HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

# Wylfa Newydd Project

## 6.3.10 ES Volume C - Project-wide effects App C1-3 - Community Cohesion Report

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# 1 Introduction

1.1.1 The *Overarching National Policy Statement for Energy (EN-1)* notes that the construction, operation and decommissioning of energy infrastructure may have socio-economic impacts at local and regional levels (5.12.1) [RD1]. Specifically, it identifies that there could be effects on social cohesion depending on how populations and service provision change as a result of the development (5.12.3).

1.1.2 This National Policy Statement also states, "*the IPC will find it helpful if that applicant sets out information on the likely significant social and economic effects of the development, and shows how any likely significant negative effects would be avoided or mitigation. This information could include matters such as employment, equality, community cohesion and well-being."* (4.2.2).

1.1.3 The *National Policy Statement for Nuclear Power Generation (EN-6)* states that the assessment should demonstrate that the applicant has taken account of, amongst other things, potential pressures on local and regional resources, demographic change and economic benefits (3.11.4) [RD2].

## 1.2 Scope

1.2.1 The scope of this community cohesion report is limited to the potential community-related effects of non-home-based workers[1] arriving in the area, which is not explicitly considered elsewhere in the Environmental Impact Assessment (EIA). Different aspects of community cohesion are covered in a number of the assessments that have been undertaken as part of the EIA for the Wylfa Newydd Project, as described below.

- Socio-economic assessment:
  - the Project-wide socio-economic assessment of the Wylfa Newydd Project (chapter C1) (Application Reference Number: 6.3.1) covers a number of different sub-topics, including skills and local labour, accommodation and the distribution of workers, along with public services.
- Welsh Language Impact Assessment (WLIA):
  - The WLIA (Application Reference Number: 8.21) covers a number of topics that are vital to community cohesion and how they are impacted upon: local Welsh culture, economic diversity, divisions in Welsh-speaking communities.
- Equality Impact Assessment (EqIA):
  - The EqIA (Application Reference Number: 8.22) covers a number of topics that are vital to community cohesion and how they're impacted upon, for example young people and the opportunities afforded to

[1] Non-home-based workers are those whose permanent residence lies outside the Daily Construction Community Zone (DCCZ) (see 1.4 Structure section for further explanation) and who are expected to base themselves locally for the duration of their employment on the Wylfa Newydd Project.

them, Welsh language in the young and old, and access to community infrastructure.

- Health Impact Assessment (HIA):
  - The HIA (Application Reference Number: 8.19) covers a number of topics that are vital to community cohesion and how they're impacted upon, such as community identity and lifestyles.

1.2.2 Further detail on where community cohesion is covered by various topics within these assessments is presented in Table 1-1.

1.2.3 The Community Impact Report (Application Reference Number: 8.23) will present the implications for community cohesion from all topics, including socio-economics, on a more granular and localised basis.

## 1.3 Welsh Government definition of community cohesion

1.3.1 An ongoing challenge when considering the issue of community cohesion is to agree a definition. On the one hand, it can be agreed that a cohesive community should be a place where people have a shared vision – a central requirement of its definition. However, there is also the argument that shared characteristics amongst some can exclude other members of the community. Therefore, it is often necessary to accept that what constitutes cohesion can differ between neighbourhoods and even between streets. The Welsh Government has considered these challenges and developed a multi-dimensional definition.

1.3.2 "Community cohesion in its simplest form is the term used to describe how everyone in a geographic area lives alongside each other with mutual understanding and respect. A cohesive community is where a person has a strong sense of belonging. It is safe, vibrant and able to be resilient and strong when tensions occur. Community cohesion describes the ability of all communities to function and grow in harmony together rather than in conflict. It aims to build communities where people feel confident that they belong and are comfortable mixing and interacting with others, particularly with different people with different protected characteristics[2]." [RD3]

1.3.3 The Welsh Government continues to define community cohesion as what must happen in all communities to enable different groups of people to get on well together [RD4]. A key contributor to cohesion is integration, which is what must happen to enable new residents and existing residents to adjust to one another and live harmoniously with one another.

1.3.4 The vision of an integrated and cohesive society is based on three foundations:

- people from different backgrounds having similar life opportunities;
- people knowing their rights and responsibilities; and
- people trusting one another and trusting local institutions to act fairly.

[2] Protected characteristics are defined in the *Equality Act (2010)* and include age, disability, sex, gender reassignment, marriage and civil partnership, pregnancy, maternity, race, religion or belief, and sexual orientation.

1.3.5 See Table 1-1 for a detailed breakdown of the various elements of community cohesion, as defined by the Welsh Government, that are addressed in different areas of the EIA.

1.3.6 The following table is based on the Welsh Government definition of community cohesion and shows the focus for each aspect across the socio-economics, HIA (Application Reference Number: 8.19), WLIA (Application Reference Number: 8.21), and EqIA (Application Reference Number: 8.22) assessments. Where a particular aspect is not covered in one of the assessments, a dash (-) has been added to the relevant column.

**Table 1-1 Community cohesion elements in each assessment**

| Elements of Welsh Government definition | Socio-economics | WLIA | HIA | EqIA |
|---|---|---|---|---|
| A geographical area | Key Socio-economic Study Area (KSA)3 | KSA | KSA | KSA |
| Mutual understanding and respect | - | Changes in local Welsh traditions/culture | Community identity, social networks and culture | - |
| Strong sense of belonging | - | Changes in local Welsh traditions/culture | Community identity, social networks and culture | - |
| Safe | Assessment of effect on crime and public safety | Threat of increased crime or violence in the community | - | Safety or perception of safety for certain protected characteristics |
| Vibrant | Tourism assessment | Economic diversity, effects on Welsh traditions and culture and effect on the amenity of the local area | Community identity, social networks and culture | Social networks and culture |
| Resilient and strong when tensions occur | - | Social tensions, conflict or serious divisions within the Welsh-speaking community | Community identity, social networks and culture | - |
| Function and grow in harmony together rather than in conflict | Consideration of effects on local labour market, local housing market and the local economy | - | Lifestyles and behaviour | Focus on young people, with particular reference to apprenticeships, employment and Welsh language |
| People feel confident that they belong | - | Changes in local Welsh traditions/culture | Community identity, social networks and culture | Welsh language in young and older people |
| Comfortable mixing and interacting with others, particularly with different | Consideration of effects of introducing construction workers to area and putting in place mitigation to encourage | Social tensions, conflict or serious divisions within the Welsh-speaking community | Community identity, social networks and culture | Interaction with protected characteristic groups, particularly during construction |

[3] See Table 2-1 for further detail on study areas.

| Elements of Welsh Government definition | Socio-economics | WLIA | HIA | EqIA |
|---|---|---|---|---|
| people with different protected characteristics | cohesion and lessen negative effects | | | |
| Enable different groups of people to get on well together | Consideration of effects of introducing construction workers to area and putting in place mitigation to encourage cohesion and lessen negative effects | Social tensions, conflict or serious divisions within the Welsh-speaking community | Community identity, social networks and culture | - |
| Enable new residents and existing residents to adjust to one another and live harmoniously with one another | Consideration of effects of introducing construction workers to area and putting in place mitigation to encourage cohesion and lessen negative effects | Social tensions, conflict or serious divisions within the Welsh-speaking community and considers any changes in local Welsh traditions/culture | Community identity, social networks and culture | Access to the housing market |
| **The vision of an integrated and cohesive society is based on three foundations:** | | | | |
| People from different backgrounds having similar life opportunities | - | Social tensions, conflict or serious divisions within the Welsh-speaking community and considers any changes in local Welsh traditions/culture | Community identity, social networks and culture | Employment opportunities for all |
| People knowing their rights and responsibilities | - | - | Not addressed directly. This aspect is closely allied to one of the guiding principles of HIA, namely democracy – emphasising the right of people to participate in the formulation and decisions of proposals that affect their life, both directly and through elected decision makers. In adhering to this value, the HIA method should involve and engage the public, and inform and influence decision makers. | - |

| Elements of Welsh Government definition | Socio-economics | WLIA | HIA | EqIA |
|---|---|---|---|---|
| People trusting one another and trusting local institutions to act fairly | - | - | See above. This is also addressed through the Community Survey | Access to community infrastructure and public services |
| **And on three ways of living together:** | | | | |
| A shared future vision and sense of belonging | - | - | This is addressed through the Community Survey. | - |
| A focus on what new and existing communities have in common, alongside a recognition of the value of diversity | Baseline of existing communities | Baseline of existing communities | This is addressed through the Community Survey. | Baseline of existing communities |
| Strong and positive relationships between people from different backgrounds | Consideration of effects of introducing construction workers to area and putting in place mitigation to encourage cohesion and lessen negative effects | Social tensions, conflict or serious divisions within the Welsh-speaking community and considers any changes in local Welsh traditions/culture | This is addressed through the Community Survey. | Focus on disproportionate or differential effects on people with protected characteristics |

## 1.4 Structure

1.4.1 The structure of the remaining section of this report is as follows. Section 2 provides an overview of the study areas applied within this report. A socio-economic baseline is then provided in section 3, which covers population and communities, mitigation, ethnicity, Welsh language, deprivation, and earnings and income. Section 4 presents the worker source study. This is an examination of the possible place of origin for non-home-based workers during the construction phase of the Wylfa Newydd Project. This study also serves to provide evidence to substantiate assumptions related to the proportions of local and non-local labour employed during the construction phase of the Project. Section 5 then provides a discussion on the results of the community survey. This survey sought to investigate people's opinions on life on Anglesey and in their local community, the Wylfa Newydd Project and the arrival of workers. Section 6 then presents key messages to be taken from the study.

# 2 Study areas

2.1.1 Defining the spatial scope for socio-economic assessment can be complex because of the wide range of receptors and the different ways they might be affected. In addition, socio-economic baseline data are often reported over a range of spatial scales (e.g. super output areas (SOAs), wards and local authority administrative boundaries). This means the area chosen for a piece of analysis will be based on the desired level of detail and the available datasets; the result, as shown below in Table 2-1, is a range of study areas being used, each with a different scope and definition.

**Table 2-1 Study area designations**

| Area | Geographic scope |
|---|---|
| Wylfa Newydd Development Area (WNDA) | The Wylfa Newydd Development Area (WNDA) represents the indicative areas of land and sea, including the Power Station Site and the surrounding areas that would be used for the construction and operation of the Power Station. It would also include the Site Campus. This area is representative of the maximum area extending around the Power Station Site that would be physically affected by construction activities related to the Power Station and used to form the setting and landscaping features of the operational Power Station. |
| Key Socio-economic Study Area (KSA) | This area is considered to represent the area most likely to be affected (both beneficially and adversely) by the Wylfa Newydd Project. It is defined by the two Travel to Work Areas (TTWAs) of 'Bangor, Caernarfon and Llangefni' and 'Holyhead'. The spatial boundary is defined based on a best-fit selection of 2001 Census of Population administrative wards to the TTWA boundaries.<br>At the time of producing this boundary, the 2011 TTWA boundary was not available. As the 2011 area is slightly smaller than the 2001 TTWA (since it excludes the Conwy wards), it is considered more robust to maintain the use of the wider 2001 dataset and have these wards included.<br>This area is further disaggregated as defined below. |

| Area | | Geographic scope |
|---|---|---|
| Isle of Anglesey | Anglesey North | An area conforming to a subdivision of the Isle of Anglesey, representing communities around Amlwch and most closely located to the WDNA. This subdivision is based on aggregates of wards defined in the 2011 Census. |
| | Anglesey South | An area conforming to a subdivision of the Isle of Anglesey, representing communities on the south side of the island including Llangefni and the Menai Crossing. This subdivision is based on aggregates of wards defined in the 2011 Census. |
| | Anglesey West | An area conforming to a subdivision of the Isle of Anglesey, representing communities on the west side of the island including Holyhead. This subdivision is based on aggregates of wards defined in the 2011 Census. |
| Mainland | Menai Mainland | Menai Mainland is a subdivision of Gwynedd, representing the communities on the mainland located within the KSA, including the main settlements of Bangor and Caernarfon. This area also contains small areas of Conwy. It is based on aggregates of wards defined in the 2011 Census. |
| Daily Construction Commuting Zone (DCCZ) | | This area is based upon a 90-minute commute time from the WNDA. Conclusions drawn from the 'Workforce Mobility and Skills in the UK Construction Sector' indicate that 85% of construction workers live within a 90-minute commute time from their place of work [RD5].<br>The definition is based on a best-fit selection of 2011 Census of Population administrative wards. Any ward wholly or partially within a 90-minute travel time has been included. The area represents the one-way travel time limit assumed for workers to commute on a daily basis from their permanent residence (these individuals are referred to as home-based workers). |
| North West Wales | | This area consists of local authority districts of the Isle of Anglesey, Conwy and Gwynedd. |
| North Wales | | This area consists of a grouping of local authority districts consisting of the Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Flintshire and Wrexham. This area has been used when it is not possible to represent the DCCZ due to statistical data limitations, including for baseline employment and migration information. It is worth noting that the area is more urbanised and industrial (with key developments in certain areas of Flintshire, etc.) and has a much larger population than the DCCZ. |
| Lower and Middle Super Output Areas (LSOA and MSOA) | | For the purposes of baseline data collection, there are occasions for specific studies to focus on a smaller geographic area. SOAs were developed by the Office for National Statistics (ONS) to improve the reporting of small area statistics in England and Wales. SOAs are designed to be of a consistent population size and their boundaries do not change over time (unlike electoral wards, which are widely used for presenting local statistical information). The two layers of SOA relevant to this report are lower (LSOA) and middle (MSOA). LSOAs have a minimum population of 1,000 and an average population of around 1,600, whilst MSOAs have a minimum population of 5,000 and an average population of around 7,000. Further details are available in appendix B of Welsh Government |

| Area | Geographic scope |
|---|---|
| | (2015). SOAs are used in the Welsh Index of Multiple Deprivation (WIMD) and to assess Welsh language abilities within the study area [RD6]. |

# 3 Baseline

## 3.1 Summary baseline

- In 2011, Anglesey had a resident population of around 70,000, which is 51% of the KSA population and 19% of the DCCZ population. Wales had a population of three million.
- In 2011, 63% of the DCCZ population were of working age (16-64). Anglesey accounted for 18.5% of the working age population in the DCCZ, in line with its population share of this study area.
- The communities throughout Anglesey have varied characteristics and resources which are summarised below (section 3.2) in terms of:
  - residential, retail, and industrial mix;
  - public services (education, health, recreational, community assets);
  - employment; and
  - transport links.
- In terms of migration, a steady trend of young people (16-25) leaving Anglesey and older workers (45-64) moving to the area occurred from 2001 to 2015. This trend is replicated at regional and national level as well.
- In 2011, 98.2% of Anglesey classed their ethnicity as “White” compared to 95.6% of Wales, 96.1% of Scotland, and 85.4% for England,
- Anglesey is an area in Wales with a strong Welsh language presence. In 2011, 45.6% of the population were able to speak, read and write in Welsh. The overall Welsh average was 14.6%.
- The WIMD shows that the majority of areas on Anglesey are more deprived than the Welsh average.
- Earnings and gross disposable income:
  - weekly earnings on Anglesey (£469) are above Gwynedd (£440) but below Conwy (£486) and the Welsh average (£493); and
  - gross disposable household income per capita on Anglesey was £16,238; higher than the Gwynedd, Conwy and Denbighshire, and Welsh average.

## 3.2 Population and communities

### *Population distribution*

3.2.1 Table 3 shows the resident population for Anglesey, the KSA, the DCCZ and Wales. In 2011, Anglesey had a resident population of around 70,000, which accounted for 51% of the KSA population and 19% of the DCCZ population [RD7].

3.2.2 The remaining population of the DCCZ comprised 31% in Conwy, 28% in Gwynedd, 20% in Denbighshire and 3% in Flintshire. The DCCZ, in turn, accounted for 12% of the Welsh population in 2011.

**Table 3-1 Total resident population by area[4] (2011)**

| Area | Resident population (2011) | Proportion of DCCZ population (%) |
|---|---|---|
| Anglesey North | 13,608 | 4 |
| Anglesey South | 31,383 | 8 |
| Anglesey West | 24,760 | 7 |
| Menai Mainland | 68,075 | 18 |
| Isle of Anglesey | 69,751 | 19 |
| KSA | 137,826 | 37 |
| DCCZ | 376,000 | 100 |
| Wales | 3,063,456 | - |

### *Population age structure*

3.2.3 The working age population, those aged between 16 and 64, is indicative of the capacity of an area to undertake and participate in economic activity. Table 3-2 shows that, in 2011, 61% of the usually resident population in the DCCZ were of working age, and 63% of the KSA's resident population were of working age. The Welsh average was 63%. Anglesey's working age population accounted for around 18.5% of the working age population within the DCCZ, in line with its share of the overall population of the DCCZ.

3.2.4 The age structure of the male population is provided in Table 3-3. As the UK construction workforce is predominantly male (87%), the size of the construction workforce is a material concern for any major construction project [RD7].

3.2.5 Table 3-3 shows that Anglesey North and Anglesey South are broadly comparable in terms of male age structure, but Anglesey West has a higher proportion of younger males (age 0 to 15) and working age males (age 16 to 64) than the other two areas of Anglesey. However, the proportion of working age males in Anglesey West is still slightly below the Welsh average (64%) and also below the figure for Menai Mainland (67%).

[4] [RD7]

**Table 3-2[5] Population distribution by age cohort and area[6] (2011)**

| | Anglesey North | | Anglesey South | | Anglesey West | | Menai Mainland | | KSA | | DCCZ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Age** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Age 0 to 15 | 2,264 | 17 | 5,090 | 16 | 4,507 | 18 | 12,101 | 18 | 23,962 | 17 | 65,114 | 17 |
| Age 16 to 64 | 8,174 | 60 | 18,798 | 60 | 15,272 | 62 | 44,844 | 66 | 87,088 | 63 | 228,719 | 61 |
| Age 65 to 74 | 1,868 | 14 | 3,940 | 13 | 2,766 | 11 | 5,871 | 9 | 14,445 | 11 | 43,133 | 11 |
| Age 75 plus | 1,302 | 10 | 3,555 | 11 | 2,215 | 9 | 5,259 | 8 | 12,331 | 9 | 39,034 | 10 |
| **Total (all usual residents)** | 13,608 | 100 | 31,383 | 100 | 24,760 | 100 | 68,075 | 100 | 137,826 | 100 | 376,000 | 100 |

[5] Figures in all tables may not sum due to rounding.

[6] [RD7]

**Table 3-3 Male population distribution by age cohort and area[7] (2011)**

| Males | Anglesey North (%) | Anglesey South (%) | Anglesey West (%) | Menai Mainland (%) | KSA (%) | DCCZ (%) | Wales (%) |
|---|---|---|---|---|---|---|---|
| Age 0 to 15 | 17 | 17 | 19 | 19 | 18 | 18 | 19 |
| Age 16 to 64 | 61 | 61 | 63 | 67 | 64 | 62 | 64 |
| Age 65 to 74 | 14 | 13 | 11 | 9 | 10 | 11 | 10 |
| Age 75 plus | 8 | 9 | 7 | 6 | 7 | 9 | 7 |
| Total (all usual residents) | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

3.2.6 Table 3-4 shows the female age structure in 2011 for the KSA sub areas, the DCCZ and Wales. The proportion of working age females is broadly comparable across the Anglesey subdivisions (59% to 60%), but much higher in Menai Mainland (65%). The proportion in Menai Mainland is also higher than the Welsh average (63%).

**Table 3-4 Female population distribution by age cohort and area[8] (2011)**

| Females | Anglesey North (%) | Anglesey South (%) | Anglesey West (%) | Menai Mainland (%) | KSA (%) | DCCZ (%) | Wales (%) |
|---|---|---|---|---|---|---|---|
| Age 0 to 15 | 16 | 15 | 18 | 17 | 17 | 16 | 17 |
| Age 16 to 64 | 59 | 59 | 60 | 65 | 62 | 60 | 63 |
| Age 65 to 74 | 14 | 12 | 11 | 9 | 11 | 12 | 10 |
| Age 75 plus | 11 | 13 | 11 | 9 | 11 | 12 | 10 |
| Total (all usual residents) | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

## *Communities*

3.2.7 The Wylfa Newydd Project would have an impact that can be examined at a number of geographical levels: the UK, Wales, north Wales, Anglesey and local area. The impact of the Wylfa Newydd Project would be spatially distributed throughout communities on Anglesey; therefore, understanding the characteristics of different communities on Anglesey is essential in predicting how they would react to the Wylfa Newydd Project. The following section describes, for a number of communities in the KSA, the public services, employment prospects, transport links and other relevant characteristics that could be affected by the Wylfa Newydd Project. These communities were chosen due to their proximity to the main site and size.

### Holyhead

3.2.8 Holyhead is the largest town on Anglesey, and the main retail and service centre. Holyhead is also home to many community facilities, including seven

[7] [RD7]

[8] [RD7]

primary schools, a secondary school, a college, a community hospital, five GP surgeries and a leisure centre. The town has a rich built environment with a number of Listed Buildings and is surrounded by a high quality natural environment.

3.2.9 Holyhead has very good national and international transport connections to the rest of Anglesey and the mainland via the A5 and A55, and via the North Wales Coast railway line. The ferry port, which is the busiest in Wales, provides a gateway to Ireland. In addition, air transport is provided between the nearby Anglesey Airport and Cardiff Airport.

3.2.10 Despite these advantages in access to services and links to other areas, the Holyhead area also has high unemployment and suffers from relative deprivation across almost all deprivation indicators.

### Llangefni

3.2.11 Llangefni is Anglesey's second largest settlement, and benefits from a range of community facilities such as primary schools, a secondary school, a college, a leisure centre, a GP surgery and a hospital. Llangefni is an historic old town with a mix of Listed Buildings and business and industrial zones. The town is mostly set amidst land of high agricultural grade, and a local nature reserve borders the north-west edge of the town.

3.2.12 There is high potential for future business growth in the town, with development of new industrial zones being a key future priority. However, despite being an area of high employment on the island, areas in the town are recorded as being of relatively high deprivation.

### Amlwch

3.2.13 Amlwch, the most northerly town in Wales, is the main centre for both employment and services in the north of the island. The town contains several important facilities, including a primary school, a secondary school, two GP surgeries and a leisure centre.

3.2.14 The town, and the surrounding area, consist of a rich and sensitive environment and considerable industrial-cultural heritage. To the north of the town, the coastline is part of the Anglesey Area of Outstanding Natural Beauty. The town, particularly the Port Amlwch area, and the area around the nearby Parys Mountain, have considerable industrial heritage and are sites of tourist attractions.

3.2.15 However, Amlwch has high unemployment levels and deprivation issues, particularly in the employment, education and access to services indicators. The town also has a very high rate of out-commuting, with residents travelling elsewhere for employment.

### Cemaes

3.2.16 Cemaes is located to the east of the WNDA. The village has a primary school, a GP surgery, a library and retail areas. These provide services not just to local residents, but also to surrounding communities in north Anglesey.

3.2.17 The local area has both locally and internationally recognised areas for nature conservation, and the coastline is part of the Anglesey Area of Outstanding

Natural Beauty. Within Cemaes, there are several Listed Buildings that add to the local character. All year, but particularly during the summer months, the area is a tourist destination for walkers, cyclists and other types of visitors.

### Tregele

3.2.18 Tregele is a small village located to the south of the WNDA. The town does not have any key community services, instead relying on Cemaes and other villages along the A5025 to access services.

3.2.19 The local area has both locally and internationally recognised areas for nature conservation, and the coastline is part of the Anglesey Area of Outstanding Natural Beauty.

### Rhos-goch

3.2.20 Rhos-goch is a small village set amidst agricultural land. It has tourist accommodation available for visitors but does not have any key local services. The village's residents rely on services located at Cemaes, Amlwch and other larger towns. To the north of Rhos-goch, a decommissioned water treatment site had been identified as the Rhos-goch Enterprise Zone.

### Bangor

3.2.21 Bangor is the largest city in Gwynedd and home to Bangor University and Coleg Menai. As such, students make up over half of the city's population. Bangor has a range of community facilities and public services including both primary and secondary schools, four GP surgeries and a hospital (Ysbyty Gwynedd), which is expected for a community of this size.

### Caernarfon

3.2.22 The town of Caernarfon is the administrative centre for Gwynedd. In addition, its rich historic setting makes it a popular tourist centre, with a thriving market and marina.

3.2.23 Services in the town include four primary schools, one secondary school that serves the town and surrounding area, two GP surgeries and a local campus for Coleg Menai.

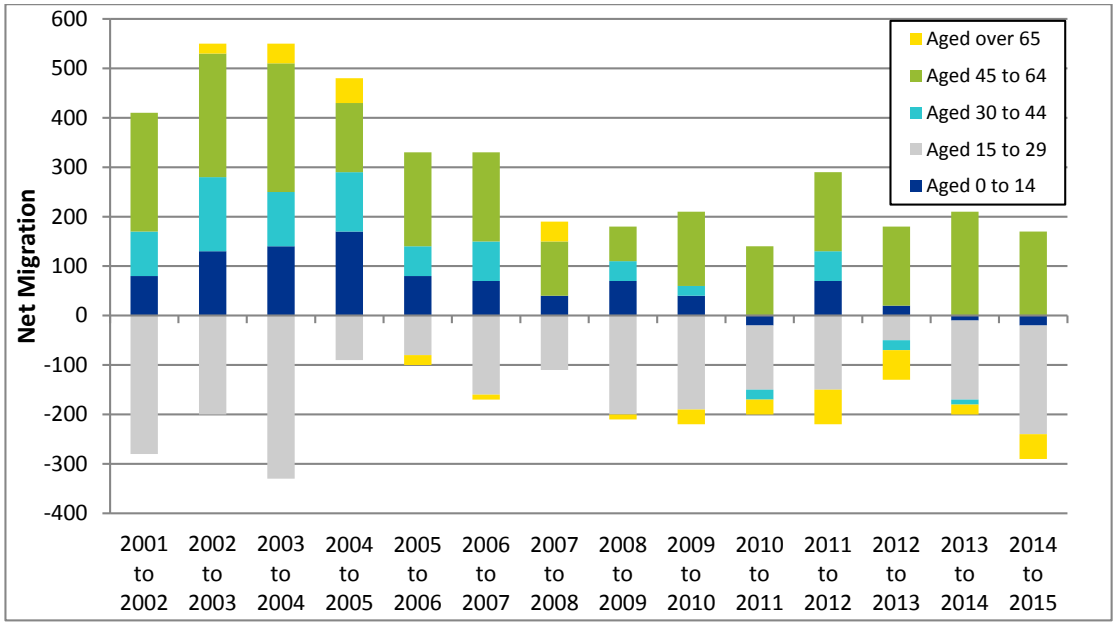
## 3.3 Migration

3.3.1 The ability to attract (or lose) population can have a bearing on the ultimate size of the local labour supply. The ONS produces annual migration data for local authorities and figures.

3.3.2 Figure 3-1, Figure 3-2, and Figure 3-3 show migration data for Anglesey, north Wales and Wales as a whole, respectively. These graphs show that a clear trend of young people (15-29) leaving is being countered by a positive net migration of older generations (aged 30+). Figure 3-4 highlights that, even though this trend takes place at different levels of the geographic scope, the Isle of Anglesey is not performing as well as other proximate areas in terms of retaining and attracting residents.

3.3.3 Figure 3 shows the net migration trends for Anglesey. A peak net migration was recorded for 2004-05, before net migration declined and turned negative between 2008 and 2011. Anglesey has consistently seen outflow of younger people (aged 15 to 29) with consistent inflow of older working-age adults (aged 45-65) throughout the period.

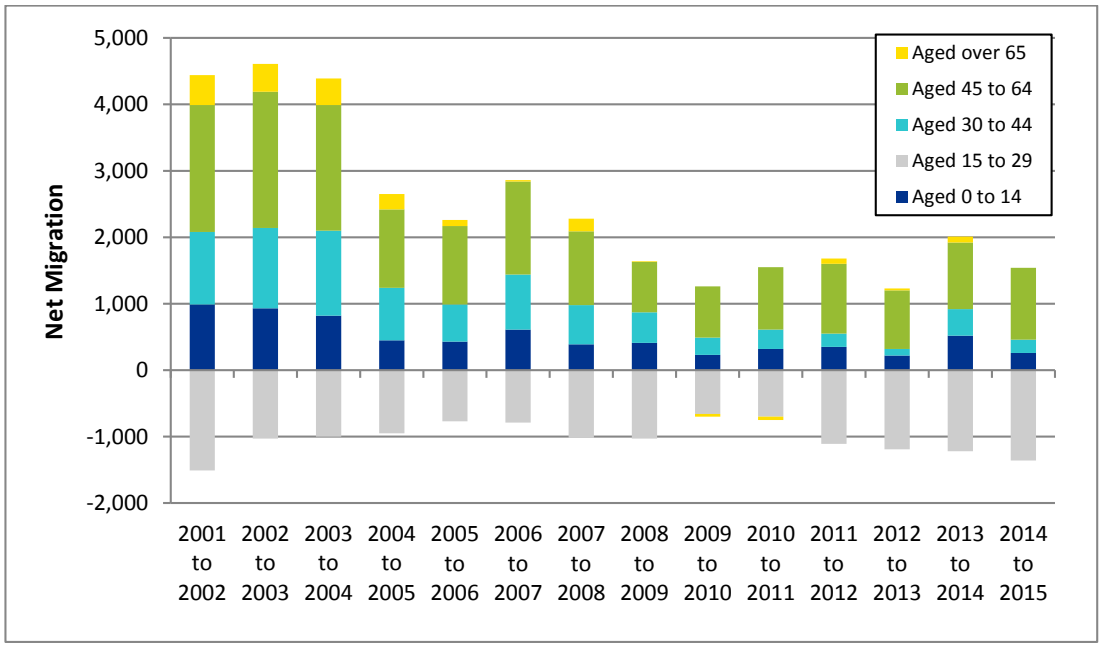
**Figure 3-1 Isle of Anglesey net population migration by age cohort[9] (2001 to 2015)**




3.3.4 Figure 3-2 shows the net migration trends for north Wales. In north Wales, peak migration was seen in 2002-03. Thereafter, net migration declined but remained positive. As is the case for Anglesey, north Wales has consistently seen outmigration of younger people (aged 15 to 29) throughout the whole period. The net outflow for that age cohort fell between 2009 and 2011 before almost reaching the 2001 to 2002 peak again in 2014-15.

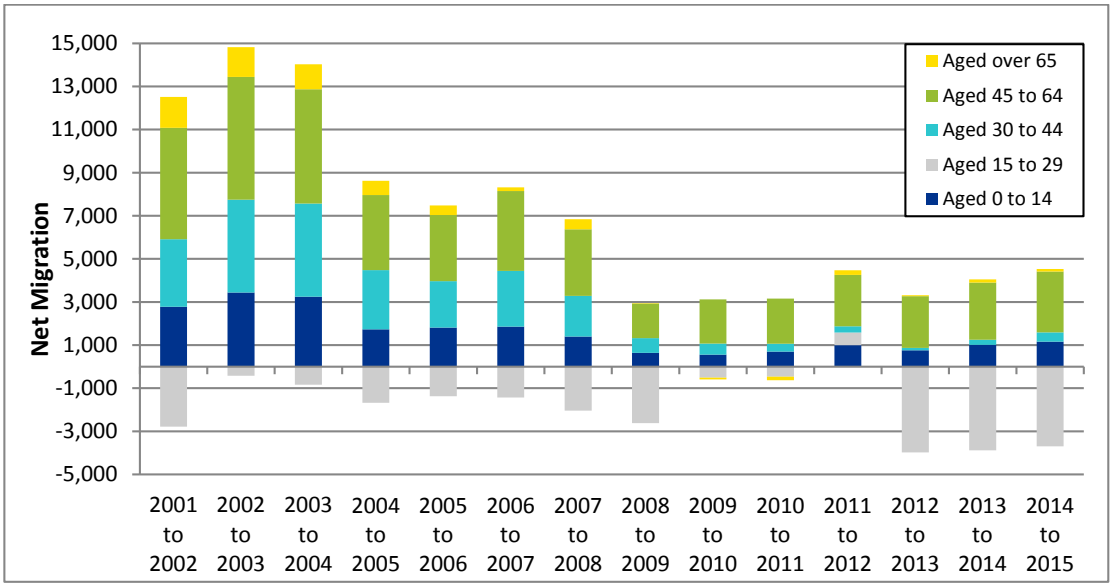
[9] [RD8] Data are independently rounded to the nearest 10 and may not add or subtract exactly.

**Figure 3-2 North Wales net population migration by age cohort[10] (2001 to 2015)**




3.3.5 Figure 3-3 shows that, with the exception of 2012-13, Wales has seen positive net migration in each year since 2001-02. Consistent with the trends on Anglesey and in north Wales, the largest net loss has been for younger people (aged 15 to 29) with positive net migration for those aged between 30 and 64.

**Figure 3-3 Wales net population migration by age cohort[11] (2001 to 2015)**

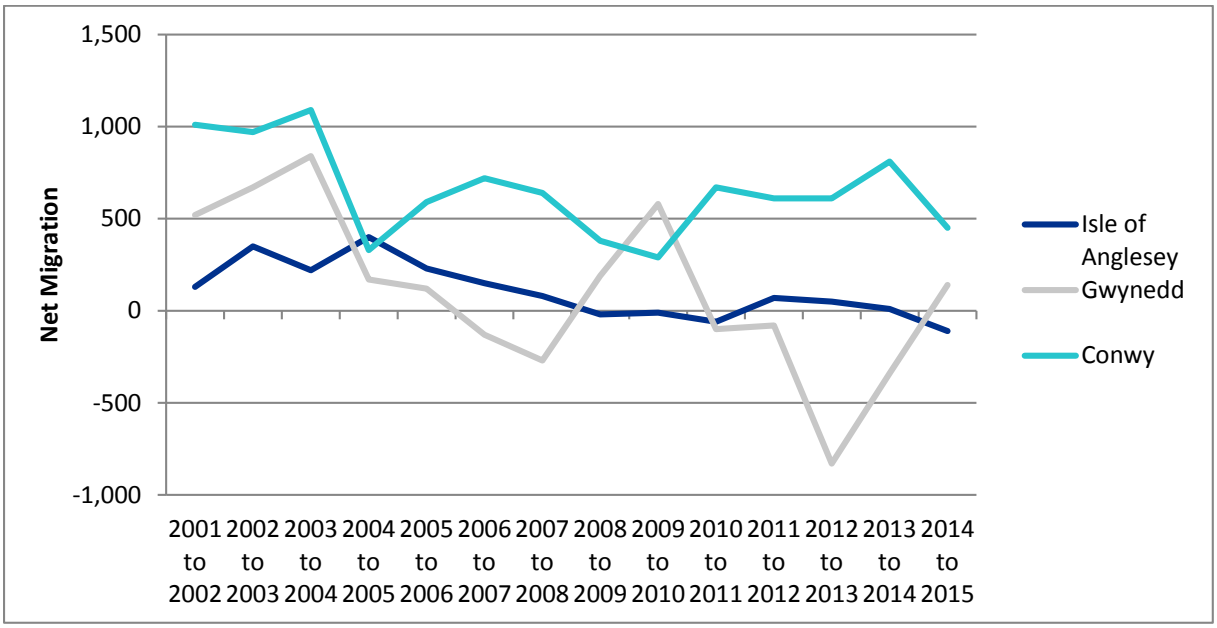



[10] [RD8] Data are independently rounded to the nearest 10 and may not add or subtract exactly

[11] [RD8] Data are independently rounded to the nearest 10 and may not add or subtract exactly

3.3.6 Figure 3-4 shows that, since 2007, the trend of net migration to the Isle of Anglesey has been unchanging whilst other areas in north Wales have experienced different trends: net in-migration (Conwy) or volatility (Gwynedd).

**Figure 3-4 Net migration per annum between[12] 2001 and 2015**




## 3.4 Ethnicity

3.4.1 Table 3-5 presents the 2001 [RD9] and 2011 Census data [RD7]. The percentage of the population on Anglesey who classed themselves as "white" fell from 99.3% in 2001 to 98.2% in 2011. Between 2001 and 2011, there was an increase of 0.4% of people who classed themselves as "mixed/multiple ethnic groups" and "Asian/Asian British", while there was a 0.2% increase of people who classed themselves as belonging to another ethnic group.

3.4.2 The 2011 Census data [RD7] show that 96.6% of the population on Anglesey were recorded as being born in the UK and 0.4% of the current population were recorded as being a UK resident for less than two years. This gives Anglesey the smallest inward migration of non-UK born residents in the north Wales region, whilst Gwynedd has the largest in the region at 1.5%.

**Table 3-5 Ethnicity of the population of Anglesey, Gwynedd and Wales in 2001[13] and 2011[14]**

| Ethnic group | Isle of Anglesey | | Gwynedd | | Wales | |
|---|---|---|---|---|---|---|
| | 2001 | 2011 | 2001 | 2011 | 2001 | 2011 |
| All usual residents | 66,829 | 69,751 | 116,829 | 121,874 | 2,903,086 | 3,063,456 |
| White | 66,348 | 68,520 | 115,450 | 117,573 | 2,841,505 | 2,928,253 |

[12] [RD8]

[13] [RD7]

[14] [RD7]

| Ethnic group | Isle of Anglesey | | Gwynedd | | Wales | |
|---|---|---|---|---|---|---|
| | 2001 | 2011 | 2001 | 2011 | 2001 | 2011 |
| Mixed/multiple ethnic groups | 205 | 480 | 470 | 964 | 17,663 | 31,521 |
| Asian/Asian British | 189 | 491 | 612 | 2,170 | 31,716 | 70,128 |
| Black/African/Caribbean/ Black British | 40 | 81 | 128 | 289 | 7,067 | 18,276 |
| Other ethnic groups | 47 | 179 | 169 | 878 | 5,135 | 15,278 |

## 3.5 Welsh language

3.5.1 Anglesey is an area in Wales with a strong Welsh language presence. The 2011 Census showed that 45.6% of the population were able to speak, read and write in Welsh) [RD7]. This is the second highest rate in Wales, second only to Gwynedd (56.0%). The overall Welsh average was 14.6%.

3.5.2 There has been a decline in the number of people who can speak, read and write Welsh on Anglesey, from 32,672 in 2001 to 30,756 in 2011, a 6% decline. However, there are still six LSOAs on Anglesey where the percentage of fluent Welsh speakers remains above 60%. These are areas in close proximity to Llangefni and Llanfairpwllgwyngyll. Holyhead is the area on Anglesey where the fewest residents were able to collectively speak, read and write in Welsh. The LSOA around Valley in west Anglesey is where the highest percentage of residents reported no skills in Welsh at 55.2%.

3.5.3 The WLIA (Application Reference Number: 8.21) includes baseline information on the percentage of people that can speak Welsh by ward within the KSA and highlights that the percentage of people who can speak Welsh in each ward varies considerably, from 18.6% in the Menai (Bangor) ward to 87.8% in the Llanrug ward. The total percentage of Welsh speakers across the study area has fallen since 2001, with the majority of these wards located on Anglesey. The largest decrease was experienced in the Garth ward (-15.7%). Only 10 out of 73 wards within the study area experienced an increase in the percentage of Welsh speakers. These wards were Llechwedd, Cadnant (Gwynedd), Clynnog, Cwm Cadnant, Groeslon, Llanllyfni, Llanrug, Moelfre, Ogwen and Waunfawr. Clynnog ward experienced the largest increase (5.4%) in Welsh speakers.

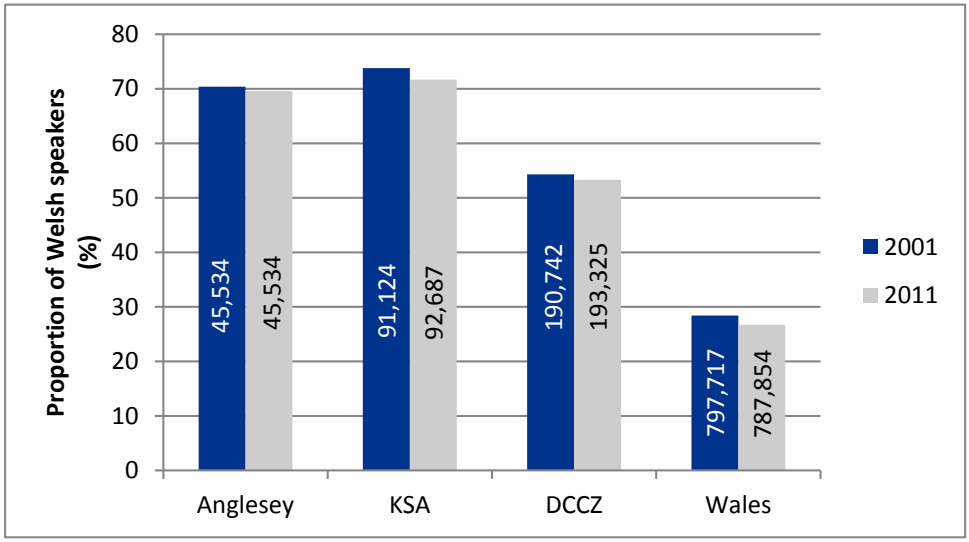
3.5.4 Compared to the older age groups, the younger age groups within the KSA tend to contain a relatively higher proportion of the population that have one or more skills in Welsh. In 2011, the age group which had the highest percentage of people who had one or more skills in Welsh was the 5-15 age group (89.6%) followed closely by the 16-19 age group (84.4%). This also reflected the trend in 2001. The age group with the lowest percentage of Welsh speakers in 2011 was the 65-74 age group.

3.5.5 Over the past decade, six age groups have seen an increase in the percentage of people with one or more skills in Welsh. The largest increase was seen in the 60-64 age group, which rose by 30.8% (equivalent to an increase of 745 people). The 5-15, 16-19, 25-39 and 50-59 age groups experienced a decrease in the percentage of people who have one or more skills in Welsh.

The largest decrease was amongst the 5-15 age group, which saw an 11.6% decrease (which is equivalent to 942 people).

3.5.6 Figure 3-5 shows the change in the number and proportion of Welsh speakers, with one or more skills[15], between 2001 and 2011 across the socio-economic study areas. Whilst the proportion of Welsh speakers fell across all areas, the absolute number of Welsh speakers remained unchanged on Anglesey and rose in both the KSA and the DCCZ, in contrast to the decline across Wales as a whole.

**Figure 3-5 Number and proportion of the population with one or more skills in Welsh[16] by area (2001[17] and 2011[18])**




## 3.6 Deprivation

3.6.1 The WIMD 2014 ranks specific small areas in terms of deprivation [RD6]. Within the KSA, more than half (56%) of LSOAs are in the top half of the WIMD, which indicates that most of these areas do not have overall deprivation issues. However, around 2% of the LSOAs on Anglesey fall in the top 10% most deprived in Wales, and the majority of areas on Anglesey are more deprived than the Welsh average.

3.6.2 Table 3-6 provides more information on the domains used within the WIMD and the relative position of the KSA within each domain.

[15] Each of the following is classed as a skill: understand Welsh, speak Welsh, read Welsh, or write Welsh.

[16] The figure for one or more skills in Welsh is calculated by deducting the number with no skills in Welsh from the population aged 3 and over.

[17] [RD7]

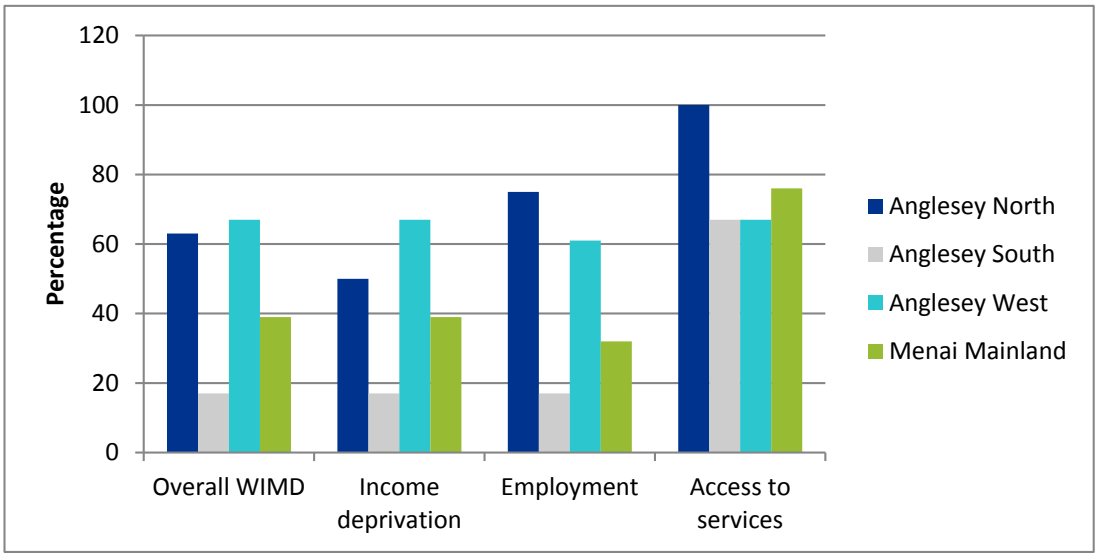
[18] [RD7]

**Table 3-6 Welsh Index of Multiple Deprivation – description of domains for the KSA**

| Domain | Description | Deprivation in the KSA |
|---|---|---|
| Income | The Income domain considers the proportion of people in an area with an income below a defined level. | Over 50% of LSOAs in the KSA are within the top half of the Income domain (least deprived), with only a few areas in the bottom deciles. |
| Employment | The Employment domain captures lack of employment and covers the involuntary exclusion of the working age population from work. It includes those who cannot work due to ill health or who are unemployed but are actively seeking work. | Over 50% of LSOAs are within the top half of the Employment domain (least deprived), with only a few areas in the bottom deciles. |
| Health | The Health domain measures premature death and the impairment of quality of life by poor health. It considers both physical and mental health. | The KSA shows particularly low levels of deprivation under this measure, with less than 30% of LSOAs in the bottom half of the index. |
| Education | The Education domain captures the extent of deprivation in education, skills and training in an area. This includes both the education of children and young people and adult skills. | Over 50% of LSOAs are within the top half of the Education domain (least deprived), and there are not many in the bottom deciles. |
| Access to Services | The Access to Services domain measures the physical and financial accessibility of key local services. This primarily considers 'geographical barriers' which relate to the physical proximity of local services. | The KSA is highly deprived by this measure, with over half (55%) of LSOAs in the bottom 30%. |
| Community Safety | The Community Safety domain covers actual experience of crime and fire, as well as perceptions of safety whilst out and about in the local area. | Over 50% of LSOAs are within the top half of the Community Safety domain (least deprived), with only a few areas in the bottom deciles. |
| Physical Environment | The Physical Environment domain measures factors in the local area that may affect the well-being or quality of life of those living in an area, and includes consideration of flood risk, air quality and proximity to industrial or waste sites. | Around 85% of LSOAs are within the top half of the Physical Environment domain (least deprived), with only a few areas in the bottom deciles. |
| Housing | Conceptually, the purpose of this domain is to capture deprivation through lack of adequate housing, in terms of housing physical condition, living conditions and availability. However, the lack of appropriate data means that it is not possible to fully measure housing deprivation according to this definition. | Around 75% of LSOAs are within the bottom half of the Housing domain (most deprived), with only a few areas in the top deciles. |

3.6.3 Figure 3-6 shows, the LSOAs within the KSA subdivisions of Anglesey North and Anglesey West show high levels of deprivation, both on average across all deprivation indices and also with regard to employment and income deprivation. All areas show significant deprivation in relation to access to services.

**Figure 3-6 Deprivation with KSA subdivision, percentage of LSOAs within 50% most deprived, selected domains[19]**




3.6.4 For further information on deprivation as measured by other domains (Income, Employment, Health, Education, Access to Services, Community Safety, Physical Environment and Housing) consult the baseline appendix C1-1 (Socio-economics Baseline Report) (Application Reference Number: 6.3.8).

## 3.7 Earnings and income

### *Weekly earnings*

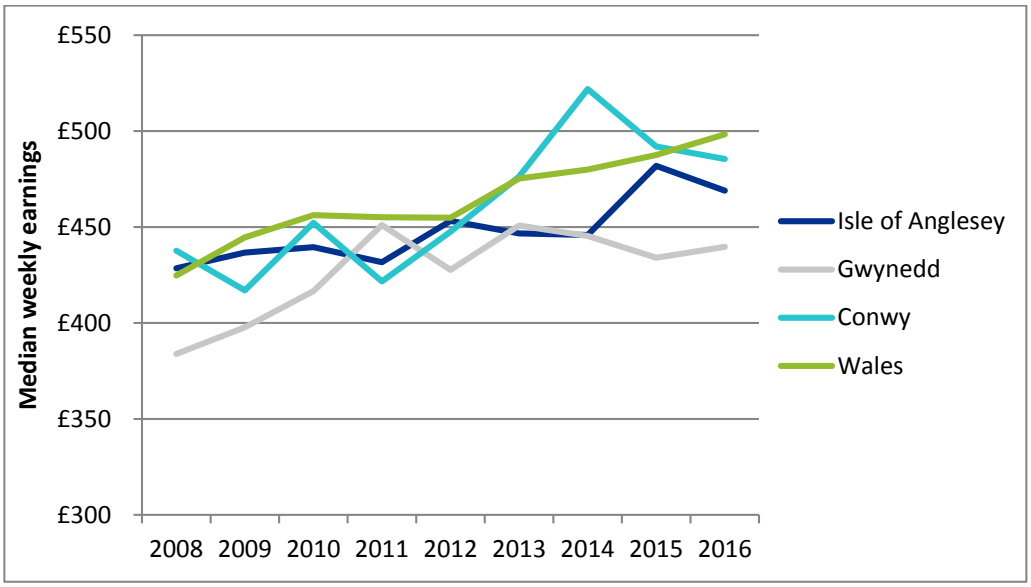
3.7.1 The *Annual Survey of Hours and Earnings* provides data on median gross weekly full-time earnings [RD10].

3.7.2 Figure 3-7 contains the latest data for Anglesey, Gwynedd and Conwy, relative to the Welsh average. These data are based on residents in each local authority for full-time employees only and include overtime.

3.7.3 These data show low growth in earnings on Anglesey between 2008 and 2016, although earnings rose by 7.9% in 2015, before declining by 2.7% in 2016. This is in contrast to Gwynedd, which has seen more significant earnings growth since 2008. In 2016, Anglesey's median weekly earnings were £469, while Gwynedd's were just less than £440. These are below the Welsh average of £498.

[19] [RD6]

**Figure 3-7 Median weekly earnings (£) of residents by area (2008 to 2016)**




## *Occupational level earnings*

3.7.4 Occupational earnings data are not available at the local authority level; however, the *Annual Survey of Hours and Earnings* publishes occupational earnings data for Wales [RD10].

3.7.5 Table 3-7 provides weekly wage data for each Standard Occupational Classification 2010 (SOC2010 [20]) major group and selected occupations consistent with nuclear-relevant skills as identified by the Construction Skills Network [RD11]. These skills are those most likely to be relevant for the Wylfa Newydd Project.

3.7.6 Table 3-7 shows that there are significant variations in earnings across the selected occupational groups. In Wales, the highest earnings in 2016 were for engineering professionals (around £708); this was more than twice the median earnings for security guards (£360).

3.7.7 The numbers in Table 3-7 differ slightly from those in Figure 3-7 due to a difference in definition.

**Table 3-7 Median weekly pay for selected occupations for Wales (2016)**

| Occupation | SOC2010 code | Wales median (£) | Wales annual % change | UK median (£) | UK annual % change |
|---|---|---|---|---|---|
| Wales – All | | 492.40 | 2.9 | 538.70 | 2.2 |
| Managers, directors and senior officials | 1 | 670.80 | 4.9 | 797.60 | 1.7 |
| Professional occupations | 2 | 704.10 | 1.0 | 725.80 | 1.3 |

[20] SOC2010 is the common classification system for occupations in the UK. Jobs are classified according to their skill level and skill content.

| Occupation | SOC2010 code | Wales median (£) | Wales annual % change | UK median (£) | UK annual % change |
|---|---|---|---|---|---|
| Engineering professionals | 212 | 707.60 | -3.7 | 769.50 | 0.4 |
| Civil engineers | 2121 | 600.60 | -13.8 | 765.60 | 2.7 |
| Engineering professionals n.e.c. | 2129 | 679.60 | -8.0 | 758.90 | -1.3 |
| Associate professional and technical occupations | 3 | 542.80 | 1.5 | 593.70 | 0.2 |
| Administrative and secretarial occupations | 4 | 390.20 | 0.6 | 423.30 | 2.0 |
| Skilled trades occupations | 5 | 469.10 | -1.2 | 498.00 | 1.9 |
| Skilled metal, electrical and electronic trades | 52 | 578.90 | 3.2 | 565.40 | 2.6 |
| Skilled construction and building trades | 53 | 457.60 | 1.8 | 507.00 | 1.7 |
| Construction and building trades | 531 | 451.70 | 2.8 | 498.40 | 1.8 |
| Roofers, roof tilers and slaters | 5313 | 436.50 | 4.0 | 457.70 | 1.9 |
| Plumbers and heating and ventilating engineers | 5314 | 553.60 | 0.4 | 574.40 | 4.6 |
| Carpenters and joiners | 5315 | 440.90 | 0.3 | 498.60 | 1.6 |
| Glaziers, window fabricators and fitters | 5316 | 328.60 | -11.2 | 404.80 | -2.0 |
| Building finishing trades | 532 | 400.00 | 0.0 | 454.40 | 1.0 |
| Painters and decorators | 5323 | 404.70 | 2.6 | 449.10 | 0.9 |
| Construction and building trades supervisors | 533 | 587.90 | -3.5 | 632.80 | 0.4 |
| Caring, leisure and other service occupations | 6 | 346.40 | 4.1 | 352.90 | 3.4 |
| Sales and customer service occupations | 7 | 344.20 | 3.3 | 354.90 | 3.0 |
| Process, plant and machine operatives | 8 | 435.20 | 3.4 | 467.50 | 3.1 |
| Construction operatives | 814 | 469.10 | -0.2 | 496.90 | 1.5 |
| Scaffolders, stagers and riggers | 8141 | - | - | 602.10 | 0.0 |
| Construction operatives n.e.c. | 8149 | 445.20 | -1.6 | 459.10 | 0.0 |
| Transport and mobile machine drivers and operatives | 82 | 441.30 | 1.2 | 498.50 | 2.5 |
| Elementary occupations | 9 | 342.60 | 4.4 | 356.40 | 3.4 |
| Elementary construction occupations | 912 | 399.50 | 6.9 | 411.00 | 2.8 |
| Elementary security occupations | 924 | 335.60 | -5.8 | 430.40 | 2.3 |
| Security guards and related occupations | 9241 | 359.00 | -2.1 | 436.90 | 1.3 |

## *Gross disposable household income*

3.7.8 Gross disposable household income is a measure of the amount of money individuals have available for spending or saving. It is based on where people live rather than where they work, and therefore it generally provides a more reliable indicator of living standards across different areas. The data are sourced from regional accounts, which are produced by the ONS. It is measured at the NUTS3 level[21].

3.7.9 Table 3-8 shows gross disposable household income per head for 2008 and 2014 for the relevant NUTS3 areas and Wales.

3.7.10 In 2014, gross disposable household income per head on Anglesey was £16,238 and was the third highest among the 12 NUTS3 areas in Wales. It was higher than the Welsh average, Gwynedd, and Conwy and Denbighshire.

**Table 3-8 Gross disposable household income (£) per head[22] (2008 to 2014)**

| Year | Isle of Anglesey (£) | Gwynedd (£) | Conwy and Denbighshire (£) | Wales (£) |
|---|---|---|---|---|
| 2008 | 13,830 | 13,034 | 14,447 | 13,730 |
| 2009 | 14,436 | 13,610 | 14,668 | 13,986 |
| 2010 | 15,129 | 14,192 | 15,375 | 14,605 |
| 2011 | 15,391 | 14,255 | 15,732 | 14,799 |
| 2012 | 15,970 | 14,794 | 16,371 | 15,389 |
| 2013 | 15,959 | 14,644 | 16,165 | 15,310 |
| 2014 | 16,238 | 14,640 | 16,004 | 15,302 |

[21] Nomenclature of Units for Territorial Statistics (NUTS) is a hierarchical classification of administrative boundaries. NUTS3 refers to an administrative level comprising counties or groups of unitary authorities with a population size ranging 150,000 to 800,000.

[22] [RD10]

# 4 Worker source study: construction

## 4.1 Introduction

4.1.1 The purpose of the worker source study is to present the evidence available on the possible place of origin for non-local labour (or non-home-based) during the construction phase of the Wylfa Newydd Project. The outputs of the analysis are used to support the traffic and transport assessment as well as consideration relating to community cohesion within this report and the socio-economic assessments presented as part of the EIA.

4.1.2 Modelling of the labour market, presented in the project-wide effects chapter (C1) (Application Reference Number: 6.3.1) and in Technical Appendix (C1-2) (Socio-economic technical appendix) (Application Reference Number: 6.3.9) section 2, concludes that a 22% local labour contribution could be achieved (with intervention) from within the DCCZ (the boundary representing a 90-minute commuting journey), with the remaining 78% coming from elsewhere. This assumption has been tested and validated through evidence gathered for this worker source study (see section 4.3). For the non-home-based workers, a profile by country of origin has been built up based on previous project examples, anecdotal evidence and available data on the existing labour supply in those locations.

4.1.3 For the purpose of this study, the peak construction workforce of 8,550 is used. This excludes the construction phase operational staff [23] from the total workforce estimate of 9,000 at peak. Detail on the likely employment requirements by trade was extrapolated from a range of information sources provided by Horizon Nuclear Power.

## 4.2 Methodology

### *Evidence gathering*

4.2.1 An evidence-gathering exercise has been undertaken in order to collate available reports and data along with anecdotal evidence on the nature of construction employment for comparator projects. A search was conducted and relevant sources identified which broadly fall into the following categories:

- statistical datasets on labour supply (sourced from the ONS, Nomis (official labour market statistics), the Construction Skills Network and the Organisation for Economic Co-operation and Development (OECD));
- publications on general migration trends (OECD);
- publications on trends in the UK construction industry from the Chartered Institute of Buildings, Construction Industry Training Board, etc.;
- information on other UK and international nuclear projects, including new build and decommissioning, such as environmental statements,

[23] The reason behind this is a lack of information on the profile of operation staff required to produce an estimate.

economic impact assessments (pre and post construction), news articles, etc.; and

- information on other recent major infrastructure projects such as London 2012 Olympics, Crossrail, Queensferry Crossing, etc.

4.2.2 Anecdotal evidence from industry colleagues covering a range of energy and infrastructure projects across the globe was used to supplement evidence available from published sources.

### *Skills matching*

4.2.3 A skills-matching exercise was undertaken to understand the labour demand generated by the Wylfa Newydd Project in the context of the existing labour supply in the UK. This served to verify the expected proportion of local (i.e. home-based) versus non-local (i.e. non-home-based) workers, as well as to determine the proportion of the non-local labour demand that is likely be met elsewhere in the UK and by foreign nationals.

4.2.4 The best available data on the existing labour supply in the UK are sourced from the annual Business Register and Employment Survey, which reports the number of employer jobs by Standard Occupational Classification (SOC) minor codes. The trades/skills requirements extrapolated from other information sources produced as part of the Joint 2 Study programme were mapped on to the SOC minor codes to understand the location of the current labour supply versus the demand generated by the project.

4.2.5 Table 8-1 in the appendix section shows the minor groups that are considered to be nuclear-relevant occupations based on the terminology developed by the Construction Skills Network [RD11]. The sub-minor groups are also included in order to provide an understanding of what occupations fall into each minor code and were used to map the trades/skills required for the Wylfa Newydd Project.

4.2.6 The existing labour supply for each SOC minor code is presented in section 4.6, broken down by Scotland, Wales, and each of the eight English regions (no similar data are available for Northern Ireland). Comparing the project demand against the supply in each geographic region serves to answer two questions:

- Will the project demand put pressure on any single trade/skill in the UK in general? This then informs how much of the labour demand is likely to be met by foreign nationals.
- In what geographic region are the jobs in these skills/trades currently located? This informs the assumptions around where the non-local, UK workers are likely to come from.

4.2.7 Further information is provided in the section 4.6.

## 4.3 Supporting research

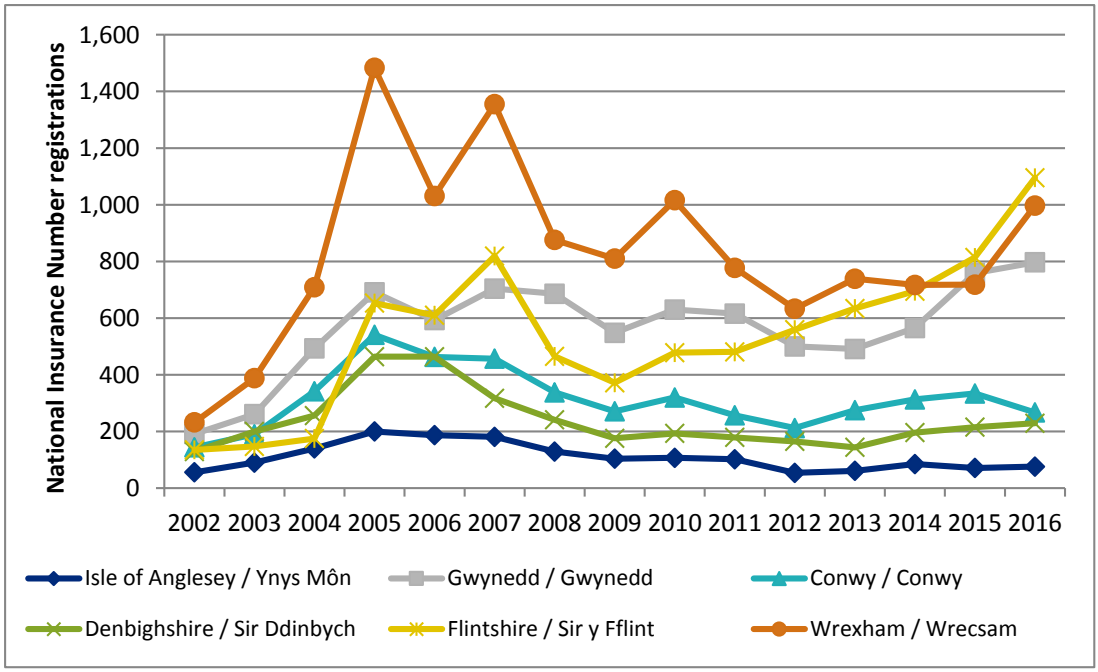
### *Migration trends and literature*

4.3.1 As shown in section 3.3, Wales has seen positive net migration in each year since 2001-02, with the exception of 2012-13. The largest net loss has been

for younger people (aged 15 to 29) with positive net migration for those aged between 30 and 64.

4.3.2 The number of foreign national adults in North Wales registering for a National Insurance Number is shown in Figure 4-1. These data show the number of registrations, but do not provide any indication of the duration of their stay, or the number who become permanent residents. There is a clear upward trend from 2004 until the onset of the recession in 2007/2008; the most significant increase was in Wrexham over that period. More recently, from 2012 onwards, there has been a substantial rise in registrations in Flintshire, Wrexham and Gwynedd. Anglesey continues to have a much lower level of registrations than elsewhere in North Wales.

**Figure 4-1 National Insurance Number registrations by foreign national adults in North Wales[24] (2002-2016) [RD12]**




4.3.3 According to a report by the Wales Migration Partnership, *Migration and Employment in Wales*, the percentage of migrant workers in the Welsh labour force has doubled to 9.2%, around 82,600 employees [RD13]. The main regions of origin are Asia and Oceania (2.8%), Western Europe (2.4%) and the A8 accession countries[25] that joined the EU in 2004. The main countries of origin are Poland, India, Germany, Ireland, the Philippines, South Africa and the United States.

4.3.4 Between May 2004 and March 2008, around 22,300 migrants from Central and Eastern Europe joined the Welsh labour market; over half of all migrant workers from Central and Eastern Europe are living in Carmarthenshire, Cardiff, Newport and Wrexham. The main migrant communities in North Wales have been identified as Wrexham, the Deeside industrial estate and surrounding areas, North Flintshire, Llandudno, Bangor, Llangefni and

[24] [RD12]

[25] The A8 accession countries are: Poland, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia.

Gaerwen. In South Wales, the main migrant communities are in Llanelli, Cardiff and Newport.

4.3.5 The report highlights that, although the perception is that migration leads to higher unemployment and lower wages, there is little evidence to support this view. This is because migrants often work in areas and sectors with high levels of hard-to-fill vacancies [RD13]. However, the report indicates that in some areas an increase in migrant workers has placed pressure on local services, both through additional demand and, in some cases, through necessary changes to the means of service delivery.

4.3.6 Another report by the Wales Migration Partnership, *Migration and Community Cohesion in Wales*, provides some insight into the policy context and migration trends relating to community cohesion [RD13]. The report highlights that there are a number of different and interrelated factors that can impact on community cohesion at a local level, including:

- perceived competition over resources;
- increased immigration in the UK;
- additional housing pressures created by inward migration into rural areas;
- perceptions of increased competition for employment and services; and
- concerns that demographic changes in rural areas could impact the sustainability of predominantly Welsh-speaking communities.

4.3.7 Existing evidence suggests that there is no straightforward relationship between the number of migrants in a particular community and levels of cohesion; cohesion and tensions in areas of new migration often reflect broader issues, including poverty, deprivation and racism.

### *Examples of migration in other nuclear projects*

4.3.8 Despite the large number of existing UK and international nuclear projects, there is little published evidence on labour demand and countries of origin of the utilised workforce; therefore, this section presents the relevant information available, in general the proportion of local and non-local workforce in each example.

4.3.9 Sizewell A, located in Suffolk in the east of England, was built in the 1960s and employed over 2,000 construction workers at peak. People working during its construction stated that the construction workforce comprised both local and travelling workers, "*from far flung parts of Britain and Ireland*" [RD14].

4.3.10 Construction of the Existing Power Station began in 1963 and was undertaken by UK firms Babcock & Wilcox Ltd, Taylor Woodrow Construction and English Electric, the same consortium that built Sizewell A. Anecdotal evidence from stakeholders[26] in the Wylfa Newydd Project describes a core workforce who moved from site to site and was augmented by local skills. At the time, the UK had sufficient nuclear capability to manufacture and construct nuclear power stations; therefore, it is thought that the majority of the workforce would have come from the UK. Given that the Existing Power Station was constructed by

[26] [RD15]

the same consortium as Sizewell A, it can be assumed that a portion of the travelling workforce also came from Ireland.

4.3.11 Sizewell B (in Suffolk) was constructed between 1988 and 1995. The proportion of labour drawn from the local area (defined by a 90-minute commuting journey time) fluctuated throughout the construction programme from a maximum of 65% to a minimum of 35% in the final year [RD16]. No information is available with regard to the country of origin of non-local labour.

4.3.12 Looking at international nuclear projects, the Olkiluoto 3 Nuclear Power Plant is currently under construction in Finland, employing an estimated 4,700 construction workers at peak, of which 25% are Finnish [RD17]. The nationalities of the remaining 75% foreign workers span 55 countries [RD18]. While the breakdown by country of origin is not known, there is reported to be a large Polish contingent (approximately 30%).

4.3.13 The American company Westinghouse was building four nuclear power stations in China, which had estimated to have created and sustained more than 20,000 jobs in the United States [RD19]. While the majority were likely to be based in the US as opposed to site based (such as design and management, as well as supply chain jobs), it is likely that some positions would have been site-based, requiring US workers to work in China. Westinghouse has recently filed for bankruptcy and therefore the progress of these power stations is uncertain but the size of project and employment level remains relevant.

4.3.14 There are a limited number of ex-ante projections of the construction workforce for nuclear projects that are currently under construction; however, these are predictions as opposed to the actual numbers realised. For example, the peak workforce for the construction of Hinkley Point C is predicted to be 5,600, of which 34% are forecasted to be home-based (within a 90-minute drive time from the site) and the remaining 66% non-home-based workers [RD16]. The majority of non-home-based workers were assumed to temporarily reside within a 60-minute drive of the site while employed.

4.3.15 Prior to the start of construction of Flamanville 3 in France, which began in 2007, the predicted peak workforce was over 3,000 with 45-50% expected to come from the local area[27]. A high level of local recruitment was assumed to be possible due to the large skills pool available from other nuclear-related sites in the Manche area of France. The remaining 50% non-local labour was largely expected to come from elsewhere in France, along with around 300 Romanians, 80 Portuguese and others from Poland, Spain and Bulgaria. While construction is ongoing, subsequent evidence [RD16] suggests that the project has achieved 45-50% local recruitment during the Civils phase, although the actual breakdown of workers by country of origin is not available.

### *Examples of migration in non-nuclear projects*

4.3.16 As there was limited information on nuclear-relevant projects, some evidence was sourced related to other large infrastructure projects with similar construction workforce requirements.

[27] [RD20]

4.3.17 Looking at other (non-nuclear) energy projects, construction of Progress Power Station in Suffolk is scheduled to begin in 2017. The Environmental Statement considers the demand for construction workers in the context of the local labour supply within 30 to 60 minutes' commuting time from the site, as well as the wider UK labour pool [RD21]. There is no assessment or inclusion of foreign nationals in the skills-matching exercise that was undertaken for the Environmental Statement. Another point to note is that pressure on local labour capacity is defined as demand equalling 10% of existing capacity or greater. Similarly, the construction of Hirwaun Power Station near Merthyr Tydfil in Wales is scheduled to begin in 2019. The Environmental Statement makes similar reference to the availability of local skills (within 60 minutes' travel time of the site) and the UK as a whole, with no reference to non-UK labour [RD21].

4.3.18 A recent major infrastructure project in the UK was the 2012 Olympic Games in London, which entailed the construction of several large sporting venues such as the Aquatics Centre, Eton Manor, the London Velodrome and the Olympic Stadium. According to one source, 46,000 workers were employed over the course of the construction programme, of which 40% came from outside the UK [RD22]. The European contingent made up 28%, primarily from Romania (8% of total), followed by Ireland, Lithuania, Poland and Bulgaria. This breakdown is based on a sample of 8,465 construction workers employed in 2011 on the Olympic Games sites.

4.3.19 However, according to another report by the Olympic Delivery Authority, which looked at the local workforce contribution, between 3,300 and 4,400 workers were employed, of which 22% came from one of the five host boroughs, a further 30% from elsewhere in London and the rest from elsewhere in the UK [RD23]. Only a very small proportion (0-2%) of non-UK workers was reported in these samples. This is based on samples taken in 2008-2009 and relate to a project target for a minimum of 10% to 15% of the total construction workforce to be from the five host boroughs (Greenwich, Hackney, Newham, Tower Hamlets and Waltham Forest).

4.3.20 A further report for the Global Labour University about the London Olympics estimated that the share of migrant workers was around 30% in 2008 and 2009, but that this could range from 10% to 70%. The majority of these workers were reported to come from the Baltic States and Eastern Europe (Poland, Lithuania, Romania and Bulgaria) [RD24]. The discrepancies in these reported figures highlight the difficulties in obtaining accurate data on migrant workers.

4.3.21 Anecdotal evidence[28] from Crossrail, which is currently under construction, suggests a roughly 50/50 split between UK and non-UK workers. This project began in 2011 and is due to be completed in 2018. An estimated 10,000 workers are required at peak, with the non-UK contingent comprised largely of Romanian, Polish and Spanish workers as well as a small proportion from Ireland. It was noted that the relatively large Spanish contingent may be a result of economic conditions in Spain in recent years and that this might not be representative of past or future construction projects in the UK.

[28] [RD25]

4.3.22 The Queensferry Crossing, which is currently under construction in Scotland, required an estimated workforce of 1,200 at peak. This project began in 2011 and is due to open in 2017. Anecdotal evidence[29] from the most recent stages of the construction programme has shown that around 46% of workers are from the local region, an additional 40% from elsewhere in Scotland, and 14% international and out-with Scotland. Of the international contingent, the countries of origin are mainly Spain, Portugal, Germany, Poland, Czech Republic and Romania.

4.3.23 Another useful comparator is an assessment of the offshore workforce in the UK's oil and gas sector [RD27]. Of the total 57,000 workers who worked offshore in 2012, 82.8% were of British nationality (50% from Scotland, 30% from England, and a small number from Wales and Northern Ireland). The nationalities of the remaining 17.2% were incredibly diverse; the top 10 representative countries are depicted in Table 4-1. This sector shares similarities with the construction sector in that the workforce is transient; therefore, the profile of workers provides an indication of the likely nationality of temporary workers in the UK, albeit there is a particularly high proportion of Norwegian and Dutch workers in the oil and gas sector which does not necessarily transfer across to the construction industry.

**Table 4-1 Nationality of workers in the UK continental shelf offshore workforce**

| Nationality | Proportion of non-British workers | Number of personnel |
|---|---|---|
| Norwegian | 15.0% | 1,473 |
| Dutch | 9.4% | 918 |
| American (USA) | 4.7% | 464 |
| Polish | 4.4% | 429 |
| Irish | 3.5% | 344 |
| Danish | 3.5% | 340 |
| French | 2.5% | 247 |
| Canadian | 2.3% | 230 |
| Lithuanian | 2.1% | 201 |
| German | 1.9% | 188 |
| Other | 50.6% | 4,956 |
| Total number of non-British employees | | 9,790 |

## 4.4 Workforce demand for construction phase of Wylfa Newydd Project

4.4.1 A range of workforce scenarios were developed to account for a number of scenarios based on differing assumptions concerning the numbers of workers required across different occupational groupings. Originally, the workforce

[29] [RD26]

profile for Target 2[30], the most likely "central or worst case scenario", was used for the worker source study analysis; this was based on a 54-month programme with an 18-month lag between the beginning of construction for each reactor. The peak workforce profile (arising in month 30) shown in Table 4-2 has been updated to reflect a lower level of workers[31] but maintains the Target 2 categories. Table 4-5 presents the workforce breakdown in different terms: Civil Engineering Operatives, Mechanical & Electrical (M&E) Engineering Operatives, Professional Staff and Security & Clerical. This is discussed further in section 4.6.

**Table 4-2 Target 2 – peak workforce profile**

| Worker type[32] | Number |
|---|---|
| M&E Labour | 1,419 |
| M&E Staff | 1,360 |
| Civil/Build Staff | 1,305 |
| Civils Labour | 2,763 |
| Hitachi-GE Nuclear Energy (HGNE) Office Staff & Commissioning | 560 |
| Security & Traffic Management | 817 |
| Site Support Staff | 326 |
| Total | 8,550 |

4.4.2 In order to provide a further breakdown by trade, the analysis provided in the HGNE Front-End Engineering Design document was overlaid onto the workforce profile. This assessment is a work in progress, so the figures attributed to each trade could vary, possibly significantly, as the project develops further. Please note that the sub-totals have been rounded throughout for the purpose of simplification. The most relevant SOC minor code[33] was then selected to map onto the trade categories as shown in Table 4-3.

**Table 4-3 Workforce demand by trade**

| Trade | Number of workers[34] | SOC minor code |
|---|---|---|
| **Civils** | | |
| Tunnellers | 90 | 531. Construction and Building Trades |
| Earthworks | 50 | 531. Construction and Building Trades |

[30] Targets with regards to the amount of workers and the division between the different categories of workers; these were estimated by Horizon.

[31] 8,550 (excluding Operational Staff of 450).

[32] Operational workers are omitted from the analysis (450).

[33] A common classification of occupational information. Within the context of the classification, jobs are classified in terms of their skill level and skill content.

[34] Figures are rounded to nearest 5 and therefore may not sum

| Trade | Number of workers[34] | SOC minor code |
|---|---|---|
| Plant & General Operatives | 720 | 814. Construction Operatives |
| Finishing Trades | 80 | 532. Building Finishing Trades |
| Metal Workers | 40 | 521. Metal Forming, Welding and Related Trades |
| Steel Erectors | 160 | 531. Construction and Building Trades |
| Concrete Operatives | 290 | 814. Construction Operatives |
| Scaffolders | 100 | 814. Construction Operatives |
| Embedded Item Fitters | 130 | 531. Construction and Building Trades |
| Carpenters | 560 | 531. Construction and Building Trades |
| Carpenters – Workshop | 90 | 531. Construction and Building Trades |
| Rebar Fixers | 690 | 531. Construction and Building Trades |
| Rebar Cut & Bend | 80 | 531. Construction and Building Trades |
| Sub-Total Civils | 3,070 | |
| **M&E** | | |
| Fitter | 110 | 522. Metal Machining, Fitting and Instrument Making Trades |
| Grade 3 Operative | 50 | 814. Construction Operatives |
| Electrician Advanced | 540 | 525. Skilled Metal, Electrical and Electronic Trades Supervisors |
| Equipment + Piping | 690 | 524. Electrical and Electronic Trades |
| Scaffolder | 310 | 814. Construction Operatives |
| Mechanical | 200 | 522. Metal Machining, Fitting and Instrument Making Trades |
| Welder | 680 | 521. Metal Forming, Welding and Related Trades |
| Sub-Total M&E | 2,580 | |
| **Professional Staff** | | |
| HGNE Office Staff | 350 | 212. Engineering Professionals |
| M&E Staff | 840 | 212. Engineering Professionals |
| Civils and Buildings Staff | 810 | 212. Engineering Professionals |
| Sub-Total Professional Staff | 2,000 | |
| **Site Services, Security and Clerical** | | |
| Security and Traffic Management | 640 | 924. Elementary Security Occupations |

| Trade | Number of workers[34] | SOC minor code |
|---|---|---|
| Site Support Staff | 260 | 543. Food Preparation and Hospitality Trades<br>923. Elementary Cleaning Occupations |
| Sub-Total Site Services, Security and Clerical | 900 | |
| Total | 8,550[35] | |

## 4.5 Potential supply of workforce for construction phase of Wylfa Newydd Project

4.5.1 Information has been gathered on the existing labour supply within and outside the UK, largely from the 2011 UK Census and the International Labour Organization (ILOSTAT)[RD28]. This has been used to inform the skills-matching exercise.

4.5.2 The construction sector in the UK had an annual turnover of £122bn in 2011, representing between 7% and 8% of the national gross domestic product [RD29]. It employs over 2.2 million people [RD29]. The list of SOC minor occupation codes identified as nuclear relevant is provided in the appendix (section 8). These data are available for England and Wales only, based on 2011 Census data.

4.5.3 The breakdown of employee jobs by nuclear-relevant SOC codes for Scotland, Wales and the eight English regions is also provided in the appendix (section 8). While 'occupation' data are reported by individuals in the Census, 'employee jobs' are reported by employers in the annual Business Register and Employment Survey. It is employee jobs that are used in the skills-matching exercise to identify where specific skills/trades might be sourced from, as it is more up to date and the data are broken down by region.

4.5.4 These data indicate that there is a large nuclear-relevant labour pool (>100,000 across England, Scotland and Wales) for most of the occupations, which have been matched to the workforce demand profile for the Wylfa Newydd Project in the appendix to this report. These are namely (by SOC code):

- 212. Engineering Professionals;
- 522. Metal machining, Fitting and Instrument Making Trades;
- 524. Electrical and Electronic Trades;
- 531. Construction and Building Trades;
- 543. Food Preparation and Hospitality Trades;
- 814. Construction Operatives;
- 923. Elementary Cleaning Occupations; and

[35] Total number of workers does not include Operations staff (450), which decreases the total from 9,000 to 8,550.

- 924. Elementary Security Occupations.

4.5.5 There is a smaller labour pool (<50,000) available for Metal Forming, Welding and Related Trades (SOC minor code 521) and (<10,000) for Skilled Metal, Electrical and Electronic Trades Supervisors (SOC minor code 525). There are, however, gaps against some of the minor codes due to data being unavailable or unreliable, suggesting the totals reported are an underestimation of available skills.

4.5.6 Table 4-4 shows the construction workforce as a percentage of the total number of people employed in each country. This could be used to identify which countries have an 'over supply' of construction labour and therefore might be more likely to supply workers to the Wylfa Newydd Project; however, the proportion of the construction workforce with nuclear-relevant skills is not known. These data show that the figures are broadly similar across the countries in Europe, with the construction workforce comprising around 6-7% of the total labour force. Latvia and Estonia have higher percentages (8% and 9% respectively); however, this alone is not a significant enough deviation to draw any conclusions around the proportion of workers likely to come from these Baltic States.

**Table 4-4 Country comparison of construction workforce as a percentage of total labour force[36]**

| Country | Total number of construction workers (thousands) | Construction as a percentage of total labour force |
|---|---|---|
| UK | 2,235 | 7% |
| Germany | 2,732 | 7% |
| Belgium | 325 | 7% |
| Spain | 993 | 6% |
| France | 1,698 | 7% |
| Ireland | 109 | 6% |
| Sweden | 316 | 7% |
| Poland | 1,186 | 7% |
| Latvia | 73 | 8% |
| Estonia | 59 | 9% |
| Bulgaria | 187 | 7% |
| Finland | 127 | 6% |
| Netherlands | 270 | 4% |

4.5.7 There are only six countries worldwide which have connected a Nuclear Power Station to the grid in the last five years. They are Russia, Argentina, China, India, Iran and Pakistan. This suggests that there is a skilled nuclear construction workforce in these countries that are still of working age; however, the majority are not from mainland Europe.

[36] Calculated from data from Ilostat database [RD28]

4.5.8 As of January 2016, there were 16 countries in which nuclear reactors, of various numbers, were under construction. China has by far the largest existing nuclear new build programme with 24 reactors under construction, followed by Russia (8), India (6) and the United States (5). There are a small number in Europe (one each in Finland, France, Slovakia and Belarus). This could indicate which countries may have a newly skilled nuclear construction workforce that might supply workers to the Wylfa Newydd Project. However, this depends on the degree to which their current construction programmes overlap with the Wylfa Newydd Project, as it is reasonable to assume that the majority of workers would meet the nuclear labour demand in their own countries before seeking work in the UK.

## 4.6 Skills matching and gap analysis

4.6.1 In order to derive the estimated split between the potential local, non-local (UK) and non-local (international) workforce, a series of steps were undertaken.

1. Apply the assumptions for possible local labour share within the DCCZ to each broad labour category as set out in sections 2.4 and 2.5 of Technical Appendix chapter C1-2 (Application Reference Number: 6.3.9).
2. Within each broad labour category, determine the likely local share for specific trades, taking account of known skills shortages in Wales as identified in the Nuclear Workforce Assessment (Nuclear Energy Skills Alliance, 2015).
3. Of the remaining non-local labour share, determine the likely proportion that could come from elsewhere in the UK, taking account of known skills shortages in the UK as a whole, as identified in the Nuclear Workforce Assessment [RD30].
4. Within the non-local (UK) share, determine the likely proportion that could come from England, Scotland and the rest of Wales using SOC data on the geographic distribution of the existing workforce.
5. Determine the likely countries of origin for the remaining non-local international contingent based on evidence from other large infrastructure projects along with knowledge of the Tier-1 contractors appointed to the project.

4.6.2 Each step and the results achieved are described in more detail below.

4.6.3 The first step was to review the results of sections 2.4 and 2.5 of Technical Appendix chapter C1-2 (Application Reference Number: 6.3.9), which derived the proportion of local workforce likely to be achieved for each broad category of labour as shown in the appendix. In Technical Appendix chapter C1-2 (Application Reference Number: 6.3.9) the proportion of local labour is 22% of 9,000 workers but as seen below in Table 4-5 it is 21%; this is because 450 operational workers are omitted from this analysis leading to 8,550 total workers.

**Table 4-5 Local labour share by category of occupation**

| Category | Combined sub-categories from Target 2 profile | Total | Assumptions for[37] possible local labour share in DCCZ[38] | Possible local labour (number) |
|---|---|---|---|---|
| Civils Operatives | Civils Labour, Building Labour | 3,070 | 22% | 675 |
| M&E Operatives | M&E Labour | 2,580 | 8% | 208 |
| Professional Staff | M&E Staff, Civil/Build Staff, HGNE Office Staff & Commissioning | 2,000 | 12% | 237 |
| Site Services, Security and Clerical | Security and Traffic Management, Site Support Staff | 900 | 77% | 689 |
| Total | | 8,550 | 21% | 1,809 |

4.6.4 The next step in the assessment was to break down each category by trade to look at the likely composition of the local labour share, based on known skills shortages identified in the Nuclear Workforce Assessment [RD30]. As shown in Table 4-6, the assumed potential overall proportion of local labour for Civils Operatives is 22% (as assessed in section 2.4 of the Technical Appendix chapter C1-2) (Application Reference Number: 6.3.9). However, there is a known lack of scaffolders and Civil Engineering Operatives in Wales, and therefore the 'Scaffolders' and 'Plant & General Operatives' trade categories were assigned a 0% and 5% local share, respectively.

The remaining non-local share was split between the UK and international workforce, taking account of skills shortages identified for certain trades across the UK, as identified in the Nuclear Workforce Assessment [RD30]. For example, there is a known lack of scaffolders and Civil Engineering Operatives not just in Wales, but in the UK as a whole, and therefore the 'Scaffolders' and 'Plant & General Operatives' trade categories were assigned a 20% and 25% non-local (UK) share, respectively.

**Table 4-6 Labour split by country of origin – Civils Operatives**

| Trade | Total worker demand at peak | Local (%) | Non-local – UK (%) | Non-local – international (%) |
|---|---|---|---|---|
| Tunnellers | 90 | 50 | 40 | 10 |
| Earthworks | 50 | 85 | 0 | 15 |
| Plant & General Operatives | 720 | 5 | 25 | 70 |
| Finishing Trades | 80 | 20 | 60 | 20 |
| Metal Workers | 40 | 50 | 40 | 10 |
| Steel Erectors | 160 | 50 | 40 | 10 |

[37] Section 2.4 of Technical appendix chapter C1-2

[38] Percentages in section 4.6 are rounded to nearest percent.

| Trade | Total worker demand at peak | Local (%) | Non-local – UK (%) | Non-local – international (%) |
|---|---|---|---|---|
| Concrete Operatives | 290 | 25 | 65 | 10 |
| Scaffolders | 100 | 0 | 20 | 80 |
| Embedded Item Fitters | 130 | 33 | 52 | 15 |
| Carpenters | 560 | 25 | 65 | 10 |
| Carpenters – Workshop | 90 | 25 | 65 | 10 |
| Rebar Fixers | 690 | 20 | 65 | 15 |
| Rebar Cut & Bend | 80 | 25 | 65 | 10 |
| Total | 3,070 | 22% (#675) | 50% (#1,535) | 28% (#860) |

4.6.5 A similar approach was taken for M&E Operatives, taking account of skills shortages in Wales and across the UK for specific trades, with the results presented in Table 4-7.

**Table 4-7 Labour split by country of origin – M&E Operatives**

| Trade | Total worker demand at peak | Local (%) | Non-local – UK (%) | Non-local – international (%) |
|---|---|---|---|---|
| Fitter | 110 | 10 | 70 | 20 |
| Grade 3 Operative | 50 | 5 | 40 | 55 |
| Electrician Advanced | 540 | 5 | 70 | 25 |
| Equipment & Piping | 690 | 5 | 60 | 35 |
| Scaffolder | 310 | 0 | 20 | 80 |
| Mechanical | 200 | 15 | 60 | 25 |
| Welder | 680 | 15 | 70 | 15 |
| Total | 2,580 | 8% (#210) | 60% (#1,550) | 32% (#820) |

4.6.6 The breakdown for Professional Staff is shown in Table 4-8. The same potential proportion of local split taken from section 2.4 in the Technical Appendix chapter C1-2 (Application Reference Number: 6.3.9) was applied across the sub-categories, as there is no identifiable evidence to justify a deviation. In deriving the split between the non-local workforce (UK and International), the vast majority of the non-local workforce (87%) is assumed to come from the UK; this is supported by the general size of the labour pool for Engineering Professionals (SOC code 212), which is approximately 363,000, that possess some degree of transferability to the nuclear sector. Information from contractors suggests that the remaining professional staff would come from Japan and America.

**Table 4-8 Labour split by country of origin – Professional Staff**

| Professional Staff | Total worker demand at peak | Local (%) | Non-local – UK (%) | Non-local – international (%) |
|---|---|---|---|---|
| HGNE Office Staff | 350 | 12 | 87 | 1 |
| M&E Staff | 840 | 12 | 87 | 1 |
| Civils and Buildings Staff | 810 | 12 | 87 | 1 |
| Total | 2,000 | 12% (#235) | 87% (#1,735) | 1% (#25) |

4.6.7 The breakdown for Support Staff is shown in Table 4.9. The same potential proportion of local split taken from the Technical Appendix chapter 1-2 (Application Reference Number: 6.3.9) section 2.3 was applied across the sub-categories. It is assumed that the remaining non-local contingent would all come from within the UK, given the size of the labour pool for general support staff in the UK and the fact that these roles are unlikely to require specialist skills.

**Table 4.9 Labour split by country of origin – Support Staff**

| Support Staff | Total worker demand at peak | Local (%) | Non-local – UK (%) | Non-local – international (%) |
|---|---|---|---|---|
| Security and Traffic Management | 640 | 76 | 24 | 0 |
| Site Support Staff | 260 | 76 | 24 | 0 |
| Total | 900 | 76% (#685) | 24% (#215) | 0% (#0) |

4.6.8 The next step was to derive a breakdown of the non-local UK workforce by country. The closest SOC minor code for each trade was selected, and the results of this grouping are shown in Table 4-10.

4.6.9 The proportion of demand for each trade expected to be met by non-local UK workers was then split according to the existing geographic distribution of jobs in England, Scotland and Wales. For example, as 10% of reported jobs in the Engineering Professionals category (SOC minor code 212) are located in Scotland, it is reasonable to assume that the same proportion of the non-local (UK) workforce demand would be met by workers from Scotland. Note the total for Wales represents those coming from outside the DCCZ and is additional to the local workforce identified in the above tables.

**Table 4-10 Non-local UK workforce by country**

| SOC minor code | Worker demand at peak – non-local – UK | England (%) | Scotland (%) | Wales (%) |
|---|---|---|---|---|
| 212.Engineering Professionals | 1,737 | 84 | 13 | 3 |
| 521. Metal Forming, Welding and Related Trades | 492 | 85 | 7 | 7 |

| SOC minor code | Worker demand at peak – non-local – UK | England (%) | Scotland (%) | Wales (%) |
|---|---|---|---|---|
| 522. Metal Machining, Fitting and Instrument Making Trades | 198 | 85 | 12 | 3 |
| 524. Electrical and Electronic Trades | 411 | 86 | 10 | 4 |
| 525. Skilled Metal, Electrical and Electronic Trades Supervisors | 378 | 86 | 10 | 4 |
| 531. Construction and Building Trades | 1,084 | 87 | 8 | 5 |
| 532. Building Finishing Trades | 47 | 0 | 100 | 0 |
| 543. Food Preparation and Hospitality Trades; and<br>923. Elementary Cleaning Occupations | 60 | 86 | 9 | 5 |
| 814. Construction Operatives | 473 | 86 | 9 | 6 |
| 924. Elementary Security Occupations | 152 | 85 | 11 | 4 |
| Total | 5,030 | 85% (#4,260) | 11% (#550) | 4% (#220) |

4.6.10 The final step was to determine the estimated breakdown by country for the non-local international labour force. Up to 120 staff are expected to come from the United States; a mixture of Professional, M&E Engineering and Civil Engineering staff could be expected to be recruited from the US by the joint Tier-1 contractor Bechtel. Similarly, it is assumed that the joint Tier-1 contractor JGC could be expected to recruit around 210 workers from Japan, these assumptions are based on information received by Bechtel. The remaining Civil and M&E Operatives are assumed to come primarily from Eastern Europe, including Poland, Romania, Bulgaria and the Czech Republic, as supported by previous examples of recent major infrastructure developments. A smaller contingent is expected from the Baltic States, Ireland and elsewhere in Europe. This breakdown is summarised in Table 4-11.

**Table 4-11 Summary of international workforce by country of origin**

| Non-local – international | Number | Proportion of total worker demand at peak (%) |
|---|---|---|
| Japan | 210 | 2 |
| United States | 120 | 1 |
| Eastern Europe | 550 | 6 |
| Ireland | 330 | 4 |
| Baltic States | 210 | 2 |
| Other Europe and Rest of World | 280 | 3 |
| Total | 1,705 | 19% |

## 4.7 Summary of workforce by country of origin

4.7.1 An overall summary of the estimated split between local, UK and international workforce is presented in Table 4-12. The analysis has confirmed that an approximate proportion of 21% of the workforce (22% when including operational workers) coming from the DCCZ appears challenging, but achievable with an effective Jobs and Skill Strategy in place. It is estimated that a further 59% of the total workforce would come from elsewhere in the UK and the remaining 20% from overseas.

**Table 4-12 Summary of estimated workforce split**

| Labour category | Total worker demand at peak[39] | Local | | Non-local – UK | | Non-local – international | |
|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % |
| Civils Operatives | 3,070 | 675 | 22% | 1,535 | 50% | 860 | 28% |
| M&E Operatives | 2,580 | 208 | 8% | 1,550 | 60% | 820 | 32% |
| Professional Staff | 2,000 | 237 | 12% | 1,735 | 87% | 25 | 1% |
| Support Staff | 900 | 689 | 77% | 210 | 23% | 0 | 0% |
| Total | 8,550 | 1,809 | 21% | 5,030 | 59% | 1,705 | 20% |

## 4.8 Conclusions

4.8.1 The worker source study set out to provide an indication of where the workforce required for the construction phase of the Wylfa Newydd Project may originate from. This is an important consideration, as the source of labour has implications for interactions between workers and the local communities within Anglesey, given the differences in demographic profile of Anglesey and the workers that would be recruited.

4.8.2 The study estimates that a substantial majority (79%) of the construction workforce would be sourced from outside the DCCZ. It is estimated that this is made up of approximately 60% from the rest of the UK the remainder (approximately 20%) from overseas. These workers would introduce diversity that does not currently exist on Anglesey. As shown in section 3.4[40], 96% of Anglesey residents were born in the UK; therefore, the introduction of workers of other nationalities could alter the demographic profile in some communities. These workers could need support to help them harmonise with their new surroundings. They could also benefit the community by introducing diversity to the area, through which people can learn about new cultures.

4.8.3 Multiple forms of mitigation (embedded, good practice and additional mitigation) that will serve to support on-going community cohesion consideration will be put in place; for example, linguistic training for all Horizon

[39] It should be noted that this analysis excludes 450 operational workers that could alter the proportion of Local, Non-Local – UK, and Non-Local – International slightly.

[40] Further information on ethnicity is provided in the appendix C1-1

employees, provision of Site Campus accommodation and associated facilities, and additional training to upskill the local workforce therefore increasing the ability to maximise local employment. In addition, the Workforce Management Strategy will define the vision of Horizon Nuclear Power to attract the right workforce resources to construct the Wylfa Newydd nuclear power plant and minimise impact of the construction workforce on the local community. See section 6 for further detail.

## 4.9 Limitations and uncertainty

4.9.1 The analysis presented above relies on the best available data and evidence. The results must be viewed in light of the following areas of uncertainty.

- The broad labour categories have been disaggregated by trade using indicative information supplied by Horizon Nuclear Power. This is subject to change as the construction programme is refined.
- There are limited data available on the actual local workforce share realised for other large nuclear and non-nuclear construction projects. There is even less information available on the countries of origin of the non-local workforce.
- In mapping the trade descriptions onto SOC minor codes, there is a degree of uncertainty as the categories are not identical.
- There is uncertainty in the use of data on existing employee jobs to infer the size and geographic distribution of the labour pool in the UK as there are gaps in the data. This has likely resulted in an underestimate of the total available labour in the UK and may skew the regional split within the UK workforce assumed for the project.
    - UK business register and employment survey (BRES) is sample based and therefore is susceptible to sampling variability and lower quality when looking at small geographical areas.
- The assumption that the proportion of the UK workforce coming from England, Scotland and Wales would match the proportion of existing jobs located in each region is not unrealistic; however, there are many other factors which may influence this split.
- Other market forces, such as the availability of alternative jobs, wages, recruitment choices made by the contractors and worker preferences, would ultimately influence the actual makeup of the workforce.

# 5 Community Survey

## 5.1 Introduction

5.1.1 A telephone survey of 509 randomly selected residents of Anglesey was carried out in order to assess community concerns and aspirations. It is necessary to gauge the opinion of those who do not seek to respond to consultations or other forms of communication during the planning stage, as their opinion is just as equally as valid as those who actively provide input into the consultation. This underlines the importance of this survey. The following sections outline the results.

## 5.2 Key points relevant to the Wylfa Newydd Project

5.2.1 In terms of community cohesion, this survey has proved useful in highlighting three things: a strong community spirit exists (see "Community" section of Table 5-1); there is general good will towards Horizon (see "Nuclear Power Station" section of Table 5-1) and the employees that would arrive with the Wylfa Newydd Project (see "Workers" section of Table 5-1); and there are some underlying reservations[41] from a significant proportion of the population surveyed that underlines the need for mitigation of negative impacts. Key messages include the following:

- Strong community spirit and identity:
  - resilient to change, both positive and negative; and
  - hard for non-locals to penetrate.
- Positive about the influx of workers into the area and their ability to "fit in" with local population:
  - some reservations indicate need for mitigation.
- High awareness and reasonable support of new power station and its implications:
  - employment;
  - safety;
  - energy security; and
  - impact on the environment.

5.2.2 These results highlight the need for appropriate communication with the community and mitigation of effects where they may arise. Further details of the survey and results can be found in Table 5-1 below with standalone report on the Community Survey also being made available as part of the Development Consent Order.

[41] For example, 47% of respondents were neutral or disagreed with statement that workers will behave themselves, implying that there is concern about disruption that could be caused by the introduction of workers to the area. This implies mitigation should be implemented in terms of prevention of aforementioned disruption. Details are shown in Table 5-1.

## 5.3 Implications for community cohesion

5.3.1 Community cohesion, as defined in section 1.3, can be interpreted as a vision of an integrated and cohesive society that is based on three foundations:

- people from different backgrounds having similar life opportunities;
- people knowing their rights and responsibilities; and
- people trusting one another and trusting local institutions to act fairly.

5.3.2 When interpreting the results of this survey with these foundations in mind, it is clear that the respondents are cautiously optimistic about the Wylfa Newydd Project, in terms of the positive and negative effects it may have upon their life opportunities, their responsibilities and their trust in others and institutions to act fairly. The results of this survey emphasises the different opportunities to enhance the potential positive effects of the Wylfa Newydd Project and mitigate possible negative effects. This effectively informs the strategies, such as Jobs and Skills Strategy, Welsh Language and Culture Mitigation Enhancement Strategy, Workers Accommodation Strategy and Supply Chain Charter, that are mentioned in section 6.

**Table 5-1 Summary of Community Survey and responses**

| Section | Question | Most common or highest scoring | Key point |
|---|---|---|---|
| Life on Anglesey | What do you like about life on Anglesey? | Beautiful scenery and landscape (54%) | Highlights the value placed on the environment by the local community. |
| | What do you dislike about life on Anglesey? | Nothing to dislike (39% [42] ) Unemployment (15%, highest scoring) Existing Power Station and pylons (2%) | Employment is an area that the Wylfa Newydd Project would have an impact. The landscape impacts of the Wylfa Newydd Power Station may not be poorly received. |
| Community | Do you identify with the local community? | Agree (85%) | This vast majority indicates a strong community identify. This may mean they are resilient to external pressures (changes to road networks) but vulnerable from internal pressures within the community (employment issues). |
| | Do you have friends, neighbours or family you see often? | Agree (95%) | This underlines a strong community spirit, which implies resilience to changes resulting from the Wylfa Newydd Project, Therefore mitigation should be implemented to lessen issues the Wylfa Newydd Project may cause that may hinder these relationships. |
| | Is the Welsh way of life | Agree (78%) Agree (91% for Welsh speakers) | This indicates a strong sense of the Welsh identity but also a substantial amount of variation between Welsh and non-Welsh |

[42] Unless stated otherwise, percentage refers to all respondents.

| Section | Question | Most common or highest scoring | Key point |
|---|---|---|---|
| | important to you? | Agree (55% for non-Welsh speakers) | speakers. The responses indicate that non-Welsh speakers still value the identity, but not as commonly. |
| | Does the place where you live mean a lot to you? | Agree (92%) | Strong attachment to place of living tends to indicate emotional attachment and, in turn, a lack of evidence-based decision making in relation to issues relating to their community. |
| Cohesion | How well do people from Anglesey get along? | Positive reply (81%) | The response indicates strong networks that would be resilient to change. This may be difficult for non-locals to penetrate. |
| Wylfa Newydd Power Station | Have you heard about the proposal for the Wylfa Newydd Power Station? | Yes (98%) | High level of awareness means that locals are engaged with the process to an extent and would not be surprised by works associated with the Wylfa Newydd Project. |
| | Do you or someone you know work at the Existing Power Station? | No (51%) | Despite such a close split of Yes/No, this still indicates a relatively high level of awareness of the present Nuclear Power Stations and its implications for the area, therefore a similar situation would result from another power station.<br>Unsurprisingly, the closer applicants were to the Existing Power Station, the higher the proportion of those with a connection. |
| Workers | Will local people be able to get along with construction workers? | Yes (69%) | Generally, a positive response was given, but there are signs of uncertainty which need to be noted/mitigated. |
| | Do you agree that workers would fit in better if they understood the local way of life? | Yes (78%) | This response highlights the importance of introducing some sort of localisation mitigation. |
| | Will construction workers behave well in the local area? | Yes (64%) | Local residents are not scared of the workers. Therefore, a relatively harmonious community integration can be expected. More “vulnerable” groups of respondents disagreed more. This highlights that those who we expect to feel threatened, are feeling so. Therefore, mitigation for the most vulnerable should be considered. |
| | Will the worker’s influence on the community make you | No (57%) | A positive answer, but enough reservation is shown to be concerning. This highlights again the need for mitigation to lessen negative impacts and alleviate concerns. |

| Section | Question | Most common or highest scoring | Key point |
|---|---|---|---|
| | identify with it less? | | |
| Nuclear power | Nuclear Power Stations: safe and reliable way of producing energy? | Yes (62%) | High engagement with nuclear power and an overall positive view of it. |
| | Will a new Nuclear Power Station present local people with opportunities? (jobs and investment) | Yes (83%) | Positive idea of the opportunities provided by Horizon. Expectations would need to be met. Opportunities for locals should be considered at all levels: design, mitigation, construction, operation and decommissioning. |
| | Do you support nuclear power on Anglesey? | Yes (71%) | Very positive again, though may be susceptible to decrease in positivity if they are adversely affected by nuclear power generation. People who lived in Cemaes were less positive (59% agree), which highlights that those who have lived near a Nuclear Power Station may be less positive about the operation. |
| | Will the new Power Station affect people's physical health? | Yes (45%) v No (22%)[43] | Wariness of the negative health impacts that a Nuclear Power Station presents. |
| | Will the new Power Station affect people's mental health? | Yes (47%) v No (24%) | - |
| | Positive or negative about Nuclear Power Stations? | Positive (68%) | Positive. |
| | Will the place you live mean less to you if the new Nuclear Power Station is built? | No (81%) | Reasonably high level of no indicates that for a substantial proportion of respondents, their emotional attachment to the area will be unaffected by the Wylfa Newydd Project. |

[43] Some percentages do not sum because "neither agree, nor disagree" is an option on the survey.

# 6 Key Conclusions

6.1.1 It is estimated that approximately 78% of the 9,000 peak workforce for the Wylfa Newydd Project would be non-home-based. The worker source study also demonstrates that the estimated 22% of workers being local to the area is achievable when coupled with an effective Job and Skills Strategy. Analysis presented in the worker source study approximates that a reasonable proportion of the construction workers could be foreign nationals given lack of supply for UK workers in certain disciplines that are required.

6.1.2 The Community Survey also highlighted that the people of Anglesey value their communities and traditions and are generally enthusiastic about the Wylfa Newydd Project and the opportunities it presents, although a significant amount have reservations about the potential issues that could arise with the arrival of workers.

6.1.3 A number of key community cohesion issues have been identified in the Project-wide socio-economic assessment, the HIA (Application Reference Number: 8.19), the WLIA (Application Reference Number: 8.21), and the EqIA (Application Reference Number: 8.22). These include:

- welsh language – potential impacts from non-Welsh-speaking workers moving in to the area;
- housing – risk of placing additional pressure on affordable housing in certain areas, or perception of this;
- services – placing increased pressure on local services, either through an increase in demand or a need to change the method of service delivery;
- employment – influx of relatively well-paid and skilled workers who have access to better opportunities than local residents;
- economy – opportunity for local businesses and development of working relationship with local communities could be missed unless adequate strategy is in place to increase awareness of the Wylfa Newydd Project; and
- community issues – the majority of the workforce would likely be male and temporarily based in the area – risk/perception of poor conduct.

6.1.4 Key measures that could be implemented in order to reduce the effects of these potential issues are shown in Table 6-1.

**Table 6-1 Proposed measures to reduce the potential for adverse effects on community cohesion**

| Issue | Measure | Objective |
|---|---|---|
| Welsh language | • Appointment of Welsh Language and Culture Coordinator<br>• Horizon would implement measures such as linguistic training to all staff, a Welsh language programme, mentoring for learners, and approving businesses who operate similar schemes. | • Allow some basic communication in Welsh.<br>• Encourage use of local businesses. |

| Issue | Measure | Objective |
|---|---|---|
| | • Further details are in the Welsh Language and Culture Mitigation Enhancement Strategy. | |
| Housing | • Embedded mitigation: the provision of the Site Campus and facilities within it during the construction of the Wylfa Newydd Project to house the majority of workers migrating to Anglesey.<br>• The provision of a Worker Accommodation Management Service as set out in the Workers' Accommodation Strategy. | • Reduce the potential impact on the local affordable housing supply.<br>• Reduce the potential for an influx of non-Welsh-speaking workers into a largely Welsh-speaking community.<br>• Preserving community cohesion by mitigating potential negative effects, therefore contributing to maintaining good relations between the Wylfa Newydd Project and local communities. |
| Access to services | • Embedded mitigation: the provision of Site Campus and facilities within it during the construction of the Wylfa Newydd Project to house the majority of workers migrating to Anglesey, therefore reducing the impact on local communities in terms of public service provision, including health service provision.<br>• Providing appropriate provision for medical health, occupation health and emergency services.<br>• Monitoring of workers use of public services. | • Reduce the adverse effects on the services.<br>• Ensuring that local residents have equal access to provision.<br>• Ensures that adverse effects on local populations' access to health services, and in turn health, is monitored, identified and addressed via agreement between Wylfa Newydd and public services stakeholders (health service and emergency services). |
| Employment opportunities for local residents | • Good practice mitigation: implementation of a Jobs and Skills Strategy in order to enhance the employment opportunities for local residents. During the operational phase of the Wylfa Newydd Project, the Jobs and Skills Strategy would continue to be implemented.<br>• Additional mitigation: Wylfa Newydd Employment and Skills Service, which would provide additional training to meet needs identified for the Wylfa Newydd Project. The Employment and Skills Service would also aim to offset potential effects of labour churn that existing local business may encounter by backfilling vacant posts to support businesses whose workers have moved on to the Wylfa Newydd Project. | • Provide opportunities for local residents to gain employment on the Wylfa Newydd Project.<br>• Ensuring that local residents feel they have equal access to employment opportunities.<br>• Lessen effects of churn on local business. |
| Business opportunities for local enterprises | • Good practice mitigation: Supply Chain Charter and Action Plan that aims to present opportunities for local | • Present opportunities for local business to benefit from the Wylfa Newydd Project. This could foster a |

| Issue | Measure | Objective |
|---|---|---|
| | businesses to be involved with the project. During the operational phase of the Wylfa Newydd Project, the Supply Chain Charter will continue. | positive economic and social relationship between communities and the Wylfa Newydd Project. |
| Community issues | • Implementation of a Code of Conduct, ensure sufficient resources available for local providers to deal with potential issues.<br>• Community Liaison Office – Horizon would employ a Community Liaison Officer and provide a 24-hour hotline to allow members of the public to raise any concerns.<br>• Community Liaison Group – Horizon would also appoint a Community Liaison Group that would consist of a group of local residents from the immediate local communities, businesses and representatives of local groups. This is discussed further in the EqIA. | • Reduce the risk or perception of poor behaviour by a predominantly male workforce.<br>• The purpose of the Community Liaison Group is to exchange information and dialogue between Horizon and the local community during construction. |
| Workforce Management Strategy | • The Workforce Management Strategy defines the vision of Horizon Nuclear Power to attract the right workforce resources to construct the Wylfa Newydd nuclear power plant and minimise impact of the large construction workforce team on the local community. | • The Strategy outlines, at a high level, a range of strategies and associated arrangements that will allow effective management and control of the construction workforce and which will help deliver the project safely, to budget and on schedule whilst taking into account local community needs. |

# 7 References


| ID | Reference |
|---|---|
| RD1 | Department of Energy and Climate Change, 2011a. *Overarching National Policy Statement for Energy (EN-1)*. [Online]. [Accessed: March 2017] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf. |
| RD2 | Department of Energy and Climate Change, 2011b. *National Policy Statement for Nuclear Power Generation (EN-6)*. [Online] [Accessed: March 2017] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47859/2009-nps-for-nuclear-volumeI.pdf. |
| RD3 | UK Government, 2010. Equality Act 2010. [Online]. [Accessed: June 2017]. Available from: http://www.legislation.gov.uk/ukpga/2010/15/contents |
| RD4 | Welsh Government ,*2014. Community Cohesion National Delivery Plan 2014-2016,* [Online], [Accessed: June 2017]. Available *from:* http://gov.wales/docs/dsjlg/publications/comm/140603-community-cohesion-national-delivery-planv2-en.pdf |
| RD5 | IFF Research/University of Warwick, (2005). *Construction Worker Mobility and Skills in the UK*. [Online]. [Accessed: October 2016]. Available from: http://www.cskills.org/uploads/mobskillsuk2005_tcm17-17744.pdf. |
| RD6 | Welsh Government ,2015. *Welsh Index of Multiple Deprivation (WIMD) 2014*, [Online], [Accessed: July 2017]. Available from: http://gov.wales/docs/statistics/2015/150812-wimd-2014-revised-en.pdf |
| RD7 | Nomis, 2013. *2011 Census Data for England and Wales*. [Online]. [Accessed: October 2016]. Available from: https://www.Nomisweb.co.uk/census/2011. |
| RD8 | StatsWales (2016). Migration between Wales and the rest of the UK by local authority, flow and period of change. [Online]. [Accessed October 2016]. Available from: https://statswales.gov.wales/Catalogue/Population-and-Migration/Migration/Internal/migrationbetweenwalesandrestofuk-by-localauthority-flow-periodofchange |
| RD9 | Nomis, 2003. *2001 Census Data for England and Wales*. [Online]. [Accessed: October 2016]. Available from: https://www.Nomisweb.co.uk/census/2001. |
| RD10 | Office for National Statistics (ONS), 2016. *Annual Survey of Hours and Earnings. 2016 Provisional Results*. [Online]. [Accessed: January 2017]. Available from: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2016provisionalresults |
| RD11 | Construction Skills Network, 2012. New Nuclear Build Employment Scenarios. [Online]. [Accessed: April 2016]. Available from: https://www.citb.co.uk/documents/research/nuclear_new_build_employment_scenarios_report_web_tcm17-27989.pdf. |
| RD12 | Department for Work and Pensions, 2017. Nino registrations to adult overseas nationals entering the UK, [Online]. [Accessed: June 2017] Available from: https://stat-xplore.dwp.gov.uk/webapi/jsf/dataCatalogueExplorer.xhtml |
| RD13 | Wales Migration Partnership, 2014. Migration and Community Cohesion in Wales. [Online]. [Accessed: February 2017]. Available from: http://www.wmp.org.uk/documents/wsmp/News%20and%20Events/Migration%20Briefings/Migration%20and%20Community%20Cohesion%20English%20Final%205th%20Aug.pdf. |
| RD14 | University of Westminster, 2011. Building workers stories. It was a new world: Building Sizewell A nuclear power station. |
| RD15 | Personal Communication, Horizon Nuclear Power, local stakeholder manager, 2016. |

| ID | Reference |
|---|---|
| RD16 | EDF Energy, 2011. Hinkley Point C Environmental Statement Vol 2. |
| RD17 | OL 3 Nuclear Power Plant (n.d.). [Online]. [Accessed 14 Jan 2016]. Available from: http://www.eurodetachement-travail.eu/datas/files/EUR/OL3_power_plant_finland |
| RD18 | Areva, 2016. Olkiluoto 3. [Online]. [Accessed: Jan 2016]. Available from:http://www.areva.com/EN/operations-2389/finland-olkiluoto-3.html |
| RD19 | Westinghouse, 2017. Nuclear energy jobs. [Online]. [Accessed: December 2016]. Available from: http://www.westinghousenuclear.com/Why-Nuclear/Jobs |
| RD20 | Personal Communication, Prof. John Glasson .2016. |
| RD21 | Parsons Brinckerhoff, 2014. The Progress Power (Gas Fired Power Station) Order – 6.1 Environmental Statement. Progress Power. [Online]. [Accessed: 14 January 2016]. Available from: https://infrastructure.planninginspectorate.gov.uk/document/2393582 |
| RD22 | The Construction Index, 2016. 4 in 10 Olympic construction jobs went to foreign workers. [Online]. [Accessed 12 Jan 2016]. Available from: http://www.theconstructionindex.co.uk/news/view/4-in-10-olympic-construction-jobs-went-to-foreign-workers |
| RD23 | Olympic Delivery Authority, 2011. Job, Skills, Futures – Employment and Skills update. |
| RD24 | Agtaş, Ö. B., & Sauviat, L., 2010. The Case of the London Olympics from a Migration Aspect. Global Labour University. [Online] [Accessed: December 2016]. Available: http://www.global-labour-university.org/fileadmin/Summer_School_2014/luciole-oezge-glu-publication-construction.pdf |
| RD25 | Jacobs, Construction Manager. pers. comm., .2016. |
| RD26 | Jacobs, Health and Safety Manager, pers. comm., .2016. |
| RD27 | Oil & Gas UK, 2013. UK Continental Shelf Offshore Workforce Demographics Report 2013. [Online]. [Accessed: Jan 2016]. Available from: http://www.slideshare.net/TomHeathMIRP/uk-continental-shelp-offshore-workforce-demographics-report-2013 |
| RD28 | ILOSTAT, 2016. [Online]. [Accessed: December 2016]. Available from: http://www.ilo.org/global/lang--en/index.htm |
| RD29 | Office for National Statistics (ONS), 2011. A better deal for public building, 2012. [online]. [Accessed: Jan 2016]. Available from: http://cic.org.uk/admin/resources/appg-for-ebe-report-.pdf |
| RD30 | Nuclear Energy Skills Alliance, 2015. Nuclear Workforce Assessment 2015. [Online] [Accessed: 5 January 2016] Available from: https://www.nsan.co.uk/system/files/furtherinfo/Nuclear%20Workforce%20Assessment%202015_R1.pdf. |

# 8 Appendix – Data Tables

**Table 8-1 Nuclear-relevant job descriptions using Standard Occupational Classification**

| SOC minor code | SOC sub-minor code |
|---|---|
| 116.Managers and directors in transport and logistics | 1161 Managers and directors in transport and distribution<br>1162 Managers and directors in storage and warehousing |
| 117.Senior officers in protective services | 1171 Officers in armed forces<br>1172 Senior police officers<br>1173 Senior officers in fire, ambulance, prison and related services |
| 212.Engineering professionals | 2121 Civil engineers<br>2122 Mechanical engineers<br>2123 Electrical engineers<br>2124 Electronics engineers<br>2126 Design and development engineers<br>2127 Production and process engineers<br>2129 Engineering professionals n.e.c.4 |
| 213.Information technology and telecommunications professionals | 2133 IT specialist managers<br>2134 IT project and programme managers<br>2135 IT business analysts, architects and systems designers<br>2136 Programmers and software development professionals<br>2137 Web design and development professionals<br>2139 Information technology and telecommunications professionals |
| 214.Conservation and environment professionals | 2141 Conservation professionals<br>2142 Environment professionals |
| 243.Architects, town planners and surveyors | 2431 Architects<br>2432 Town planning officers<br>2433 Quantity surveyors<br>2434 Chartered surveyors<br>2435 Chartered architectural technologists<br>2436 Construction project managers and related professionals |
| 246.Quality and regulatory professionals | 2461 Quality control and planning engineers<br>2462 Quality assurance and regulatory professionals<br>2463 Environmental health professionals |
| 311.Science, engineering and production technicians | 3111 Laboratory technicians<br>3112 Electrical and electronics technicians<br>3113 Engineering technicians<br>3114 Building and civil engineering technicians<br>3115 Quality assurance technicians<br>3116 Planning, process and production technicians |

| SOC minor code | SOC sub-minor code |
|---|---|
| | 3119 Science, engineering and production technicians n.e.c.4 |
| 312.Draughtspersons and related architectural technicians | 3121 Architectural and town planning technicians<br>3122 Draughtspersons |
| 313.Information technology technicians | 3131 IT operations technicians<br>3132 IT user support technicians |
| 331.Protective service occupations | 3311 NCOs and other ranks<br>3312 Police officers (sergeant and below)<br>3313 Fire service officers (watch manager and below)<br>3314 Prison service officers (below principal officer)<br>3315 Police community support officers<br>3319 Protective service associate professionals n.e.c.4 |
| 342.Design occupations | 3421 Graphic designers<br>3422 Product, clothing and related designers |
| 351.Transport associate professionals | 3511 Air traffic controllers<br>3512 Aircraft pilots and flight engineers<br>3513 Ship and hovercraft officers |
| 353.Business, finance and related associate professionals | 3531 Estimators, valuers and assessors<br>3532 Brokers<br>3533 Insurance underwriters<br>3534 Finance and investment analysts and advisers<br>3535 Taxation experts<br>3536 Importers and exporters<br>3537 Financial and accounting technicians<br>3538 Financial accounts managers<br>3539 Business and related associate professionals n.e.c.4 |
| 355.Conservation/environmental associate professionals | 3550 Conservation and environmental associate professionals |
| 511.Agricultural and related trades | 5111 Farmers<br>5112 Horticultural trades<br>5113 Gardeners and landscape gardeners<br>5114 Groundsmen and greenkeepers<br>5119 Agricultural and fishing trades n.e.c.4 |
| 521.Metal forming, welding and related trades | 5211 Smiths and forge workers<br>5212 Moulders, core makers and die casters<br>5213 Sheet metal workers<br>5214 Metal plate workers, and riveters<br>5215 Welding trades<br>5216 Pipe fitters |
| 522.Metal machining, fitting and instrument making | 5221 Metal machining setters and setter-operators<br>5222 Tool makers, tool fitters and markers-out<br>5223 Metal working production and maintenance fitters<br>5224 Precision instrument makers and repairers |

| SOC minor code | SOC sub-minor code |
|---|---|
| | 5225 Air-conditioning and refrigeration engineers |
| 523.Vehicle trades | 5231 Vehicle technicians, mechanics and electricians<br>5232 Vehicle body builders and repairers<br>5234 Vehicle paint technicians<br>5235 Aircraft maintenance and related trades<br>5236 Boat and ship builders and repairers<br>5237 Rail and rolling stock builders and repairers |
| 524.Electrical and electronic trades | 5241 Electricians and electrical fitters<br>5242 Telecommunications engineers<br>5244 TV, video and audio engineers<br>5245 IT engineers<br>5249 Electrical and electronic trades |
| 525.Skilled metal, electrical and electronic trades | 5250 Skilled metal, electrical and electronic trades supervisors |
| 531.Construction and building trades | 5311 Steel erectors<br>5312 Bricklayers and masons<br>5313 Roofers, roof tilers and slaters<br>5314 Plumbers and heating and ventilating engineers<br>5315 Carpenters and joiners<br>5316 Glaziers, window fabricators and fitters<br>5319 Construction and building trades |
| 532.Building finishing trades | 5321 Plasterers<br>5322 Floorers and wall tilers<br>5323 Painters and decorators |
| 533.Construction and building trades supervisors | 5330 Construction and building trades supervisors |
| 543.Food preparation and hospitality trades | 5431 Butchers<br>5432 Bakers and flour confectioners<br>5433 Fishmongers and poultry dressers<br>5434 Chefs<br>5435 Cooks<br>5436 Catering and bar managers |
| 544.Other skilled trades | 5441 Glass and ceramics makers, decorators and finishers<br>5442 Furniture makers and other craft woodworkers<br>5443 Florists<br>5449 Other skilled trades |
| 623.Housekeeping and related services | 6231 Housekeepers and related occupations<br>6232 Caretakers |
| 624.Cleaning/housekeeping managers/supervisors | 6240 Cleaning and housekeeping managers and supervisors |
| 814.Construction operatives | 8141 Scaffolders, stagers and riggers<br>8142 Road construction operatives<br>8143 Rail construction and maintenance operatives<br>8149 Construction operatives |

| SOC minor code | SOC sub-minor code |
|---|---|
| 821.Road transport drivers | 8211 Large goods vehicle drivers<br>8212 Van drivers<br>8213 Bus and coach drivers<br>8214 Taxi and cab drivers and chauffeurs<br>8215 Driving instructors |
| 822.Mobile machine drivers and operatives | 8221 Crane drivers<br>8222 Fork-lift truck drivers<br>8223 Agricultural machinery drivers<br>8229 Mobile machine drivers and operatives |
| 823.Other drivers and transport operatives | 8231 Train and tram drivers<br>8232 Marine and waterways transport operatives<br>8233 Air transport operatives<br>8234 Rail transport operatives<br>8239 Other drivers and transport operatives |
| 912.Elementary construction occupations | 9120 Elementary construction occupations |
| 923.Elementary cleaning occupations | 9231 Window cleaners<br>9232 Street cleaners<br>9233 Cleaners and domestics<br>9234 Launderers, dry cleaners and pressers<br>9235 Refuse and salvage occupations<br>9236 Vehicle valets and cleaners<br>9239 Elementary cleaning occupations |
| 924.Elementary security occupations | 9241 Security guards and related occupations<br>9242 Parking and civil enforcement occupations<br>9244 School midday and crossing patrol occupations<br>9249 Elementary security occupations n.e.c.4 |

**Table 8-2 Number of employees by nuclear-relevant minor groups (SOC) in England and Wales 2011[44]**

| Minor group | England | Wales |
|---|---|---|
| 116.Managers and Directors in Transport and Logistics | 134,271 | 5,475 |
| 117. Senior Officers in Protective Services | 51,982 | 2,186 |
| 212. Engineering Professionals | 335,725 | 16,939 |
| 213. Information Technology and Telecommunications Professionals | 559,885 | 16,263 |
| 214. Conservation and Environment Professionals | 25,891 | 2,305 |
| 243. Architects, Town Planners and Surveyors | 198,743 | 8,670 |
| 246. Quality and Regulatory Professionals | 68,343 | 3,767 |
| 311. Science, Engineering and Production Technicians | 208,116 | 13,748 |
| 312. Draughtspersons and Related Architectural Technicians | 41,786 | 1,680 |
| 313. Information Technology Technicians | 154,661 | 5,910 |
| 331. Protective Service Occupations | 374,327 | 19,757 |
| 342. Design Occupations | 120,587 | 3,648 |
| 351. Transport Associate Professionals | 26,110 | 1,176 |
| 353. Business, Finance and Related Associate Professionals | 501,472 | 19,296 |
| 355. Conservation and Environmental associate professionals | 5,860 | 542 |
| 511. Agricultural and Related Trades | 270,517 | 27,468 |
| 521. Metal Forming, Welding and Related Trades | 91,305 | 6,263 |
| 522. Metal Machining, Fitting and Instrument Making Trades | 263,400 | 16,436 |
| 523. Vehicle Trades | 249,498 | 16,903 |
| 524. Electrical and Electronic Trades | 343,623 | 19,279 |
| 525. Skilled Metal, Electrical and Electronic Trades Supervisors | 40,982 | 2,844 |
| 531. Construction and Building Trades | 742,018 | 45,341 |
| 532. Building Finishing Trades | 199,417 | 11,420 |
| 533. Construction and Building Trades Supervisors | 35,275 | 2,553 |
| 543. Food Preparation and Hospitality Trades | 429,719 | 26,332 |
| 544. Other Skilled Trades | 87,598 | 4,270 |
| 623. Housekeeping and Related Services | 119,610 | 6,389 |
| 624. Cleaning and Housekeeping Managers and Supervisors | 54,894 | 3,011 |
| 814. Construction Operatives | 154,615 | 10,193 |

[44] Nomis – QS606EW – Occupation (Minor Groups) 2011

| Minor group | England | Wales |
|---|---|---|
| 821. Road Transport Drivers | 781,459 | 40,447 |
| 822. Mobile Machine Drivers and Operatives | 112,225 | 8,730 |
| 823. Other Drivers and Transport Operatives | 67,625 | 3,444 |
| 912. Elementary Construction Occupations | 127,074 | 9,265 |
| 923. Elementary Cleaning Occupations | 659,521 | 36,579 |
| 924. Elementary Security Occupations | 284,804 | 13,876 |

**Table 8-3 Number of jobs per occupation minor group for England, Scotland and Wales 2015 (thousand)[45]**

| Minor group | England | Scotland | Wales |
|---|---|---|---|
| 116. Managers and Directors in Transport and Logistics | 156 | 12 | 7 |
| 117. Senior Officers in Protective Services | 5 | x | x |
| 212. Engineering Professionals | 315 | 35 | 13 |
| 213. Information Technology and Telecommunications Professionals | 535 | 38 | 15 |
| 214. Conservation and Environment Professionals | 14 | 6 | x |
| 243. Architects, Town Planners and Surveyors | 124 | 14 | x |
| 246. Quality and Regulatory Professionals | 99 | 8 | 6 |
| 311. Science, Engineering and Production Technicians | 287 | 35 | 18 |
| 312. Draughtspersons and Related Architectural Technicians | 26 | x | x |
| 313. Information Technology Technicians | 207 | 20 | 9 |
| 331. Protective Service Occupations | 309 | 39 | 16 |
| 342. Design Occupations | 51 | x | x |
| 351. Transport Associate Professionals | 0 | x | x |
| 353.Business, Finance and Related Associate Professionals | 450 | 38 | 16 |
| 355.Conservation and Environmental associate professionals | 0 | x | x |
| 511. Agricultural and Related Trades | 85 | 14 | x |
| 521. Metal Forming, Welding and Related Trades | 50 | 7 | x |
| 522. Metal Machining, Fitting and Instrument Making Trades | 357 | 31 | 21 |
| 523. Vehicle Trades | 144 | 14 | 12 |
| 524. Electrical and Electronic Trades | 280 | 32 | 12 |

[45] ONS Table 15.1a Weekly Pay – Gross (£) – For all employee jobs: UK, 2015

| Minor group | England | Scotland | Wales |
|---|---|---|---|
| 525. Skilled Metal, Electrical and Electronic Trades Supervisors | 7 | x | x |
| 531. Construction and Building Trades | 181 | 26 | 12 |
| 532. Building Finishing Trades | 0 | 7 | x |
| 533. Construction and Building Trades Supervisors | 6 | x | x |
| 543. Food Preparation and Hospitality Trades | 342 | 38 | 20 |
| 544. Other Skilled Trades | 0 | x | x |
| 623. Housekeeping and Related Services | 83 | 12 | 4 |
| 624. Cleaning and Housekeeping Managers and Supervisors | 32 | 6 | x |
| 814. Construction Operatives | 113 | 13 | 10 |
| 821. Road Transport Drivers | 538 | 52 | 32 |
| 822. Mobile Machine Drivers and Operatives | 60 | 9 | 5 |
| 823. Other Drivers and Transport Operatives | 40 | 6 | x |
| 912. Elementary Construction Occupations | 40 | 6 | 4 |
| 923. Elementary Cleaning Occupations | 568 | 59 | 31 |
| 924. Elementary Security Occupations | 223 | 14 | 10 |

**x – data are unreliable*

**Table 8-4 Country comparison of construction workforce as a percentage of total labour force[46]**

| Country | Total number of construction workers (thousands) | Construction as percent of total labour force |
|---|---|---|
| UK | 2,235 | 7% |
| Germany | 2,732 | 7% |
| Belgium | 325 | 7% |
| Spain | 993 | 6% |
| France | 1,698 | 7% |
| Ireland | 109 | 6% |
| Sweden | 316 | 7% |
| Poland | 1,186 | 7% |
| Latvia | 73 | 8% |
| Estonia | 59 | 9% |

[46] Calculated from data from Ilostat database [online]. Available from: http://www.ilo.org/global/lang--en/index.htm [Accessed 5th Jan 2016].

| Country | Total number of construction workers (thousands) | Construction as percent of total labour force |
|---|---|---|
| Bulgaria | 187 | 7% |
| Finland | 127 | 6% |
| Netherlands | 270 | 4% |

**Table 8-5 Date of most recent nuclear power plants constructed**

| Country | Last grid connection |
|---|---|
| **Europe** | |
| Armenia | 1980 |
| Belgium | 1985 |
| Bulgaria | 1991 |
| Czech Republic | 2002 |
| Finland | 1980 |
| France | 1999 |
| Germany | 1989 |
| Hungary | 1987 |
| Netherlands | 1973 |
| Romania | 2007 |
| Russia | 2015 |
| Slovakia | 1999 |
| Slovenia | 1981 |
| Spain | 1988 |
| Sweden | 1985 |
| Switzerland | 1984 |
| Ukraine | 2004 |
| United Kingdom | 1989 |
| **Rest of the World** | |
| Argentina | 2014 |
| Brazil | 2000 |
| Canada | 1993 |
| China | 2015 |
| India | 2013 |
| Iran | 2011 |
| Japan | 2009 |
| Republic of Korea | 2015 |
| Mexico | 1994 |
| Pakistan | 2011 |
| South Africa | 1985 |
| Taiwan | 1985 |
| United States of America | 1996 |

**Table 8-6 Number of reactors in operation, 2016**

| Country | Number of reactors in operation |
|---|---|
| United States of America | 99 |
| France | 58 |

| Country | Number of reactors in operation |
|---|---|
| Japan | 43 |
| Russia | 35 |
| China | 31 |
| Republic of Korea | 24 |
| India | 21 |
| Canada | 19 |
| Ukraine | 15 |
| United Kingdom | 15 |
| Sweden | 10 |
| Germany | 8 |
| Belgium | 7 |
| Spain | 7 |
| Czech Republic | 6 |
| Taiwan | 6 |
| Switzerland | 5 |
| Finland | 4 |
| Hungary | 4 |
| Slovakia | 4 |
| Argentina | 3 |
| Pakistan | 3 |
| Brazil | 2 |
| Bulgaria | 2 |
| Mexico | 2 |
| Romania | 2 |
| South Africa | 2 |
| Armenia | 1 |
| Iran | 1 |
| Netherlands | 1 |
| Slovenia | 1 |
| Total | 441 |

**Table 8-7 Number of reactors under construction, 2016**

| Country | Number of reactors under construction |
|---|---|
| China | 24 |
| Russia | 8 |
| India | 6 |
| United States of America | 5 |
| Republic of Korea | 4 |
| United Arab Emirates | 4 |
| Belarus | 2 |
| Japan | 2 |
| Pakistan | 2 |
| Slovakia | 2 |
| Taiwan | 2 |
| Ukraine | 2 |
| Argentina | 1 |
| Brazil | 1 |
| Finland | 1 |
| France | 1 |
| Total | 67 |