co-related. Overall, it is considered that houses prices in the long term will be more adversely affected by supply and demand dynamics and the response of global markets to the effects of climate change. Given the relatively low number of houses within 2km of the windfarm, it is considered that Significant Adverse impacts are not likely to occur. However, it is acknowledged that while most houses in the surrounding area will have Low magnitude impacts, those houses closest to the windfarm may experience larger Medium magnitude effects.

Impact Magnitude	**Low**	**Impact Significance:** ***(pre-mitigation)***	**Imperceptible - Slight**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

OMM24	A Community Liaison Officer will be appointed for the duration of the operational phase of the windfarm and will act as a point of contact for the local community.
OMM25	A committee will be formed to oversee the distribution of the Community Benefit Fund. This committee will include the Community Liaison Officer and members of the local community.
OMM26	Following the completion of the construction and commissioning of the Project, the Environmental Management Plan will be updated, and the operation of the Ballynalacken Windfarm will be carried out in accordance with the updated Plan. A suitably qualified Environmental Manager will be appointed by the Project Promoter, and it will be their responsibility to ensure that the EMP is implemented through liaising with the Asset Manager and by carrying out regular audits on EMP compliance. The EMP will be an important contract document for the Asset Management contractor who will be contractually obliged to comply with the EMP and the requirements of the Environmental Manager.

Effectiveness of Mitigation Measures: Overall, while it is considered that houses prices in the long term will be more adversely affected by supply and demand dynamics and the response of global markets to the effects of climate change, a suite of mitigation measures are included in the EIAR to protect the amenity of properties in the vicinity of the Ballynalacken project. These will be implemented during the construction, operation and decommissioning phases through the Environmental Management Plan. Furthermore, the windfarm will be required to comply with any planning conditions relating to the windfarm, in particular in relation to noise and shadow flicker.	
Residual Impact Significance *(post-mitigation)*:	**Imperceptible - Slight**

EIAR 17.3.2.2.5	**Secondary impact on walking & cycling routes tourism from the presence of a windfarm in the landscape**
Sensitive Aspect:	Tourism
Sensitivity:	**Moderate** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Operating turbines, operating substation
Impact Pathway(s)	Landscape
Project Stage	Operation Phase

Overview of Impact (general):

Walking and cycling are both activities in the Study Area engaged in by local residents, domestic and oversees visitors alike. The visual amenity of walking and cycling routes could be impacted upon by the presence of new above ground structures such as the Ballynalacken Windfarm turbines.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

All of the existing walking trails within the Study Area avail of screening from trees and forestry for much or all of their routes, which lessens the potential for views of Ballynalacken Windfarm, and therefore the associated visual impacts. The Heywood Gardens Loop does afford views of Ballynalacken Windfarm, particularly at the southern end of the loop walk, with the Durrow Leafy Loop walks likely experiencing intermittent views of the Ballynalacken Windfarm turbines. As per Chapter 14: Landscape, the visual impact from Ballinakill is considered to be **Moderate**, while the visual impact from Durrow is considered Slight.

The various cycling routes within the Study Area do provide views of Ballynalacken Windfarm, however such views would be intermittent and fleeting due to the lengths of the cycling routes, screening provided by buildings and vegetation, and the progression of cyclists along the route. The North Kilkenny Cycle Route follows the L5853 local road, c.1.2km from the closest Ballynalacken Windfarm turbine. As per Chapter 14: Landscape, the visual impact from this local road is considered **Imperceptible-Slight**.

Overall it is not considered that walking and cycling routes will experience significant visual impacts as a result of the presence of Ballynalacken Windfarm. While the worst-case visual impacts are considered to be **Moderate** (in Ballinakill), walkers and cyclists will be progressing in a linear manner along these routes, with views of the Ballynalacken Windfarm turbines intermittent. In this context the impact magnitude on walking and cycling tourism is assessed as **Low**.

Impact Magnitude	**Low**	**Impact Significance: *(pre-mitigation)***	**Slight**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by design	All the proposed turbines are set back several hundred metres from both local roads and the trails/loops within the locality.
OMM27	A viewpoint/picnic area will be provided at Site Entrance 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. This will afford a safe place to enjoy Viewpoint V19 "View west towards the Slieve Bloom Mountains on road no's LS5840 and LS5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)" as described in Kilkenny City and County Development Plan 2021 - 2027. The proposed Ballynalacken Windfarm turbines will be behind the viewer and therefore not visible within the Viewpoint V19 viewshed west.

Residual Impact Significance *(post-mitigation)*:	**Slight**

EIAR 17.3.2.2.6	**Secondary impact on scenic routes tourism from the presence of a windfarm in the landscape**
Sensitive Aspect:	Tourism
Sensitivity:	**Moderate** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Operating turbines, operating substation
Impact Pathway(s)	Landscape
Project Stage	Operation Phase

Overview of Impact (general):

Scenic views consist of the views and prospects designated in the Couty Development Plans within the Study Area. Such views could potentially be impacted upon by the presence of new above ground structures such as the Ballynalacken Windfarm turbines.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

There are 2 no. scenic views within the Study Area which look in the direction of Ballynalacken Windfarm, as per the Laois County Development Plan 2021-2027: scenic view 022 which offers views from Heywood Demesne towards Mass Lough and of Ballymartin Hill beyond, and scenic view 023 which offers views from Heywood Demesne over farmland and of Ballymartin Hill. There are no views designated in the Kilkenny County Development Plan looking in the direction of the proposed Ballynalacken Windfarm. As per Chapter 14: Landscape, the visual impact from Heywood Demesne is considered to be **Moderate**.

Overall it is not considered that the scenic views described above will experience significant visual impacts as a result of the presence of Ballynalacken Windfarm. While the worst-case visual impacts are considered to be **Moderate**, the Demesne itself is in the foreground of the view. The tourism product of Heywood Gardens and Demesne offers additional tourism experiences such as the gardens themselves, historic walks and a walk to Mass Lough. In this context the magnitude is assessed as Low.

Impact Magnitude	**Low**	**Impact Significance:** ***(pre-mitigation)***	**Slight**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

OMM27	A viewpoint/picnic area will be provided at Site Entrance 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. This will afford a safe place to enjoy Viewpoint V19 "View west towards the Slieve Bloom Mountains on road no's LS5840 and LS5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)" as described in Kilkenny City and County Development Plan 2021 - 2027. The proposed Ballynalacken Windfarm turbines will be behind the viewer and therefore not visible within the Viewpoint V19 viewshed west.

Residual Impact Significance *(post-mitigation)*:	**Slight**

EIAR 17.3.2.2.7	**Secondary impact on amenity areas tourism from the presence of a windfarm in the landscape**
Sensitive Aspect:	Tourism
Sensitivity:	**Moderate** (as per Section EIAR 17.3.2.1)
Impact Source(s)	Operating turbines, operating substation
Impact Pathway(s)	Landscape
Project Stage	Operation Phase

Overview of Impact (general):

While not located within the Ballynalacken Windfarm Study Area, there are amenities in the wider area which are important tourism sites. Such sites could potentially be impacted upon by the presence of new above ground structures such as the Ballynalacken Windfarm turbines.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

Kilkenny Castle and Castle Parklands, and St. Canice's Cathedral and Round Tower are important amenity areas in Kilkenny and are located c.17km south of Ballynalacken Windfarm. According to Fáilte Ireland, Kilkenny Castle Parklands attracted 1,418,171 visitors in 2022, while St. Canice's Cathedral saw 25,000 visitors that same year. The separation distance and screening by trees around the Castle Park, reduces the potential for visibility of Ballynalacken Windfarm from the Castle Park. Views are afforded from the top of St. Canice's Round Tower, but again from a distances of 17km. As per Chapter 14: Landscape, the visual impact from the top of St. Canice's Round Tower is considered Slight-imperceptible. Further the visual impact from St. Canice's Cathedral and Round Tower has also been assessed in the landscape chapter and Chapter 15: Cultural Heritage as Not Significant.

Overall it is not considered that the any views afforded from Kilkenny city will have an adverse effect on tourism to the city because of the multitude of tourism offering in Kilkenny city and the separation distance to Ballynalacken Windfarm. In this context the magnitude is assessed as **Low**.

Impact Magnitude	**Low**	**Impact Significance:** ***(pre-mitigation)***	**Slight**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by design	The proposed development design is largely in accordance with the guidance for this 'Hilly and Flat Farmland' landscape type, as set out in the Department of Environment, Heritage and Local Government Wind Energy Development Guidelines. Additionally, the site is located across a broad ridgeline in an area of the county that is deemed 'Acceptable in principle' for such wind energy developments in Kilkenny County Development Plan 2021-2027. The surrounding landscape is also influenced by more typical working rural land uses such as pastoral farmland, areas of commercial conifer forest plantations and numerous highly anthropogenic built features i.e. sizable industrial facilities, major routes, quarries and modest-sized settlements.
OMM27	A viewpoint/picnic area will be provided at Site Entrance 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. This will afford a safe place to enjoy Viewpoint V19 "View west towards the Slieve Bloom Mountains on road no's LS5840 and LS5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)" as described in Kilkenny City and County Development Plan 2021 - 2027. The proposed Ballynalacken Windfarm turbines will be behind the viewer and therefore not visible within the Viewpoint V19 viewshed west. See Figure 17.5: Carpark and Picnic Area Amenity on Cromwell's Road *(included at end of chapter)*

Residual Impact Significance *(post-mitigation)*:	**Slight**

EIAR 17.3.2.3 Cumulative Impact on Local Economy with Other Projects

EIAR 17.3.2.3.1 Introduction to the Cumulative Evaluation for Local Economy & Tourism

The Ballynalacken Windfarm Project (*whose effects range from Imperceptible to Slight Adverse and Slight Positive, as per Section EIAR 17.3.2.2*) is examined hereunder for potential to have cumulative effects on Local Economy & Tourism with other existing and permitted projects and projects advanced in the planning system. These projects are referred to as 'Other Projects' herein.

A Cumulative Study Area is set out below and Other Projects located within this Study Area are identified and examined for in-combination effects with the Ballynalacken Windfarm Project. The potential for off-site and secondary consequential development is also considered.

EIAR 17.3.2.3.2 Cumulative Study Areas

Local Economy: Electoral Divisions Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill. It is considered that this study area is sufficient as the cumulative evaluation focuses on local communities, and therefore the Local Economy, around the development.

Tourism: Electoral Divisions Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill. It is considered that this study area is sufficient as the cumulative evaluation focuses on local tourism products around the development which could be impacted by the Ballynalacken Windfarm Project.

EIAR 17.3.2.3.3 Evaluation of Cumulative Impacts

The Other Projects which occur within the Cumulative Study Area are identified in the table below and in Figure 17.6: Other Projects considered for Cumulative Effects to Local Economy (included at end of this chapter).

The Ballynalacken Windfarm Project is examined below for cumulative effects with each of the Other Projects within the Cumulative Study Area. An evaluation of the collective cumulative impact of the Ballynalacken Windfarm Project in-combination with all the Other Projects then follows.

Table 17-6: Evaluation of Ballynalacken Windfarm Project cumulatively with Other Projects

Other Project	Status	Evaluation of Cumulative Impact
Laois-Kilkenny Grid Reinforcement Project	Under Construction	No Cumulative Impact: Project will be constructed by the time the proposed Ballynalacken Windfarm Project commences construction. Any induced spending or disruption in the area will have already occurred.
Pinewood Wind Farm	Consented	Imperceptible Cumulative Impact (positive): According to the Pinewood EIAR, c.€15m could enter the local economy during the construction stage of the windfarm, with a Community Benefit Fund of €1000/MW committed during the operational phase. This is projected to have a Slight positive effect on the local economy and employment. However, the potential for cumulative impacts with Ballynalacken are limited due to the location of Pinewood Windfarm outside of County Kilkenny, with a very limited footprint within the Ballinakill ED and a substantially smaller community benefit fund - therefore any positive cumulative impacts of the two projects together will be imperceptible.
Pinewood Wind Farm	Consented	Not Significant Cumulative Impact on Tourism: Pinewood is a consented windfarm to the north of the study area (not constructed). The cumulative effect of the visual presence of more than one windfarm on the Castlecomer Plateau is considered in Landscape Chapter 14 wherein the landscape expert states that in relation to cumulative effects of the proposed Ballynalacken turbines being viewed in combination with other windfarm developments within the study area, they consider that cumulative development will result in some sense of windfarm proliferation

Other Project	Status	Evaluation of Cumulative Impact
		within the Castlecomer Plateau and its immediate surrounds. However, this upland plateau has a strong working character and is not considered unique or rare. The cumulative effect is considered to be Medium within the Castlecomer plateau and its immediate surrounds, which will reduce to Low in the wider surrounds of the study area where the proposed turbines will appear as small-scale distant features and are unlikely to generate any negative cumulative aesthetic effects with other wind energy development. Overall, it is considered that any cumulative effects will not be significant. The magnitude of any secondary impact on tourism activities of walking and cycling in the vicinity would be Low, considering the plateau setting and the movement of walkers and cyclists through the landscape offering intermittent views. Therefore the secondary impact on tourism of cumulative windfarms on the plateau will be Slight and therefore Not Significant.
Farranrory Wind Farm Grid Connection Parksgrove and Ballyragget Solar Farms Grid Connection Battery Energy Storage Developments, Moatpark	Consented	Imperceptible Cumulative Impact: Due to the nature of this project, which will likely be constructed by a contractor from outside of the area any contribution to the local economy will be negligible. Due to the relatively minor scale and temporary nature of construction works in the area around Moatpark any cumulative effects on tourism products in the area will be imperceptible. No road works are likely to be required for the BESS projects, and short sections of cable trenching in the regional road for the other grid connections, therefore cumulative impacts with the Ballynalacken Grid Connection, should they be constructed at the same time will be imperceptible.
Mixed Use Development, Castlecomer	Consented	Imperceptible Cumulative Impact (positive): While this retail and residential project will have a positive impact on the local economy in Castlecomer, due to the location away from the main construction works at the Ballynalacken Windfarm site, and the spending concentrated during the construction phases of the development, it is considered that the potential for cumulative impacts to the Castlecomer local economy will be imperceptible (positive).
Moatpark – Loan 38kV Overhead Line Telecoms Masts, Ballyouskill Agriculture Forestry	Ongoing	Neutral: Considered to be part of the baseline environment and contributing to the anthropogenic character of the locality.
Offsite Project – Forestry Replant Lands (outside of cumulative geographical boundary)	Future activity	No Cumulative Impact: Small scale with negligible contribution to the economy at national level. Due to location away from the Ballynalacken Windfarm Project site area excludes any potential for noticeable cumulative impacts to tourism.
Secondary Project – Other Energy Projects connecting to Tinnalintan Substation	Future project, unknown	Cumulative Impacts Not Likely: Future connections of other energy projects, which may arise due to the existence of the Tinnalintan Substation (if built), are currently not known. Other connections, should they occur, would likely involve the installation of underground cabling, either under agricultural land or alongside the public road/private access roads, or overhead line mounted on wooden poles. Such works are likely to be of relatively small scale and short duration, and likely to occur after construction of the Ballynalacken Windfarm Project is completed, therefore it is considered that t cumulative impacts on the local economy or tourism with the Ballynalacken Windfarm Project are unlikely to occur.

EIAR 17.3.2.3.4 Local Economy & Tourism – Cumulative Evaluation

As detailed in the evaluations in the table above, the Ballynalacken Windfarm Project will not result in significant cumulative impacts with any of the Other Projects within the Cumulative Study Area.

When the effects of the Ballynalacken Windfarm Project on the Local Economy & Tourism, are considered collectively with all of the Other Projects within the Cumulative Study Area, it is evaluated that due to the general separation of construction works (either temporarily or geographically) with spending concentrated during the construction phases of the projects, the carrying out of renewables/grid projects by contractors who are likely to come from outside the study area, and the separation distance and separate administrative authorities associated with the Ballynalacken and Pinewood Wind Farms, that **the collective cumulative impact will not be significant.**

EIAR 17.3.3 Statement on Certainty and Sufficiency of Information Provided

Local Economy & Tourism: A clear documentary trail is provided throughout this chapter and chapter appendices to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from site-specific investigations, data and documents generated by public bodies and statutory agencies and from the other competent experts' assessments in this EIAR. The online baseline data was verified in the field.

There is no specific guidance on the production of a Population chapter of an EIA Report, with respect to economic activity and employment. However, extensive experience with EIA and planning systems together with the EPA guidance on EIAR preparation (May 2022) and the application of the IMPERIA methodology, has informed the production of this chapter.

Baseline data and trends for the local population have been derived from a range of national statistical data sources which annually collect and report statistics for geographic areas across the whole of Ireland and include datasets from the CSO census data.

Future trends are not anticipated to change enough to alter the baseline scenario when compared to the national average, the baseline environment information provided within this chapter is considered sufficient for the purpose of this assessment.

Human Health: A clear documentary trail is provided throughout this chapter and chapter appendices to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from the other assessments in this EIAR.

In respect of Population and Human Health, no material limitations or difficulties were encountered during the course of the studies carried out to inform the assessment of impacts of the Ballynalacken Windfarm Project on Population & Human Health.

EIAR 17.4 Summary Conclusion

LOCAL COMMUNITY HEALTH & WELLBEING: There would be an imperceptible impact during construction on water supply at the 3 No. abstraction points identified, with an associated negligible effect on local population health. Similarly, the impact on dust emissions during construction would also be imperceptible, with an associated negligible effect on local population health.

There would be a long-term positive impact on air quality during operation due to NOx savings. However, as these benefits would be diffuse across the region/Ireland, the resultant effect on local population health would be negligible.

This is also the case with the benefits on local population health from positive impacts on climate change. While the proposed development would contribute positively to climate change action, the benefits are diffuse nationally/globally and require collective action for any material change. However, the delivery of the Ballynalacken Windfarm project may improve perception of climate change action, with associated wellbeing benefits to those locally and would result in a minor beneficial effect on local population health.

During operation, there is the potential for changes in exposure to EMF. Due to the underground nature of transmission infrastructure, there would be no change in exposure to electric fields. The change in exposure to magnetic fields would be minor and would remain substantially within public exposure guidelines which are set to be protective of health. Therefore, the resultant effect on local population health would be negligible.

Noise from operational turbines would remain within permitted levels which are set to be protective of human health. The potential effects from AM and infrasound have also been considered, where it is concluded that there would be no potential for adverse effects due to the size of the turbines proposed. Overall, the effect on local population health from changes in the noise environment is considered to be minor adverse (not significant).

Concerns associated with the potential for photo epileptic seizures from shadow flicker have been raised. Similar to the above, it is concluded that the effect on local population health from shadow flicker is negligible due to the installation of Shadow Flicker control modules on all turbines which will be deployed if a complaint about shadow flicker effect from a residence within the 1170m Shadow Flicker Study Area (10-rotor diameters). Deployment of this module will turn off the turbine or turbines if the defined parameters for shadow flicker events, at a given receptor is predicted to occur. This will eliminate shadow flicker at the affected sensitive receptor.

With regards to landscape impacts, the secondary impact on local population health would be subjective and very much dependent on attitudes towards onshore wind projects and renewable energy in general. While there is potential for dissatisfaction, over time the wind turbines would become part of the landscape and any adverse perceptions are likely to improve. As a result, the effect on local population health would be negligible.

Overall, it is evaluated that the residual impact on Local Community Health & Wellbeing, will not be significant in all instances.

LOCAL ECONOMY: The proposed Ballynalacken Windfarm Project will impact the Local Economy during the construction phase through gross value added (GVA) to businesses & employment opportunities with c.€6 million of the construction spend occurring locally. During the operation phase the Local Economy will be strengthened through c.€1 million annual local payments relating to landowner payments; the community benefit fund and local operation & maintenance employment. Commercial rates of c.€800,000 will be paid to Kilkenny County Council annually. It is considered that in the context of the GVA of the local economy, the full employment status of the

study area and the strength of the County budget, the magnitude of the impact of the proposal is Low. The impact is assessed as positive but Imperceptible/Slight and therefore not significant. Similarly, in that context the cumulative impact of any additional windfarms or other large projects in the area would be positive but Imperceptible/Slight and therefore **Not Significant**.

TOURISM: Tourism in the area is limited to walking and cycling routes, designated scenic routes in Counties Kilkenny and Laois, and Garden trails in County Laois where the landscape forms part of the tourism experience. The proposed Ballynalacken Windfarm Project alone and cumulatively with other windfarms contemplated in the area, will have a visual presence on the landscape which has potential to indirectly impact tourism in the area. The magnitude of that impact is considered to be Low. Walkers and cyclists will be progressing in a linear manner along these routes, with views of turbines intermittent and with regard to Heywood Gardens and Demesne, there are additional tourism experiences such as the gardens themselves, historic walks and a walk to Mass Lough on offer. Further, mitigation proposed include provision of a viewpoint/picnic area at Site Entrance No.7 at Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. The secondary impact on local tourism is assessed as Slight and therefore **Not Significant**.

Additionally, it is considered that any views afforded of the Ballynalacken turbines from important sites in Kilkenny city (Kilkenny Castle and Parklands and St. Canice's Cathedral and Round tower) will not have any adverse effect on tourism in Kilkenny city because of the multitude of tourism offerings in Kilkenny and the substantial separation distance to the proposed turbines (17km). The impact on tourism to Kilkenny city is assessed as Slight and therefore **Not Significant**.

The cumulative impact on tourism of the visual presence of more than one windfarm on the Castlecomer Plateau is considered to be Slight. The Castlecomer plateau has a strong working character and is not considered unique or rare. The secondary impact on tourism activities of walking and cycling in the vicinity will be Slight and therefore **Not Significant**.

Overall, it is evaluated that the impact on the Environmental Factor, Population & Human Health, will be

- **Imperceptible/Slight (positive) impact alone and cumulatively on the Local Economy; and**
- **Slight secondary impact alone and cumulatively on Tourism.**
- Overall, it is evaluated that the **residual impact on Local Community Health & Wellbeing, will not be significant in all instances**.

Therefore the impact will Not be Significant.

EIAR 17.5 Reference List for Population & Human Health

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EIAR 17.6 List of Figures for Population & Human Health

FIGURES (overleaf)

EIAR 17.7 List of Appendices for Population & Human Health

APPENDICES (overleaf)

Figures for Population & Human Health

EIAR Chapter 17: Population and Human Health

Figure 17.1: Communities around the Ballynalacken Windfarm Project Site

Legend:

- Ballynalacken Windfarm Project
- Ballynalacken Windfarm Project (Haul Route Works)
- North Kilkenny Cycling Route
- Schools
- Castlecomer Discovery Park
- Heywood Gardens
- Kilkenny Scenic Views

Heywood Gardens

BALLINAKILL

DURROW

BALLYOUSKILL

ATTANAGH

BALLYRAGGET

CASTLECOMER

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12

V19

V12

R432

R694

N77

N78

North Kilkenny Cycle Route

Castlecomer Discovery Park

N

EIAR Chapter 17: Population and Human Health

Figure 17.2: Local Population and Community

Legend:

- Ballynalacken Windfarm Construction Works Area
- Residential Properties within 2km of a Ballynalacken Turbine
- Residential Properties within the 50m and 250m Study Area
- Residential Properties within the 2km, 50m and 250m Study Area
- Residential Properties within the 2km, 250m and 100m Study Area
- Residential Properties within the 50m, 250m and 100m Study Area
- Residential Properties within the 500m, 250m and 100m Study Area

Windfarm Control Building

Internal Cable Link

Ballynalacken Grid Connection

Tinnalintan Substation

Eirgrid Ballyragget Substation

N

EIAR Chapter 17: Population and Human Health

Figure 17.3: Local Economy

Legend:

- Ballynalacken Windfarm Project
- Ballynalacken Windfarm Project (Haul Route Works)
- Electoral Divisions
- Study Area for Local Economy

BALLINAKILL

DURROW

ATTANAGH

BALLYRAGGET

KILMACAR

CASTLECOMER

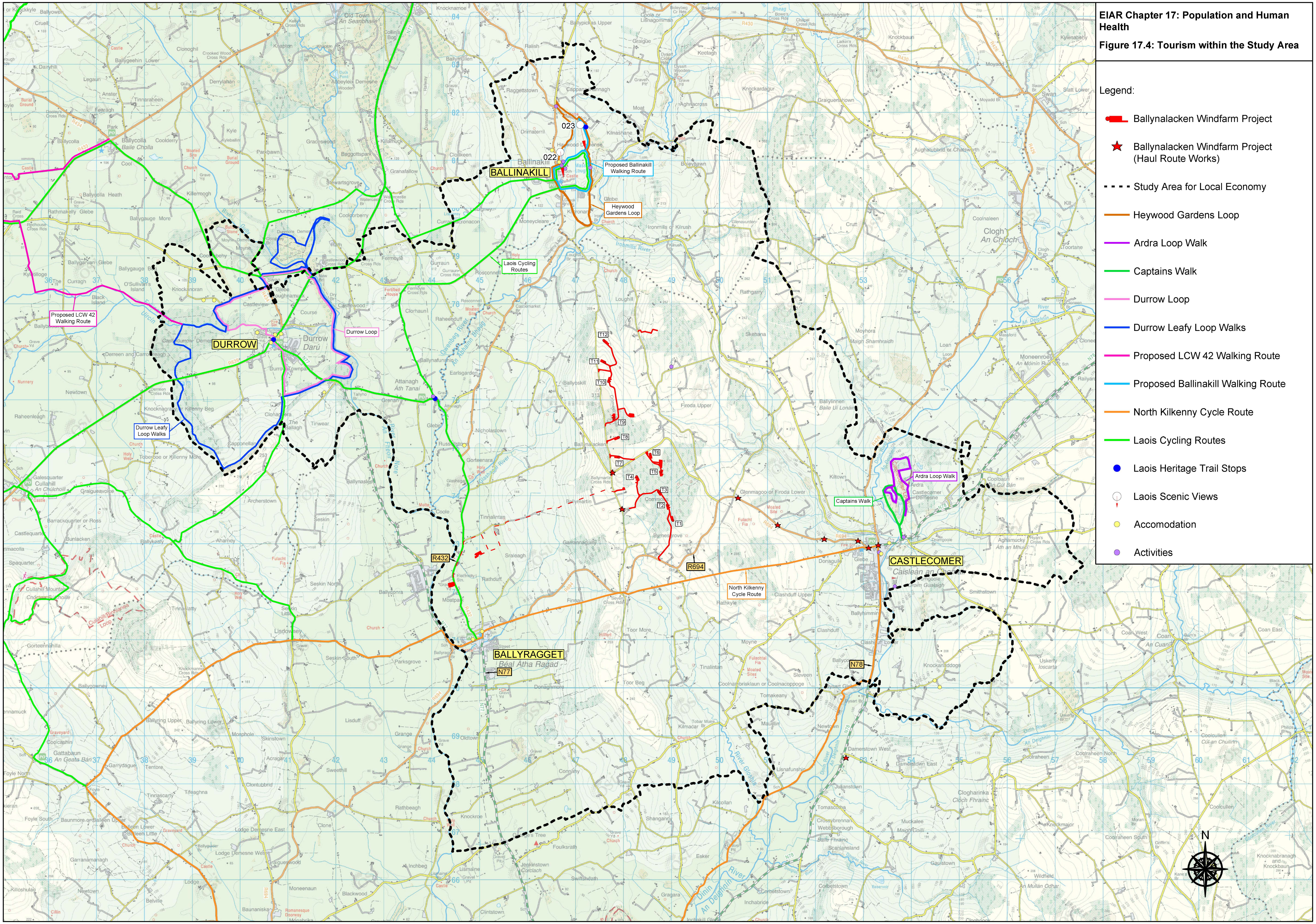
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12

R432 R694 N77 N78

N

EIAR Chapter 17: Population and Human Health

Figure 17.4: Tourism within the Study Area



EIAR Chapter 17: Population and Human Health

Figure 17.5: Carpark and Picnic Area Amenity on Cromwells Road

Visual Splay

Entrance Gates for walkers

Kilkenny County Development Plan - V19: "View west towards the Slieve Bloom Mountains on road no's L5840 and L5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)

Windfarm hardcore - Access road

Picnic Benches

1.74

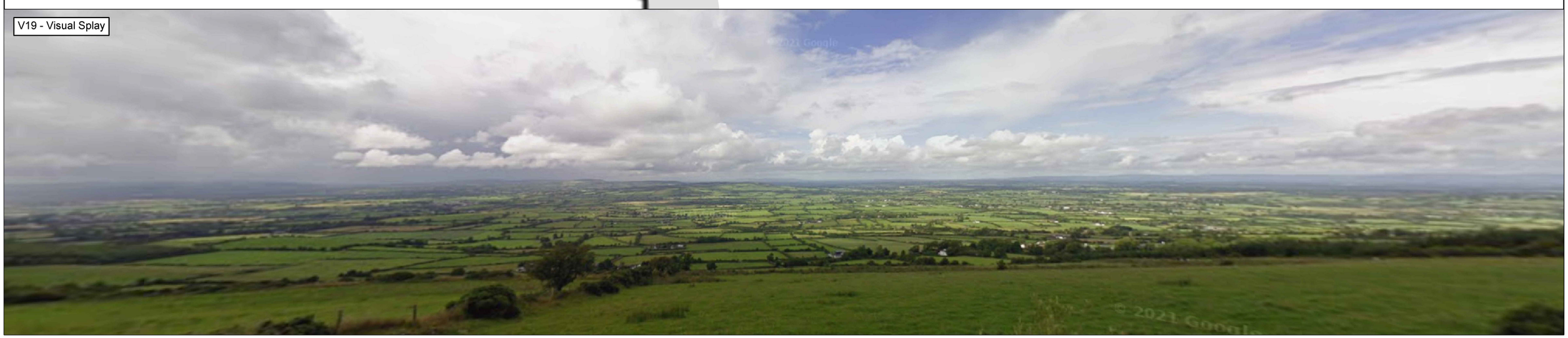
Information Boards - to include Local Archaeology and Viewpoint imformation

Windfarm Entrance Gate

Post, rail and mesh fencing

Site Entrance No. 7

Public Road L5840



EIAR Chapter 17: Population and Human Health

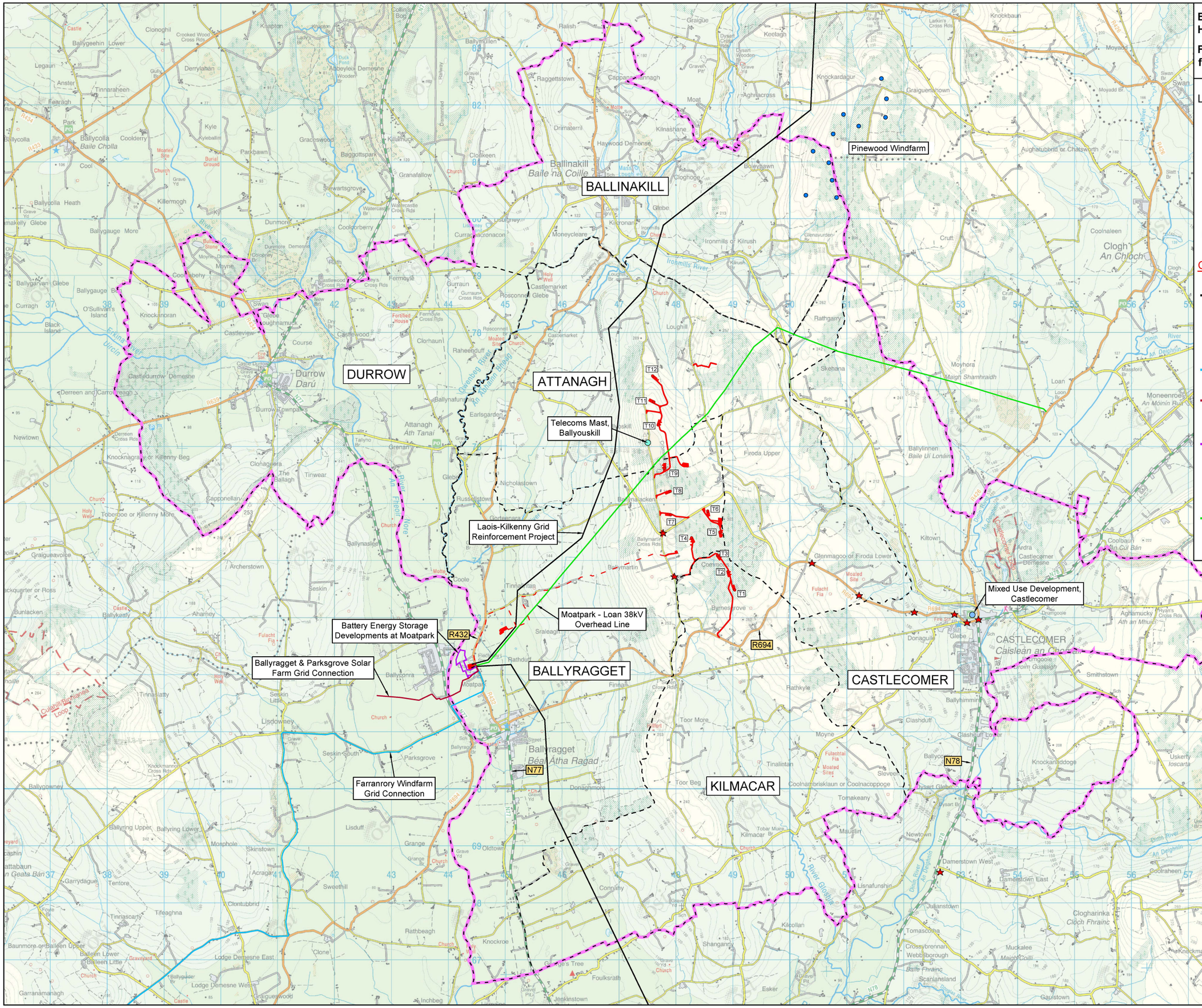
Figure 17.6: Other Projects considered for Cumulative Effects to Local Economy

Legend:

- Ballynalacken Windfarm Project
- Ballynalacken Windfarm Project (Haul Route Works)
- Electoral Divisions
- Study Area for Local Economy

Other Projects:

- Laois - Kilkenny Grid Reinforcement Project
- Pinewood Windfarm
- Farranrory Windfarm Grid Connection
- Ballyragget and Parksgrove Solar Farms Grid Connection
- Battery Energy Storage Developments at Moatpark
- Mixed Use Development, Castlecomer
- Moatpark - Loan 38kV Overhead Line
- Telecoms Mast, Ballyouskill



Appendix 17.1: Central Statistics Office Data

Appendix to Chapter 17: Population & Human Health

Appendix 17.1: Central Statistics Office Data

Table of Contents

A17.1.1 Introduction

The data and descriptions in this appendix have informed Chapter 17: Population and Human Health of the EIA Report, in relation to the existing Local Economy environment.

Data is sourced primarily from the Census of Population 2022, with data from previous censuses used for trend analysis.

Ballynalacken Windfarm, including the grid connection to EirGrid Ballyragget Substation, is located in three Electoral Divisions (EDs) – Kilmacar, Ballyragget and Attanagh – all located in north County Kilkenny. These EDs, including surrounding urban areas containing local businesses and labour forces that could potentially be impacted by the Ballynalacken Windfarm Project, are included as the Ballynalacken Windfarm Study Area.

Where possible, data relating to the Ballynalacken Windfarm Study Area is compared to the State averages to provide an insight as to how the Electoral Divisions potentially impacted by the Ballynalacken Windfarm Project compare to the rest of Ireland.

A17.1.2 Population and Age Profile

The total population of the Ballynalacken Windfarm Study Area came to 7,080 as of Census 2022. The populations of all Electoral Divisions (EDs) have increased over the 20-year period 2002 – 2022, with no ED exhibiting a decrease in population.

Population levels, growth and density vary considerably between ED. Castlecomer stands out with the highest population and population density over the 20 years, however it has experienced the lowest population growth over the same period. Population density in the Ballynalacken Windfarm study area, as one would expect for a largely rural area, is low.

There are two towns in the Ballynalacken Windfarm Study Area within County Kilkenny, Ballyragget and Castlecomer, as well as the village of Ballyouskill. The Kilkenny County Council Settlement Hierarchy per the Kilkenny County Development Plan 2021-2027 details the following:

- Castlecomer is classed in the 3rd tier, “Towns >1,500 in population”;
- Ballyragget is classed in the 4th tier, “Rural Towns and Villages”;
- Byrnesgrove and Connahy are in the 5th tier, “Rural Nodes and the wider rural area”.

The Settlement Hierarchy for Laois, as per the Laois County Development Plan 2021-2027, details the following:

- Durrow is in the 4th tier, "Towns and Villages";
- Ballinakill is in the 6th tier, "Rural Remainder (including villages with population <500).

Table 1: Population, 2002-2022

ED	2022	2016	2011	2006	2002	% Change 2002-2022	Population Density per km²
Attanagh	404	385	395	368	350	15.4%	16.1
Ballyragget	1,587	1,513	1,532	1,451	1,272	24.8%	59.4
Kilmacar	471	449	452	426	412	14.3%	20.2
Castlecomer	2,397	2,318	2,293	2,407	2,314	3.6%	78.3
Ballinakill	838	826	792	782	682	22.9%	42.3
Durrow	1,383	1,258	1,278	1,262	1,164	18.8%	53.4
Ballynalacken Windfarm Study Area	**7,080**	**6,749**	**6,742**	**6,696**	**6,194**	**14.3%**	**46.8**
Total State	**5,149,139**	**4,761,865**	**4,588,252**	**4,239,848**	**3,917,203**	**31.4%**	**73.3**

Source: CSO Census of Population, various years

As seen in Table 2, the age structure of the population of the Ballynalacken Windfarm Study Area is not radically different from the State average, although there is a lower proportion of people aged 25-44 and a higher proportion of people aged 45+. There is also some variation between EDs with some exhibiting a lower proportion of young people and a higher proportion of older people, such as Ballyragget and Castlecomer.

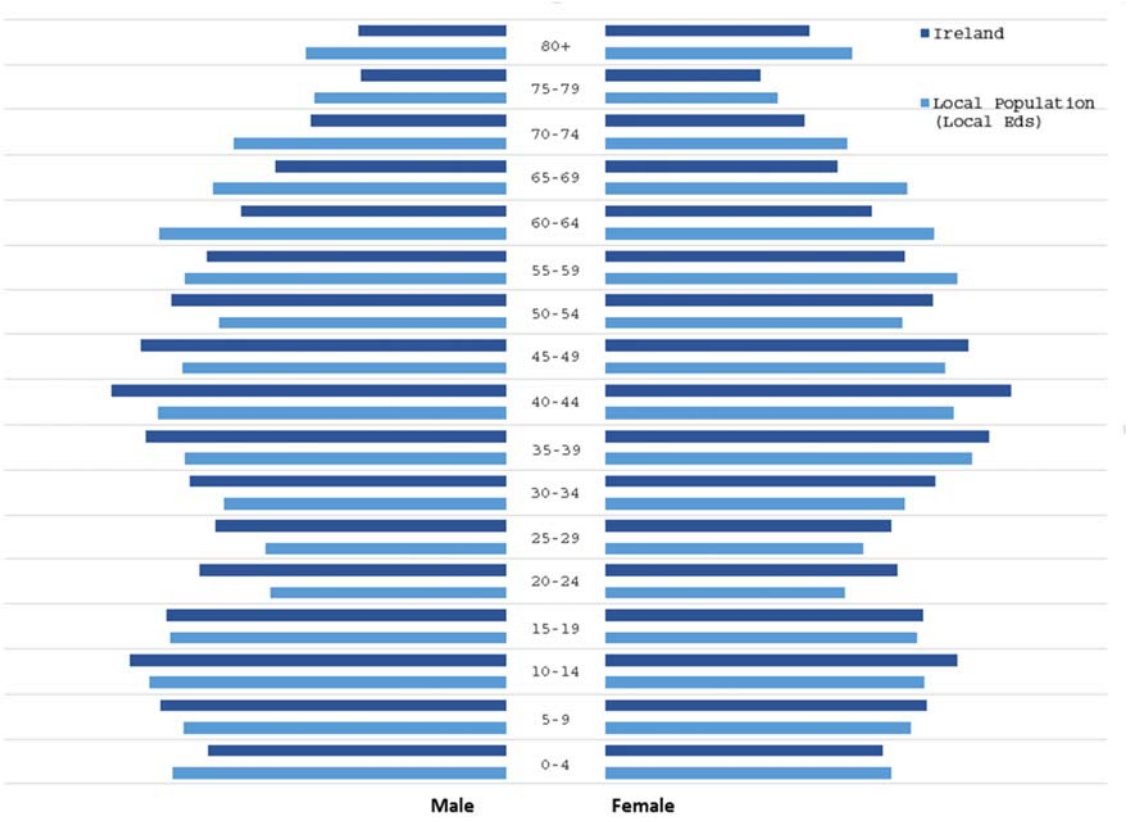
Table 2: Population Age Profile, 2022

ED	≤15	15-24	25-44	45-64	≥65
Attanagh	22.0%	10.9%	26.0%	27.0%	14.1%
Ballyragget	19.2%	11.0%	23.6%	24.2%	22.0%
Kilmacar	18.5%	13.4%	23.6%	28.5%	16.1%
Castlecomer	16.9%	11.7%	25.2%	26.6%	19.6%
Ballinakill	21.6%	9.5%	27.0%	27.0%	18.6%
Durrow	21.3%	10.8%	24.9%	24.9%	17.8%
Ballynalacken Windfarm Study Area	**19.2%**	**11.2%**	**24.6%**	**25.9%**	**19.1%**
Total State	**19.7%**	**12.5%**	**27.6%**	**25.1%**	**15.1%**

Source: CSO Census of Population, 2022

The population age structure within the study area is shown on Graph 1. Dark blue bars indicate the male and female population percentages of the population of the State, while the light blue bars indicate the male and female percentages of the Ballynalacken Windfarm Study Area for each age category.

Graph 1: Population Structure of the Study Area compared to Ireland



Source: Census of Population, 2022

As shown in Graph 1, local residents and communities in the study area are generally of a similar demographic to the national average. The most significant differences can be seen in the older age categories where there is a significantly larger percentage of females aged 55+ and a lower percentage of both genders aged 20-44 in the study area compared to the national average.

A17.1.3 Housing Stock, Age and Average Household Size

There were 2,573 private households (i.e. excluding guest houses, religious institutions etc.) identified in the Ballynalacken Windfarm Study Area in the 2022 Census, with average household sizes slightly lower than the Stage average at 2.72. The age of the stock in the study area is slightly older than the State average, with the percentage of housing stock built pre-1991 higher than the State average in all EDs. Conversely, Ballinakill ED had the highest percentage of housing stock built post-2000 in the Study Area, reflective of the rapid population expansion in that ED in recent years.

Table 3: Housing Stock, Average Household Size and Age, 2022

ED	# Private Households	Average Household Size	Pre 1991	1991-2000	Post 2000	Not Stated
Attanagh	131	3.09	57%	10%	29%	4%
Ballyragget	563	2.70	56%	7%	35%	2%
Kilmacar	156	2.99	56%	15%	26%	3%
Castlecomer	928	2.57	58%	14%	27%	1%
Ballinakill	296	2.84	54%	7%	38%	0%
Durrow	499	2.75	57%	9%	30%	4%
Ballynalacken Windfarm Study Area	**2,573**	**2.72**	**57%**	**11%**	**31%**	**2%**
Total State	**1,836,728**	**2.74**	**51%**	**15%**	**32%**	**2%**

Source: CSO Census of Population, 2022

A17.1.4 Commuting Patterns

The Census presents the commuting patterns of the population in school, college or work (aged 5+) in the Ballynalacken Windfarm Study Area as well as the lengths of those commutes. Local commuters are dependent on private transport to a varying degree, with a high usage of motor vehicles and low percentage of walkers and cyclists, while being marginally less dependent on public transport than the State average, as one would expect for a rural area, although there is a moderate usage of buses in the Ballynalacken Windfarm Study Area. All EDs are highly car dependent with Ballinakill having the highest dependency at 78%.

Table 4: Commuting Mode of Transport, Population Aged 5+, 2022

ED	Walk	Bicycle	Bus	Motor Vehicle (inc. passengers)	Train	Other & Not Stated
Attanagh	4%	0%	8%	76%	0%	10%
Ballyragget	10%	0%	11%	67%	0%	12%
Kilmacar	4%	1%	6%	77%	1%	12%
Castlecomer	13%	0%	3%	72%	0%	11%
Ballinakill	6%	0%	2%	78%	1%	13%
Durrow	9%	0%	11%	61%	1%	17%
Ballynalacken Windfarm Study Area	**10%**	**0%**	**7%**	**70%**	**1%**	**13%**
Total State	**13%**	**3%**	**9%**	**58%**	**2%**	**15%**

Source: CSO Census of Population, 2022

Commute journey times in the study area are not greatly different from the State average on an overall basis, but there is some variation. The proportion of commuters travelling less than 15 minutes to work is equal to or higher than the State average in all EDs, with the highest amount in Ballinakill at 44%, a statistic which may be reflective of the study areas proximity to Kilkenny and the employment opportunities available in Castlecomer and Ballyragget.

Table 5: Commute Journey Time, Population Aged 5+, 2022

ED	<15 min	15-30 min	30-45 min	45 min – 1 hour	1-1.5 hours	>1.5 hours	Not stated
Attanagh	29%	27%	26%	4%	6%	4%	4%
Ballyragget	30%	29%	21%	4%	4%	4%	8%
Kilmacar	33%	27%	21%	4%	6%	5%	5%
Castlecomer	36%	24%	18%	3%	6%	5%	8%
Ballinakill	44%	21%	16%	5%	4%	4%	7%
Durrow	35%	22%	19%	4%	4%	4%	11%
Ballynalacken Windfarm Study Area	**35%**	**25%**	**19%**	**4%**	**5%**	**4%**	**8%**
Total State	**29%**	**28%**	**17%**	**6%**	**6%**	**3%**	**11%**

Source: CSO Census of Population, 2022

A17.1.5 Economic Profile

The 2022 Census allows us to ascertain the employment and economic status of the inhabitants of the study area. The Ballynalacken Windfarm Study Area's local labour force in 2022 numbered approximately 3,318, with 3,084 of these at work. Just over 33 percent of this labour force is resident in Castlecomer ED at the eastern end of the study area. The labour market characteristics of the Study Area are slightly better than the State average, with a lower unemployment rate and similar labour force participation rate, but these vary by ED.

Table 6: Employment Status, Labour Force Aged 15+, 2022

ED	At work	Unemployed	Labour Force	Implied Unemployment Rate
Attanagh	199	8	207	3.9%
Ballyragget	678	45	723	6.2%
Kilmacar	224	8	232	3.4%
Castlecomer	1,017	104	1,121	9.3%
Ballinakill	357	20	377	5.3%
Durrow	609	49	658	7.4%
Ballynalacken Windfarm Study Area	**3,084**	**234**	**3,318**	**7.1%**
Total State	**2,320,297**	**210,802**	**2,531,099**	**8.3%**

Source: CSO Census of Population, 2022

Some 58 percent of the Ballynalacken Windfarm Study Area's population aged 15+ is in the labour force (either at work or looking for work), with a further 9 percent in education, 7 percent homemakers and 19 percent retired, all close to the State average.

Looking at historic trends, the labour force in the Ballynalacken Windfarm Study Area per the 2002 Census was 2,697, with an unemployment rate of 8.9 percent; by the 2006 Census the labour force had increased to 3,124, while the unemployment rate had fallen slightly to 8.5 percent. Comparing the 2002 data with the 2022 data, two developments are clear:

- The labour force in the Ballynalacken Windfarm Study Area grew strongly, by more than 23 percent (dominated by Attanagh ED at 64 percent);
- Labour market conditions deteriorated markedly, then improved, with the unemployment rate falling between 2002 and 2006, before more than doubling from 8.5% to 20.5% by 2011. By Census 2022, the unemployment rate had fallen to 7.1% in the Ballynalacken Windfarm Study Area, the lowest unemployment rate in the previous 20 years.

Table 7: Principal Economic Status, Population 15+, 2022

ED	At work %	Unemployed %	Labour Force Participation Rate	Implied Unemployment Rate	Student %	Home-maker %	Retired %	Other %
Attanagh	63%	3%	66%	3.9%	11%	8%	13%	3%
Ballyragget	53%	4%	56%	6.2%	8%	7%	22%	7%
Kilmacar	58%	2%	60%	3.4%	12%	8%	15%	5%
Castlecomer	51%	5%	56%	9.3%	9%	6%	20%	8%
Ballinakill	54%	3%	57%	5.3%	9%	10%	18%	5%
Durrow	56%	4%	60%	7.4%	10%	8%	17%	4%
Ballynalacken Windfarm Study Area	**54%**	**4%**	**58%**	**7.1%**	**9%**	**7%**	**19%**	**6%**
Total State	**56%**	**5%**	**61%**	**8.3%**	**11%**	**7%**	**16%**	**5%**

Source: CSO Census of Population, 2022.

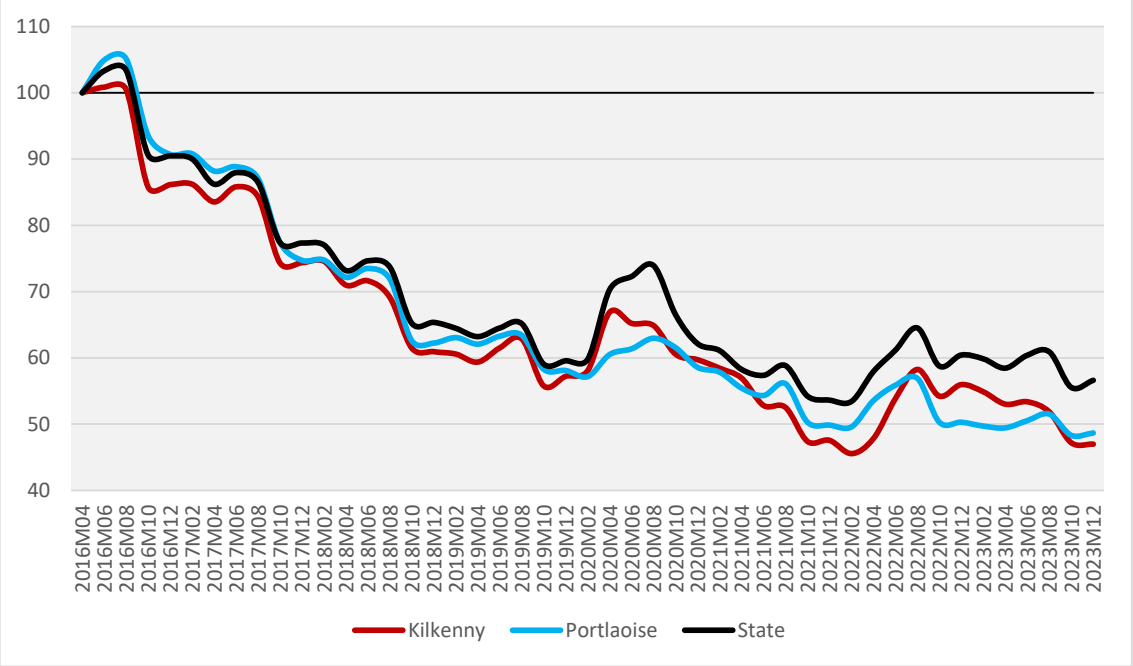
In terms of developments since the 2016 Census, labour market conditions have improved greatly. At a national level as per the Labour Force Survey (CSO 2018; CSO 2024a), the unemployment rate has more than halved from 9.1% in Q2 2016 to 4.2% in Q4 2023, while for the south-east region, which contains four of the above EDs (Attanagh, Ballyragget, Kilmacar and Castlecomer), the equivalent fall has been from 9.4% to 4.3% for the same period. The remaining two EDs, Ballinakill and Durrow, are in the Midland region which has seen unemployment fall from 13.0% to 5.5% over the same period.

More localised data is available in the form of monthly Live Register statistics from the Social Welfare offices (see Graph 2). Discussions with the Department of Social Protection have identified that residents of the study area would "sign on" in the following Social Welfare Offices: Kilkenny Intreo Centre and Portlaoise Branch Office. Many more people from outside the Ballynalacken Windfarm Study Area would also sign on at these offices, so the data does not relate precisely to the study area, and the Live Register is not an exact indicator of unemployment[1], but it does point to a significant improvement in local labour market conditions in the years since the 2016 Census of Population.

The data in Graph 2 is expressed as an index with April 2016 (the date of the Census) equal to 100 to allow comparability across the offices. Labour market conditions initially disimproved but have since improved substantially. The numbers now signing on at these offices have dropped between 51.3 percent and 53 percent of their 2016 levels, with Kilkenny performing better than Portlaoise. This compares to a 43.4 percent fall in the State overall.

[1] A number of categories of people are on the Live Register who would not be considered unemployed, including those signing on to maintain their social insurance credits and people working part-time.

Graph 2: Live Register, Local Social Welfare Offices & State, April 2016 to December 2023, Index (April 2016 = 100)



Source: CSO, 2024b

The 2022 Census also identifies the broad sectoral categories that the local labour force works in. In 2022, some 8% of the Ballynalacken Windfarm Study Area's workforce was engaged in Agriculture, Forestry & Fishing, double the State average of 4%. A further 8% were engaged in the Building & Construction sector, 23% in Commerce and Trade, 27% in Professional Services and 6% in the Public Sector. Ballyragget and Castlecomer stand out as having the fewest workers engaged in Agriculture, Forestry & Fishing and relatively more in Commerce & Trade, indicating a pattern of commuting to larger urban areas for work.

Comparing the 2022 Census with previous censuses, some trends are clear. Between 2002 and 2022:

- The proportion of the workforce in the Ballynalacken Windfarm Study Area engaged in Agriculture, Forestry & Fishing fell from 12% to 8%, with the actual numbers falling from 288 to 247;
- The proportion engaged in Construction fell from 11% to 8%, and numerically from 278 to 233;
- The proportion engaged in Professional Services grew from 15% to 27%.

These changes point to strong long-term trends in the workforce, reflecting those in the wider economy.

Table 8: Sectoral Employment, Population Aged 15+, 2022

ED	Agriculture Forestry & Fishing	Building & Construction	Manufacturing Industries	Commerce & Trade	Transport & Communications	Public Admin	Prof. Services	Other
Attanagh	15%	12%	11%	19%	6%	7%	24%	8%
Ballyragget	5%	9%	12%	24%	5%	4%	28%	13%
Kilmacar	18%	7%	9%	21%	4%	5%	28%	8%
Castlecomer	5%	6%	11%	24%	3%	5%	30%	15%
Ballinakill	11%	6%	15%	20%	5%	8%	28%	7%
Durrow	9%	8%	7%	23%	6%	8%	23%	15%
Ballynalacken Windfarm Study Area	**8%**	**8%**	**11%**	**23%**	**5%**	**6%**	**27%**	**13%**
Total State	**4%**	**6%**	**12%**	**24%**	**9%**	**6%**	**24%**	**16%**

Source: CSO Census of Population, 2022

The 2022 Census allows us to assess the socio-economic status of the labour force. This indicates the type of work people do, rather than the sector they work in. A lower than average proportion of the workforce in the Ballynalacken Windfarm Study Area is categorised as Professional/Managerial or Non-Manual workers, while a higher proportion is categorised as Agricultural. Ballyragget and Castlecomer are closer to the State averages than the other EDs in the study area.

Table 9: Socio-Economic Status, Head of Household, 2022

ED	Professional /Managerial	Lower Professional	Non-Manual	Skilled	Semi/ Unskilled	Agriculture	Others
Attanagh	14%	5%	27%	15%	7%	21%	12%
Ballyragget	13%	5%	29%	14%	16%	6%	16%
Kilmacar	15%	8%	28%	8%	9%	25%	7%
Castlecomer	13%	3%	35%	11%	15%	5%	18%
Ballinakill	14%	2%	30%	11%	12%	13%	17%
Durrow	15%	3%	33%	12%	8%	10%	18%
Ballynalacken Windfarm Study Area	**14%**	**4%**	**32%**	**12%**	**13%**	**10%**	**16%**
Total State	**16%**	**7%**	**34%**	**9%**	**11%**	**4%**	**19%**

Source: CSO Census of Population, 2022

The Pobal HP Deprivation Index can also be used to provide an insight into the relative socio-economic conditions of EDs within the Study Area. Data is available for a range of categories such as unemployment, educational attainment and population change, and is used to score areas based on their relative affluence to the State average[2]. Attanagh and Kilmacar are the only EDs in the Study Area to score positively and are considered marginally above average in terms of affluence, scoring 3.37 and 6.37 respectively. All other EDs in the Study Area are considered marginally below average, with Ballyragget scoring lowest at -4.80.

[2] Data is expressed as an index where the State average is given a score of 0. Areas scored positively (>0) are considered more affluent than the State average, while areas scored negatively (<0) are considered more disadvantaged than the State average.

A17.1.6 Self-Reported General Health

General health was self-reported during the 2022 Census of Population. General health included the presence or absence of a disability, along with an indication of the overall state of health. Disability and general health in the study area are both generally in line with the State average.

Table 10: Persons with a disability, 2022

ED	Persons with a disability	Persons with a disability % of population
Attanagh	90	22.3%
Ballyragget	393	24.8%
Kilmacar	91	19.3%
Castlecomer	599	25.0%
Ballinakill	183	21.8%
Durrow	263	19.0%
Ballynalacken Windfarm Study Area	**1,619**	**22.9%**
Total State	**1,109,557**	**21.5%**

Source: CSO Census of Population, 2022

Table 11: Population by general health, 2022

ED	Very good	Good	Fair	Bad	Very Bad	Not Stated
Attanagh	249	120	27	3	3	2
Ballyragget	834	491	140	27	10	85
Kilmacar	289	138	31	3	0	10
Castlecomer	1,194	778	283	48	12	82
Ballinakill	481	249	73	10	3	22
Durrow	693	426	124	13	3	124
Ballynalacken Windfarm Study Area	**3,740**	**2,202**	**678**	**104**	**31**	**325**
	84%		**10%**	**2%**		**5%**
Total State	**83%**		**9%**	**2%**		**7%**

Source: CSO Census of Population, 2022

A17.1.7 Public Health Statistics for Kilkenny & Laois

HSE (Lenus) statistics for physical, mental and social health status of the populations of Kilkenny and Laois are summarised and compared to the national average in Table 12.

Cells highlighted in green indicate a better health status than the national average, while red highlighted cells represent a worse health status compared to the national average.

Table 12: Kilkenny & Laois Health Baseline Compared to the Ireland Average

Indicator	Kilkenny	Laois	Ireland Average
Limiting Long-Term Illness			
Total persons with a disability	12.5%	12.7%	13.0%
Condition that limits basic physical activities	42.0%	39.1%	41.1%
Mental Health			
Psychological or emotional condition	15.0%	16.3%	16.1%
Suicide per 100,000	11.3	14	11.3
Debilitating self-harm per 100,000	389.3	316.5	423.1
5-Year Standardised Mortality Rates			
All deaths – all ages	531.8	541.7	563.6
Deaths – heart disease and stroke – all ages	177.0	192.0	182.8
Deaths – cancer – all ages	170.7	156.2	175.6
Deaths – respiratory disease – all ages	60.6	60.1	64.9

Source: HSE, 2015a; HSE, 2015b

As shown in Table 12, health status in Kilkenny is better than the national average for the majority of health status indicators. Of the selected indicators for comparison, conditions that limit basic physical activities is the only indicator which saw Kilkenny score higher than the national average. Overall, the most noticeable health status contrasts in Kilkenny compared to the national average are the lower mortality rates and instances of mental health issues.

While the health status in Laois is generally better than the national average for the majority of health status indicators, there is a higher incidence of mental health conditions and deaths from heart disease and stroke. Laois has scored considerably better than the Ireland average for deaths from cancer and incidences of debilitating self-harm, 11% and 25% lower than the national averages respectively.

A17.1.8 Reference List

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Appendix 17.2: Human Health Baseline Data

Appendix to Chapter 17: Population & Human Health

Appendix 17.2: Human Health Baseline Data

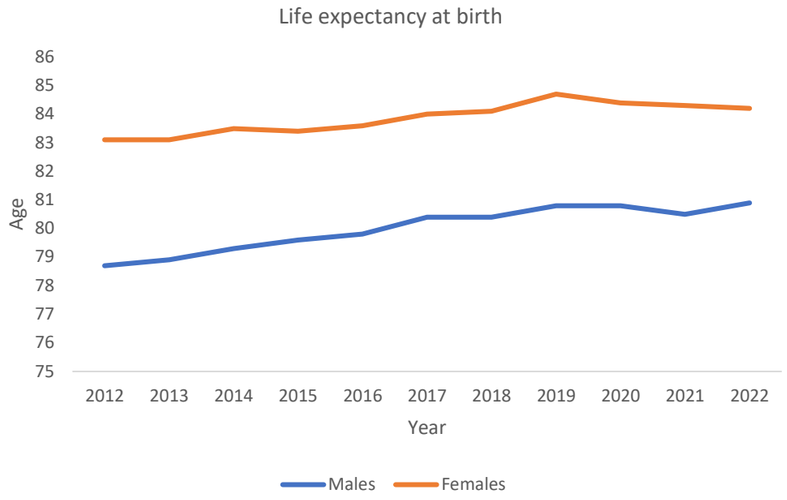
Human Health Baseline

Introduction

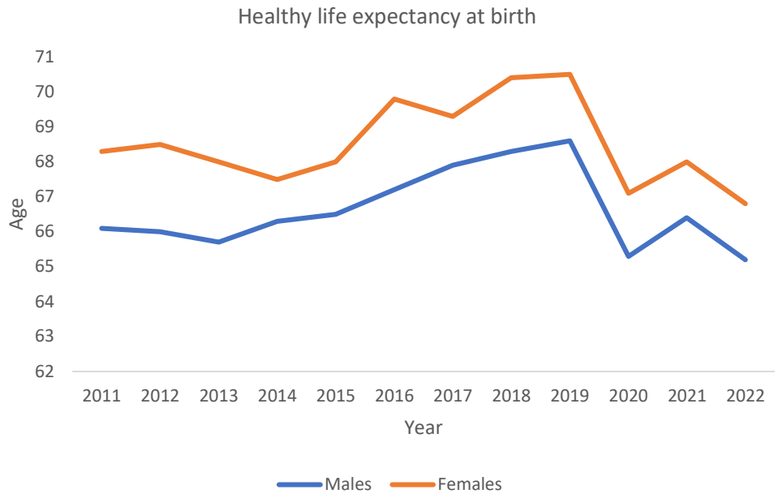
Individuals and communities vary in their susceptibility to adverse and/or beneficial population and health impacts associated with changes in environmental and socio-economic conditions as a result of demographic structure (i.e. age); existing burden of poor health; behaviours and lifestyle choices that constitute risk factors; and socio-economic circumstance. The following information, which makes up this human health baseline, is intended to contextualise the local health circumstance of the communities surrounding Ballynalacken Windfarm using publicly available statistics. When feasible, data has been collected for the Electoral Divisions (ED) (i.e. Attanagh, Ballyragget and Kilmacar) and were compared to the national average. County data (Kilkenny) or NUTS3 data (South-East) were utilised in instances where ED data were not available as a representative alternative.

Life expectancy and physical health

Key



Source: Eurostat



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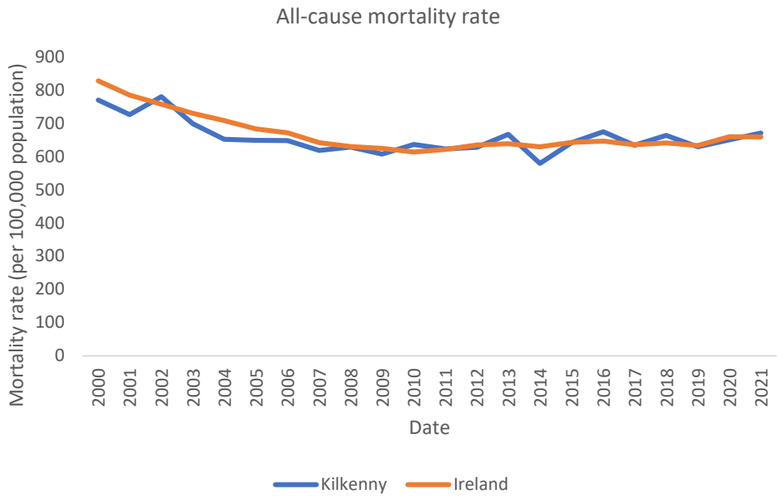
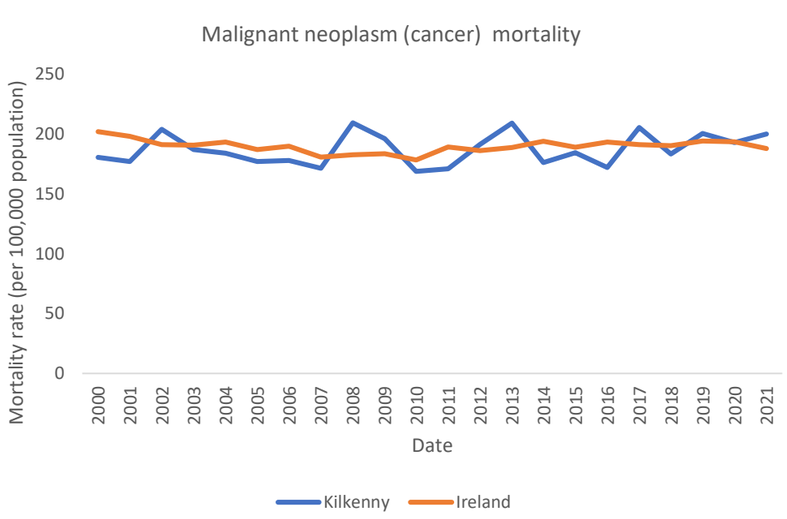


Source: Statbank (DHA12)



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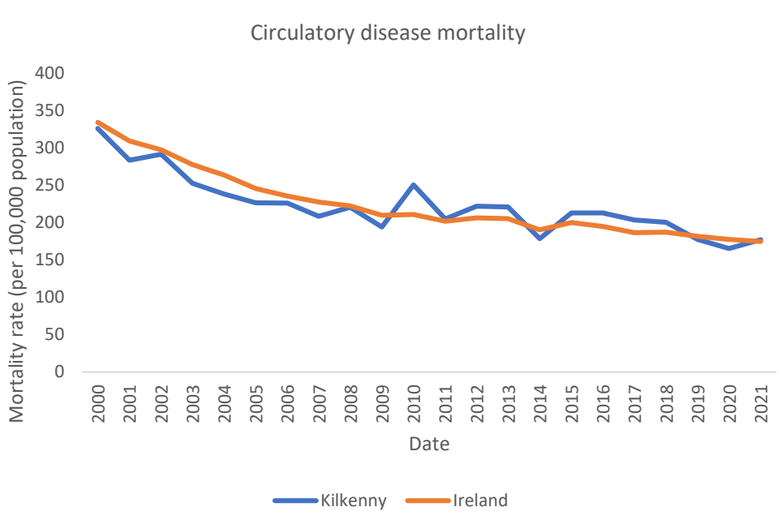

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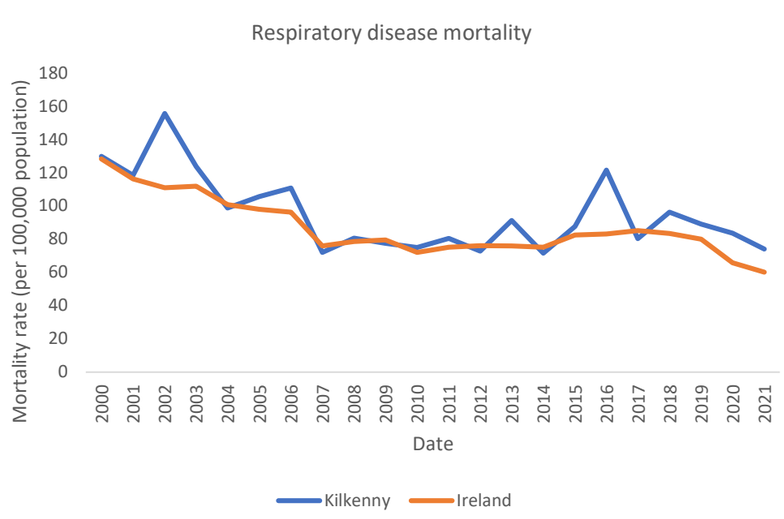


Source: Statbank (DHA12)

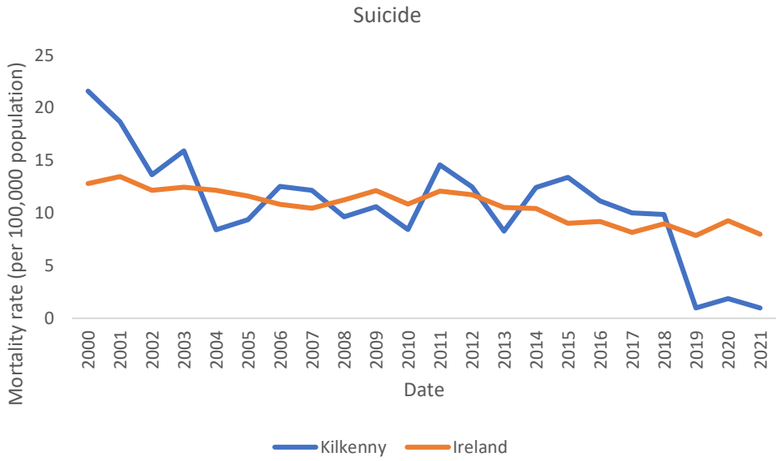
Life expectancy statistics are available for Ireland only. Both male and female life expectancy (LE) at birth have shown a general increase since 2012. Healthy life expectancy (HLE), which represents the number of years a person is in good health, also increased for both males and females since 2013 and 2014, respectively. Despite this, there was a decline in HLE between 2019-20 and 2021-22, which may be associated with the Covid-19 pandemic. Overall, female LE and HLE is consistently higher than for males.

All cause mortality rate in Kilkenny has fluctuated above and below the Ireland average since 2000, with most recent statistics showing a marginally higher all-cause mortality rate than nationally. Similar relationships can be seen when analysing specific causes of mortality (respiratory disease, circulatory disease and cancer). Consistent with national trends, mortality rate from respiratory disease and circulatory disease in Kilkenny have shown a general decrease over the years; mortality from all causes has also seen a general decrease over the years, which has plateaued in recent years; and mortality from cancer in Kilkenny has remained relatively static.

Mental health

The suicide rate in Kilkenny has fluctuated substantially over the years between 10-15 per 100,000 population and above/below the national average. In recent years (2019-21), suicide rate in Kilkenny has reduced to between 1-2 per 100,000 population, whereas the national average has remained fairly static at between 8-9 per 100,000 population.

Depression statistics are based on the data collected via The Irish Health Survey (IHS) conducted in 2019. The self-reported depression status reflects how respondents felt in the two weeks prior to the Survey. The depression rates among people aged 15 years and over are the same for the South East are similar to the national average, with 1% more people in South East having none to minimal depression and 1% less people in South East having moderate depression. The proportion of the South East population experiencing mild or moderately severe/severe depression is the same as the national average.



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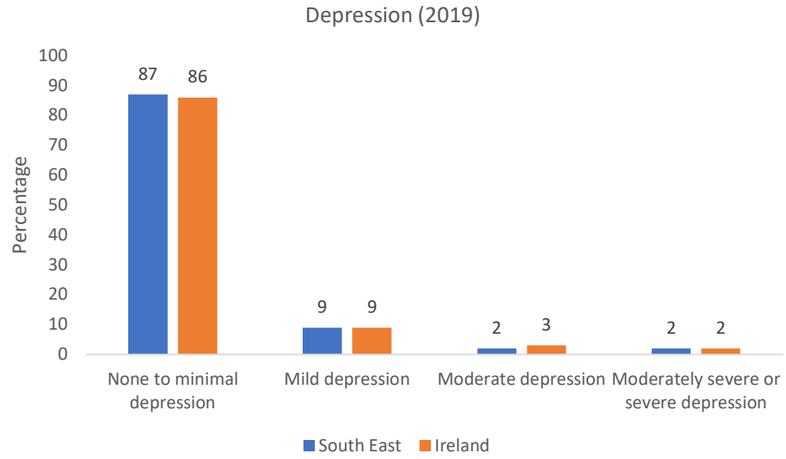
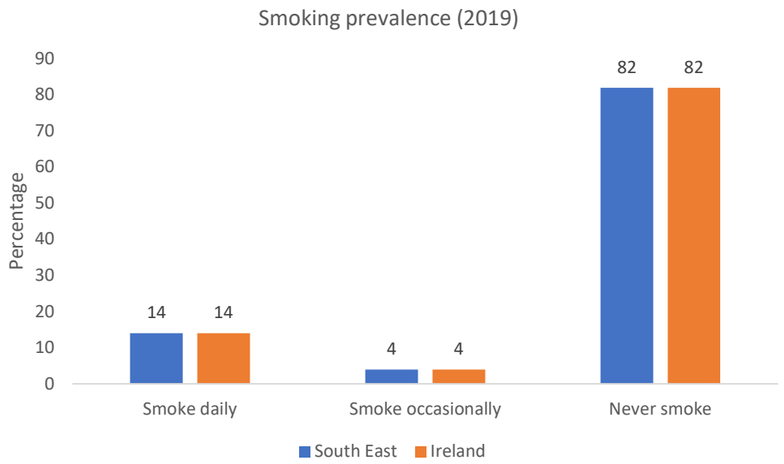


Source: Statbank (IH245 & IH243)

Lifestyle and behavioural factors



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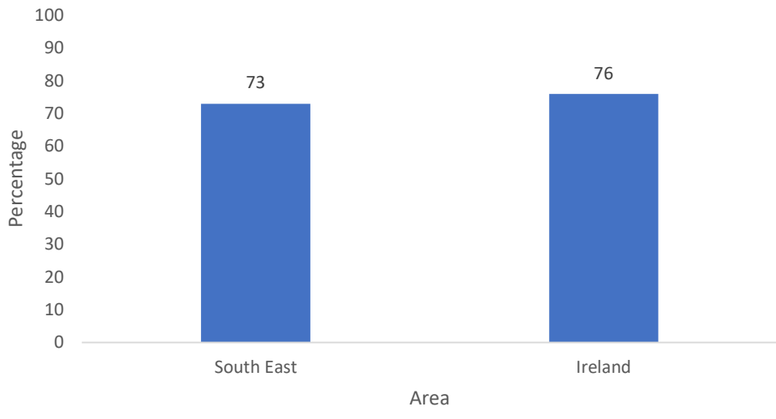

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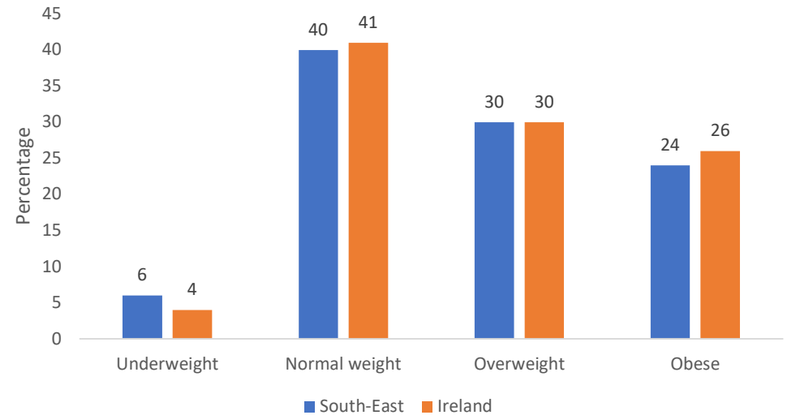
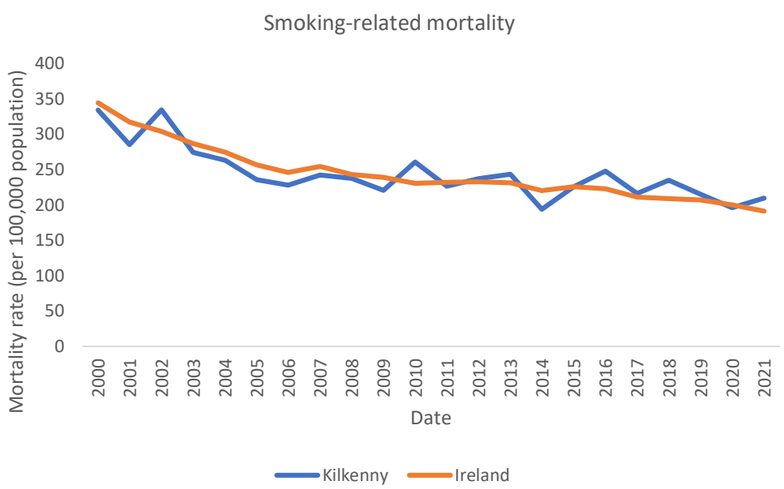
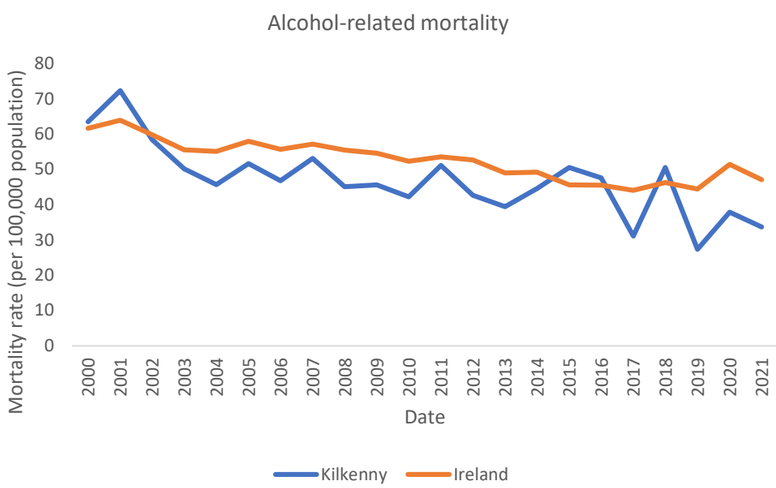


Source: Statbank (IH307 & IH309)



Source: Statbank (DHA12)



Source: Statbank (DHA12)

Smoking prevalence in the South East is the same as for the national average, with 14% of the population smoking on a daily basis, 4% smoking occasionally and 82% never having smoked. This is reflected in the smoking-related mortality statistics for Kilkenny, which show a general decrease over the years and fluctuation above and below the national average.

The proportion of the population who drink alcohol is 3% lower in the South East compared to the national average. Again, this is largely reflected in the alcohol-related mortality statistics for Kilkenny, which show a general decrease over the years and are more consistently below the national average.

The distribution of Body Mass Index across the South East shows that there is a higher proportion of people who are underweight than the national average. Comparatively, there is a lower proportion of people in the South East who are obese or normal weight. The proportion of people who are overweight in the South East is the same as the national average.

Conclusions

Overall, the population living within the study area have comparable physical health to the national average. Regarding mental health, levels of depression in the South East are comparable to the national average and in recent years, suicide rate is lower than the national average. Lifestyle and behaviour data shows lower levels of alcohol consumption and less obesity. Overall, the local health circumstance of the communities surrounding Ballynalacken Windfarm is similar to the national average, and therefore individuals are not considered to be more sensitive than average.

Appendix 17.3: Methodology for the evaluation of Population & Human Health

Appendix to Chapter 17: Population & Human Health

Appendix 17.3: Methodology for the evaluation of Population & Human Health

A17.3 Methodology Applied

A17.3.1 Methodology – Socio-economic assessment

In the absence of specific guidance on the evaluation of Land for an EIA Report, in addition to the desktop surveys and fieldwork carried out for the Project as detailed in Section EIAR 17.1.3 of Chapter 17, the *Guidance on the information to be contained in EIA Reports* (EPA, 2022), along with the ARVI approach for impact significance assessment developed under the EC IMPERIA LIFE11 Project, are employed for this evaluation. The ARVI approach has been used to evaluate impact significance using a multi-criteria decision analysis, where the sensitivity of the receptor in the environment and the magnitude of the change caused by a particular project are rated, and then an overall significance can be determined. The IMPERIA Project Report Guidelines for the systematic impact significance assessment – the ARVI approach (2015) is included in full as Appendix 2.1 of this EIAR. The author's extensive experience with EIA preparation also informs this report.

The author's extensive experience with EIA preparation and economics also informs this report.

A17.3.2 Methodology – Health Impact Assessment

The 'Scoping' section of the Manual on Health Impact Assessment Guidance states that health effects that are considered to be 'likely' and 'potentially significant' require further analysis and should be scoped in. Figure M11 sets out when an effect is 'likely' and 'significant', and is replicated below.

Figure M11. When is an effect likely and significant?

'**Likely**' health effects are those that, based on the scientific literature, have a *plausible* theoretical link between source-pathway-receptor, the occurrence of which in the relevant context is *probable* based on professional judgement.

'**Significant**' health effects are those that, based on professional judgement, are *important* (a positive or negative effect), highly *desirable* (a positive effect) or *unacceptable* (a negative effect) for population health with regards to changes triggered by the proposal in question.

Consistent with Figure M11, the Human Health assessment methodology follows a source-pathway-receptor model to identify and assess the potential human health effects that are plausible and directly attributable to the Ballynalacken Windfarm project.

As shown in the table below, a hazard source by itself does not constitute a health risk. It is only when there is a hazard source, a receptor and a pathway of exposure that there is any potential risk to human health. The same is true for potential health benefits, where a positive influence must be present alongside a pathway of exposure and a receptor for there to be a potential health improvement.

Where a source-pathway-receptor linkage exists, it is then the nature of the specific hazard source or positive influence; the magnitude of impact via the pathway of exposure; and the sensitivity of the receptor that will determine what level of health risk or benefit is predicted, if any.

Table 1: Source-pathway-receptor model

Source	Pathway	Receptor	Plausible health impact	Explanation
X	✓	✓	No	There is not a clear source from where a potential health impact could originate.
✓	X	✓	No	The source of a potential health impact lacks a means of transmission to a population.
✓	✓	X	No	Receptors that would be sensitive or vulnerable to the health outcome are not present.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean a health outcome is a likely significant effect; health impacts should be assessed (describing what effect will occur and its likelihood) and likely health effects are then evaluated for significance.

This has been applied in the context of the Ballynalacken Windfarm project through consideration of inter-related topics with the potential to have secondary impacts on Human Health. The results and key outputs from the following Chapters of this EIAR were examined:

- Chapter 8: Water (Water Supply)
- Chapter 9: Air Quality & EMF
- Chapter 10: Noise and Vibration
- Chapter 11: Shadow Flicker
- Chapter 12: Climate
- Chapter 14: The Landscape

The assessments included in the above inter-related Chapters of this EIAR provide an independent consideration of sensitivity of the receiving population and the magnitude of any change/impact. The Human Health chapter draws from and builds upon this analysis to determine whether the proposal has the potential to change 'risks to human health' in a way 'likely' to 'significantly' affect population health through consideration of population sensitivity and magnitude of change/impact in a human health and wellbeing context.

The sensitivity of a population from a human health perspective can be informed by some or all of the following: life stage; deprivation; health status; daily activities; inequalities; outlook; capacity to adapt; and/or resource-sharing with the project. Sensitivity is considered in relation to the general population and vulnerable groups. The criteria for defining sensitivity in this chapter are outlined in the table below.

Table 2: Sensitivity descriptors

Sensitivity	Description
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

Source: IEMA Guide to Determining Significance for Human Health in EIA

The magnitude of change/impact from a human health perspective can be informed by some or all of the following: exposure; scale; duration; frequency; severity; population extent; outcome reversal; and/or service quality implications. The criteria for defining magnitude of impact in this chapter are outlined in Table 3.

Table 3: Magnitude descriptors

Magnitude of impact	Description
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Source: IEMA Guide to Determining Significance for Human Health in EIA

The significance of effect is determined based on the sensitivity of a receptor and the magnitude of an impact. The method employed for this assessment is presented in Table 4. Where a range of significance levels are presented, the final assessment for each effect is based upon evidence based expert judgment. For the purposes of this assessment, any effects with a significance level of minor or less are not considered to be significant.

Table 4: Significance matrix

		Magnitude of impact			
		Negligible	**Low**	**Medium**	**High**
Sensitivity	**Very low**	Negligible	Negligible	Minor/negligible	Minor/negligible
	Low	Negligible	Minor	Minor	Moderate/minor
	Medium	Minor/negligible	Minor	Moderate	Major/moderate
	High	Minor/negligible	Moderate/minor	Major/moderate	Major

Source: IEMA Guide to Determining Significance for Human Health in EIA