Socio-Economic Assessment of impact of proposed transition to Biomass and associated development at West Offaly Power Station

Prepared on behalf of

ESB INTERNATIONAL

by

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Planning | Research | Economics

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1 Introduction

1.1 Context

Future Analytics Consulting Ltd has been appointed by ESB International to prepare a socio-economic assessment in relation to the proposed development at the West Offaly Power (WOP) peat fuelled station at Shannonbridge, Co. Offaly.

The ESB peat fired power generating stations are located at Shannonbridge, County Offaly (West Offaly Power, known as WOP Station) and Lanesborough, County Longford (Lough Ree Power, known as LRP Station) and are fuelled using peat supplied by Bord na Móna. Bord na Móna own a third Midlands station - Edenderry Power Limited (EPL), located at Edenderry, Co. Offaly. That facility is currently co-fired with peat and biomass.

WOP Station currently provides a significant contribution to the local and regional Midlands economy, through the direct provision of employment and economic activity, as well as having an indirect positive impact on economic activity in the area through the on-going acquisition of fuel and services. Current planning permission for the plant will expire in December 2020 and the PSO (Public Service Obligation) contract that supports peat combustion at the plant is due to end December 2019. The proposed development will ensure the continued generation of energy at this site and phased transition of the station towards exclusively firing with biomass. The transition to 100% biomass will comprise initial phases of co-firing of reducing volumes of peat. It is the ESB's objective that any changes to the operation of the WOP Station should have a positive socio-economic impact on the Midlands Region by sustaining local employment at the power station post expiry of the current fuel source and stimulating the development of the indigenous biomass industry.

Provision for the transition of the three Midlands plants [1] to co-firing with peat and biomass dates back to the publication of the 2007 Energy White Paper, and the Irish Government's subsequent support under the REFIT 3. That scheme was approved by the European Commission on 18th October 2011.

The three plants have received approval from Department of Communications, Climate Action and Environment for REFIT 3 support for co-firing with peat and biomass to 31st December 2030.

This socio-economic report has been prepared in the context of the preparation of a planning application and EIAR (Environmental Impact Assessment Report) in order to provide information on the socio-economic implications of the modifications to, and continued operation of the WOP Station and the phased transition to exclusively firing with biomass.

This development to convert the ESB's Midland generating stations (WOP and LRP Stations) to low carbon fuel is part of ESB's commitment to leading Ireland's transition to a low-carbon economy in-line with EU policy, Government policy, and ESB Corporate policy to decarbonise its energy business. Bord na Móna has also committed to cease peat harvesting activities for energy generation purposes and to transition energy production away from peat combustion sources and towards renewable biomass sources by 2030, as set out in Sustainability 2030 (Bord Na Mona, 2015). In October 2018, Bord na Móna announced the acceleration of this decarbonisation process, bringing forward the end

[1] The ESB owned stations - West Offaly Power and Lough Ree Power, and the Bord na Móna owned Edenderry Power Limited.

of using peat for energy by two years to 2028[2]. To that end, ESB propose to transition the WOP Station to achieve full firing on 100% biomass (zero peat) over a defined time period.

1.2 Generating Station Location

WOP Station is located close to the village of Shannonbridge on the north-eastern bank of the River Shannon in County Offaly, adjacent to the R357 travelling south-east from Ballinasloe. An off-site non-hazardous Ash Disposal Facility (ADF) where ash – a by-product of the combustion process, is disposed of is located approximately 5.5 kilometres northeast of the village of Shannonbridge, west of the Gowlan River, which is a small tributary to the Shannon River.

1.3 Catchment Areas

In order to assess the socio-economic impact of the WOP Station in terms of its current operation and future potential change an analysis of 'POWSCAR'[3] census information was undertaken, which identifies where people commute from to WOP and other business and employers in Shannonbridge[4]. This analysis confirmed that the facility has a current economic influence over an extensive area, and a 50 km catchment was considered reasonable based on the analysis of commuting patterns. The catchment area covers parts of three regions[5]: The Midlands, The West and Mid-West. The Catchment covers parts of 8 counties: Offaly, Galway, Roscommon, Tipperary, Longford, Westmeath, Laois and Clare.

[2] https://www.bordnamona.ie/company/news/articles/bord-na-mona-accelerates-decarbonisation/

[3] Place of Work, School or College - Census of Anonymised Records: This data set includes anonymised records of commuting patterns.

[4] Due to the anonymized nature of the data it was not possible to distinguish between different employers in the Shannonbridge electoral division.

[5] The Nomenclature of Territorial Units for Statistics (NUTS) was drawn up by Eurostat in order to define territorial units for the production of regional statistics across the European Union. The NUTS classification has been used in EU legislation since 1988, but it was only in 2003 that the EU Member States, the European Parliament and the Commission established the NUTS regions within a legal framework (Regulation (EC) No 1059/2003). It should be noted that the Local Government Reform Act 2014 provided for the 8 regional authorities and 2 regional assemblies to be replaced by 3 new regional assemblies. The new assemblies were established with effect from 1 January 2015 by the Local Government Act 1991 (Regional Assemblies) (Establishment) Order 2014 (SI 573 of 2014). The NUTS 3 boundaries were amended on 21st of November 2016 (Regulation (EC) No 2066/2016). The changes resulting from the amendment are that Louth has moved from the Border to the Mid-East and what was formerly South Tipperary has moved from the South-East to the Mid-West.

Fig. 1.1 WOP Site Location, 50 km radius, locations of Lough Ree Power and Edenderry Power

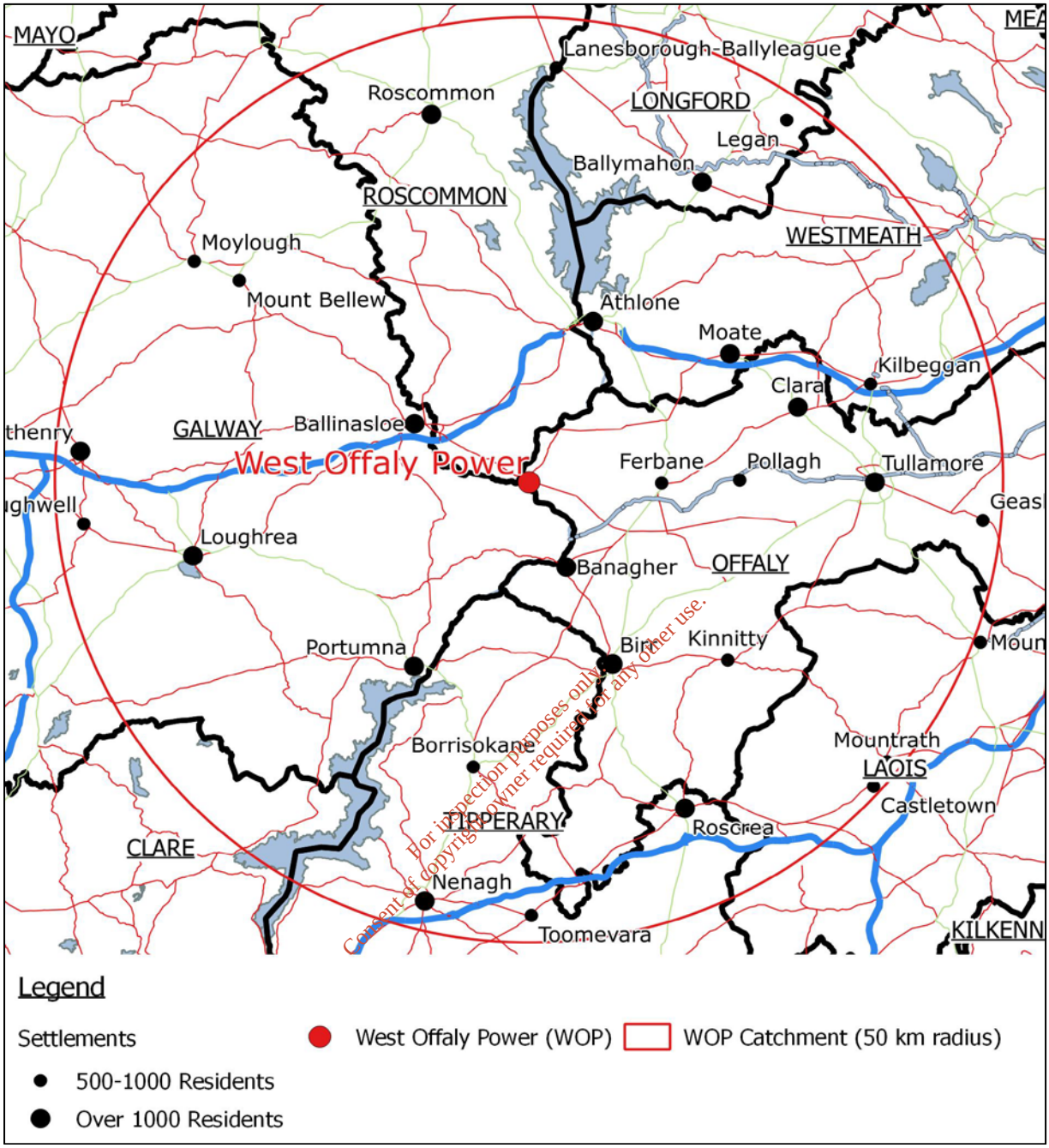

Fig. 1.2 Catchment Area

1.4 Data Sources

This socio-economic profile of the study area is based primarily on 2016 census data[6]. More up to date data relating to employment is available at regional level from the CSO Quarterly Labour Force Survey. Income data is available at county level. Other sources include the European Union Regional

[6] 2016 Census data at electoral division level has been aggregated to create the profile. All electoral divisions which are wholly or partially within 50 km of the WOP station have been included.

Innovation Monitor[7], *Socio Economic Review 2017 - Rural Development* published by Social Justice Ireland[8] and the *Midland Region Action Plan for Jobs 2015-2017* [9].

1.5 Terms of Reference

The purpose of this report is to examine the socio-economic impacts of the proposed changes from peat fuel to biomass at the station over a defined horizon timeframe (between 2020 and end of 2027) and the continued operation of the station post 2027, firing on biomass only and to compare the impact of the proposed development with alternative scenarios such as the Do-Nothing Scenario (closure of the peat fired stations when they reach the end of their planning permission). The assessment has regard to the direct impact on the ESB generating stations themselves and ancillary supports and also on the indirect impacts on Bord na Móna peat supply operations to the stations.

It includes the following elements;

- A review of relevant policies, strategies, and guidelines at national, regional and local level;
- Analysis of the of socio-economic profile of the WOP catchment areas compared to the country as a whole- including demographics, labour force, sectoral employment and income profile;
- Examination the current status of the industrial, agricultural, and services sectors in the catchment area;
- Analysis of the degree of dependence of these areas on the peat to power industry;
- Analysis of the potential local and regional impact if peat fuel is replaced by both indigenous[10] and imported biomass materials [11];
- Evaluate the impact of closing of WOP at the end of their PSO supported contracts/ planning permission, rather than continuing to allow it to operate as a hybrid plant co-firing on peat and biomass and ultimately 100% biomass;
- Socio-economic impacts of biomass haulage; and
- Cumulative impacts of WOP Station, LRP Station and EPL.

The identified time period addressed in this study for future years reflects the transition from peat usage and increase of biomass use up to 100% biomass fuel only scenario by the end of 2027. This is likely to be in block periods affected by factors such as the technical capabilities of the existing plant; financial considerations and the potential future availability of biomass.

1.6 Structure of Report

Following this introduction, Section 2 of the report provides a review of relevant policies, strategies, and guidelines at national, regional and local level and planning history of the WOP site. Section 3 of the report provides a comprehensive overview of the socio-economic profile of the catchment area of the plant (as a whole- including demographics, labour force, sectoral employment and income profile), benchmarked against national averages. This includes analysis of the current status of the industrial, agricultural and service sectors in the Midland Region. Section 4 of the report examines the

[7] *Regional Innovation Monitor Plus - Internal Market, Industry, Entrepreneurship and SMEs - European Commission. Border, Midland and Western (BMW) Region* (https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/border-midland-and-western-bmw-region)

[8] Socio Economic Review 2017 - Rural Development Social Justice Ireland. (https://www.socialjustice.ie/content/publications/socio-economic-review-2017-rural-development)

[9] *Midland Region Action Plan for Jobs 2015-2017* , Department of Business, Enterprise and Innovation, 2015 (https://dbei.gov.ie/en/Publications/Publication-files/Action-Plan-for-Jobs-Midland-Region-2015-2017.pdf)

[10] by-product from Irish forestry operations and residues from sawmills

[11] shipped to major ports and transported by road to the plants

potential impacts of operational change at the plant and reviews various scenarios of socio-economic impact associated with an end to peat fuel production and increased biomass use. Similar operational changes are proposed for the ESB at Lanesborough (LRP Station). Section 4 also assesses the cumulative impact of the operational changes to the two plants. Section 5 of the report sets out our conclusions of key scenarios associated with operational and supply changes at the WOP Station up to and after 2027.

2. Policy Review

This policy review section highlights the policy framework for the WOP development, in the specific context of the socio-economic imperative arising from land use, energy and economic strategies at a national, regional and local level. This review has regard to the National Planning Framework under Project Ireland 2040, Regional Planning Guidelines (RPGs) and the Offaly County Development Plan 2014-2020.

The review also refers to a number of important policy documents on renewable energy that set the framework for the transition to a co-firing peat and biomass plant. These include the *National Climate Policy Position on Climate Action and Low Carbon Development, National Mitigation Plan, National Climate Change Adaption Framework, Green Paper on Energy Policy in Ireland*, *Irelands Transition to a Low Carbon Energy Future 2015-2030*, *National Renewable Energy Action Plan, Strategy for Renewable Energy: 2012-2020, Draft Bioenergy Plan 2014, National Peatlands Strategy*, *Action Plan for Jobs 2018, Government Policy Statement on the Strategic Importance of Transmission and other Energy Infrastructure, Prospects for Irish Regions and Counties.*

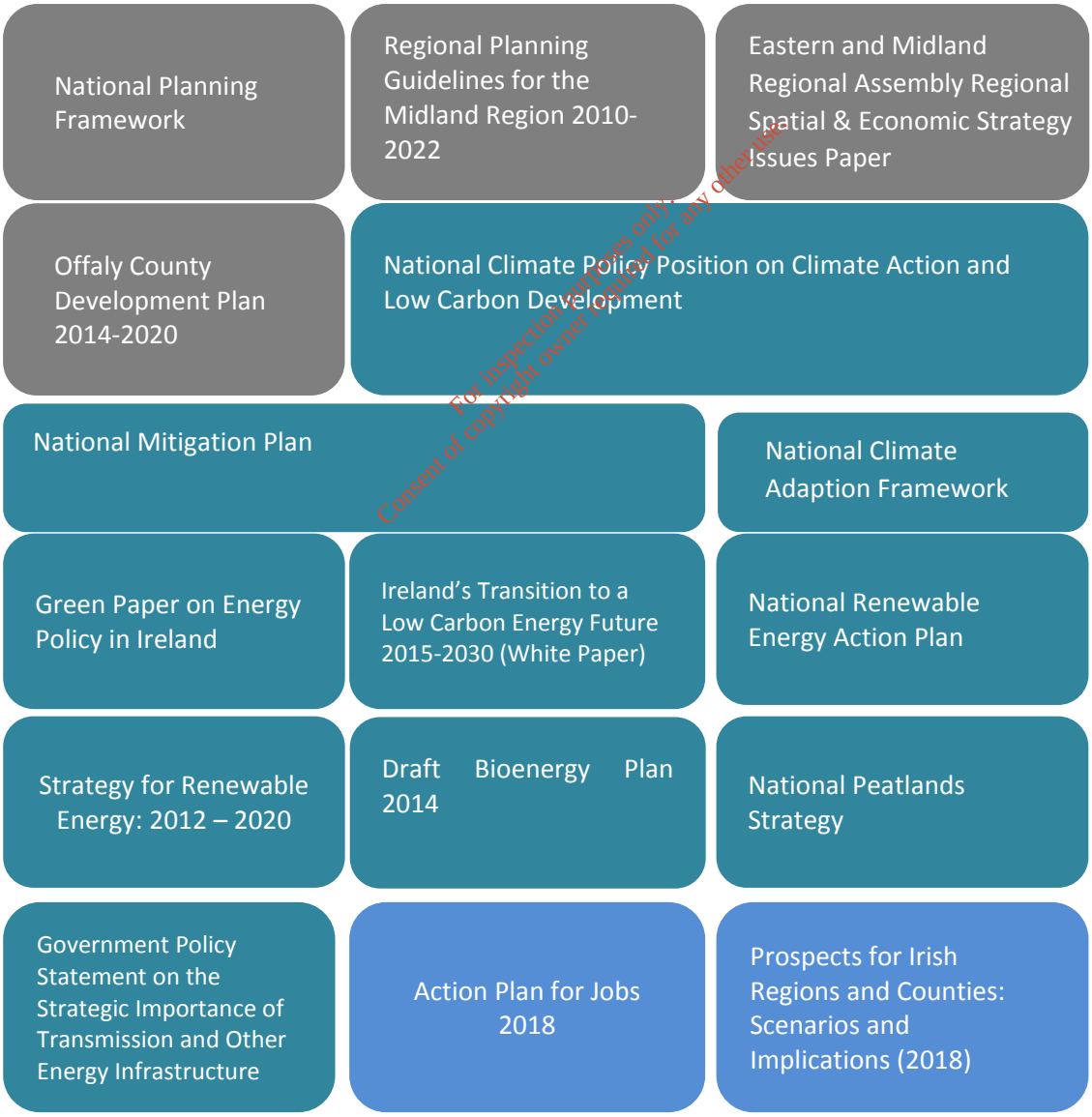

Fig. 2.1 Overview of Policy Framework relevant to Socio-Economic Analysis

For the purpose of this Report, key terms used within the Policy Review are defined as follows;

Bioenergy: Bioenergy is the general term for energy derived from solid, liquid and gaseous biomass[12].

Biomass: *For clarity, ESB proposes that the biomass will comprise indigenous and imported material, comprising:*

- *non-pelleted woody biomass, e.g.*
  - *products, co-products, by-products and residues of the forestry sector such as brash, thinning and other residues from the forestry sector where those materials are produced from the active management and felling of commercial forests;*
  - *products, co-products, by-products and residues - such as saw dust, sourced from timber mills, manufacturing processes and the forestry sector and*
  - *wood chips produced by the timber industry – whether from commercial products or chipped wood arising from other commercial activities such as gum tree plantations;*
- *products, co-products, by-products and residues for energy crops*
- *products, co-products, by-products and residues from agricultural industries, e.g. husks, shells, and pulp; and*
- *manufactured wood pellets.*

2.1 National Planning Framework

The National Planning Framework (Department of Housing, Planning and Local Government) was released in February 2018 and is the Government's high-level strategic plan for shaping the future growth and development of Ireland out to the year 2040. It is a framework to guide public and private investment, to create and promote opportunities for people, and to protect and enhance the environment. Unlike the previous National Spatial Strategy, the National Planning Framework will be given full legislative support within the planning system, including regular review and update, to reflect changing circumstances and make adjustments where necessary.

The purpose of the National Planning Framework is to enable all parts of Ireland, whether rural or urban, to successfully accommodate growth and change, by facilitating a shift towards Ireland's regions and cities other than Dublin, while also recognising Dublin's ongoing key role. Some central objectives of the National Planning Framework, in the context of this report, are as follows;

National Policy Objective 6

'Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area.'

National Policy Objective 21

'Enhance the competitiveness of rural areas by supporting innovation in rural economic development and enterprise through the diversification of the rural economy into new sectors and services, including ICT based industries and those addressing climate change and sustainability.'

[12] Definitions based on the definitions of the document *Irelands Transition to a Low Carbon Energy Future 2015-2030.*

National Policy Objective 23

'Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism.'

National Policy Objective 52

'The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital.'

National Policy Objective 53

'Support the circular and bio economy including in particular through greater efficiency in land management, greater use of renewable resources and by reducing the rate of land use change from urban sprawl and new development.'

National Planning Objective 54

'Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions.'

It is stated regarding Climate Action and Planning;

'In addition to legally binding targets agreed at EU level, it is a national objective for Ireland to transition to be a competitive low carbon, economy by the year 2050. The National Policy Position42 establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate resilient and environmentally sustainable economy by 2050, guided by a long-term vision based on:

- *an aggregate reduction in carbon dioxide (CO2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and*

- *in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.*

Meeting our commitments will require investment and ambitious and effective action across all sectors, as well as societal behavioural change.'

Under the section Resource Efficiency and Transition to a Low Carbon Economy of the Framework, and further under subsection Energy Policy and Planning it is stated;

'Ireland's national energy policy is focused on three pillars: (1) sustainability, (2) security of supply and (3) competitiveness. The Government recognise that Ireland must reduce greenhouse gas emissions from the energy sector by at least 80% by 2050, compared to 1990 levels, while at the same time ensuring security of supply of competitive energy sources to our citizens and businesses.

> *Our transition to a low carbon energy future requires: A shift from predominantly fossil fuels to predominantly renewable energy sources; Increasing efficiency and upgrades to appliances, buildings and systems; Decisions around development and deployment of new technologies relating to areas such as wind, smartgrids, electric vehicles, buildings, ocean energy and bio energy; and Legal and regulatory frameworks to meet demands and challenges in transitioning to a low carbon society.'*

Related to this section in the framework, it is the National Policy Objective 55 to;

> *'Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050.'*

In terms of energy production, the Plan states the following;

> *'Rural areas have significantly contributed to the energy needs of the country and will continue to do so, having strong role to play in securing a sustainable renewable energy supply. In planning Irelands future energy landscape and in transitioning to a low carbon economy, the ability to diversify and adapt to new energy technologies is essential. Innovative and novel renewable solutions have been delivered in rural areas over the last number of years, particularly from solar, wind and biomass energy sources;*
>
> *In meeting the challenge of transitioning to a low-carbon economy, the location of future national renewable energy generation will, for the most part, need to be accommodated on large tracts of land that are located in rural setting, while also continuing to protect the integrity of the environment and respecting the needs of people who live in rural areas;*
>
> *In relation to peatlands, some of Irelands cutaway bogs are suitable to facilitate the generation of energy, most notably wind/ biomass. Considering the significant amount of peatlands in the ownership of semi-state bodies, a medium and long term strategic national land use plan for peatlands in state ownership will be prepared in order to manage their most appropriate future use, building on the existing National Peatlands Strategy and other national policy related to peatlands conservation and management'.*

The National Policy Objectives above, describes climate change and sustainability as an opportunity to develop new sectors and services. Further on, to diversify and create economic possibilities and delivering sustainable communities, both rural and urban, across the country. It is stated in the Framework that the transition to a low carbon energy future requires a shift from predominantly fossil fuels to predominantly renewable energy sources, with a national energy policy focused on the three pillars: (1) sustainability, (2) security of supply and (3) competitiveness. The last section regarding energy production should highlight the importance of biomass to the energy sector. With three current generating stations in the region, the change from a peat fuelled power station to the use of renewable fuel will act as a more sustainable and environmentally friendly option, while also providing electricity for the region.

2.2 Regional Planning Guidelines for the Midland Region 2010-2022

The Midlands Regional Authority in 2010 adopted its guidelines for 2010-2022. Though the Midlands authority no longer exists with the formation of a new Midlands and Eastern Region, the guidelines are still applicable to the region. The Regional Planning Guidelines is a long-term strategic planning framework that will direct the future physical, economic and social development of the Midland Region over the medium to long term. They provide a clear policy link between national policies, the

National Spatial Strategy and the National Development Plan, and Local Authorities planning policies and decisions. The Midland Region categorised as a NUTS III region comprises the counties of Laois, Longford, Offaly and Westmeath.

Biomass is an important aspect in the replacement of Peat bogs in the midlands' region. The guidelines note at section 3.3.4.5 (Industrial Peatlands) that approximately 43,000 acres in the Midlands region, 54% of total land holdings are made up of bogs owned by Bord na Móna. With Bord na Móna's plans to move away from the production of peat for energy generation purposes in the coming years Biomass and Biofuels have been highlighted as a way for the bog lands to be developed within the region with the phasing out of peat harvesting enabling a transition period to ensure minimum socio-economic impact on the workforce engaged in the extractive industry for energy. Alternative sustainable industries will be developed, and the peat lands are required to be rehabilitated under IPC licenses requirements. Using biomass to fuel the midland peat stations will offer alternate employment and economic opportunities in terms of mobilising, preparing and transporting this fuel type (Sustainability 2030, Bord Na Mona, 2015).

In Section 3.4.6.1 Renewable Energy, the guidelines state that;

> *'The Midlands Region is well placed for the development of renewable energy such as wind and biomass/biofuels given the predominantly rural nature of the landscape which includes large expanses of worked out peatland'.*

The guidelines go on to state;

> *'The Midland Region also offers significant potential for the growth and development of biomass and biofuels as sustainable sources of energy, both in worked out peatland areas and on agricultural land. Biomass crops such as coppice willow and oil seed rape are well suited to midlands soils. The processing of raw biomass material into fuel (e.g. wood chips, biodiesel etc.) or energy (heat/ power) also present opportunities for enterprise development and job creation within the region.*
>
> *The Midland Region which has three peat burning power stations at Lanesboro, Shannonbridge and Edenderry is well placed to assist in achieving the target of using 30% biomass to co- fire peat power plants by 2020. The development of this sector will greatly assist in the conversion from peat to biomass/biofuel. The existing peat- fired stations also have an infrastructural network in place accessing these peatlands, working independently from existing road network, which is a significant advantage in the transport of high bulk, low energy biomass from harvest to power station'.*

Clearly the guidelines state that not only should the Midland Region be used as an area for growing these Biomass fuels but also for creating energy in the replacement of peat from power stations.

2.3 Eastern and Midland Regional Assembly Regional Spatial & Economic Strategy (RSES) Issues Paper

The Eastern and Midland Regional Assembly was established on 1st January 2015. One of the principal functions of the Assembly is the delivery of Regional Spatial and Economic Strategies (RSES). The principal purpose of the RSES is to support the implementation of the emerging National Planning Framework (NPF) - Ireland 2040. The RSES is required to address *inter alia* Employment, Energy and communications, Environment and heritage, Landscape, Sustainable development and climate change The Issues paper presents a context for the RSES, as an evidence-based profile of the region and it is thematically presented with the four key themes of People and Places, Economy and Employment,

Environment and Heritage, and Infrastructure and Climate Change. The region contains 12 local authorities including Longford, Westmeath, Offaly and Laois as a Midland sub-regions or Strategic Planning Areas (SPAs).

It notes at Section 5 that *the development of a circular economy and our renewable energy potential will help to future proof our region, to take greater care of our non-renewable resources and explore new ways to add value by turning waste into new resources such as food or bio-energy.*

Under the heading of Energy the issues paper notes an over-reliance on non-indigenous supplies of energy and that Security of energy supply and climate change are important drivers of energy policy in the region. The issues paper notes:

> *"To meet our energy targets, we need to better leverage natural resources to increase our share of renewable energy. There is an established tradition of energy production in the Midland counties by state agencies, however national environmental policies are dictating the wind down of traditional fossil fuel powered stations, such as peat fired power plants in these counties."*

The report highlights that over the next ten years there is a predicted growth in energy demand of between 11% and 30%, mainly due to additional data centres. Extra generating capacity will likely be required to accommodate this demand, particularly in the region. Increased connectivity with other grids is needed.

The issues paper raises the questions *inter alia*:

- How can we support a greater return on infrastructure investment by the state?
- What can be done to reduce the environment impact of the receiving environment from our use of infrastructure, and a transition to a low carbon society?

The stimulation and development of a biomass industry in Ireland arising from the biomass demand created from the midland peat stations will be important in energy security as this will represent a diversification in fuel type.

2.4 Offaly County Development Plan 2014-2020

The Offaly County Development Plan 2014-2020 seeks to set out a clear spatial framework for the growth of County Offaly over the plan period. The Core Strategy is consistent with higher order spatial plans at national and regional level and translate objectives to subsidiary plans such as town plans and local area plans.

The Core Strategy seeks to;

> *'• Rationalise spatial land-use planning and population distribution in accordance with higher order plans.*
>
> *• Align these with investment in infrastructure services and facilities.*
>
> *• Enhance sustainability and ensure quality of life and protection of the environment'.*

The Plan sets out an overall vision, strategies, policies and objectives for the county as a whole and with the aim to have a positive impact on all areas within the county. The 8th Strategic Objective of the Core Strategy of the Plan, related to economic development, is to;

> *'promote sustainable economic development and direct economic activity into the most appropriate locations within County Offaly for employment generation and to capitalise on opportunities available in order to enhance the strategic competitiveness and attractiveness of the county'.*

The Core Strategy highlights the specific aspects to assist the overall delivery of the core Strategy for Offaly during the lifetime of the Plan, one being Economic Development;

> *'The period of this plan will be a time of planned economic recovery, and this will have consequences for the physical development of county Offaly. Within the lifetime of this plan, indigenous employment growth in Offaly will come from the vibrant start-up sector, many of which will be technology based. It will also come from more traditional areas such as Tourism, Agriculture and Food. The reuse of cutaway bog will present significant opportunities in the energy sector. In urban areas, professional services, retail and food services provide current employment and future growth potential. Further inward investment may be gained through pharmaceutical research, development and manufacturing, waste processing and energy production. The Public Sector, including health, education and central government is also a major employer in the county, as is the semi-state sector including the ESB, Bord na Móna and Coillte'.*

With regard to Energy the plan notes;

> *'The history of peat fired stations has left a valuable legacy for Offaly in the existing sites and transmission infrastructure that traverses the county and this existing distribution network can now be used for the sustainable development of new generation capacity. The main developments in the energy industry over the lifetime of this plan will be in generation, particularly the migration from non-renewables to renewables'.*

Under the section Energy Strategy, it is Council policy EP–01 to;

> *'support national and international initiatives for limiting emissions of greenhouse gases and to encourage the development of **renewable energy** sources'.*

Under section Infrastructure and Environment Strategy, it is Council policy EnvP-01 to;

> *'reduce emissions to the air of greenhouse gases in order to contribute to a reduction and avoidance of human induced climate change. The Council supports and is committed to the National Climate Change Strategy and, in general to facilitating measures which seek to reduce emissions of greenhouse gases. In this regard, the Council will support any initiatives taken to provide for more sustainable forms of energy use'.*

Section 1.9.3 Energy of the Plan, recognises the need to transition to renewable energy, and that non-renewable sources of energy will continue to have a role in maintaining the consistency of supply that is expected from consumers.

> *'The main developments in the energy industry over the lifetime of this plan will be in generation, particularly the migration from non-renewables to renewables'.*

Section 1.9.3 Energy of the Offaly County Development Plan 2014-2020 states the following on Biomass energy;

> *'Energy production from **Biomass** could add value to the agricultural economy, which could provide more employment in a rural county'.*

The same section states the following about peat fired energy production;

> *'There is potential for development of generating capacity in the county on brownfield sites previously used for peat- fired energy production'.*

Section 2.4.5 Peatlands goes on to explain the following;

> *'There are approximately 32400 hectares (80000 acres) of peatlands within the county much of which are currently owned by Bord na Móna. Given the significant size and location of areas of land involved, it is important to avoid piecemeal or uncoordinated use/ development of this major resource. It is considered that some of the Counties cutaway bogs may be suitable for the provision of industrial/ business type development and/ or facilitate the generation of energy, most notably, wind/ **biomass** (refer to energy strategy)'.*

Section 2.8.5 Energy has a sub heading dealing with Bio Energy within the County. The following is stated;

> *'Energy production from **biomass** can reduce greenhouse gas emissions, provide a secure native fuel source and provide some diversification out of traditional farm enterprises. The Council will support the development of the bio-energy, including bio-gas, industry in the county, including rural areas, where appropriate'.*

Section 3.4.2 Non- renewable energy makes reference to the peat burning site at present by stating the following;

> *'The process of burning peat in Edenderry and Shannonbridge is likely to migrate to a co-fuelling process over the lifetime of the plan. Offaly County Council supports the continued operation of power generation facilities at these sites'.*

It goes onto explain the following in Section 3.4.3 Renewable Energy;

> *'In Offaly there has already been planting of some bio- energy crops including Miscanthus, Oil Seed Rape and Willow. These have the potential to provide alternative markets to tillage farmers in the county. There may be significant opportunity as both Edenderry and **Shannonbridge** Power Plant move to co-fuelling operations. Bio-energy crops will most often be farmed using existing facilities and without recourse to the planning application system, but where an application for associated infrastructure is required, the planning authority will consider it favourably subject to environmental considerations.*

The policies of the Council (as set out in the Offaly County Development 2014-2020), are to support and encourage the development of renewable energy sources as well as initiatives to provide for more sustainable forms of energy use, in order to reduce emissions of greenhouse gases. Bord na Móna aim to transition to new uses by 2030, changing the land use to provide renewable energy development, domestic fuels, biomass development, resource recovery, horticulture, eco- tourism and community amenities. With this in mind, Offaly County Council, as stated above, are aware that a co-fuelling

process (Peat and Biomass) will happen over the period of the current development plan. The aim of this socio-economic study is to establish whether there is scope to develop these current stations into 100% Biomass power stations. From a planning policy point of view, the council have a general sustainability goal to reduce emissions and facilitating measures which seek to reduce emissions of greenhouse gases and recognises that "energy production from biomass can reduce the same". Specifically, it is expressed that "the Council will support the development of the bio-energy, including bio-gas, industry in the county", and therefore seem to be willing to allow for the continuing development at these power station sites once Bioenergy is involved.

2.5 National Climate Policy Position on Climate Action and Low Carbon Development

The National Policy Position (Department of Communications, Climate Action and Environment) provides a high-level policy direction for the adaption and implementation by Government of plans to enable the State to move to a low carbon economy by 2050. Statutory authority of plans is set out in the Climate Action and Low Carbon Development Act 2015. The approach to be adopted by the government is to be iterative with a series of national plans to be developed and evolved over the period to 2050. Greenhouse gas mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through National Mitigation Plans (see section 2.5) and National Climate Change Adaptation Frameworks (See section 2.6).

'National climate policy in Ireland -

- *recognises the threat of climate change for humanity;*
- *anticipates and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future;*
- *recognises the challenges and opportunities of the broad transition agenda for society; and*
- *aims, as a fundamental national objective, to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050'.*

2.6 National Mitigation Plan

The first National Mitigation Plan (NMP) (Department of Communications, Climate Action and Environment, 2017) establishes the first step in putting Ireland on the pathway towards achieving the necessary reductions in greenhouse gas emissions as set out in the commitments to the Paris Agreement and as reflected in the National Policy Position on Climate Action and Low Carbon Development (2014) and the Climate Action and Low Carbon Development Act, 2015. The National Policy Position established a commitment to deep decarbonisation of the economy by 2050 and the 2015 legislation provides the enabling statutory framework for this to happen.

The NMP contains measures to address the challenge to 2020 whilst stressing the importance of development on medium to long term options to ensure that the country is in a position to take the necessary actions in the future decades to come. The plan is not to be considered a roadmap to achieve the 2050 objective, rather a living document reflecting the country's state of play as regards climate and energy with ongoing analysis to be undertaking in view of achieving the decarbonisation transition.

The NMP is composed of six chapters and six annexes, with four key sectors identified within, that provide further clarity on the nature and scale of the reduction pathways required to get from the present levels of emissions to the levels set by the national transition objective. Within these chapters, ***Biomass*** is regularly referenced as a method of further developing the sustainability of the energy mix and achieving the necessary emission reductions.

Within Chapter 3 *Decarbonising Electricity Generation* it is described how in the decade following 2021 the new Renewable Support Scheme (RESS) will incentivise investment in further renewable generation. Specifically, it is intended that ***peat burning generation will gradually be replaced by sustainable biomass.*** This will see benefits in health, well-being, air quality and sustainable development. It is expected that biomass will play a significant role in the heating sector.

It is stated that in December 2016, the total amount of renewable energy connected to the grid was 3,120MW, of which wind generation was approximately 2,796MW, hydro was 238MW and ***biomass was 86MW***. Eirgrid estimates that a total of between 3,900MW and 4,300MW of onshore renewable generation capacity will be required to allow Ireland to achieve 40% renewable electricity by 2020. This leaves a further requirement of between 780MW and 1,180MW to be installed by 2020 if the 2020 electricity target is to be reached, requiring an increased rate of installation.

This chapter also introduces the Draft Bioenergy Plan, (described in more detail in section *2.11 Draft Bioenergy Plan*) describing how it is intended that ***Bioenergy*** makes a significant contribution to the heating and transport sectors where fewer alternative technologies are available.

It also outlined that there has been a proposal to establish ***Bord na Móna BioEnergy***, a new division of Bord na Móna which will aim to be the biggest supplier of ***Biomass*** in Ireland. The Plan makes clear that Bord na Móna intend to cease harvesting peat for electricity generation by 2030 and will continue to decarbonise the electricity in keeping with the Energy White Paper, as described in section 2.9 below. It is highlighted that the PSO for the ESB's WOP and LRP peat power stations expire in 2019 in line with the Government transition to a low carbon energy system, thus ***providing the opportunity to move to co-firing peat plants*** and creating a situation whereby the peat plants would be eligible to apply for support under REFIT 3.

Chapter 4 focuses on Decarbonising the Built Environment and highlights the expectation that the mix of fuels providing energy to the building stock will have transitioned to a much lower carbon content through improved energy efficiency measures by 2050. The phasing out of peat, a carbon intense fuel is stressed, especially as regards the residential heating mix by 2050. Electrification is set to play a much more significant role and ***Biomass*** is identified as a key component towards this cleaner energy transition. It is emphasised that there are two main options for moving away from using fossil fuels as the source of energy to power our buildings, these are ***Biomass*** and the electrification using heat pumps.

Chapter 6 An Approach to Carbon Neutrality for Agriculture, Forest and Land Use Sectors also recognises the significance of Biomass. The chapter is centred on a vision of reducing emissions from the land sector, particularly with regard to agriculture and forestry, whilst not compromising the capacity for sustainable food production. This is seen as a significant challenge both nationally and at EU level, with increasing emphasis put on mitigating against additional demand for food production through the improvement of 'environmental credentials'. In this regard, ***Biomass*** is cited as an important component.

Within Section 6.2 Emissions Profile, it is stated;

> *'the forest sector, through afforestation and the use of **forest-based biomass (FBB)** and wood products, offers considerable scope for climate change mitigation, equivalent to 20-22% of agricultural emissions on an annual basis'.*

Section 6.3 Opportunities and Challenges presents the Neutrality Concept and the significant challenge it entails. It introduces the work carried out by Teagasc towards adopting 'carbon-neutrality' as a 'horizon point' for agriculture by 2050. It is stated that;

> *'Sustainable intensification should also provide space for, or contribute to, biodiversity, water quality, air quality and soil/carbon protection and of course creates space for alternative land uses such as forest. Increased afforestation and* ***biomass use*** *would occur under a sustainable land use policy as illustrated by the Teagasc analysis'.*

The same section also describes the Mitigation Potential of Forests and Forest Products. It describes the Afforestation Programme and its significance as regards carbon sequestration, highlighting an estimation that between 1990 and 2030 €3.2 billion will have been invested in the programme, providing wood for long-lived timber products and ***sustainable biomass.***

Of particular importance is the section on Circular Bioeconomy which stresses the opportunities for ***Forest Based Biomass*** and residues to produce biomaterials and biochemicals through biorefining or to produce heat and/or power through combustion or anaerobic digestion;

> *'Biorefining provides a strategic opportunity for* ***large-scale sustainable use of biomass*** *in the bioeconomy resulting in cost-competitive co-production of food and feed ingredients and also biobased products and bioenergy with optimal socioeconomic and environmental impacts (e.g. efficient use of resources and reduced greenhouse gas emissions)'.*

It is stated that Government is currently developing a National Policy Statement on the Bioeconomy due to be released in 2020.

The Renewable Energy section explains that analysis by the SEAI indicates that approximately 1,000 ktoe of bioenergy will be required per annum to meet the country's 2020 renewable energy targets. Moreover, and as consequence of the afforestation scheme;

> ***Forest Based Biomass (FBB)*** *available for energy, including residues from harvesting and wood-processing,* ***is forecast to double by 2035****, to 4.2 Mm3 . The equivalent of 15 PJ (c.360 ktoe) and 29 PJ (c.690 ktoe) of* ***FBB*** *is forecast to be available by 2020 and 2035 respectively.*

The significance of FBB is that it provides a sustainable fuel source with high levels of greenhouse gas emissions savings. However, there is a challenge in removing the barriers to mobilisation and setting a price that provides incentive for producers which is being addressed in the Draft Bioenergy Plan as detailed in section 2.11 below.

Annex 2 of the Plan provides a notable 'Reference';

> *'Electricity Generation – Eliminate Peat Powered Plants'.*

This 'Reference' provides the following Mitigation objective;

> *'Undertake a feasibility study to address the measures required to discontinue the combustion of peat for electricity. All options for discontinuation of these plants should be considered and a multi criteria analysis undertaken to determine the optimum approach. Environmental criteria should be the primary driver for the decision-making process. This study should be undertaken within the next five years to inform decision making for the next NMP and provide a clear roadmap for the phased cessation of peat in this sector'.*

This is complemented with an intended Sector Response/Proposed Action;

> *'Energy: The harvesting of peat for electricity generation is expected to cease by 2030. Currently, one of the three peat-fired electricity generating plants (Edenderry, owned by Bord na Móna) co-fires with biomass at levels in excess of 30%. The two ESB plants,* ***West Offaly and Lough Ree****, are* ***technically capable of co-firing with biomass*** *and the owners are currently examining the potential for co-firing. The subsidies currently supporting the generation of electricity from peat in these two power stations will cease by end 2019. This will provide a key incentive for the owners of these plants to convert to co-firing. An issue to be overcome is the* ***development of more cost-effective supply chains of biomass****.*
>
> *Action 24 of the NMP provides that in line with Bord na Mona's sustainability strategy, DCCAE will oversee a review of the future of peat generation plants.'*

Ireland's first NMP is a critical first step towards decarbonising the country's economy. It is intended that this and successive plans will, over time, build on the foundation work underway with further policy development in the years ahead and expansion of the suite of measures already in place. As can be observed from the above, the NMP acknowledges the significant role Biomass can play as a key measure in achieving appropriate mitigation options and towards emissions reductions. The NMP specifically states the intention of the LRP Station and WOP Station to transition from Peat to Biomass as a national objective. The document also emphasises the importance of promoting sustainable economic development and how this can be achieved in line with the globally agreed 2030 UN Sustainable Development Goals. Climate action should be seen as complementary to other important policy objectives, such as improving energy security and addressing air pollution impacts on human health. It is recognised that climate initiatives to date have not been that effective and there is a currently review of the NMP ongoing.

2.7 National Climate Change Adaption Framework

This non-statutory, but Government (Department of Communications, Climate Action and Environment, 2018) approved, Framework mandated the development and implementation of sectoral adaptation plans and local authority adaptation strategies which, together, would form part of the national response to the impacts of climate change. The aim of 'adaption' of in the National Adaption Framework is described below;

> *'Essentially, adaptation is the approach for addressing the current and future risks posed by a changing climate.* ***The aim of adaptation is to reduce the vulnerability of our environment, society and economy and increase resilience.*** *Adaptation also* ***brings opportunity through green growth, innovation, jobs and ecosystem enhancement as well as improvements in areas such as water and air quality'****.*

The NASC defines 'resilience' as follows;

> *'The National Adaptation Steering Committee's Governance subgroup has considered how the sectors represented on the group* ***define resilience and this process identified a number of common themes – namely the importance of reducing vulnerability, recovery and availing of opportunities.*** *Taking all of these themes into account, an overarching definition of resilience for the purposes of this Framework and for the sectors to consider in the development of sectoral adaptation plans and local government strategies is as follows:*

> ***Climate resilience is the capacity of a system, whether physical, social or ecological, to absorb and respond to climate change and by implementing effective adaptation planning and sustainable development (including governance and institutional design**) to reduce the negative climate impacts while also taking advantage of any positive outcomes. This will allow the system to either return to its previous state or to adapt to a new state as quickly as possible'.*
>
> *'Adaptation is the only way to deal with unavoidable impacts of climate change and additionally offers an opportunity to **adjust economic activity in vulnerable sectors and support sustainable development** (Stern, 2007)'.*
>
> *'Knowing the potential costs of climate impacts is a pre-requisite for developing adaptation strategies. From a purely cost-benefit perspective, the present value of avoided or reduced climate impacts in the future represents the "benefit" of any proposed investments in adaptation'.*
>
> *'However, it is widely accepted that such global level, aggregated, estimates have tended to understate the economic costs of climate change, in part due to important omitted impacts – such as the costs of more extreme weather events, or the indirect economic effects of social or political disruptions due to climate change (Revesz et al., 2014; Stern, 2016). Translating global (or even regional) estimates of the costs of climate impacts to the national level is difficult and would need to consider issues such as where climate change will have most impact, the individual structure of the economy and the relative exposure of economic assets across countries which would be very relevant for a small country like Ireland'.*
>
> *'It is also important to take note of the social and economic policy context surrounding adaptation action. Climate change is likely to disproportionally impact on the lowest socio-economic groups in society, these groups are also the worst positioned to adapt to the changing climate. Other socio-economic changes such as urbanisation and increasing population are also likely to pose further challenges to adaptation. Failing to consider climate risks and adaptation is likely to enhance existing vulnerabilities and could potentially give rise to new ones. In enabling a just transition it is therefore important that all adaptation planning takes these considerations into account and factors them into policy making'.*

The Framework outlines a comprehensive approach to climate change adaption and considers the social and economic context for climate change. The adaption framework supports sustainable development as it contributes towards developing adaption measures, and it therefore seems that the framework would support transitioning from peat to biomass as this would mean implementing effective adaption planning and sustainable development, as well as contributing to a more resilient energy sector availing of opportunities and reducing vulnerability in energy supply.

2.8 Green Paper on Energy Policy in Ireland

The purpose of the consultation process on the Green Paper (Department of Communications, Energy and Natural Resources, 2014) was to invite written views, observations and suggestions from interested parties on the shape of Ireland's future energy policy, which then contributed to the development of the Energy White Paper for Ireland (reviewed in the next section).

Biomass is highlighted in the section Key Energy Policy Developments as follows;

> *'To support this strategy, Ireland adopted* two **Renewable Energy Feed In Tariff (REFIT)** *schemes, extending supports to include new onshore wind and biomass capacity. These*

schemes have played a central role in enabling Ireland to become a world leader in grid integration of variable energy'.

In section Collective Delivery it is stated;

*'The **commercial State energy companies** (Bord na Móna, EirGrid, Bord Gáis Éireann and ESB) have played a critical role in delivering secure, sustainable and competitive energy supplies through:*

- *delivering critical electricity and gas network investment programmes,*
- *adding significant fossil fuel and renewable generation capacity,*
- ***developing co-firing of peat with biomass,***
- *complying with EU unbundling requirements,*
- *reducing dominance (in the case of ESB) by divesting generation capacity,*
- *enhancing competition by new market entry, and offering new services, choice and value to consumers, and*
- *investing in R&D and innovation'.*

The Energy Mix 2012 is analysed as follows;

*'Energy is used in the economy in electricity, heating and transport, and in approximately equal proportions in each of the three sectors. Figure 4 illustrates Ireland's total primary energy requirement and total final consumption in 2012. It shows that the economy remains largely reliant on imported oil and gas for its energy, **with peat, coal and renewables contributing to a lesser extent'.***

Peat and Biomass is described in the Paper as follows;

*'The increase of peat generation in the fuel mix from 2011 to 2012 was largely driven by forced outages of peat stations in 2011, which were not repeated in 2012. Peat generation is supported by a PSO that expires in 2015 for the Edenderry station and 2019 for the West Offaly and Lough Ree peat stations. Extensions to these peat PSOs are not envisaged. In line with Government policy, Bord na Móna has gradually increased the proportion of co-firing with biomass at the Edenderry plant, achieving 22% co-firing in 2012. **Market dynamics, regulatory decisions on priority dispatch for hybrid renewables, as well as policy decisions on REFIT 3 and in the forthcoming Bioenergy Strategy, will influence the future of peat in the Irish generation fuel mix once the current peat PSOs have expired'.***

2.9 Ireland's Transition to a Low Carbon Energy Future 2015-2030 (White Paper)

This White Paper is a complete energy policy update, which sets out a framework to guide policy between 2015 and 2030. Its objective is to guide a transition to a low carbon energy system, which provides secure supplies of competitive and affordable energy to citizens and businesses. This national energy policy framework has been developed in the context of the significant role played by European Institutions in determining energy policy, markets, and regulation. It takes account of European and International climate change objectives and agreements, as well as Irish social, economic and employment priorities.

The Vision of the Policy Framework is;

> ***'by 2030, be a leader in renewable energy deployment with a broad portfolio of large and small-scale renewable energy technologies'***.

In relation to that Vision, the implementation is described as follows;

> *'the immediate priority for the energy sector between now and 2020 is to meet Ireland's climate change and energy sustainability targets by reducing emissions**, increasing renewable energy** and increasing energy efficiency'.*

Further on, under section 3.2 Ireland's Climate Change Targets, the Policy states;

> *'Ireland's 2020 renewable energy target is to increase the share of final energy consumption that is made up by renewable energy sources (RES) to 16%'.*

The State could potentially be subject to fines or additional costs if these targets are missed. The section Fossil Fuels in the Energy Transition, describes the future role of renewables as follows;

> *'Fuels with higher carbon content (peat and coal) will become relatively more expensive and be replaced over time by fuels with lower carbon content, for example natural gas and **renewables**. In effect, higher carbon fuels will be phased out by a combination of sustainable policy measures and consumer reaction to the higher price of carbon intensive fuels'.*

Further on, examples of peat-fired power stations with PSO, including the subject site of this report, is highlighted in the Policy Framework;

> *'The public service obligation (PSO) for the Edenderry peat-fired power station expires in December 2015. PSOs for the West Offaly and Lough Ree power stations, which are supplied with peat from Bord na Móna, expire in 2019. In October 2015, Bord na Móna published its Sustainability 2030 report, **which outlined its strategy to complete the replacement of large-scale peat production with alternative energy sources, including biomass,** wind and solar by 2030 [18]. The strategy includes a target to achieve a 75% reduction in the company's CO^2 emissions intensity by 2020, compared to 2007 levels'.*

Section 5.3 Renewable Energy describes the role of renewable energy;

> *'Specifically in 2014, renewable electricity generation, consisting of wind, hydro, landfill gas, **biomass** and biogas, accounted for 22.7% of gross electricity consumption. The use of renewables in electricity generation in 2014 reduced CO2 emissions by 2.6 Mt and avoided €255 million in fossil fuel imports. In 2014, wind generation accounted for 18.2% of electricity generated and as such was the second largest source of electricity generation after natural gas'.*

The section regarding Renewable Electricity (RES-E) states;

> *'Bioenergy is a versatile source of energy that can be used for heating, transport and power generation. The most advantageous economic benefits arise when it is used for heating. Bioenergy encompasses a range of fuels in solid, liquid and gaseous forms, including forest-based **biomass**, dry agricultural residues, energy crops, organic materials including wastes, and landfill gas and other biogases. Bioenergy can contribute to broader policy objectives such as waste recovery and rural development, as is the case with anaerobic digestion, which not only generates energy, but also gives effect to national waste policy in terms of utilising waste as a resource. It has been highlighted in waste management plans as a technology suitable for development at a local and regional level and at varying scales. Anaerobic digestion also has the potential to improve air quality, for example through mitigation of ammonia emissions and odour by diverting slurry from land spreading. However, expanding the uptake of bioenergy involves several challenges, including the availability of sufficient sustainably-sourced **biomass**, competition with other land uses such as food production, and the cost of support. Consideration must be given to the most prudent uses for bioenergy'.*

Further on, in the same section;

> *'**Biomass** is currently co-fired in one peat-fired power station in Edenderry. This is supported under REFIT 3 [32], up to a level of 30% average co-firing and 125 MW in total. Some of the **biomass** being used is imported. A Government-commissioned technical analysis [16] considered biomass usage and concluded that Ireland's limited **biomass** resource would be more efficiently deployed in the heating sector. Future support for **biomass** will be decided in the context of the renewable electricity and renewable heat consultations that are currently underway'.*

Under section Renewable Heat (RES-H), biomass is discussed in relation to emissions reductions below;

> *'**Biomass** will make a more significant short term contribution to meeting our targets for renewable energy and GHG emissions reductions. Analysis shows that greater use of **biomass** in renewable heat will bring positive macroeconomic and employment benefits, with the potential to support up to 5,000 rural jobs through reduced fuel costs and reduced imports. The benefits of **biomass** are greatest when local **biomass** resources are used [37]'.*

The Policy Framework recognises that the transition from traditional to renewable sources of energy is already underway and highlighting the need to support that process as well as making sure it is an efficient and diversified use of energies. Based on a technical analysis of Ireland's limited biomass resources, and consequential import, the policy states that biomass would be more efficiently deployed in the heating sector. The Policy also states that analysis shows that greater use of biomass in renewable heat will bring positive macroeconomic and employment benefits, and that the benefits of biomass are greatest when local biomass resources are used. The future support for biomass will be decided in the context of the renewable electricity and renewable heat consultations, which are currently underway. In the context of this report, it is therefore not yet clear from the Policy Framework, if biomass deployed in the electricity sector is fully supported.

2.10 National Renewable Energy Action Plan

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's target to achieve 16% of energy from renewable sources by 2020, under the Directive 2009/28/EC of the European Parliament and of the Council. Ireland's National Renewable Energy Action Plan to 2020, submitted to the EU Commission, as legally required under the Directive, is the Framework within which Ireland has set out the detailed schemes, policies and measures underway and planned to deliver the trajectory of growth from renewable sources. The National Renewable Energy Action Plan sets out in considerable detail the range of actions underway. The role of renewable energy within the energy policy in Ireland is described below;

> *'The development of renewable energy is central to overall energy policy in Ireland. Renewable energy reduces dependence on fossil fuels, improves security of supply, and reduces greenhouse gas emissions creating environmental benefits while delivering green jobs to the economy, thus contributing to national competitiveness.*
>
> *The Government's commitment to accelerating the development of renewable energy is set out in the Government's Energy Policy 'Delivering a sustainable energy future for Ireland – The Energy Policy Framework 2007-2020'; the Programme for Government and in the Government's strategy 'Building Ireland's Smart Economy – A Framework for Sustainable Economic Renewal.'*
>
> *Climate change, energy security and competitiveness are inter-related challenges that will be addressed through the transforming of Ireland's economy from one based on fossil fuel dependence to a low carbon economy based around energy efficiency, renewable energy and smart networks'.*

The table below is the National 2020 target and estimated trajectory of energy from renewable sources in heating and cooling, electricity and transport (highlighted in blue are the targets for renewable energy sources for electricity);

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RES- H&C[15] (%)	3.5%	4.3%	4.9%	5.1%	6.9%	7.7%	8.9%	9.7%	10.1%	10.5%	11.2%	**12.0%**
RES-E[16](%)	6.9%	20.4%	24.6%	25.3%	30.5%	31.0%	32.4%	32.2%	33.8%	37.5%	37.3%	**42.5%**
RES-T[17](%)	0.0%	3.0%	3.9%	4.6%	5.1%	5.5%	5.9%	6.6%	7.4%	8.1%	8.8%	**10.0%**
Overall RES share[18] (%)	3.1%	6.6%	8.1%	9.0%	10.5%	11.0%	11.8%	12.2%	12.9%	14.0%	14.4%	**16.0%**

> *'The Government has set a target of 40% electricity consumption from renewable sources by 2020. In the last 5 years in particular, Ireland has made big strides in accelerating renewable generation. In the 2001 European RES-E Directive, Ireland was set a target of moving from 3.6% RES-E to 13.2% RES-E by 2010. Ireland achieved 14.4% RES-E in 2009 and is on track to exceed the national target of 15% in 2010'.*

It is clear from the Action Plan that the use of renewable energy sources is targeted to grow within the plan period, with these national targets based on directive of the European Parliament and of the Council. The transition to renewable energy is described in the Plan to have positive environmental, economic and social effects as well as contributing to national competitiveness and energy security.

2.11 Strategy for Renewable Energy: 2012 – 2020

The Government's Renewable Energy Strategy (Department of Communications, Energy and Natural Resources, 2012) is set firmly in the global and European context. The objectives accord with the policy ambitions for renewable energy set by the European Union and the International Energy Agency, specifically under Directive 2009/28/EC, as described in previous section. This high-level Strategy, underpinned by the detailed National Renewable Energy Action Plan, sets out the Government's

Strategic Goals for Renewable Energy and the Key Actions underway and planned in the short and medium term for each of the renewable energy sectors. The Key Actions are designed to address current challenges and support progressive delivery on our national ambitions for renewable electricity, heat and transport.

The following statement introduces the Strategy;

> *'The Government's overriding energy policy objective is to ensure competitive, secure and sustainable energy for the economy and for society. This energy imperative is fundamental to economic recovery and wellbeing. Renewable energy, allied with energy efficiency, is crucial to our goals of secure sustainable and competitive energy supplies reducing dependency on expensive fossil imports and underpinning the move towards a low carbon economy. Energy Policy has a pivotal role to play in creating the conditions for job creation and a return to economic growth'.*

Further on it states;

> *'The development of renewable energy is central to overall energy policy in Ireland. Renewable energy reduces dependence on fossil fuels, improves security of supply, and reduces greenhouse gas emissions creating environmental benefits while delivering green jobs to the economy, thus contributing to national competitiveness and the jobs and growth agenda'.*

Renewable energy in related to jobs created, is described as follows;

> *'The Government's overarching strategic objective is to make renewable energy an increasingly significant component of Ireland's energy supply by 2020, so that at a minimum we achieve our legally binding 2020 target in the most cost-efficient manner for consumers. Of critical importance is the role which the renewable energy sector plays in job creation and economic activity as part of the Government's action plan for jobs'.*

The Strategic Goal 2 of the plan is as follows;

> *'A sustainable Bioenergy sector supporting renewable heat and power generation'.*

In relation to this goal, it is stated;

> *'The REFIT scheme also recognises the importance of more sustainable management of waste, including municipal waste, through a range of treatments including AD and Waste to Energy and the inherent potential this source has to contribute to meeting Ireland's renewable energy targets. Bioenergy electricity generation offers the additional advantage of being dispatchable, i.e. it is available on demand and not intermittent.*
>
> ***The development of biomass energy will encourage the establishment of new rural enterprises and support job creation in the regions, using our existing and potential indigenous resources.*** *Forest harvesting residues and thinnings, as well as dedicated energy crops such as miscanthus*

and willow, and farm wastes, all provide additional opportunities, while wastes such as used cooking oil, and meat and bone meal, which previously incurred disposal costs, can now be converted into biofuels for transport or used to generate renewable electricity and heat'.

The REFIT for biomass technologies is mentioned as follows;

'REFIT for biomass technologies, (REFIT III), is designed to support, for the first time, a range of technologies including Combined Heat and Power (CHP) and Anaerobic Digestion (AD) as well as for co-firing of biomass in peat power plants.

The scheme aims to incentivise the addition of 310MW of renewable electricity biomass capacity to the Irish grid, with a total of 200MW of this being new capacity in the Anaerobic Digestion and solid Biomass areas. Of this, 150MW will be High Efficiency Combined Heat and Power (CHP), using both Anerobic Digestion and the Thermochemical conversion of solid Biomass. REFIT III will also provide supports for the co-firing of biomass with peat at the peat plant at Edenderry and potentially in future, subject to technical acceptance, at Lanesborough and Shannonbridge'.

It is clear from the Strategy for Renewable Energy that the development of renewable energy is central to overall energy policy in Ireland. The strategy is in place in order to reduce dependency on fossil fuels and reduce greenhouse gas emissions as well as ensure competitive, secure and sustainable energy for the economy and for society. Along-side creating environmental benefits it has the potential to deliver green jobs to the economy. The REFIT III program is designed to support a range of biomass technologies, including co-firing of biomass in peat power plants, and it can therefore be concluded that the use of biomass is supported, however the Strategy does not express a specific position on full transition to biomass in generation of electricity.

2.12 Draft Bioenergy Plan 2014

The overarching objective of the Government's (Department of Communications, Energy and Natural Resources, 2014) energy policy is to ensure secure and sustainable supplies of competitively priced energy to all consumers. The development of Ireland's renewable energy resources is critical for the achievement of each element of this objective. The Bioenergy Plan will underpin the development of the sector in the period to 2020 and lay the foundations for its long-term growth. The Plan seeks to form a link between critical policy areas for Ireland, namely, renewable energy; agriculture; forestry; the environment; sustainability; and the growth potential of the green economy; while taking account of international development policy considerations. In this way, it is intended that the Bioenergy Plan will provide a mechanism to inform and coordinate policy and implementation across these policy areas, thus supporting the sustainable exploitation of Ireland's bioenergy resources.

This Draft Bioenergy Plan sets out a **vision:**

'Bioenergy resources contributing to economic development and sustainable growth, generating jobs for citizens, supported by coherent policy, planning and regulation, and managed in an integrated manner'.

Three high level **goals**, of equal importance, based on the concept of sustainable development have been identified within the Plan;

• To harness the market opportunities presented by bioenergy in order to achieve economic development, growth and jobs

• To increase awareness of the value, opportunities and societal benefits of developing bioenergy

• To ensure that bioenergy developments do not adversely impact the environment and its living and non-living resources'

The Plan continues;

'From the policy context review in the Plan, the development of bioenergy industry in Ireland cuts across a wide range of sectors, bodies and stakeholders. Safeguarding the public interest, while realising the benefits of the commercial development of our bioenergy resource, is the overarching priority for the Government, and therefore, it informs every aspect of this Draft Bioenergy Plan.

To this end, and in the light of the diversity of interests and stakeholders involved, the following core principles are set out as being necessary to underpin the work that is required to implement the Bioenergy Plan and advance the sustainable development of Ireland's bioenergy resources:

- *Policies that support bioenergy should deliver genuine carbon reductions and help Ireland to meet its carbon emissions and renewable energy objectives to 2020 and beyond.*

- *Policies must be economically and financially feasible, and cost effective. All policies, including taking no action, will attract a cost either now or post 2020. Taking no action now may result in higher costs in terms of achieving objectives for the post-2020 period. This plan is framed by the limited scope for direct Exchequer support and an imperative that policies are as cost-effective as possible.*

- *The use of scarce resources should be optimised and policies should take account of the availability of biomass domestically and internationally, including the potential impact that the demand for biomass can have on land-use change in Ireland and abroad.*

- *Bioenergy policies should contribute to wider environmental policy objectives. Bioenergy supports should be designed in a manner that assists in managing the particulate, POPs and NOx emissions that are associated with the combustion of biomass. Bioenergy supports should also maximise the wider environmental co-benefits such as reduction and control of methane.*

- *Bioenergy supports should afford a degree of certainty for investment in the sector. Central to achieving policy objectives will be the extent to which policy actions directly and indirectly offer certainty and predictability for the principal actors and engender investor confidence.*

- *Bioenergy supports should seek to optimise enterprise and employment opportunities.*

- *The governance of the Bioenergy Plan must be in line with best practice, with robust and transparent reporting mechanisms'.*

The broad high-level categorise for bioenergy actions and enablers are described below;

> *'The bioenergy actions and enablers to be pursued fall into five broad high-level categories:*
>
> *• demand-side measures that contribute directly to delivering renewable energy;*
>
> *• supply-side measures that address the supply-chain challenges faced by domestic producers of biomass and enable the supply of the resources necessary to meet demand over the medium and long term;*
>
> *• research, development and demonstration;*
>
> *• further market support and sustainability measures; and*
>
> *• governance'.*

The vision of the Plan describes bioenergy resources and development to have the potential to positively contribute to economic development and sustainable growth, as well as increase societal benefits and contribute positively to the environment, and further on, shall be managed in an integrated manner supported by planning, policy and regulation. It is the overarch priority for the Government to safeguarding the public interest, while realising the benefits of the commercial development of our bioenergy resource, which informs every aspect of this Draft Bioenergy Plan.

2.13 National Peatlands Strategy

The purpose behind the National Peatlands Strategy (Department of Culture, Heritage and the Gaeltacht, 2017) is to set down clear principles which will guide Government policy in relation to all Irish peatlands. These principles will be applied through their incorporation into the more detailed sectoral plans, policies and actions adopted and undertaken for each policy area. The Strategy will cover the period 2015 to 2025 and will be subject to a mid-cycle review in 2020 as well as ongoing monitoring and reporting of progress. This Strategy aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations.

The Vision Statement of the national peatlands strategy is as follows;

> *'This Strategy aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations'.*

Peat and electricity in relation to the two subject sites of this report is stated in the National Peatlands Strategy, as follows;

> *'The generation of electricity from peat at three power stations – Edenderry, run by Bord na Móna and two at Lough Ree and West Offaly – is supported through the electricity Public Service Obligation which will expire in 2015 for the Bord na Móna plant and 2019 and 2020 for the other two. The peat industry is influenced by the availability of subsidies that promote the generation of electricity from peat sources. Bord na Móna employed substantial numbers between the late 1940s and the mid- 1980s but the number has reduced to over 2,000 people now. Combined with the numbers employed by the ESB, this constituted a significant social*

and economic benefit for the midlands, sustaining or creating communities. While the numbers employed in this area have significantly reduced, peat production for energy remains important for the local and national economy'.

Further on, the National Peatlands Strategy states the following on Biomass co-firing with peat;

'Co-firing of biomass with peat and other fossil fuels offers a number of potential benefits in terms of reducing that carbon emissions of peat-only plants and also, depending on the tariffs they can offer, stimulating the demand for indigenously sourced biomass. Co-firing biomass with peat is a technology supported under the Renewable Energy Feed-in Tariff scheme (REFIT)'.

The strategy states the following on Peat Fired Electricity Generation-Action A6;

'The state energy companies will continue to work with the biomass sector on the potential of co-firing in the short term at State owned peat stations. Biomass power generation projects will be supported through the REFIT scheme'.

The strategy is making clear that Ireland's peatlands must be managed in a balanced way. Biomass co-firing with peat is recognised and supported in the Strategy, and supported under the REFIT scheme. The strategy states that, while the numbers employed at LRP and WOP have significantly reduced, peat production for energy remains important for the local and national economy. Though biomass co-firing with peat is supported within the Strategy, diversification away from peat entirely is not an expressed aim.

2.14 Action Plan for Jobs 2018

Action Plan for Jobs (APJ) 2018 (Department of Business, Enterprise and Innovation, 2018) is the seventh in an annual series outlining the Government's joined-up approach to maximising employment across Ireland.

Related to renewable energy it is stated;

'Ireland must also be at the forefront of the transition towards a low-carbon and circular economy. This transition will have a profound impact on the competitiveness and sustainability of our enterprise base and will create new enterprise opportunities through the development and diffusion of new technologies by Irish based firms. The bio-economy will have an important role to play in this transition through the improved production of renewable biological resources and their conversion into bio-based products and bio-energy, and has the potential to contribute to rural economic development'.

The transition and development of bio-energy and renewable resources is stated to have role to play in the competitiveness and sustainability of Ireland's enterprise base and creating new opportunities as part of the bio-economy and potential to contribute to rural economic development.

2.15 Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure

The Department of Communications, Energy and Natural Resources' Policy Document (2012) sets out 'Adherence to National and International Standards in Designing and Constructing Energy Networks and Infrastructure' stating as follows:

> *'The Government does not seek to direct EirGrid and ESB Networks or other energy infrastructure developers to particular sites or routes or technologies. These are matters for the developers and for the forward planning process through regional and local development plans and at project level through the development management process';*
>
> *'The Government does expect the Companies in making their choices, of project specific technologies and routing as well as mitigation measures, to take account of all relevant national and international standards, to follow best practice and ensure value for money and be informed by detailed consultation at local level'.*

Under the same section, continuing;

> *'In addition to undertaking extensive statutory and non statutory public consultation, the State Companies and energy developers must adhere to national and international standards on health, environment, biodiversity, landscape and safety as an intrinsic part of the Planning process. Compliance together with appropriate impact mitigation measures are central to the Environmental Impact Assessments which form the basis of planning applications to An Bord Pleanála'.*

The Policy Statement concludes as follows;

> *'The Government reaffirms, in conclusion, the imperative need for development and renewal of our energy networks, in order to meet both economic and social policy goals. The planning process provides the necessary framework for ensuring that all necessary standards are met and that comprehensive statutory and non-statutory consultation is built into the process'.*

The Government Policy Statement highlights that it does not seek to direct infrastructure developers to particular sites or routes or technologies, however**, the Government endorses, supports and promotes the strategic programmes of the energy infrastructure providers.** The development process of energy infrastructure is expected to take account of all relevant national and international standards, to follow best practice and ensure value for money and be informed by detailed consultation at local level, undertaking statutory and non-statutory public consultation.

2.16 Prospects for Irish Regions and Counties: Scenarios and Implications (2018)

This 2018 ESRI Report sets out a number of findings regarding projections for regions and counties across Ireland up to the year 2040 , one of them below regarding employment rate across the regions;

> *'While the unemployment rate across the regions follows a very similar time path, there are differences between the regions. On average over the full period, the highest unemployment rates were recorded in the Border, South-East and Midland regions. The lowest rates were recorded in the Mid-East, Mid-West and West'.*

3. Socio-Economic Profile of Catchment Area

This section provides a profile of the catchment area of the power generating station, to provide a comprehensive evaluation of socio-economic context in which the plant operates within the Midland Region. It includes:

- Analysis of the current status of socio-economic profile of the WOP catchment area compared to the country as a whole-including demographics, labour force, sectoral employment and income profile,
- Examination of the current status of the industrial, agricultural, and services sectors in the catchment area; and
- Analysis of the degree of dependence of these areas on the peat to power industry and the ESB as an employer.

3.1 Context

Region

The Midland Region forms part of Eastern and Midland Region. The Midland Region consists of the counties of Laois, Longford, Offaly and Westmeath. According to the EU Regional Innovation Monitor[13]:

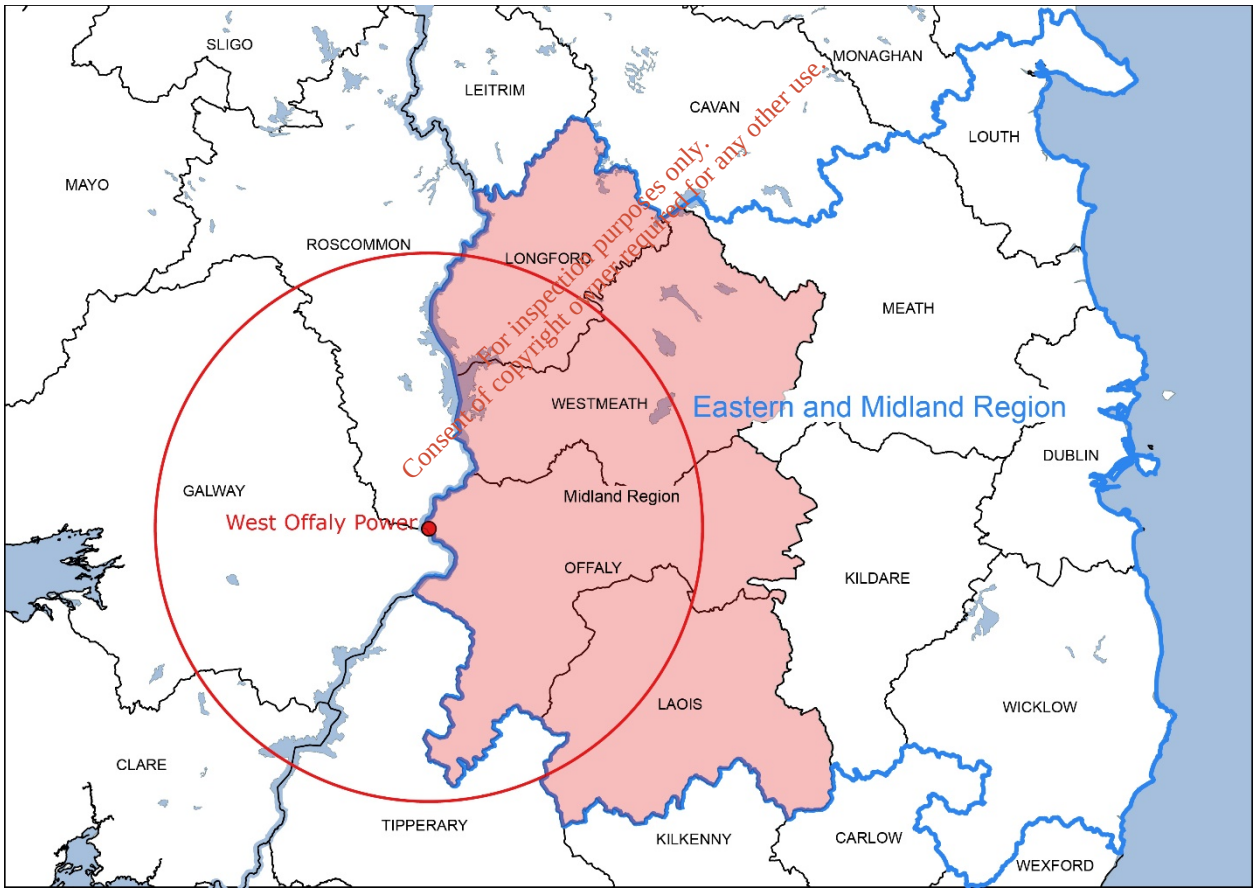

Fig. 3.1 Map showing WOP in the regional context

> *'[The Midlands counties] have the lowest disposable incomes in Ireland. Between 2013 and 2016, there has been a decrease in the severe material deprivation rate from 11.4% to*

[13] *Regional Innovation Monitor Plus - Internal Market, Industry, Entrepreneurship and SMEs - European Commission. Border, Midland and Western (BMW) Region* (https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/border-midland-and-western-bmw-region)

4.9%. However, in the same period, the at-risk-of-poverty rate has increased from 21.3% to 22.4%'.

The Midland region has attracted less Foreign Direct Investment than other regions. Of the net additional jobs created by IDA clients in 2016 47% were located in Dublin and the Mid-East, 5% were located in the Border region and just 0.5% in the Midland region.[14] The *Midland Region Action Plan for Jobs 2015-2017* published by the Department of Business, Enterprise and Innovation in 2015 identified 'Energy & Sustainability' as a strong sectoral activity rooted in the region which has sustainable competitive advantage.[15] According to the report:

'ESB has been synonymous with the Midlands Region for over 60 years, with over 10 peat burning stations since the early 1950s in different counties dotted the country…. Down the years, ESB has had a special relationship with Bord Na Mona, which remains to this day with ESB being their biggest customer. The peat harvesting required to supply the stations is a source of substantial fulltime and seasonal employment through Bord na Mona, as they meet ESB'S significant requirement for milled peat on an ongoing basis'.[16]

'The Midland region has a strong history of energy production and transmission and is well placed to relay the history of energy generation and transmission. Bord na Mona has harvested the peatlands of the region for many years and has provided substantial levels of employment. The ESB is also a significant employer in the Midland region.

The region has embraced the renewable sector with the presence of co-fired peat and biomass and wind power, whilst also being home to the internationally significant Clara Bog and the 2015 National Tourism Award Winner for Environmental Innovation with Lough Boora Discovery Park'.[17]

The report identifies increased production and supply of biomass for a range of customers including electricity generating stations as an action which would support jobs growth in the Energy & Sustainability sector. [18]

Power from Peat in the Midland Region

Figure 3.2 below shows the distribution of peat bogs which supply WOP Station and LRP Station. WOP Station is supplied by bogs in counties Offaly, Westmeath Roscommon, Galway, Meath and Laois.

[14] *Midland Region Action Plan for Jobs 2015-2017* , Department of Business, Enterprise and Innovation, 2015 (https://dbei.gov.ie/en/Publications/Publication-files/Action-Plan-for-Jobs-Midland-Region-2015-2017.pdf)

[15] *Ibid.*

[16] *Ibid*, p. 22

[17] *Ibid*, p. 67

[18] *Ibid*, p. 68

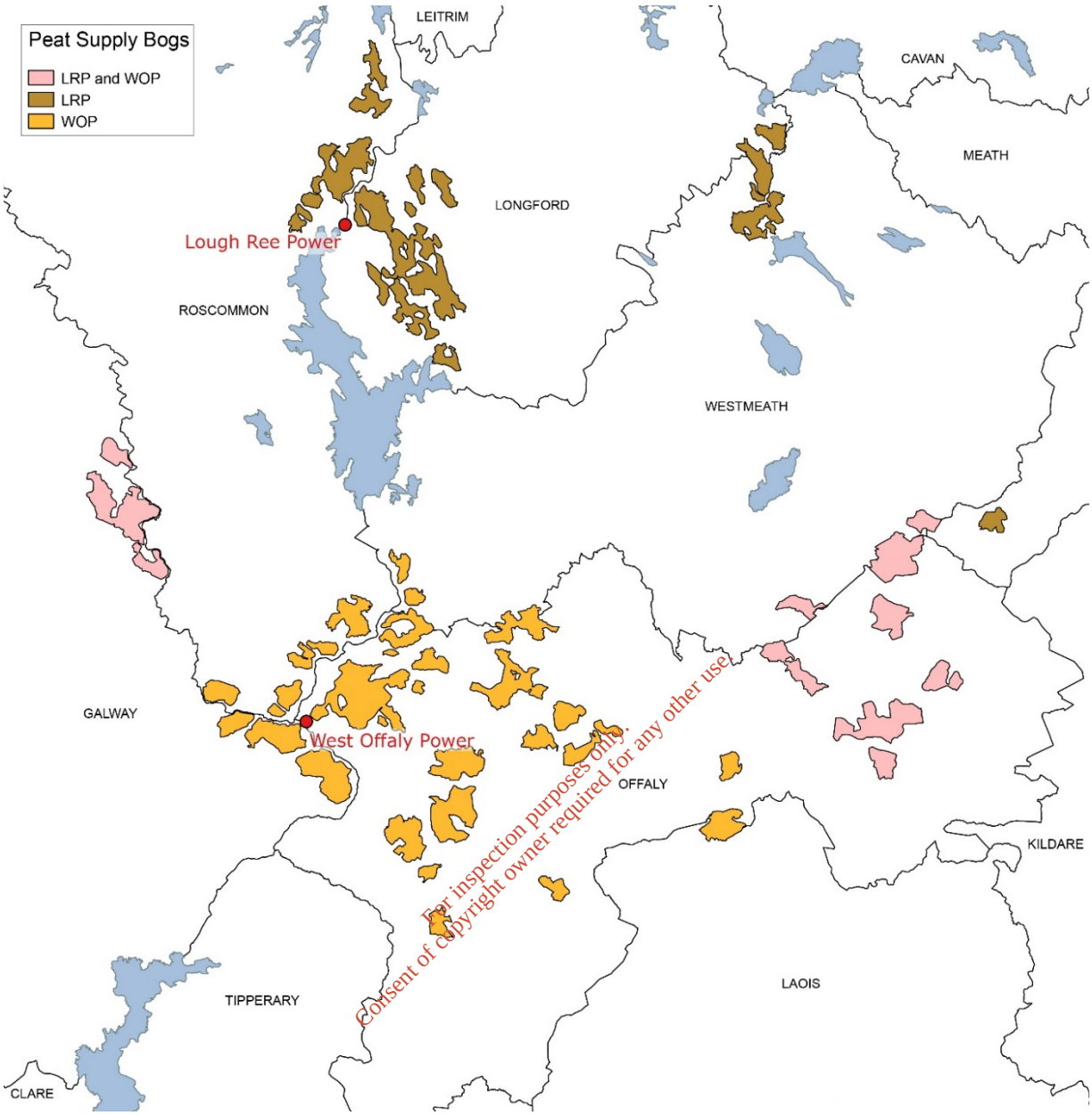

Fig. 3. 2 Map showing WOP, LRP and their Supply Bogs (Source: Bord na Móna, CORINE Land cover Mapping 2012 EPA - http://www.epa.ie/soilandbiodiversity/soils/land/corine/)

Large scale commercial exploitation of bogs in Ireland began in the mid-20th century. Bord na Móna's brought 21 new bogs into production and expanding production in bogs which were already in production. Annual production rose from 150,000 tons in 1946 to one million tons by 1950.

The main purpose of Bord na Móna's program of bog development was to provide fuel for electricity generation. By 1963 40% of Ireland's total electricity production came from peat fired generating stations.[19] According to Dr Proinnsias Breathnach of NUI Maynooth:

> *Mechanized peat harvesting and associated processing activities had a major economic impact on the districts where these activities were introduced. These districts were characterized by a very heavy dependency on agriculture and, given that farms were generally small and the land*

[19] Breathnach, P., 2011. Engineering and Re-engineering Earth: Industrialized Harvesting of Ireland's Peatlands and its Aftermath. In *Engineering Earth* (pp. 429-446). Springer, Dordrecht.

> *was of poor quality, average farm incomes – and, therefore, incomes in general – were relatively low. One can appreciate, therefore, what the introduction of two major industrial employers (Bord na Móna and the ESB) meant to the areas in question…. In the case of County Offaly, where Bord na Móna had its biggest presence, between 1951 and 1961 employment in peat production and electricity generation grew by 37% to 2,084, which amounted to almost one-fifth of all non-agricultural employment in the county. This greatly helped to stabilize non-agricultural employment, which fell by just 3% over the decade compared with 8% nationally. These figures were reflected in population change, in that Count Offaly's population fell by just 2% compared with figure of 7% for the country at large outside of Dublin, the national capital.*[20]

Three peat fuelled electricity generating stations continue to operate in the Midland region today. These generating stations – WOP Station, LRP Station and EPL, continue to be important providers of non-agricultural employment. Between them they employ 926 people directly (546 full-time and 380 seasonal) and support 111 indirect[21] and 139 induced[22] jobs (see Table 4.1, Section 4 and Appendix 2 for more details). The Table A1.18 in Appendix 1 shows the continued stagnation or decline of employment in agriculture and industry in the Midland region within a 50 km radius of WOP and underlines the importance of the plant as a local employer. (See Appendix 1, A1.18)

Employer/Type of Employment - Current Situation	Full-time	Seasonal	Total	FTE
ESB	82	0	82	82
BnM	412	380	792	602
Transport Employees – Employed by Haulier Company contracted to BnM	52	0	52	52
Total Direct	**546**	**380**	**926**	**736**
Indirect Employment	111	0	111	111
Induced Employment	139	0	139	139
Total (Direct + Indirect + Induced)	**796**	**380**	**1,176**	**986**

Table 3.1 Total Employment across Power Stations in Shannonbridge, Lanesborough and Edenderry. (Source ESBI, Bord na Móna, 2018)

The age profile of Bord na Móna employees is set out in Table 3.2. Bord na Móna has a relatively mature workforce with 53% of the company's total workforce aged over 45. 31.3% of the workforce have 3rd level qualifications[23]. This reflects the long-established nature of Bord Na Móna as an employer.

In addition to direct employment associated with peat extraction for energy Bord na Móna employs a significant number of people in other business units. 376 in Resource Recovery, 253 in Central Support Group, 208 in fuels, 201 Horticulture, 63 in Powergen, 22 in Powergen Development and 6 in Biomass. While only 971(46%) of Bord na Móna's 2,100 direct employees are employed in the peat division and continues to be by far the largest single division[24].

[20] *Ibid.* pp. 438-439

[21] Employment supported through the purchases of goods and services made by the generating stations.

[22] Induced effects relate to the wider follow-on spending of wages and salaries of both direct employees and indirectly supported jobs.

[23] 'Economic, Financial & Social Contribution' in Powering the Midlands, Bord na Móna (n.d.) p.29

[24] 'Economic, Financial & Social Contribution' in *Powering the Midlands,* Bord na Móna (n.d.) p.29

Age	Proportion of Employees
18-25	5%
26-30	11%
31-35	11%
36-40	10%
41-45	10%
46-50	11%
51-55	13%
56-60	18%
61-65	11%

Table 3.2 Age profile of Bord na Móna employees (source: Bord na Móna, 2018)

West Offaly Power

WOP Station is located next to the town of Shannonbridge in County Offaly. WOP directly employs 41 ESB staff on site. 148 full-time and 156 seasonal Bord Na Móna workers are employed by supplying WOP with peat[25] and 13 full-time transport employees contracted by Bord Na Móna. 55 of these Bord Na Móna employees are located on site at WOP (i.e. 48 located at WOP Station and 7 at ADF). In addition to the direct employment connected with WOP provided by Bord Na Móna and the ESB a significant level of indirect and induced employment is supported by the plant. The existing direct and supported employment for WOP totals 454 jobs. 298 of these are full time and 156 are seasonal (part-time).

Fig. 3.3 Aerial image showing WOP and Shannonbridge

[25] Including employees involved in fuel handling at station, rail hauliers based at WOP, employees at WOP ash disposal facility, peat operations and transport employees contracted by Bord na Móna.

Power Station - Current Situation	Full-time	Seasonal	Total	FTE
West Offaly Power				
ESB Staff	41	0	41	41
BnM Staff	148	156	304	226
Transport Employees – Employed by Haulier Company contracted to BnM	13	0	13	13
Total Direct	**202**	**156**	**358**	**280**
Total Indirect Employment Supported by WOP	41	0	41	41
Total Induced Employment Supported by WOP	55	0	55	55
Total (Direct + Indirect + Induced)	**298**	**156**	**454**	**376**

Table 3.3 WOP Direct, Indirect and Induced Employment. (Source: ESBI, Bord na Móna, 2018) [26]

The importance locally of WOP as an employer is underlined by data relating to employment from the 2016 census. According to the census the total population of Shannonbridge is 267 and the total number of jobs located in the town is 247. WOP pays 1.5 million euros annually to Offaly County Council in rates. The net amount of rates levied by the council to 2017 was €16.6 million[27]. WOP rates contribution represents over 9% of the net amount levied by the council on a county basis. Rates paid by WOP is a significant positive impact in terms of contribution to Offaly County Council's annual budget requirements.

3.2 Socio-Economic Profile

For the purposes of this socio-economic evaluation the catchment area of the WOP Station is considered to be the area within a 50 km radius of the power station. Census data from 2016 is available for this area. More up to date data is available at a regional or county level.

While the employment rate of the Midland region has been falling since 2012 this fall has been less pronounced than the fall in unemployment nationally and in neighbouring regions. Between 2012 and 2017 the unemployment rate for the midland region fell from 18.4% to 9.3%. Over the same period the unemployment rate for the state as a whole fell from 15.9% to 6.9 % while the unemployment rate for the neighbouring border region fell from 18.9% to 6.5%.(See Appendix 1, Table A1.9). Between 2011 and 2016 the unemployment rate of the catchment area fell 19.6% to 13.8%, based on CSO Census. (See Appendix 1, Fig. A1.8)

The greatest loss of employment in the WOP catchment area can be seen to have taken place in the construction sector. With the number of workers employed in this sector having fallen by 56.9% between 2006 and 2016. The number of workers employed in industry has fallen by 4.1% over the same period. (See Appendix 1, Fig. A1.13 Change in sectorial profile 2006-16). Between 1999 and 2017 the percentage of workers in the Midland region working in industry has fallen from 26% to 16.7% in 2017. Over the same time period the percentage of workers working in the services sector has grown from 53% to 69.1%. (See Appendix 1, Fig. A1.18)

[26] Seasonal jobs are counted as 0.5 FTE

[27] Offaly County Council Local Authority Budget, Calculation of Annual Rate on Valuation For The Financial Year 2018, Adopted 2017 Net Expenditure

Fig. 3. 4 Area within a 50 km radius around WOP Station

The socio-economic profile of the catchment area and Midland region clearly shows that when compared to the state as a whole, the catchment area and Midland region are lagging behind in terms of economic recovery following the economic down turn which began in 2007. This is illustrated by several indicators such as unemployment and disposable income. Whereas prior to the down turn the catchment area's population was growing at a faster rate than the state as a whole between 2011 and 2016 the rate of population growth in the catchment area has slowed and is now lower than the state as a whole. (See Appendix 1, Table A1 .2) All the counties in the catchment area have a lower average disposable income per person that the average for the state as a whole. Offaly, the county in which WOP is located has an average annual disposable income per person of € 16,226 this is 14.3% lower than the figure for the state as a whole. (See Appendix 1, Table. A1.5)

4. Development Scenarios

4.1 Introduction

This section considers the likely socio-economic effects of alternative scenarios regarding changes to operation of the existing WOP Station.

It primarily addresses two scenarios – a ***Do Something scenario*** and a ***Do Nothing Scenario***.

A ***Do Nothing*** **Scenario** entails the maintenance of the current condition, leading to the closure of WOP in line with the current planning conditions, i.e. at the end of 2020. This scenario will include an assessment of the indirect impacts to Bord na Móna resulting from closure of the plants (e.g. fines, changes in generation profile, termination of employment, indirect impacts on other enterprise operations within the catchment area etc.).

A **Do-Something Scenario** considers the continued operation of WOP and transition of the station from peat-fired to biomass fired operation. The likely transition scenarios are addressed in block periods of reduction (and eventual cessation) of peat usage and gradual proportional increase of biomass use at the station leading eventually to a 100% biomass fuel only scenario by 2027 with continued operation post 2027.

Appendix 2 sets out the methodology used in this section.

4.2 Existing Situation

The existing direct and supported employment for WOP totals 454 jobs (2018 figures). 298 are full-time and 156 are seasonal. The composition of this employment estimate is set out in Table 4.1 below. 358 jobs are supported directly by the plant (41 by ESB and 317 by Bord na Móna). 41 jobs are indirectly supported by WOP through non-fuel purchases and non-salary spending by ESB and Bord na Móna. Spending of salaries by workers employed directly by WOP and by workers whose jobs are indirectly supported by WOP supports an additional 55 Jobs[28].

WOP Employment - Current Situation	Full-time	Seasonal	Total	FTE
ESB	41	0	41	41
BnM Total - Consisting of:	161	156	317	239
BnM Fuel Handling at Station	11	1	12	12
BnM Rail Hauliers based at WOP	22	14	36	29
BnM employees at WOP ADF	2	5	7	5
BnM Peat Operations	113	136	249	181
Transport Employees - Employed by Haulier Company contracted to BnM	13	0	13	13
Total Direct - ESB + BnM	**202**	**156**	**358**	**280**
Indirect Employment	41	0	41	41
Induced Employment	55	0	55	55
Total (Direct + Indirect + Induced)	**298**	**156**	**454**	**376**

Table 4.1 Employment – Existing Scenario (Source: ESBI, Bord na Móna, 2018)

[28] This figure is based on the assumption that one induced job is supported for every c. €300,000 of salaries paid to direct and indirect employees.

According to the 2016 census the total number of people working in the Shannonbridge Electoral division was 247.[29]

Table 4.2 below illustrates the importance of the 454 jobs directly associated with and supported by the WOP Station. In terms of employment the WOP Station alone makes a similar economic contribution to the towns of Banagher, Clara, Moate and Ballymahon based on a comparison between the number of employees supported by WOP and the number of people employed in those towns.

Urban Settlement	Daytime Working Population[30]	Resident Population
Athlone	13,108	21,349
Tullamore	8,259	14,607
Nenagh	4,357	8,968
Roscommon	3,917	5,876
Ballinasloe	3,045	6,662
Loughrea	2,225	5,556
Roscrea	1,798	5,446
Birr	1,524	4,370
Athenry	1,450	4,445
Ballymahon	586	1,877
Moate	559	2,763
Clara	525	3,336
Banagher	520	1,760
Shannonbridge	267	247[31]

Table 4.2 Daytime working population of towns within 50 km of the WOP station (Source: CSO, 2016)

Table 4.3 below illustrates the sectoral distribution of daytime workers in Shannonbridge. By far the largest sector is the Manufacturing, Mining and Quarrying. This sector includes ESB and Bord na Móna workers employed at WOP[32]. Shannonbridge's dependency on this sector as a direct employer is clearly illustrated by the fact that 71.3% of Shannonbridge's daytime working population is employed in the sector. While not all Bord na Móna employees engaged in supplying WOP are necessarily located at Shannonbridge, it seems reasonable to assume that the vast majority of the 176 workers in the 'Manufacturing, Mining and Quarrying' sector at Shannonbridge are employed by Bord na Móna or ESB. In addition to this employment, the 'Wholesale, Retail Trade' can be seen as being in part dependent on spending by Bord na Móna and ESB employees based at WOP.

[29] 2016 census Daytime population and workplace zones (https://www.cso.ie/en/census/census2016reports/census2016smallareapopulationstatistics)

[30] CSO: Population Aged 15 and Over at Work, Usually Resident and Present in the State and Place of Work 2016 by Towns with a Population of over 1,500 (https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=E6034&PLanguage=0)

[31] Population of Electoral Division rather than settlement. WOP is inside the Shannonbridge Electoral Division boundary but outside the official CSO settlement boundary for Shannonbridge.

[32] 'Detailed list of Industries (NACE Rev 2)' *Census 2016 Summary Results - Part 2* (https://www.cso.ie/en/media/csoie/newsevents/documents/census2016summaryresultspart2/Census_2016_Summary_Results_%E2%80%93_Part_2.pdf)

Sector	Number of Workers	%
Agriculture, forestry and fishing	20	8.10%
Manufacturing, mining and quarrying	176	71.26%
Construction	4	1.62%
Wholesale, Retail Trade	16	6.48%
Information and Communication, Financial	4	1.62%
Public Administration and Defence; Compulsory Social Security	2	0.81%
Education, Human Health and Social Work Activities	4	1.62%
Other Service Activities	4	1.62%
Not stated	17	6.88%
Total	247	100%

Table 4.3 Daytime working population of Shannonbridge by sector (Source: CSO 2016[33])

4.3 'Do Nothing' Scenario

In the absence of the proposed development (i.e. in the 'Do-Nothing' scenario) power generation on the site will cease in 2020 with the resultant loss of direct and indirect employment and economic activity to the Midlands Region.

A 'Do Nothing' scenario would represent the loss of all 358 jobs (202 full-time and 156 seasonal/part-time) directly associated with the WOP Station and ADF by 2020 aside from security, decommissioning and closure activities at WOP Station and ADF. This scenario would also lead to the loss of 96 indirect and induced jobs supported by the WOP Station and ADF.

It would be expected that skilled engineering and site facility tasks are mobile in nature and these employees are likely to move out of the area. Workers in the peat extraction industry, with a relatively narrow skills base, may seek opportunities to retrain or work in other industries. However, it is notable that employment in the agriculture sector has experienced decline in recent years and may have limited capacity to absorb additional workers. 53% of Bord na Móna's total workforce is aged over 45, 69% of Bord na Móna's workforce have no 3rd level qualifications[34].

Based on this age and educational profile Bord na Móna workers employed supplying WOP Station would not be well placed to secure alternative employment in the event of the plant ceasing operation in 2020.

As noted in Section 3.4 the largest growth area for employment in the catchment area is the services sector. However, it is notable that skills are not readily transferable from peat extraction and power generation industry to the services sector.

4.4 'Do Something' Scenario

The proposed development, if permitted, will ensure the continued operation of WOP Station and ADF, extending the operational life of the existing WOP Station into a new stage of increasingly

[33] CSO: Population Aged 15 and Over at Work, Usually Resident and Present in the State and Place of Work 2016 by Towns with a Population of over 1,500 (https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=E6034&PLanguage=0)

[34] Source Bord na Móna, 2018

sustainable power generation. This entails a scenario where biomass gradually replaces peat as the fuel source for WOP.

Tables 4.4 to 4.6 set out the phased transition of WOP to 100% biomass in block periods between 2020 and 2027. Starting at 40% biomass in 2020 (Table 4.4), growing to 60% biomass in 2025 (Table 4.5), 100% biomass in post 2027 (Table 4.6) All biomass figures are indicative.

An indicative gradual increase in indigenous biomass supply from 20% of biomass in 2020 to 40% post 2027 is assumed.

Phase 1

WOP Employment - 2020 - 60% Peat / 40% Biomass (20% Indigenous / 80% Imported)	Full-time	Seasonal	Total	FTE
ESB	41	0	41	41
Non-ESB Power Station Staff	13	6	19	16
BnM Peat	68	85	152	110
Peat Haulage	25	0	25	25
Biomass Haulage	21	0	21	21
Total Direct	**168**	**91**	**258**	**213**
Indirect Employment	65	0	65	65
Induced Employment	42	0	42	42
Total (Direct + Indirect + Induced)	**275**	**91**	**365**	**320**

Table 4.4 Employment – Do Something Scenario – 2020 60% Peat/ 40% Biomass (20% Indigenous 80% imported) Hybrid 2020 (Source: Future Analytics Consulting, 2018) [35] [36]

Phase 2

WOP Employment - 2025 - 40% Peat / 60% Biomass (30% Indigenous / 70% Imported)	Full-time	Seasonal	Total	FTE
ESB	41	0	41	41
Non-ESB Power Station	13	6	19	16
BnM Peat	45	54	100	72
Peat Haulage	17	0	17	17
Biomass Haulage	31	0	31	31
Total Direct	**147**	**60**	**208**	**177**
Indirect Employment	95	0	95	95
Induced Employment	38	0	38	38
Total (Direct + Indirect + Induced)	**280**	**60**	**341**	**310**

Table 4.5 Employment – Do Something Scenario – 2025 40% Peat/ 60% Biomass (30% Indigenous 70% imported) Hybrid (Source: Future Analytics Consulting, 2018)

[35] FTE - Seasonal jobs are counted as 0.5 FTE

[36] Non-ESB Power Station Staff - assumes onsite fuel handling tasks carried out by BnM in relation to use of peat as fuel will have direct equivalents after switch to biomass. i.e. "BnM Fuel Handling at Station" + "BnM employees at WOP ADF" from *Table 4.1 Employment – Existing Scenario*.

Phase 3

WOP Employment - Post 2027 - 100% Biomass (40% Indigenous / 60% Imported)	Full-time	Seasonal	Total	FTE
ESB	41	0	41	41
Non-ESB Power Station	13	6	19	16
BnM Peat	0	0	0	0
Peat Haulage	0	0	0	0
Biomass Haulage	52	0	52	52
Total Direct	**106**	**6**	**112**	**109**
Indirect Employment	161	0	161	161
Induced Employment	32	0	32	32
Total (Direct + Indirect + Induced)	**299**	**6**	**305**	**302**

Table 4.6 Employment – Do Something Scenario – Post 2027 100% Biomass (40% Indigenous 60% imported) Hybrid (Source: Future Analytics Consulting, 2018)

The phased transition to 100% biomass results in the gradual reduction of people directly employed by Bord na Móna in peat supply activities. It will also lead to an increase in workers engaged in the indigenous biomass supply chain and will lead to an increase in the number of workers indirectly employed by the WOP Station. The full-time and seasonal (part-time) fuel handling roles currently engaged by Bord na Móna on site at WOP Station and ADF are assumed to have direct equivalents during and after the transition to biomass. It has been estimated that at 100% biomass there would be a requirement for 52 road hauliers.

The transition to biomass will also result in a temporary increase in employment in construction activity. ESB estimated that up to 34 FTE external contractors will be employed in construction works associated with the transition. An additional 2 FTE ESB employees will have a site presence during these works.

4.5 Cumulative Impact

A concurrent planning proposal is being prepared for development of ESB's facility LRP Station at Lanesborough which considers the same future scenarios post 2020 including Do-Something and Do-Nothing scenarios. As noted above, Bord na Mona's facility at EDP is currently co-fired with peat and biomass.

Between them WOP and LRP power stations are responsible for 374 full-time direct jobs (202 WOP + 172 LRP), 291 direct seasonal jobs (156 WOP + 135 LRP) and 82 indirect (41 WOP + 41 LRP) and 99 induced (55 WOP + 44 LRP) jobs. Therefore, collectively the plants are responsible for some 846 jobs in the region and make a significant contribution to the local and regional economy. The Bord na Móna owned Edenderry plant supports an additional 261 direct jobs (both full-time, 172 and seasonal, 89), 29 indirect jobs and 40 induced jobs.

Table 4.7 below provides a summary of the current overall cumulative employment analysis of the three power stations.

Power Station - Current Situation	Full-time	Seasonal	Total	FTE
West Offaly Power				
ESB Staff	41	0	41	41
BnM Staff	148	156	304	226
Transport Employees – Employed by Haulier Company contracted to BnM	13	0	13	13
Total Direct	**202**	**156**	**358**	**280**
Total Indirect Employment Supported by WOP	41	0	41	41
Total Induced Employment Supported by WOP	55	0	55	55
Total (Direct + Indirect + Induced)	**298**	**156**	**454**	**376**
Lough Ree Power				
ESB Staff	41	0	41	41
BnM Staff	110	135	245	178
Transport Employees – Employed by Haulier Company contracted to BnM	21	0	21	21
Total Direct	**172**	**135**	**307**	**240**
Total Indirect Employment Supported by LRP	41	0	41	41
Total Induced Employment Supported by LRP	44	0	44	44
Total LRP	**257**	**135**	**392**	**325**
Edenderry Power				
ESB Staff	0	0	0	0
BnM Staff	154	89	243	199
Transport Employees – Employed by Haulier Company contracted to BnM	18	0	18	18
Total Direct	**172**	**89**	**261**	**217**
Total Indirect Employment Supported by EP	29	0	29	29
Total Induced Employment Supported by EP	40	0	40	40
Total EP	**241**	**89**	**330**	**286**

Table 4.7 - Cumulative employment figures (Source ESBI, Bord na Móna, 2018)

Under a Do-Nothing scenario, the closure of the WOP generating station in 2020 is imminent. If no ready alternative source of employment in comparative sectors could be found, the impact on employment on this predominantly rural area, would be profound and negative.

An analysis of employment in Section 3 shows that employment generation in the Midland Region is concentrated in the services sector. Given the sectorial experience and age profile of Bord na Móna workers employed supplying WOP and LRP it is unlikely that suitable employment will become available for these workers when employment with Bord na Móna ceases.

Under a Do-Something scenario, where peat was replaced by biomass in phases between 2020 and the end of 2027 – i.e. where the proposed development occurs, it is estimated that direct employment supported by the two plants would be 221 (209 full-time (106 WOP + 103 LRP), 12 seasonal (6 WOP + 6 LRP). The Direct FTE is 215 (as shown in Figure 4.8). An additional 322 indirect (161 WOP + 161 LRP) and 64 induced (32 WOP + 32 LRP) jobs are projected to be supported by the two plants.

Due to the phased nature of that transition to 100% biomass, this decline in employment would be gradual. Table 4.8 shows the gradual reduction in direct fulltime and seasonal jobs supported by the two plants over the period 2020-2027 where such a phased transition occurs, with the breakdown between imported and indigenous biomass assumed to range from 80%:20% to 60%:40%. Indigenous

biomass consumption can be seen to increase the number of workers whose jobs are indirectly supported by the two plants.

Phase	Direct FTE	Indirect	Induced	Total
Phase 1 - 2020 - 60% Peat / 40% Biomass (20% Indigenous / 80% Imported)	**402**	**130**	**81**	**613**
Phase 2 - 2025 - 50% Peat / 50% Biomass (40% Indigenous / 60% Imported)	**338**	**190**	**69**	**597**
Phase 3 - Post 2027 - 100% Biomass (40% Indigenous / 60% Imported)	**215**	**322**	**64**	**601**

Table 4.8 Employment – Do Something Scenario Cumulative change in employment WOP and LRP combined over the course of phased 100% biomass post 2027 (Source: ESBI, Bord na Móna, 2018)

Having regard to Ireland's renewable electricity (RES-E) target of 40% by 2020 (overall renewable energy target of 16% - see section 2.9 above) the most recent data from SEAI is that 27.2% of electricity (RES-E) was generated from renewable sources in 2016[37]. The SEAI projects that Ireland will achieve between 13.2% and 15.4% of its overall 16% renewable energy target by 2020[38]. From the initial co-firing phase, WOP Station will positively contribute to the achievement of these targets. The biomass portion of the generation would contribute directly to Ireland's renewable electricity (RES-E) targets, and by definition the country's renewable energy targets thereby helping the country to get closer to the overall renewable energy target, and potentially reduce any fines or additional costs that would accrue.

[37] Energy in Ireland 1990 – 2016, SEAI, December 2017

[38] Renewable Electricity Support Scheme (RESS): High Level Design, Government of Ireland, Para. 3.1

5. Conclusions and Implications

This report has provided a detailed socio-economic profile of the WOP catchment area and the Midlands Region. It is clear that the on-going operation of the WOP Station significantly contributes to the local and regional economy through the direct provision of employment and economic activity. The power station also has an indirect positive impact on economic activity in the area through the on-going acquisition of fuel and related services, and ongoing continuous payment of commercial rates the Local Authority.

The gradual replacement of peat burning by biofuels (including co-firing of peat and biomass) is supported by a strong policy framework including the first National Mitigation Plan (NMP) as reflected in the National Policy Position on Climate Action and Low Carbon Development (2014) and the Climate Action and Low Carbon Development Act, 2015, which is reflected in national, regional and county level land use planning policy guidelines and plans.

All scenarios considered in this report show an overall reduction in employment from the activity at the WOP site. A Do-Nothing scenario would ultimately see an immediate termination of all employment at the site. In this scenario electricity generation on the site will cease in 2020 with the resultant loss of direct and indirect employment and economic activity to the Midlands Region. This scenario would entail the loss of all 358 jobs (202 full-time and 156 seasonal) directly associated with the WOP Station and ADF by 2020 aside from security, decommissioning and closure activities at WOP station and ADF. This scenario would also lead to the loss of 96 indirect and induced jobs supported by the WOP Station and ADF.

It would be expected that skilled engineering and site facility tasks are mobile in nature and these employees are likely to move out of the area. Workers in the peat extraction industry, with a relatively narrow skills base, may seek opportunities to retrain or work in other industries. However, it is notable that employment in the agriculture sector has experienced decline in recent years and may have limited capacity to absorb additional workers. 53% of Bord na Móna's total workforce is aged over 45, 69% of Bord na Móna's workforce have no 3rd level qualifications[39]. Based on this age and educational profile Bord na Móna workers employed supplying WOP would not be well placed to secure alternative employment in the event of the plant ceasing operation in 2020.

However, the proposed development - where the plant is powered by a mix of biomass and peat for the period 2020-end 2027 before transitioning to 100% biomass, would sustain local employment at the plant and support the potential development of alternative sustainable industries in the area.

There will be a gradual reduction of people directly employed by Bord na Móna in peat supply activities. Bord na Móna's announcement of the acceleration of its Decarbonisation process (October 2018), confirms the end of using peat for energy by 2028[40] with the expected loss in some 380-430 managerial, administrative and peat operations roles. This scenario – i.e. where the proposed development proceeds, will also lead to an increase in workers engaged in the indigenous biomass supply chain and an increase in the number of workers indirectly employed by the WOP Station. The 11 full-time and 1 seasonal fuel handling roles currently engaged by Bord na Móna on site at WOP Station and ADF are assumed to have direct equivalents during and after the transition to Biomass. The phased transition period allows a realistic timeframe for the local economy to move from peat harvesting for energy generation purposes towards more sustainable industries.

[39] Source Bord na Móna, 2018

[40] https://www.bordnamona.ie/company/news/articles/bord-na-mona-accelerates-decarbonisation/

Having regard to the concurrent planning proposal for development of ESB's LRP Station at Lanesborough, it is notable that the two power stations are responsible for 374 full-time direct jobs, 291 direct seasonal jobs and 82 indirect and 99 induced jobs. Therefore, collectively the plants are responsible for some 846 jobs in the region and make a significant contribution to the local and regional economy. The Bord na Móna owned Edenderry Power Station supports an additional 261 direct jobs (172 full-time and 89 seasonal), 29 indirect jobs and 40 induced jobs. Under a do-nothing scenario, the impact on employment in a rural area, if no ready alternative source of employment in comparative sectors could be found would be profound and negative.

Under a Do-Something scenario where peat is replaced by biomass in phases between 2020 and 2027, it is estimated that direct employment supported by the two plants would be 221 with an additional 322 indirect and 64 induced jobs supported by the two plants. Due to the phased approach in switching to 100% biomass fuel, long-term employment would be sustained at the power station which (while reduced) individually and cumulatively with LRP, would have significant positive impact on the region relative to the alternative of closure.

At the local level, Table 4.3 above shows how important WOP is as an employer at Shannonbridge. The 'Manufacturing, Mining and Quarrying' sector at Shannonbridge, which can be assumed to be almost entirely composed of Bord na Móna and ESB employees, accounts for over 70% of employment according to the 2016 census. When the knock-on effect on retail on other services is taken into account it is clear that the potential closure of WOP would have a devastating effect on Shannonbridge.

The Midland Region has broadly speaking followed national trends in terms of an economic slowdown after 2008 followed by a recovery since 2013. However, across a number of indicators it is clear that the Midland region's recovery has not been as pronounced as in other regions. For example, the unemployment rate has fallen nationally from 15.9% in 2012 to 6.9% in 2017. During the same period the unemployment rate for the Midland region has fallen from 18.4% to 9.3% (the highest unemployment rate of any region). In the neighbouring Border Region the unemployment rate has fallen from 18.9% to 6.5%. This suggests that not only has the Midland region's recovery lagged behind that of the state as a whole but also that of other regions.

There is a strong sectoral shift apparent in the Midland Region from industrial and agricultural employment to employment in service sector. The services sector is the fastest growing sector of the economy in the Midland region. The number employed in professional services (a subset of the services sector) in the 50 km catchment area has grown from 18,805 in 2006 to 27,144 in 2016 a 44.3% increase. In the Midland region as a whole, the proportion of the workforce employed in the services sector has grown from 53.0% in 1998 to 69.1% in 2017. Given the age and educational profile, the transition of workers from the peat to power industry to the services sector would require considerable investment in retraining. The proposed development of WOP Station as a co-fired station transitioning to biomass would (together with the development of LRP) significantly mitigate the socio-economic challenges faced by the Region.

As discussed in Section 3 of this report, 971 (46%) of Bord na Móna's 2,100 direct employees are employed in the peat division and as such continues to be by far the largest single entity. Bord na Móna's history of investment, reputation and community relationships in the Midland region are extremely important when it comes to developing renewable energy assets in the region. The phased transition to biomass would support Bord Na Móna development as a more sustainable business entity in the longer term in accordance with their *Brown to Green* strategy[41] and provide a stimulus for the development of an indigenous biomass industry.

[41] https://www.bordnamona.ie/company/news/articles/bord-na-mona-accelerates-decarbonisation/

A phased transition to 100% biomass fuel supply for the WOP plant over the period 2020-2027 would present a significant investment in employment in the region, mitigating job losses in peat harvesting and the offsetting the profoundly negative scenario associated with the potential closure of the power station. Subject to planning permission the phased transition to 100% biomass over a 7-year period would represent and important mitigating socio-economic impact through sustaining local employment while allowing for transition to a new sustainable energy source.

Appendix 1 – Detailed Socioeconomic Profile of WOP Catchment Area.

1.1 Population Growth

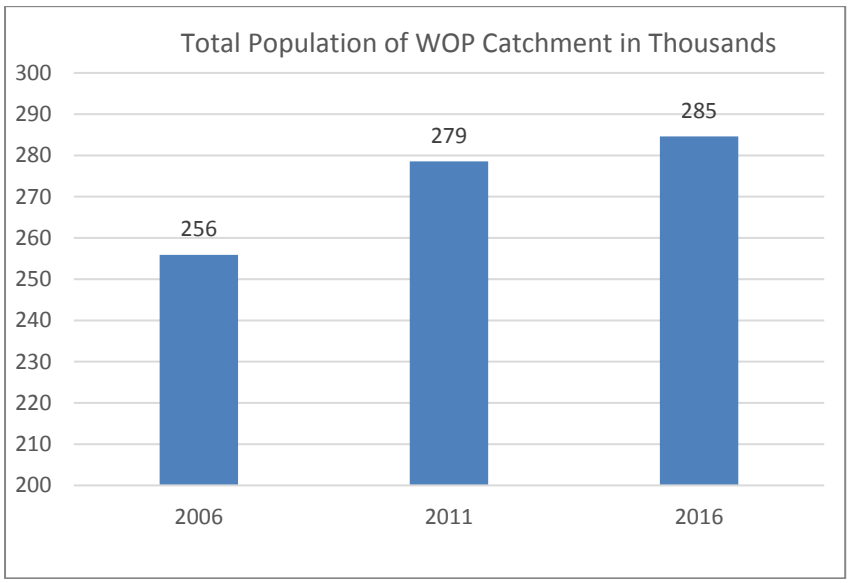

Fig A1.1 – Total population of WOP Catchment Area 2006-2016 (Source: CSO, 2006, 2011, 2016)

	2006	2011	2016
Total Population	255,892	278,555	284,606

Table A1.1- Total population of WOP Catchment Area 2006-2016 (Source: CSO, 2006, 2011, 2016)

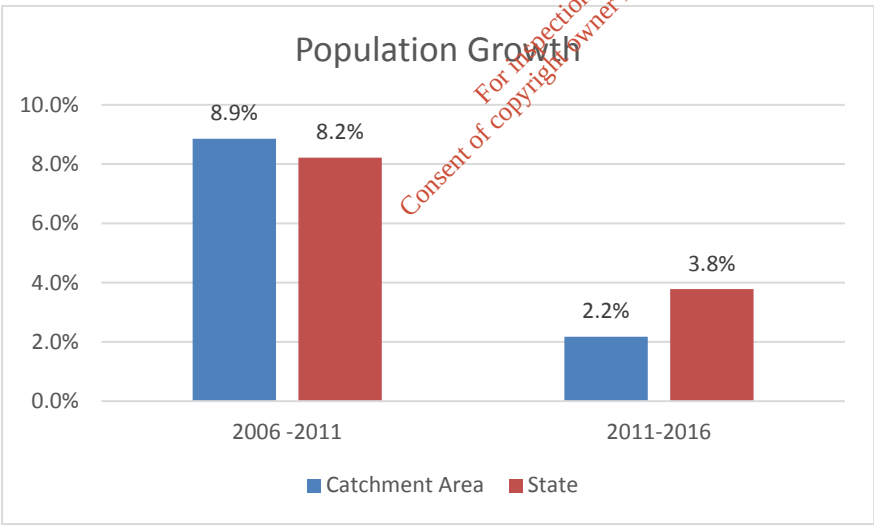

Fig.A1. 2 - Population Growth 2006-2016: Catchment Area and State Compared (Source: CSO, 2006, 2011, 2016)

	2006 -2011	2011-2016
Catchment Area	8.9%	2.2%
State	8.2%	3.8%

Table A1 .2- Population Growth 2006-2016: Catchment Area and State Compared (Source: CSO, 2006, 2011, 2016)

1.2 Age Profile

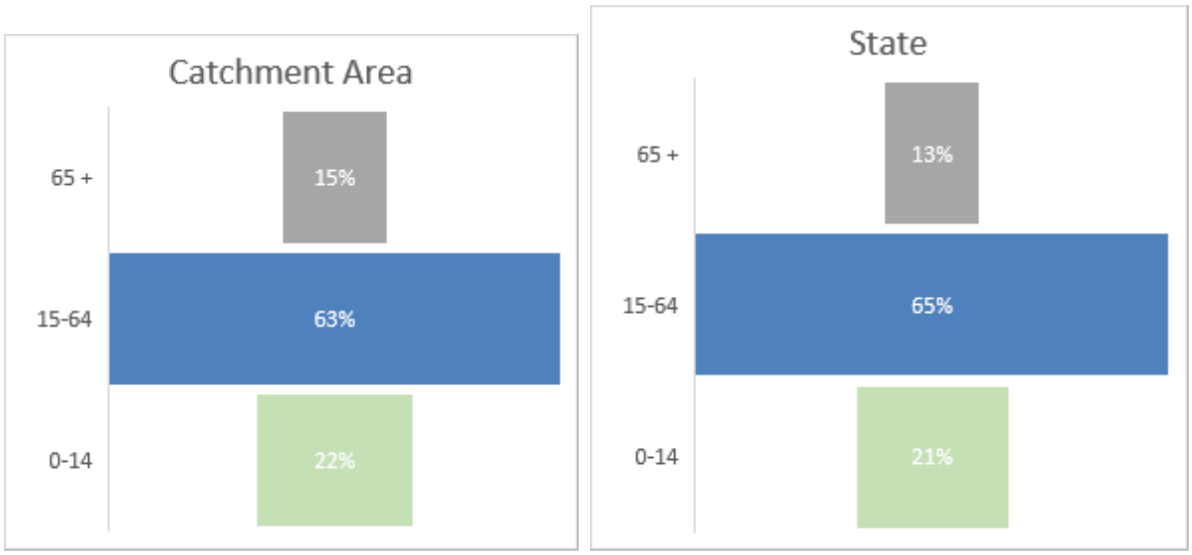

Fig. A1.3 – WOP catchment and State High Level Age Cohorts (Source: CSO,2016)

Cohort	State	State %	Study Area	Study Area %
0-14	1,006,552	21%	63,300	22%
15-64	3,117,746	65%	179,663	63%
65 +	637,567	13%	41,643	15%

Table A1.3 - High Level Age Cohorts (Source: CSO,2016)

Measure	State	Catchment Area
Dependency Ratio:	52.7	58.4
Young Dependency:	32.3	35.2
Old Dependency:	20.4	23.2

Table A1.4 - Dependency Ratios (Source: CSO,2016)

1.3 Socio-economic Groups

Income[42]

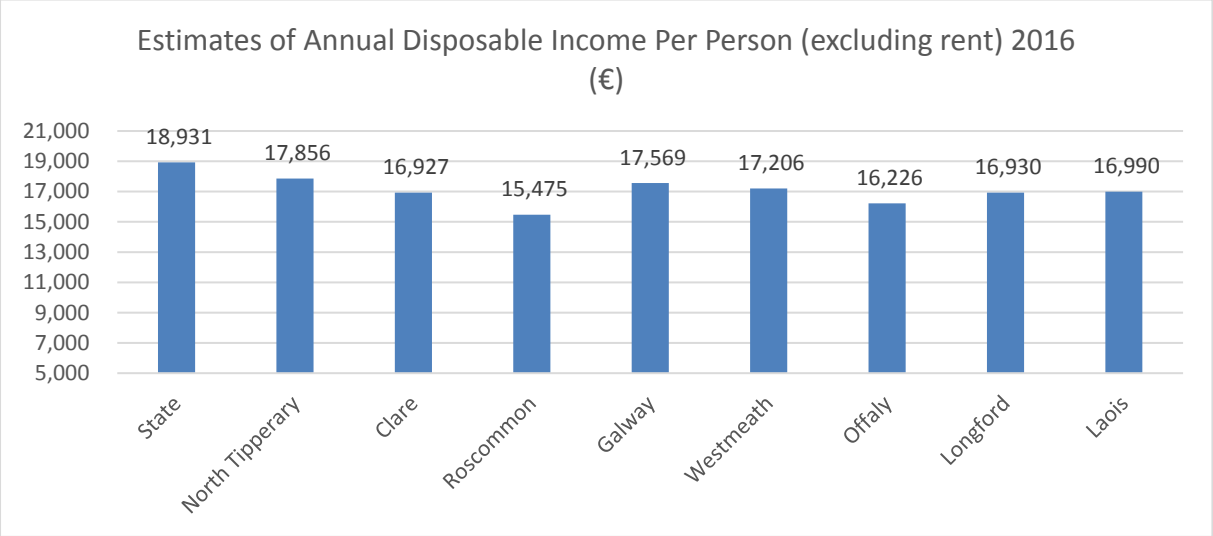

Fig. A1.4 Disposable Income (excluding rent) (Source: CSO,2018[43])

County	Estimates of Disposable Income Per Person 2016 (€)
Laois	16,990
Longford	16,930
Offaly	16,226
Westmeath	17,206
Galway	17,569
Roscommon	15,475
Clare	16,927
North Tipperary	17,856
State	18,931

Table. A1.5 Disposable Income (Source: CSO,2018)

[42] Source CSO 2018: http://www.cso.ie/en/releasesandpublications/er/cirgdp/countyincomesandregionalgdp2015/

[43] 2016 figure published in 2018

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Border	91.9	91.6	92.1	92.4	91.4	90.0	89.3	88.0	87.9	87.7
Midland	**92.9**	**92.6**	**91.8**	**91.9**	**92.0**	**91.0**	**92.0**	**90.4**	**89.1**	**89.0**
West	92.9	94.7	96.1	97.0	93.4	94.2	91.8	90.6	89.3	89.1
Dublin	107.7	107.8	108.4	107.6	108.1	109.4	110.3	112.0	112.8	113.0
Mid East	104.1	103.7	102.3	100.2	98.5	98.9	97.6	98.5	100.7	100.8
Mid West	98.2	97.8	97.4	101.7	106.8	105.6	103.1	102.1	101.4	101.3
South East	99.5	98.9	97.4	96.6	95.4	94.4	96.7	97.4	97.2	97.0
South West	97.1	97.2	97.5	98.2	99.6	99.3	100.1	98.7	97.5	97.4
State	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table. A1.6 Indices of Disposable Income (excluding rent) (Source: CSO,2018)

1.4 Socio-Economic Groups

Catchment Areas

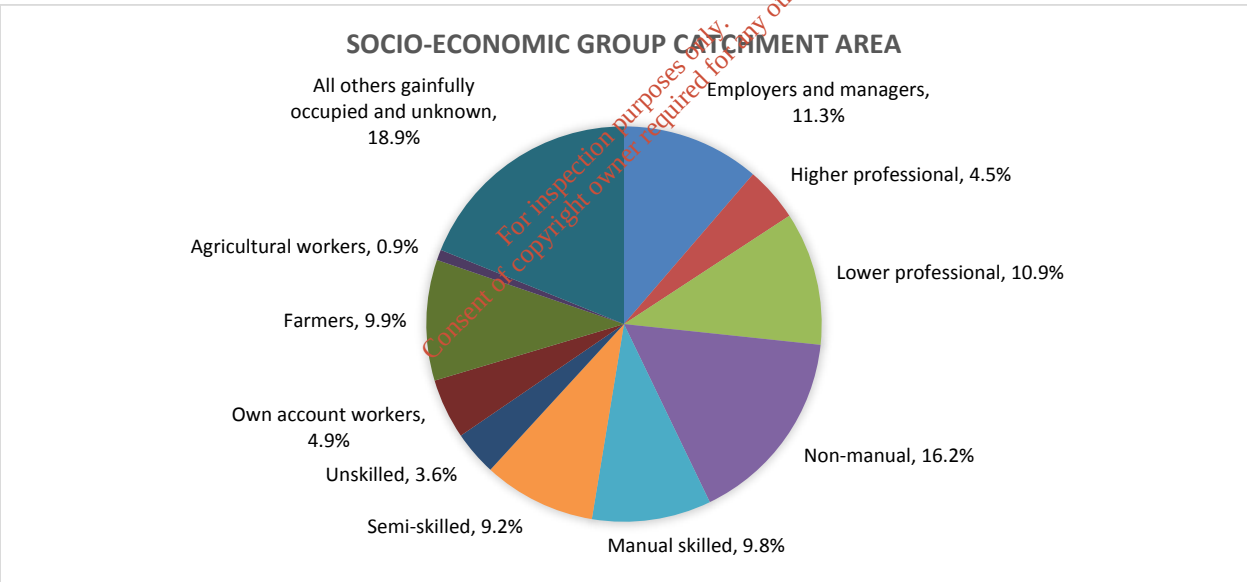

Fig. A1. 5 Socio-Economic Groupings (Source: CSO,2016)

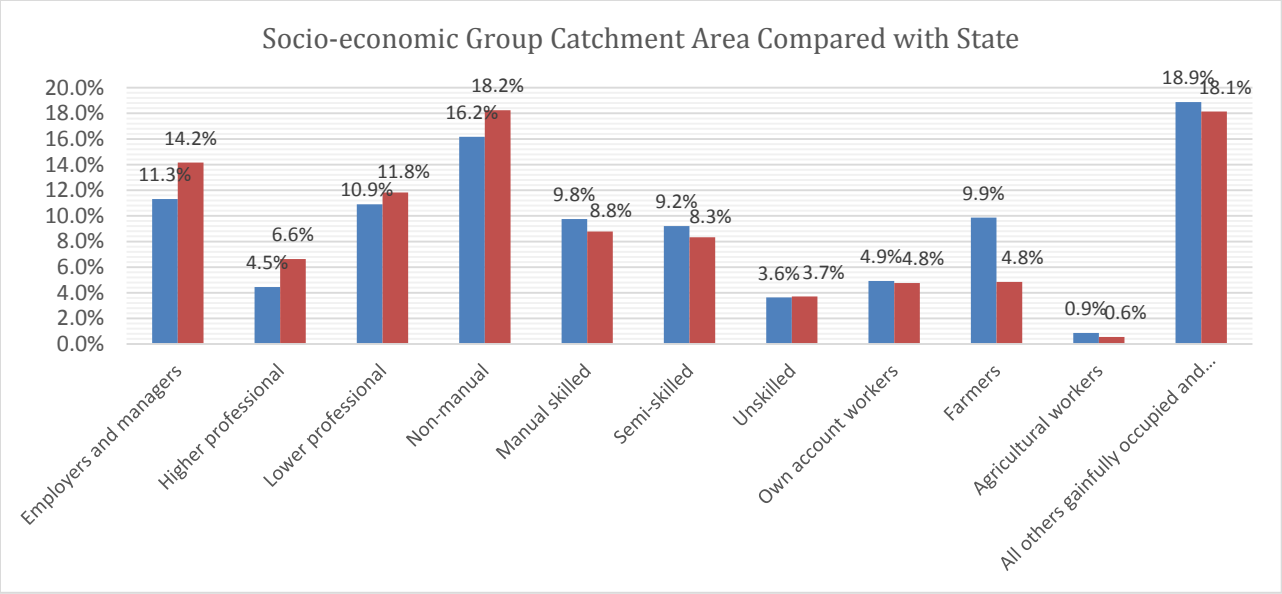

Fig. A1.6 Socio-economic Group Catchment Area Compared with State (Source: CSO,2016)

Persons in private households by socio-economic group of reference person (Number of Households)				
	Catchment	**Catchment %**	**State**	**State %**
Employers and managers	11,528	11.3%	241,098	14.2%
Higher professional	4,537	4.5%	112,965	6.6%
Lower professional	11,108	10.9%	201,286	11.8%
Non-manual	16,472	16.2%	310,587	18.2%
Manual skilled	9,933	9.8%	149,543	8.8%
Semi-skilled	9,382	9.2%	141,757	8.3%
Unskilled	3,709	3.6%	63,222	3.7%
Own account workers	5,019	4.9%	80,959	4.8%
Farmers	10,055	9.9%	82,508	4.8%
Agricultural workers	883	0.9%	9,453	0.6%
All others gainfully occupied/unknown	19,227	18.9%	308,911	18.1%
Total	101,853		1,702,289	

Table A1.7 Socio-economic groupings in catchment area and state (Source: CSO,2016)

1.5 Labour Force

Principle Economic Status

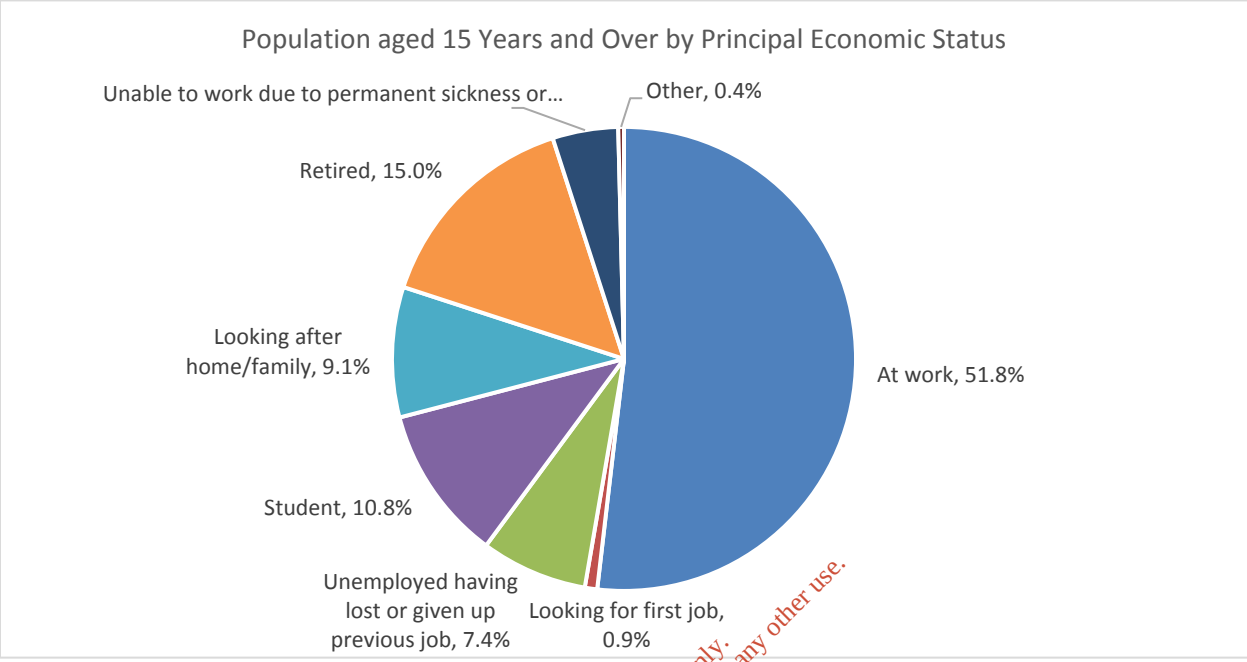

Fig. A1.7 Socio-economic Group Catchment Area Compared with State (Source: CSO,2016)

	Catchment Area	Catchment Area %	State	State %
At work	114,740	51.8%		53.4%
Looking for first job	1,906	0.9%	31,434	0.8%
Unemployed having lost or given up previous job	16,426	7.4%	265,962	7.1%
Student	23,918	10.8%	427,128	11.4%
Looking after home/family	20,088	9.1%	305,556	8.1%
Retired	33,230	15.0%	545,407	14.5%
Unable to work due to permanent sickness or	10,119	4.6%	158,348	4.2%
Other	879	0.4%	14,837	0.4%
Total	221,306			

Table A1.8 Employment in catchment area and state (Source: CSO,2016)

Unemployment

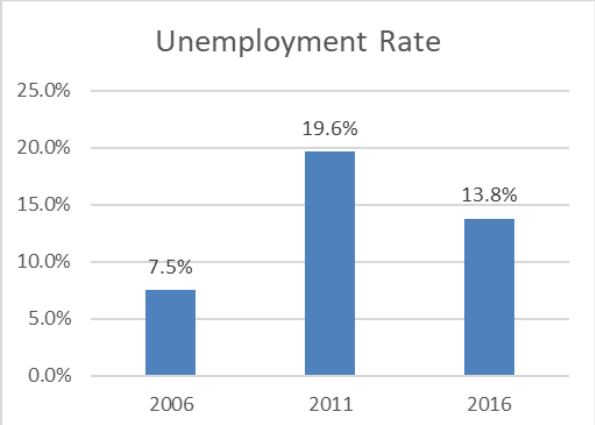

Fig. A1.8 Unemployment rate in catchment area (Source: CSO,2016)

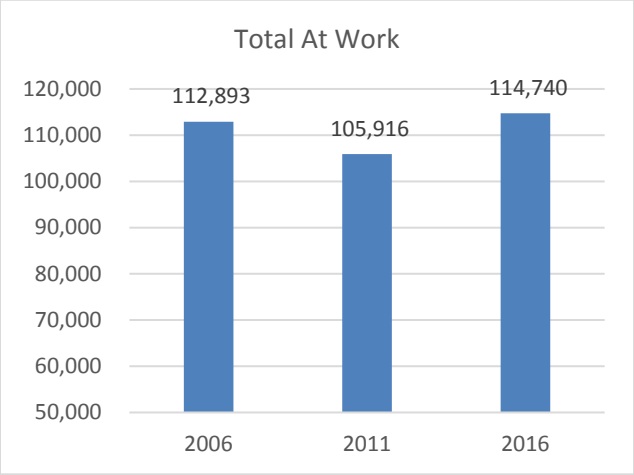

Fig. A1.9 Total at in catchment area (Source: CSO,2016)

	2006	2011	2016
At work	**112,893**	**105,916**	**114,740**
Looking for first job	1,593	2,006	1,906
Unemployed having lost or given up previous job	7,612	23,882	16,426
Unemployment Rate[44]	**9,205**	**25,888**	**18,332**
Workforce[45]	**122,098**	**131,804**	**133,072**
Student	18,943	22,507	23,918
Looking after home/family	25,877	22,248	20,088
Retired	23,926	28,698	33,230
Unable to work due to permanent sickness or disability	8,653	9,905	10,119
Other	702	725	879
Total	200199	215887	221306

Table A1.9 People At work in catchment (Source: CSO,2016)

Region	2012 (Q3)	2013 (Q3)	2014 (Q3)	2015 (Q3)	2016 (Q3)	2017 (Q3)
Border	**18.9**	**16.1**	**12.7**	**9.9**	**10.3**	**6.5**
Midland	**18.4**	**15**	**15.4**	**12.9**	**10.9**	**9.3**
West	**16.3**	**14.3**	**12.1**	**11.9**	**9.4**	**7.2**
Dublin	*13.7*	*11.1*	*10.8*	*8.3*	*8*	*6.3*
Mid-East	*14.7*	*15.3*	*11.3*	*8.8*	*7.4*	*6.2*
Mid-West	*17.7*	*14.8*	*12.2*	*10.5*	*7.9*	*8.4*
South-East	*20.2*	*17.3*	*14.6*	*12.8*	*10.7*	*8*
South-West	*13.5*	*11.9*	*11.1*	*9*	*6.6*	*6.4*
State	**15.9**	**13.7**	**12**	**9.9**	**8.6**	**6.9**

Table A1.10 Regional Employment rate trends (Source: CSO,2016)

[44] (Looking for first job + Unemployed having lost or given up previous job)/ (Looking for first job + Unemployed having lost or given up previous job + At work)

[45] Looking for first job + Unemployed having lost or given up previous job + At work

Occupation

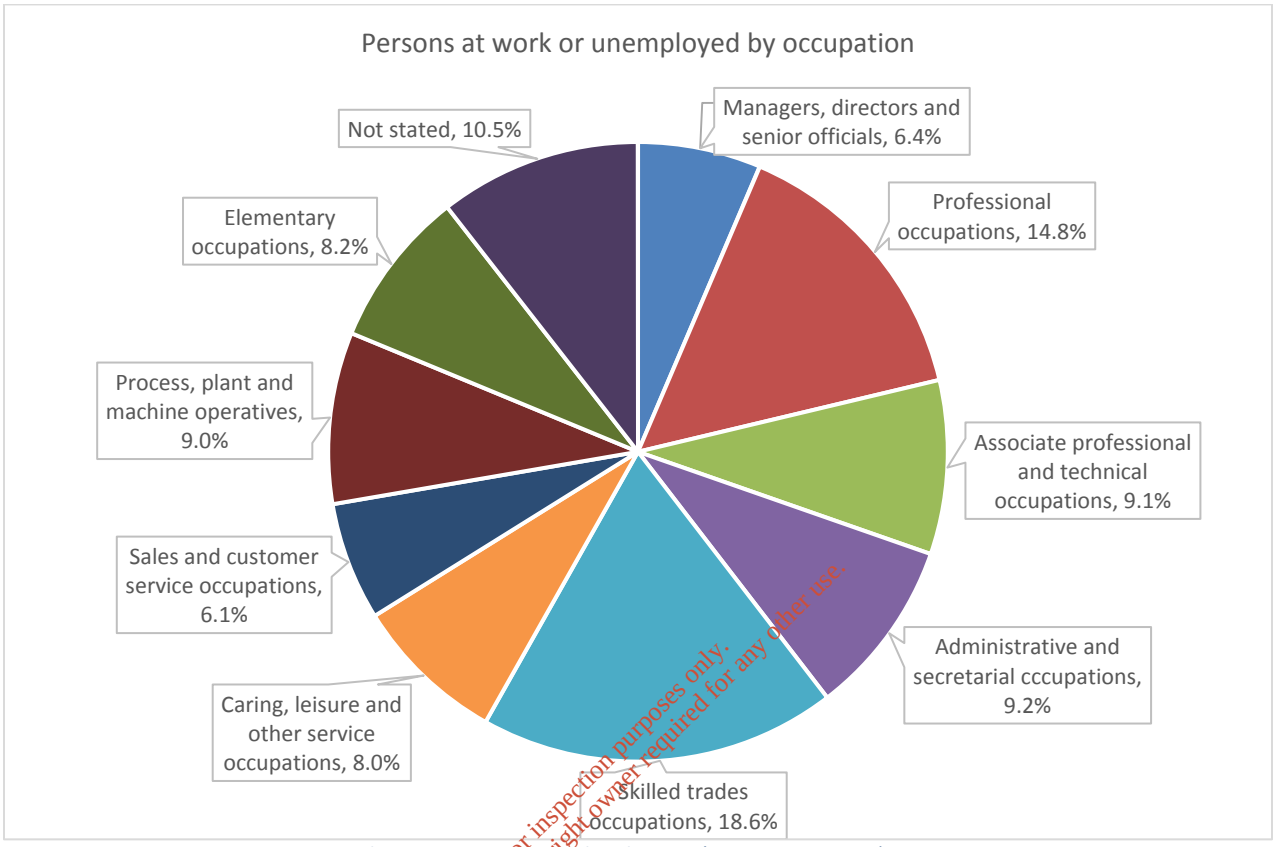

Fig. A1.10 Socio-Economic Group Catchment Area Compared with State (Source: CSO,2016)

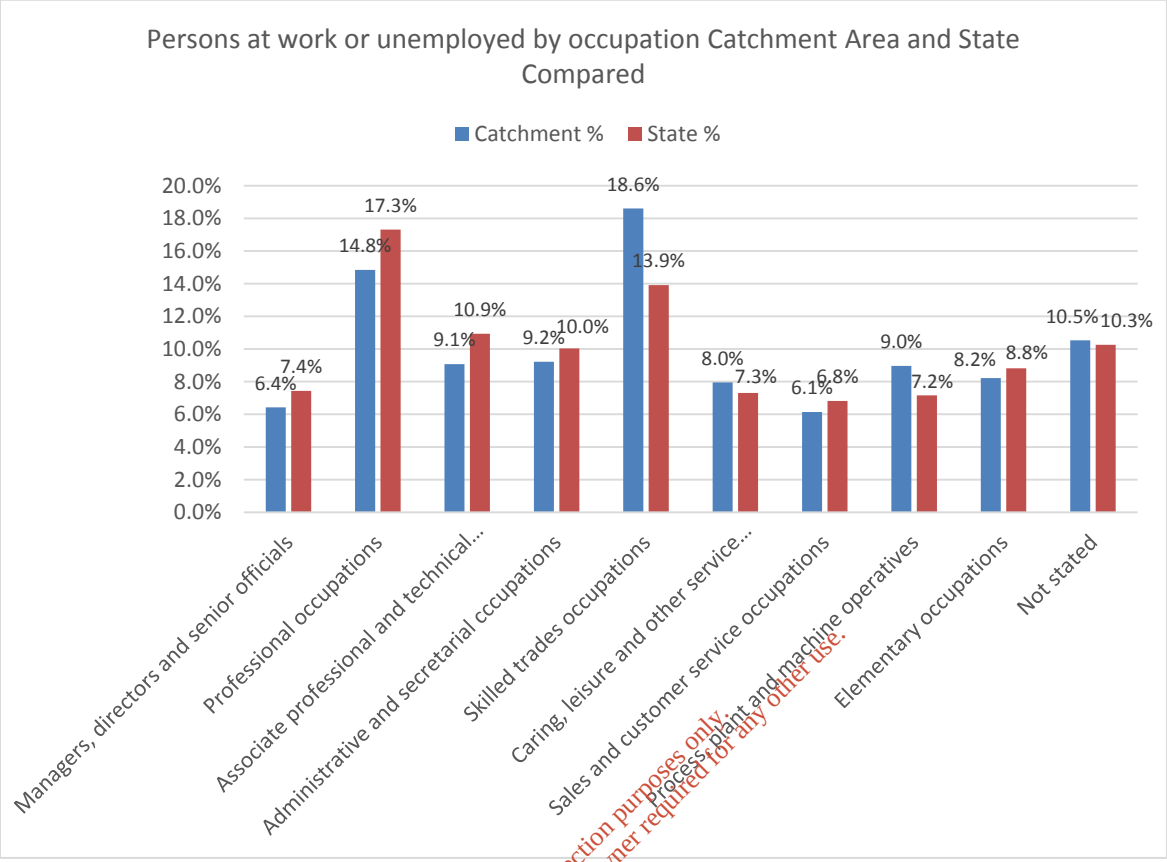

Fig. A1.11 Persons at work or unemployed by occupation Catchment Area and State Compared (Source: CSO,2016)

Persons at work or unemployed by occupation				
	Catchment	Catchment	State	State %
Managers, directors and senior officials	8,429	6.4%	169,032	7.4%
Professional occupations	19,476	14.8%	393,608	17.3%
Associate professional and technical occupations	11,901	9.1%	248,413	10.9%
Administrative and secretarial occupations	12,089	9.2%	228,032	10.0%
Skilled trades occupations	24,411	18.6%	316,313	13.9%
Caring, leisure and other service occupations	10,440	8.0%	166,163	7.3%
Sales and customer service occupations	8,062	6.1%	155,030	6.8%
Process, plant and machine operatives	11,760	9.0%	162,641	7.2%
Elementary occupations	10,780	8.2%	200,287	8.8%
Not stated	13,818	10.5%	233,084	10.3%

Table A1.11 Occupation in catchment area and state (Source: CSO,2016)

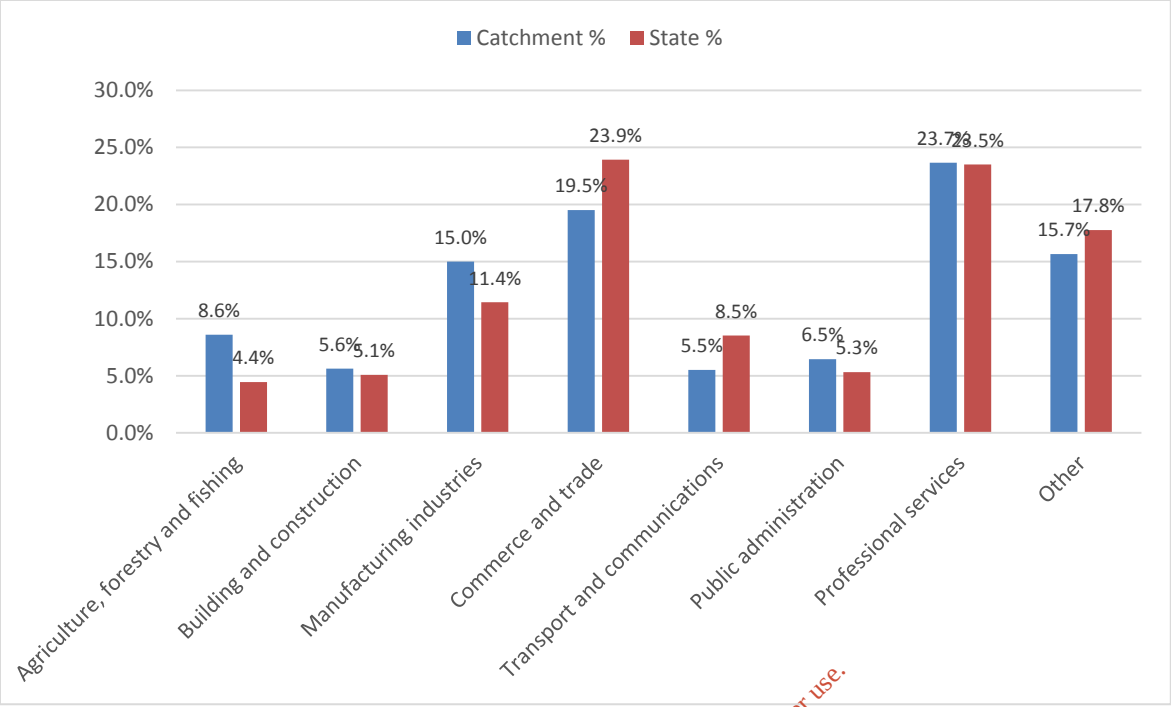

Fig. A1.12 Persons at work by Sector (Source: CSO,2016)

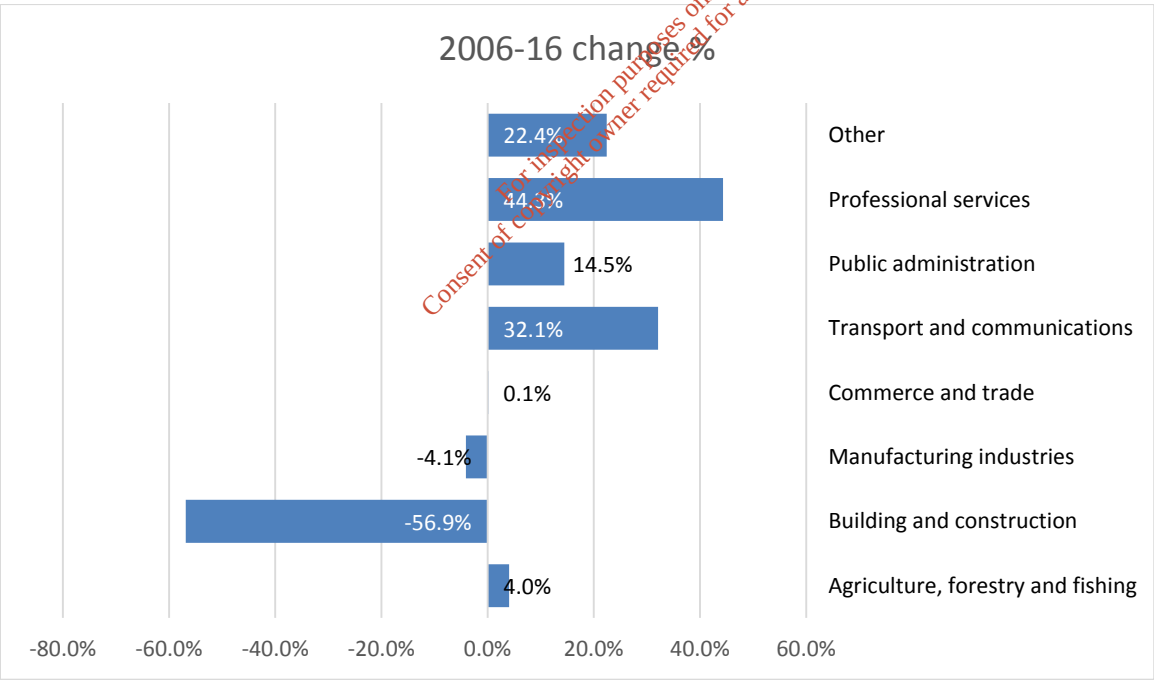

Fig. A1.13 Change in sectorial profile 2006-16 (Source: CSO,2006,2016)

Persons at work by industry										
Industry	**2016**	**Catchment %**	**2016 State**	**State %**	**2011**	**2011 %**	**2006**	**2006 %**	**2006-16 change**	**2006-16 change %**
Agriculture, forestry and fishing	9,854	8.6%	89,116	4.4%	10,449	9.9%	9,471	8.7%	383	8.5%
Building and construction	6,445	5.6%	101,849	5.1%	6,002	5.7%	14,940	13.6%	-8,495	-56.9%
Manufacturing industries	17,214	15.0%	229,548	11.4%	15,227	14.4%	17,948	16.4%	743	-4.1%
Commerce and trade	22,385	19.5%	480,117	23.9%	21,884	20.7%	22,358	20.4%	27	0.1%
Transport and communications	6,323	5.5%	171,194	8.5%	5,479	5.2%	4,786	4.4%	1537	32.1%
Public administration	7,409	6.5%	106,797	5.3%	8,084	7.6%	6,473	5.9%	936	14.5%
Professional services	27,144	23.7%	471,656	23.5%	24,267	22.9%	18,805	17.2%	8,339	44.3%
Other	17,966	15.7%	356,364	17.8%	14,524	13.7%	14,674	13.4%	3,292	22.4%

Table A1.12 Breakdown of persons at work by industry and sectorial change in catchment and state (Source: CSO,2016)

Industrial workers[46]

Date	Workers in Thousands
1998Q3	21.7
1999Q3	23.6
2000Q3	22.6
2001Q3	21.3
2002Q3	20.6
2003Q3	20.6
2004Q3	20.1
2005Q3	22.1
2006Q3	23.9
2007Q3	21.6
2008Q3	21.1
2009Q3	20.3
2010Q3	15.4
2011Q3	15.2
2012Q3	16.9
2013Q3	14.6
2014Q3	18
2015Q3	19.5
2016Q3	18
2017Q3	19.9

Table A1.13 Industrial Workers in catchment (Source: CSO,2018)

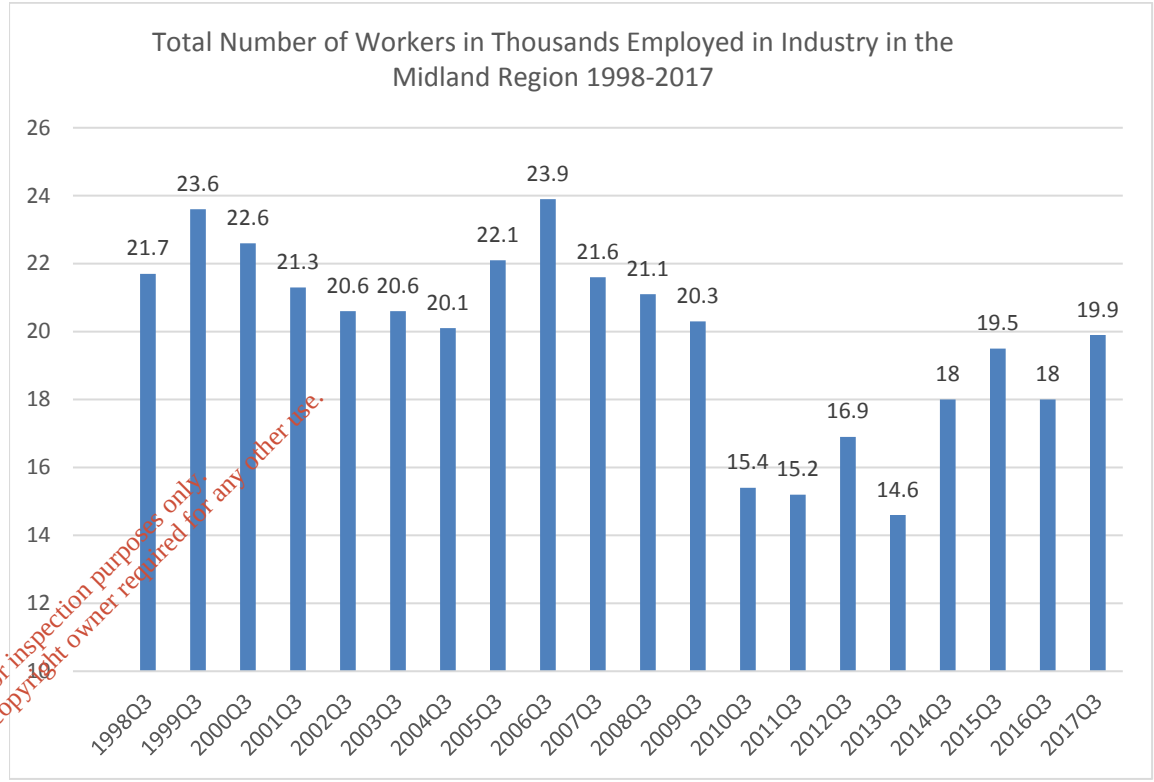

Fig. A1.14 Total Number of Workers in Thousands Employed in Industry in the Midland Region 1998-2017 (Source: CSO,2018)

[46] Industry includes: mining and quarrying, manufacturing, electricity, gas, and water supply

Date	% of people in employment employed industry (Midland Region)	% of people in employment employed industry (State)
1998Q3	25.8%	20.2%
1999Q3	26.0%	19.4%
2000Q3	23.8%	19.1%
2001Q3	21.5%	18.5%
2002Q3	20.2%	17.7%
2003Q3	19.4%	16.8%
2004Q3	17.9%	16.1%
2005Q3	18.9%	15.2%
2006Q3	19.2%	14.9%
2007Q3	16.4%	14.5%
2008Q3	16.9%	14.1%
2009Q3	17.9%	13.1%
2010Q3	14.6%	12.9%
2011Q3	14.7%	12.7%
2012Q3	15.7%	12.4%
2013Q3	12.7%	12.8%
2014Q3	15.6%	12.5%
2015Q3	16.1%	12.9%
2016Q3	14.6%	13.2%
2017Q3	16.7%	13.1%

Table A1.14 % of Workers employed in industry (Source: CSO,2018)

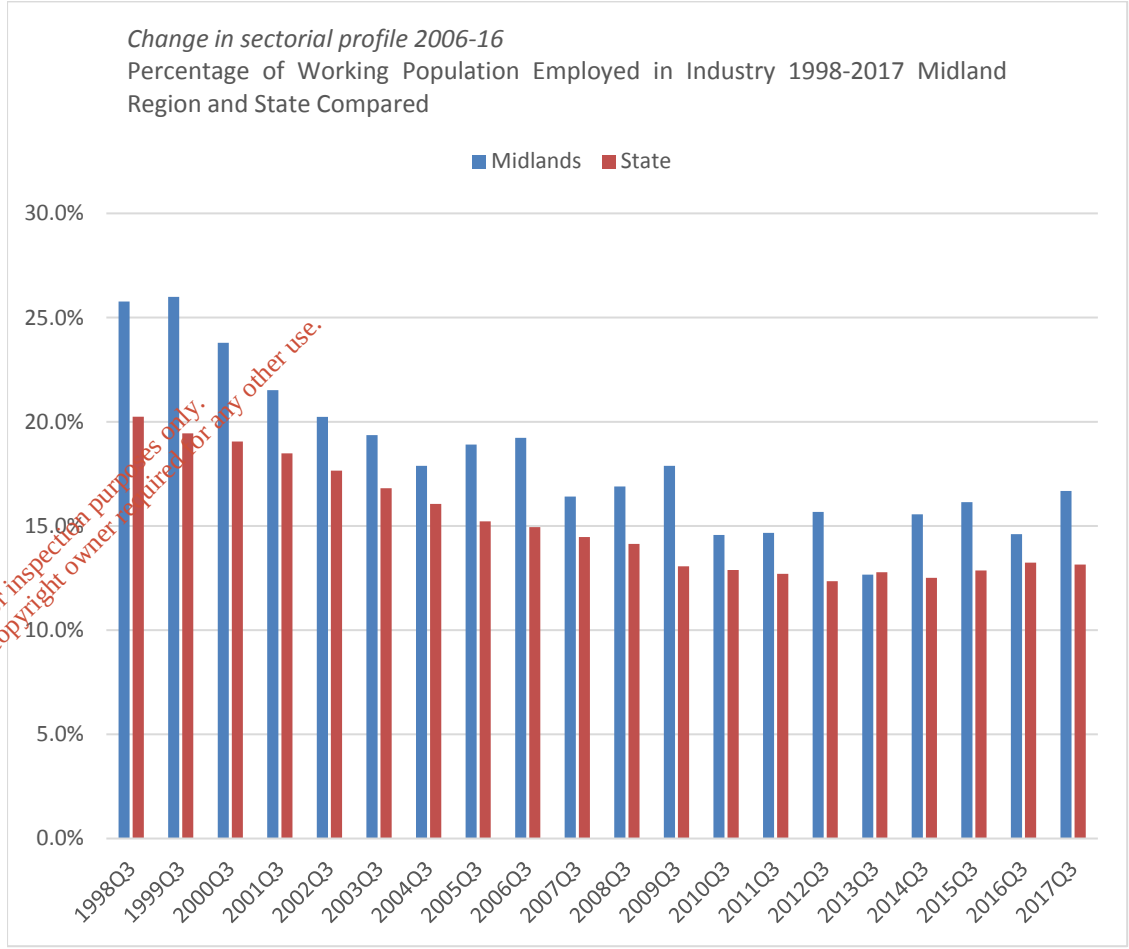

Fig.A1.15 Change in sectorial profile 2006-16 Percentage of Working Population Employed in Industry 1998-2017 Midland Region and State Compared (Source: CSO,2018)

Service sector workers

Date	Workers in Thousands
1998Q3	44.6
1999Q3	47.8
2000Q3	53.2
2001Q3	56.5
2002Q3	60.5
2003Q3	65
2004Q3	69.6
2005Q3	72.5
2006Q3	74.4
2007Q3	81.9
2008Q3	81
2009Q3	74
2010Q3	74.9
2011Q3	73.5
2012Q3	75.5
2013Q3	83.2
2014Q3	80.1
2015Q3	82
2016Q3	82.7
2017Q3	82.4

Table A1.15 Service Sector Workers in catchment (Source: CSO,2018)

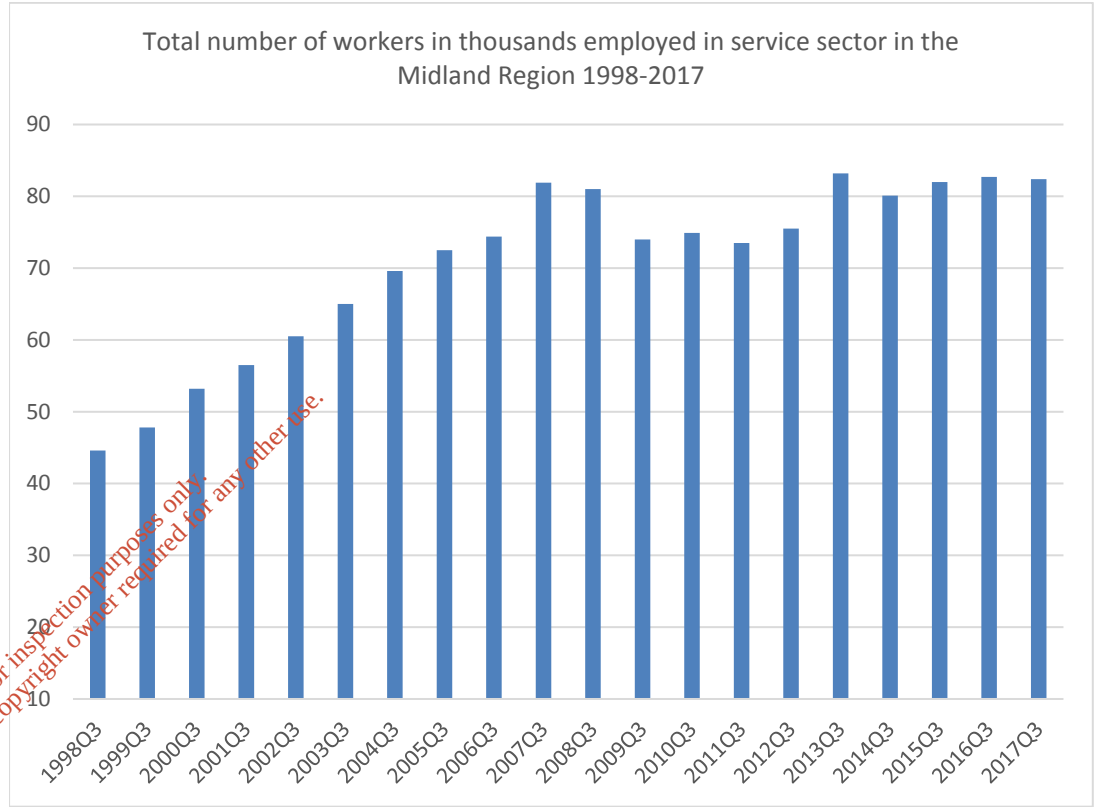

Fig. A1.16 Total number of workers in thousands employed in service sector in the Midland Region 1998-2017 *(Source: CSO,2018)*

Date	% of people in employment employed industry (Midland Region)	% of people in employment employed industry (State)
1998Q3	53.0%	64.4%
1999Q3	52.6%	65.0%
2000Q3	56.0%	65.6%
2001Q3	57.1%	66.2%
2002Q3	59.4%	67.2%
2003Q3	61.1%	68.4%
2004Q3	61.9%	68.4%
2005Q3	62.0%	69.2%
2006Q3	59.9%	68.7%
2007Q3	62.2%	69.9%
2008Q3	64.9%	71.4%
2009Q3	65.2%	74.8%
2010Q3	70.9%	76.2%
2011Q3	70.9%	76.9%
2012Q3	70.0%	77.4%
2013Q3	72.2%	77.0%
2014Q3	69.2%	77.2%
2015Q3	67.9%	76.4%
2016Q3	67.1%	75.8%
2017Q3	69.1%	76.0%

Table A1.16 % of Workers employed in Services Sector (Source: CSO,2018)

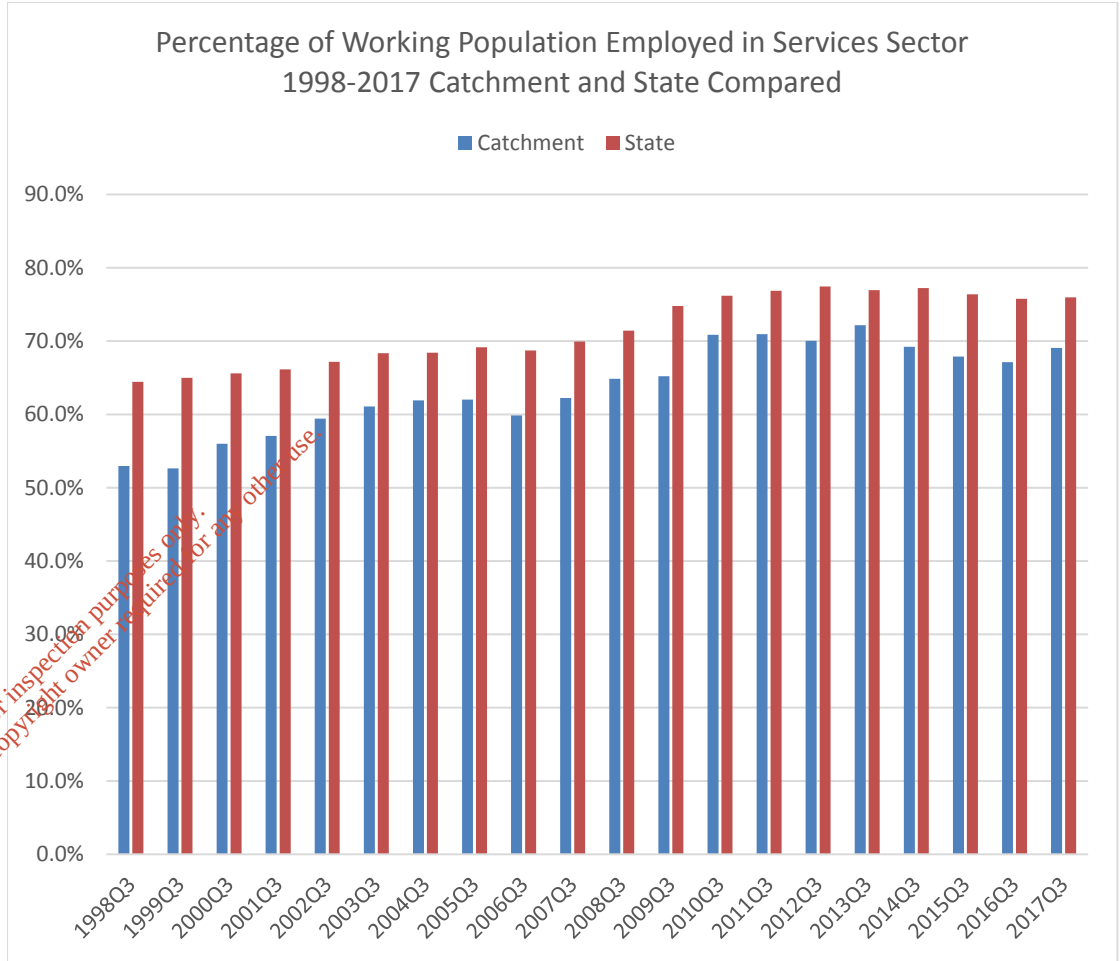

Fig. A1.17 Percentage of Working Population Employed in Services Sector 1998-2017 Catchment and State Compared (Source: CSO,2018)

Date	Agriculture, forestry and fishing	Industry	Construction	Services
1998Q3	13.4%	25.8%	7.8%	53.0%
1999Q3	12.9%	26.0%	8.5%	52.6%
2000Q3	10.3%	23.8%	10.0%	56.0%
2001Q3	10.9%	21.5%	10.5%	57.1%
2002Q3	10.0%	20.2%	10.3%	59.4%
2003Q3	8.9%	19.4%	10.6%	61.1%
2004Q3	7.8%	17.9%	12.5%	61.9%
2005Q3	6.8%	18.9%	12.3%	62.0%
2006Q3	7.0%	19.2%	13.8%	59.9%
2007Q3	7.8%	16.4%	13.5%	62.2%
2008Q3	7.6%	16.9%	10.7%	64.9%
2009Q3	8.2%	17.9%	8.7%	65.2%
2010Q3	7.8%	14.6%	6.8%	70.9%
2011Q3	8.3%	14.7%	6.1%	70.9%
2012Q3	9.4%	15.7%	5.0%	70.0%
2013Q3	9.7%	12.7%	5.5%	72.2%
2014Q3	9.0%	15.6%	6.2%	69.2%
2015Q3	9.0%	16.1%	7.0%	67.9%
2016Q3	11.0%	14.6%	7.3%	67.1%
2017Q3	7.1%	16.7%	7.0%	69.1%

Table A1.17 Sectorial employment trends in catchment (trend in percentage of size of sector) (Source: CSO,2018)

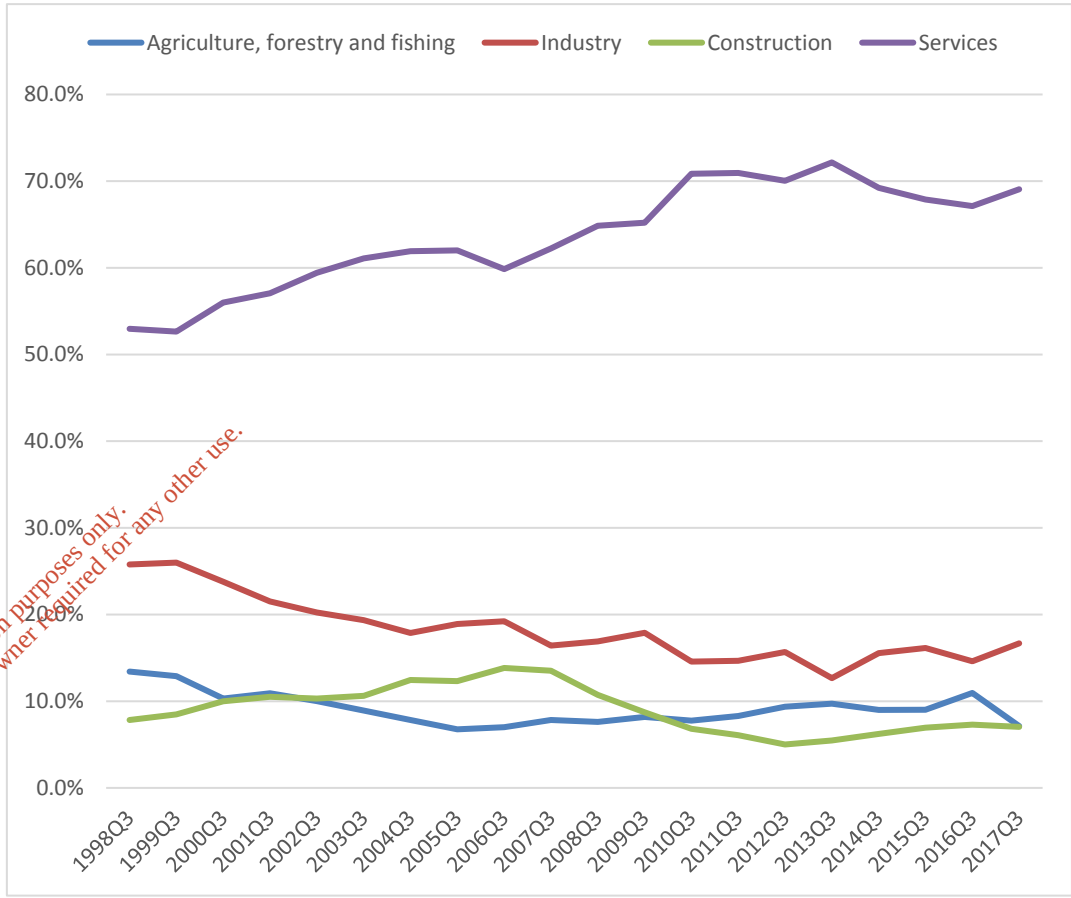

Fig. A1.18 Sectorial employment trends in catchment area (Source: CSO,2018)

Appendix 2 Methodology for Assessing Employment Impacts

2.1 Indirect Employment Calculation General Approach:

Indirect employment is supported by non-salary spending by a company or organisation. For example a company's spending on I.T. services and equipment would support jobs in the I.T. sector.

The Department of Public Expenditure (DPER) estimates that every €1 million spent on ancillary services supports 8-10 FTEs jobs in the economy; every €1 million spent on construction supports around 12 FTE jobs in the economy; and every €1 million spent on capital goods supports around 3 FTE jobs in the economy[47]. An average of 5 jobs per €1 million of expenditure is assumed[48].

An exact breakdown between salary and non-salary spending for WOP is not available. The annual gross domestic non-fuel purchases of goods and services incl. gross wages bill is €10,500,000[49] (average for past three years 2015-2017). Based on various different assumptions, it has been calculated that 41 indirect jobs are supported by WOP based on 5 indirect jobs supported for every €1 million of non-salary spending.

2.2 Induced Employment Calculation General Approach:

Induced employment is employment which is supported by the salary spending of direct employees and indirectly supported employees. For example, the money spent by a company's employees on groceries would support a certain number of jobs in the retail and food industries. Similarly, the money spent by employees whose jobs are indirectly supported by a company on groceries would support an additional number of jobs in the retail and food industries.

According to Fitzpatrick and Associates' 2011 'Methodology For Assessing Employment Impacts'[50] 1 job is support by every €300,000 of salaries paid out to direct and indirect employees. A basket of goods and services that cost €300,000 in May 2011 would have cost €308,653.85 in May 2018.[51] Based on various different assumptions, it has been calculated that 55 induced jobs are supported by WOP.

2.3 Employment Projections

The projected employment scenarios estimate the total direct, indirect and induced employment supported by WOP during and after a phased transition to a 100% biomass fuel supply. The phased transition of WOP to 100% biomass is projected to take place in block periods between 2020 and 2027. Starting at 40% biomass in 2020, growing to 60% biomass in 2025, and 100% in 2027. For the purposes of analysis, it is estimated that the ratio of indigenously produced to imported biomass will be in the range of 20:80 to 40:60 during the initial years of operation.

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[47] *Public Capital Programme 2016 to 2021:Labour Intensity of Public,* Investment Department of Public Expenditure and Reform (2015) p. 12 (https://igees.gov.ie/wp-content/uploads/2016/05/Capital-Review-Labour-Intensity-of-Public-Investment-.pdf)

[48] 'Economic, Financial & Social Contribution' in *Powering the Midlands,* Bord na Móna (n.d.) p.29

[49] Source: ESBI, 2018

[50] 'Annex 3 Methodology For Assessing Employment Impacts' in *Energy Crop Socioeconomic Study Fitzpatrick Associates* (2011) p. 9

[51] CPI Inflation Calculator (https://www.cso.ie/en/interactivezone/visualisationtools/cpiinflationcalculator)

It is assumed that the 41 employees currently employed in WOP will have direct equivalents during and after the transition to 100% biomass.

It is assumed that the 13 onsite fuel handling tasks currently carried out by Bord na Móna staff in relation to use of peat as fuel will have direct equivalents after the switch to biomass.

It has been estimated that at 100% biomass there would be a requirement for 52 hauliers.[52] For the transition to the hybrid phase biomass haulage jobs have been calculated as a proportion of that figure. For example, 70% biomass is assumed to support 52*0.7 haulage jobs. Similarly, the number of peat haulage jobs assumed during the hybrid phase is reduced in proportion to the percentage of fuel which is peat.

It is assumed that the same number indirect workers' jobs will be supported by non-fuel and non-salary spending by ESBI during and after the transition to biomass. i.e. ESBI's non-fuel and non-salary spending currently supports 41 indirect jobs, this will continue to be the case during and after the transition to 100% biomass.

Based on Fitzpatrick and Associates' 2011 *'Methodology For Assessing Employment Impacts'*[53] FAC has been able to derive that for every 1% of total power generation generated by indigenous biomass 3 jobs are supported. For example: If the break down between biomass and peat is 50:50 and the break down between indigenous and import biomass is 40:60 20% of the fuel comes from domestic biomass. This would support 60 indirect jobs in indigenous biomass supply.

[52] Source: ESBI, 2018

[53] 'Annex 3 Methodology For Assessing Employment Impacts' in *Energy Crop Socioeconomic Study Fitzpatrick Associates* (2011) p. 9