Pembrokeshire

Demographic Forecasts

July 2018

edge analytics

Leeds Innovation Centre | 103 Clarendon Road | Leeds | LS2 9DF

0113 384 6087 | www.edgeanalytics.co.uk

Acknowledgements

Demographic statistics used in this report have been derived from data from the Office for National Statistics licensed under the Open Government Licence v.3.0.

Executive Summary

E1. In 2013, Pembrokeshire County Council (PCC) adopted its Local Development Plan (LDP) which outlined a housing growth target of +5,724 (572 pa) over the 2011–2021 plan period.

E2. Pembrokeshire County Council commissioned Edge Analytics to provide a range of demographic forecasts and analysis to inform the emerging Local Development Plan (LDP2). The LDP2 will set out the development framework for the area of Pembrokeshire excluding the National Park (referred to in this report as Pembrokeshire-Out) up to 2033. As part of this, it will set out a housing requirement for the plan period. The demographic forecasts included in this document will be used to inform discussions with stakeholders around the strategic options for the housing requirement.

E3. The analysis presented in this report has considered the latest mid-year population estimates and components of change to 2016, together with the latest official population and household projections, published by the Welsh Government (WG). The 2014-based population projection has been presented (rebased to take account of the latest MYEs), alongside three demographic scenarios based on variant migration histories and assumptions.

E4. In addition, dwelling-led scenarios have been developed to consider the potential population and migration impact of dwelling growth targets based on the adopted LDP target, historical 5-year and 10-year housing completions.

E5. Over the 2001–2016 historical period the population of Pembrokeshire-Out grew by 11.7%, with slower growth evidenced since 2008. Population growth in Pembrokeshire-Out has been driven by net migration into the area, with natural change (the balance between births and deaths) having a small but changing impact on growth. Whilst net migration has remained positive throughout the historical period, notably lower net in-migration has been recorded since 2008.

E6. With an Old Age Dependency Ratio (OAD) of 40% in 2016, Pembrokeshire-Out recorded a more youthful population age profile than both Pembrokeshire Coast National Park (PCNP) (53%) and Pembrokeshire Unitary Authority (42%), however older than Wales in total (32%).

E7. The latest WG 2014-based population projections estimate an increase of 3% over the 2017–2033 plan period; driven by annual net in-migration to the area, however lower than evidenced

historically. Natural change is estimated to have a small but increasingly negative impact on population change over the projection period, reflective of population ageing.

E8. The WG 2014-based household projections estimate an increase of +2,918 over the 2017–2033 plan period, with the greatest increase expected in the 1 person and 2 person (no children) categories. Household growth under the WG 2014-based projections is notably lower than the 2008-based projections, driven by lower population growth household formation.

E9. Under the demographic trend scenarios, population growth is estimated to range from 8.2% to 10.3% (**PG10yr** and **PG Long Term** respectively). This is higher than that estimated by the WG 2014-based projection, driven by larger net in-migration flows to Pembrokeshire-Out. The importance of net migration as a key component of population growth is demonstrated under the **Net Nil** scenario, in which a balanced migration flow results in population decline of -3.5% over the plan period.

E10. The population growth estimated under the demographic scenarios (excluding the hypothetical **Net Nil** scenario) would support an average annual dwelling growth range of +196 under the **WG 2014 (Rebased)** scenario to +408 under the **PG Long Term** scenario. Applying the WG 2008-based household assumptions would increase this range to 314–552 dpa.

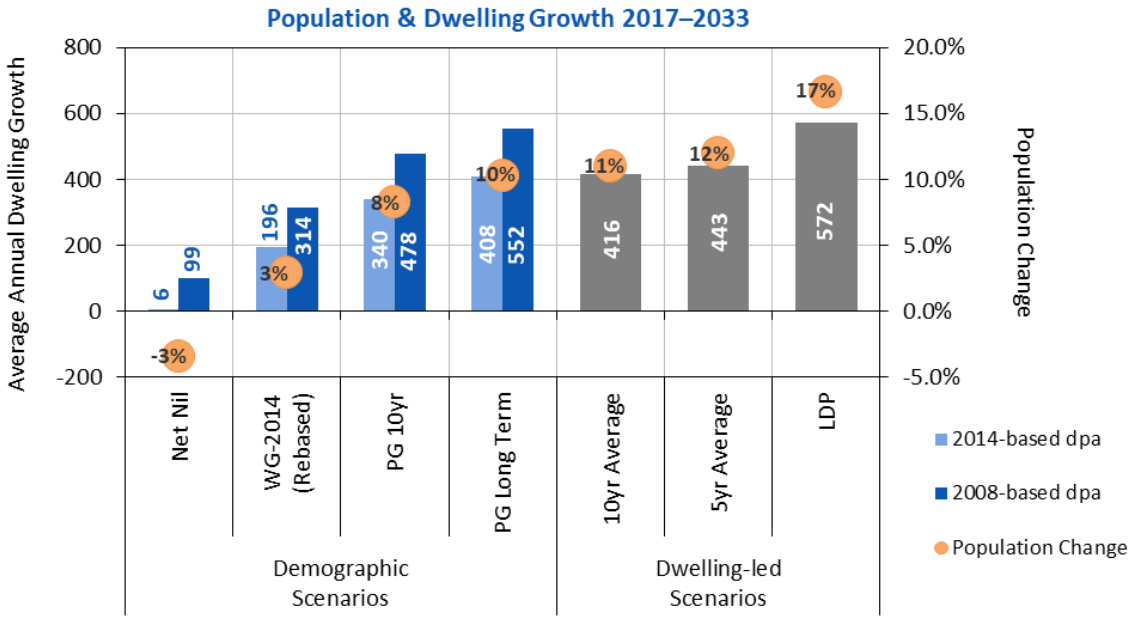


Figure 1: Pembrokeshire-Out population change and average annual dwelling growth under the demographic and dwelling-led scenarios (2017–2033)

E11. Under the dwelling-led scenarios, the annual dwelling growth targets ranging from 416–572 dpa, indicate a population growth range of 11.0% to 16.6% (**Dwelling-led 5yr Average** and **Dwelling-led LDP** respectively).

E12. Whilst an increase in the older (65+) age groups is estimated under all scenarios, larger net migration flows estimated under the dwelling-led scenarios, results in the maintenance of a more youthful population profile.

Glossary

	Abbreviation	Definition
Communal Establishments	-	Communal establishments include prisons, residential care homes and student halls of residence.
Commuting Ratio	-	The balance between the number of resident workers in the area and employment in the area.
Components of Change	-	Refers to the key drivers of population change; births, deaths and migration.
Local Development Plan 2	*LDP2*	The Local Development Plan is currently under review, and will be replaced by the Local Development Plan2 (LDP2) when adopted by the Local Authority.
Membership Rates	-	Published as part of the WG household projections. Membership rates are used to calculate the proportion of the household population by age group and household category.
Mid-Year Estimate	*MYE*	Population estimates and components of population change that are released annually by the Office for National Statistics.
Natural Change	-	The balance between the number of births and deaths.
Office for National Statistics	*ONS*	
Old Age Dependency Ratio	*OAD*	The ratio of the population aged 65+ relative to the population aged 15–64. The higher the ratio, the greater share of population aged 65+ relative to the younger 'working age' (15–64) population.
Output Area	*OA*	The geographical unit for which Census data is published.
Pembrokeshire Coast National Park	*PCNP*	Refers to the part of Pembrokeshire within the National Park boundary.
Pembrokeshire Unitary Authority	*Pembrokeshire UA*	Refers to the whole Unitary Authority (i.e. including the Pembrokeshire Coast National Park)
Pembrokeshire-Out		Refers to the part of Pembrokeshire UA *outside* of the Pembrokeshire Coast National Park.
POPGROUP	*PG*	The cohort component model used to develop a range of forecasts using assumptions on fertility, mortality and migration.
Vacancy Rate	-	The ratio between households and dwellings, taking account of vacant properties, second homes and holiday accommodation.
Welsh Government	*WG*	
WG Household Projections	-	Household projections published by Welsh Government for all local authorities in Wales. These are underpinned by the population projections and provide assumptions on membership rates, average household size and population 'not-in-households'.
WG Population Projections	-	Population projections published by the Welsh Government for all local authorities in Wales, providing key assumptions on births, deaths and migration.

Table of Contents

Introduction

Context & Requirements

1.1 In 2013, Pembrokeshire County Council (PCC) adopted its Local Development Plan (LDP)[1], outlining a housing growth target of +5,724 over the 2011–2021 plan period. PCC is seeking to replace its adopted LDP, for the LDP2 2017–2033 plan period[2] (adoption anticipated in 2021). This will cover Pembrokeshire County, excluding the Pembrokeshire Coast National Park (PCNP) area (hereon in referred to as Pembrokeshire-Out).

1.2 To support the review of the LDP, PCC has commissioned Edge Analytics to provide a range of demographic evidence for comparison with the Welsh Government (WG) 2014-based population and household projections. Population, migration, household and housing growth forecasts are required for the 2017–2033 forecast period. Scenario outcomes are presented for Pembrokeshire-Out for the 2021–2033 LDP2 period in Appendix A, with outcomes presented for Pembrokeshire UA (i.e. including PCNP) in Appendix B.

Approach

1.3 Using POPGROUP technology, a range of demographic and housing-led scenarios have been developed for Pembrokeshire-Out. This includes the 2014-based population projection for Pembrokeshire-Out, rebased to take account of the latest population estimates, together with two trend scenarios based on variant assumptions on migration.

1.4 Also included are three 'dwelling-led' scenarios, in which future population change is determined by the growth in the number of new homes, as defined by Pembrokeshire County Council.

[1] https://www.pembrokeshire.gov.uk/adopted-local-development-plan
[2] https://www.pembrokeshire.gov.uk/local-development-plan-review

1.5 Historical demographic statistics for Pembrokeshire-Out have been derived from Unitary Authority (UA) level (i.e. Pembrokeshire as a whole) Census Output Area statistics. Output Areas (OAs) are the smallest geographical unit, for which Census data are published, nesting directly into the Pembrokeshire Unitary Authority administrative boundary. A proportional split of the OAs has been calculated to estimate the extent to which each OA falls outside or inside the Pembrokeshire Coast National Park boundary. The resultant OA definition has been used as the basis for generating historical demographic statistics, used to develop forecasts for Pembrokeshire-Out that falls outside the National Park. Note that this approach is consistent with the analysis undertaken by Edge Analytics for Pembrokeshire Coast National Park in early 2018.

1.6 We are grateful for the cooperation of the Welsh Government in the development of this project. The WG has provided population and household projections as a benchmark for the forecasts presented here. The POPGROUP forecasting analysis has ensured comparability and alignment with the WG approach and output.

1.7 All scenarios are based on historical evidence for the period 2001–2016, reflecting Unitary Authority mid-year population estimate revisions (2012–2016)[3] from the Office for National Statistics (ONS), published in March 2018. The scenarios use household growth assumptions from the Welsh Government's 2014-based and 2008-based household projection model.

[3] At the time of the analysis, revised small area population estimates (SAPE) were not published by the Office for National Statistics (ONS). Therefore, OA population estimates have been rebased to align with the MYE revisions made to Pembrokeshire Unitary Authority by the ONS (March 2018). As this analysis accounts for the revised MYEs there might be a small mis-alignment with the analysis undertaken for Pembrokeshire Coast National Park Authority.

2 Area Profile

Geography

2.1 Pembrokeshire UA borders Ceredigion and Carmarthenshire to the east, with Pembrokeshire Coast National Park overlapping the coastal fringes of the county (Figure 2). In 2016, the population of Pembrokeshire UA was estimated to be 124,237, with approximately 82% of the population living in the area outside of the National Park (Pembrokeshire-Out).

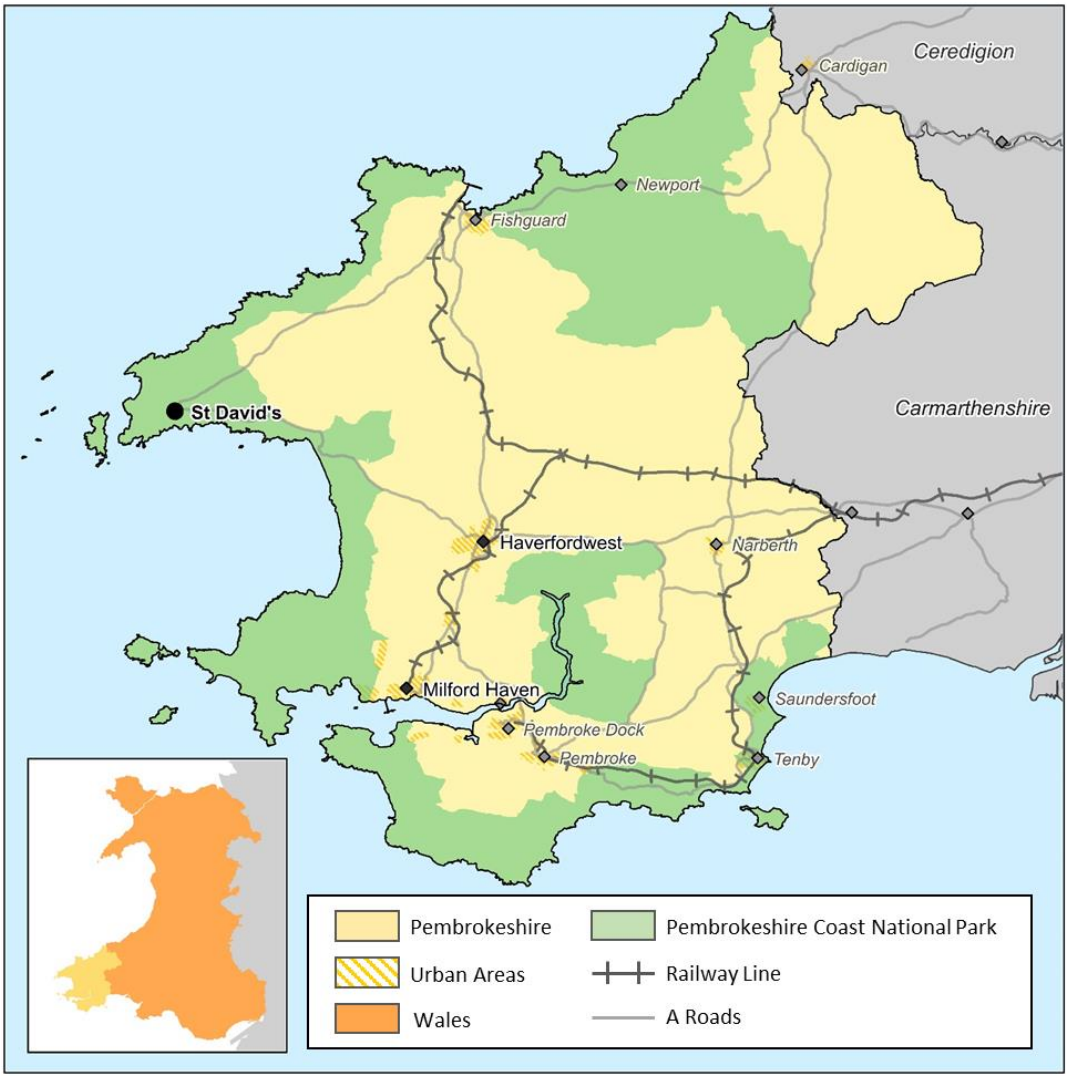


Figure 2: Pembrokeshire and Pembrokeshire Coast National Park

Population Change 2001–2016

2.2 Over the 2001–2016 historical period, the population of Pembrokeshire-Out has increased from an estimated total of 90,936 in 2001 to 101,617 in 2016, an 11.7% increase.

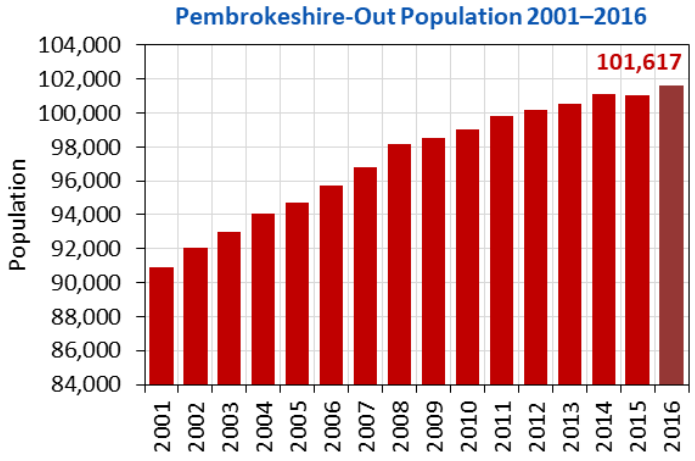


Figure 3: Population change 2001–2016

2.3 Compared to Pembrokeshire UA and Wales, Pembrokeshire-Out is estimated to have experienced a *higher* rate of population change. Between 2001 and 2008, Pembrokeshire-Out evidenced an average annual growth rate of +1.1%, which fell to an average of 0.4% over the latter half of the historical period (Figure 4).

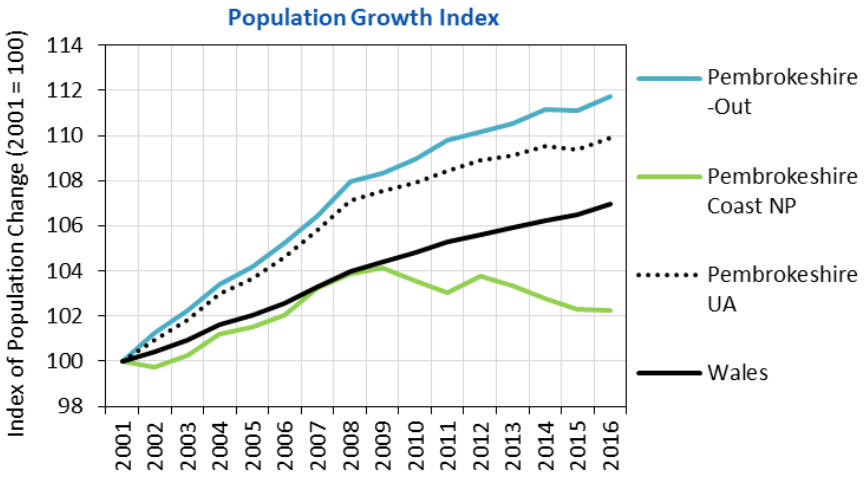


Figure 4: Population growth index 2001–2016

2.4 The annual growth of the population in Pembrokeshire-Out is reflected in the components of change profile for the 2001/02–2015/16 period (Figure 5). Natural change is the annual balance

between births and deaths; net migration is the balance between the inflow and outflow of population moving to and from Pembrokeshire-Out.

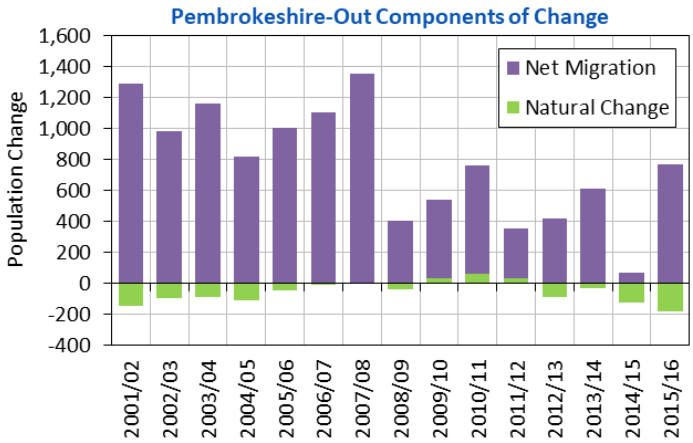


Figure 5: Pembrokeshire-Out components of population change 2001/02–2015/16

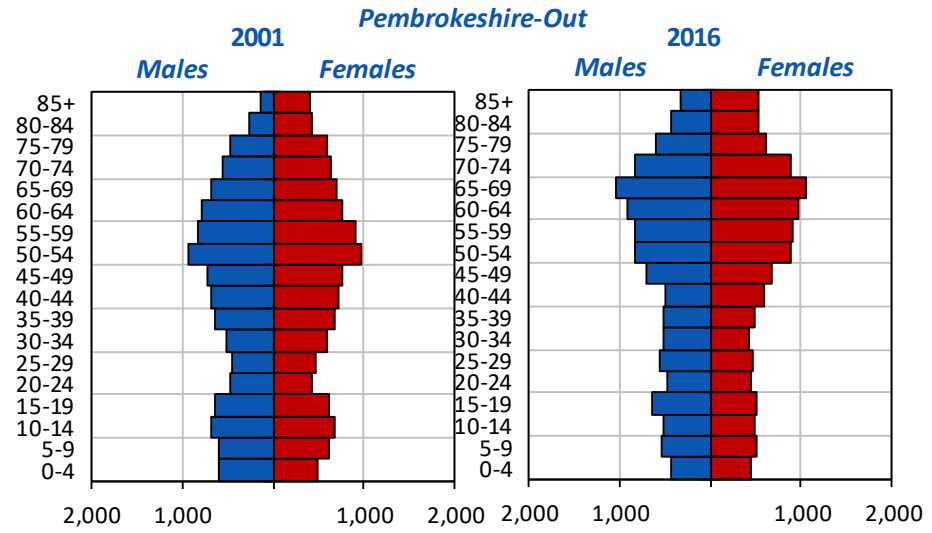
2.5 Net migration has been the dominant driver of population change in Pembrokeshire-Out, contributing to population growth in all years since 2001/02. Between 2001/02 and 2007/08, net migration averaged +1,101 per annum. A notable fall in net migration has since been recorded (averaging + 475 per annum), with the lowest historical net migration evidenced in 2014/15. For more detail on migration flows, refer to Appendix C.

2.6 Natural change has had a small but predominantly negative impact on population change over the historical period (i.e. a greater number of deaths than births), notwithstanding 2009/10–2011/12 in which a steady increase in births, coupled with a fall in deaths, resulted in a small positive impact of natural change.

Population Age Profile

2.7 In the consideration of future housing needs for Pembrokeshire-Out, the age structure of the resident population is an important factor. Over the 2001–2016 period, the profile of Pembrokeshire has aged, with the proportion of the older age groups increasing relative to the population in the younger age groups, resulting in an old age dependency ratio (OAD) of 40% in 2016, compared to 30% in 2001. This means the size of Pembrokeshire-Out's population aged 65+ is equivalent to 40% of its 15–64 age group population in 2016. This compares to 53%, 42% and 32% for PCNP, Pembrokeshire County and Wales respectively (Figure 6).

2.8 Between 2001 and 2016, the proportion of the population aged 65+ living in Pembrokeshire-Out increased from 18% to 24%. Whilst this is closely aligned to the Unitary Authority in 2016 (25%), it is higher than Wales (20%) but lower than PCNP (30%) (Figure 6). Whilst the 2016 MYE for Pembrokeshire-Out records a younger age profile than the National Park, it indicates an older and more rapidly ageing population age profile than evidenced at national level.



Indicator	2016 MYE			
	Pembrokeshire Out	Pembrokeshire Coast National Park	Pembrokeshire UA	Wales
Percentage 65+	24%	30%	25%	20%
Percentage 80+	6%	8%	7%	5%
OAD	40%	53%	42%	32%
Median Age	46	53	47	42

OAD = Old Age Dependency Ratio
(Population Aged 65+/Population Aged 15–64)

Figure 6: 2016 population age profile; Pembrokeshire-Out, PCNP, Pembrokeshire UA and Wales (Source: ONS)

Housing Completions

2.9 Figure 7 presents housing completions and annual population change in Pembrokeshire-Out since 2007/08. Over the last ten years, annual housing completions have varied from +203 in 2011/12 to +691 in 2007/08, averaging +416 per annum. The latter five years of the historical period reflect slightly higher annual completions, averaging +443 (Figure 7).

2.10 The annual change in population has varied over the historical period, and indicates some correlation with the rise and fall in number of dwelling completions (notwithstanding 2014/15). Between 2007 and 2008 (i.e. 2007/08), the population of Pembrokeshire-Out increased by +1,356; however a smaller increase was recorded in the following year (+367 between 2008 and 2009). Between 2014 and 2015, a small decline in the population was recorded (-54 persons), however the latest estimate suggests recovery with an addition +581 people from the previous year.

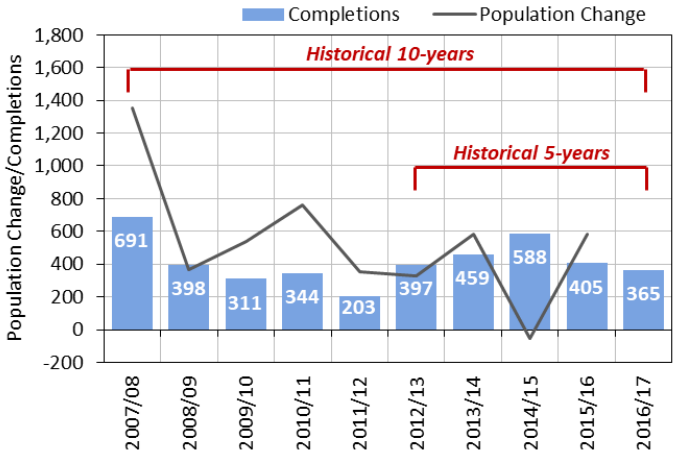


Figure 7: Pembrokeshire-Out housing completions
(Source: Pembrokeshire County Council)

Commuting Flows

2.11 In terms of travel-to work commuting flows, the 2011 Census recorded 44,719 workers aged 16–74 (i.e. people living in Pembrokeshire-Out who are in employment either in the area or elsewhere). The Census also recorded 44,516 people aged 16–74 employed within the Pembrokeshire-Out area.

2.12 The ratio between the number of resident workers (44,719) and the number of people employed within Pembrokeshire-Out (44,416), results in a balanced commuting ratio of 1.00; the size of the resident population in employment is similar to the overall level of employment in Pembrokeshire-Out (Table 1).

Table 1: Pembrokeshire-Out 2011 travel-to-work statistics

Pembrokeshire (Outside NP)	2011 Census
Resident Workers	44,719
Workplace-based employment	44,516
Commuting Ratio	**1.00**

2.13 Of the 44,719 resident workers, 85% work within Pembrokeshire-Out (including those who work at or from home), 6% commuting to PCNP, with the remaining 10% working elsewhere in the UK, offshore or abroad. Of the 44,516 people working in Pembrokeshire-Out, 85% also live in the area, with 7% coming from the National Park (Figure 8).

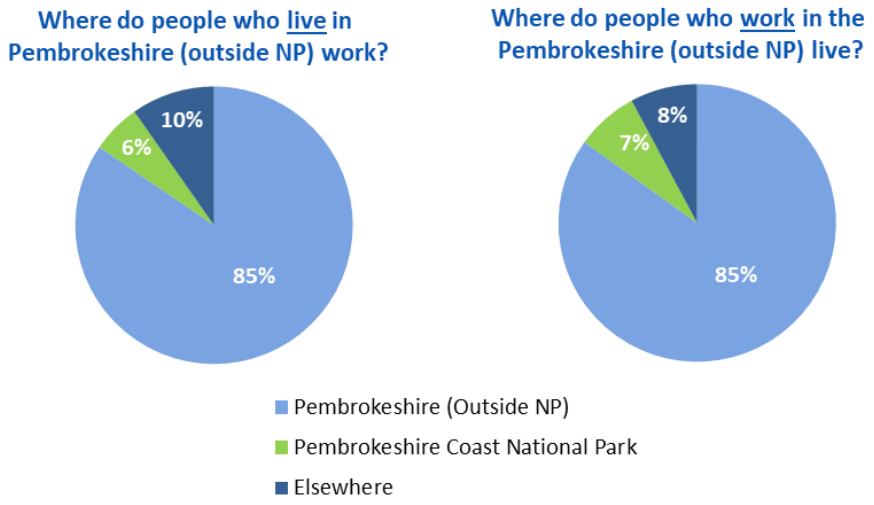


Figure 8: Pembrokeshire travel-to-work dynamics
(Source: 2011 Census)

3 Welsh Government Projections

Population Projections

3.1 The 2014-based population and household projection are the latest projections published by Welsh Government (WG), incorporating the ONS 2014 mid-year population estimate[4] and applying fertility, mortality and migration assumptions based on an historical five-year period (prior to 2014)[5]. The 2014-based projections provide a starting point for evaluating future growth for each unitary authority in Wales. Under the 2014-based projection, the population of Pembrokeshire UA (i.e. including the National Park) is estimated to *decline* by -1% over the 25-year (2014–2039) projection period, contrasting with the national *growth* rate of 5% (Figure 9).

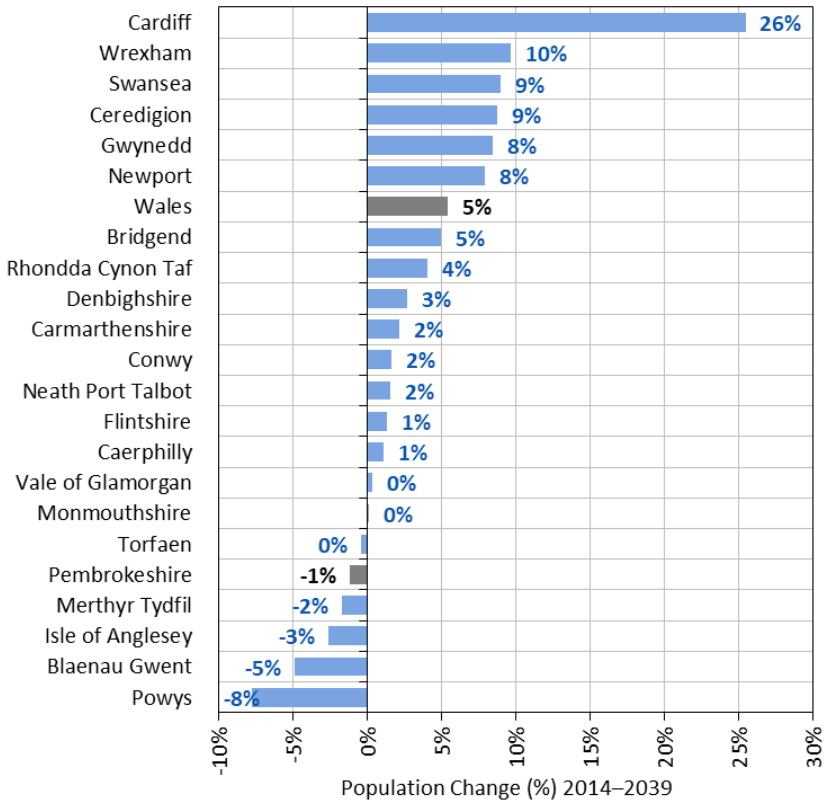


Figure 9: WG population projections for Welsh UAs (Source: StatsWales)

[4] Note that refers to the mid-year estimate pre-March 2018 revisions.

[5] https://gov.wales/docs/statistics/2017/171019-local-authority-population-projections-technical-en.pdf

3.2 As part of the 2014-based population and household projections, WG published projections for the area of unitary authorities that fall outside of the three national parks in Wales (Snowdonia, Brecon Beacons and Pembrokeshire Coast) [6].

3.3 Under the WG 2014-based population projections, the proportion of Pembrokeshire UA's population residing outside PCNP is estimated to increase from 82% in 2014 to 86% by 2039. This means that whilst the population for the whole unitary authority is estimated to decrease (driven largely by the decline in population in PCNP), Pembrokeshire-Out (i.e. excluding PCNP) is expected to experience growth, at a similar rate to the national average (Figure 10). Population growth is estimated for the Unitary Authority to 2026, followed by an annual decline thereafter, driven by an estimated slower rate of growth in Pembrokeshire-Out and population decline in PCNP.

3.4 Over the 2017–2033 period, the WG projections estimate population growth of 3% (+3,088 people) for Pembrokeshire-Out, with 2% growth (+2,007 people) estimated for the 2021–2033 LDP2 plan period. The rate of population growth is estimated to average 0.25% to 2025, reducing to 0.11% over the latter half of the plan period to 2033.

3.5 For PCNP, population decline of -14% (-3,182 people) is estimated over the 2017–2033 projection period, with a -12% (-2,478 people) decline over the LDP2 period.

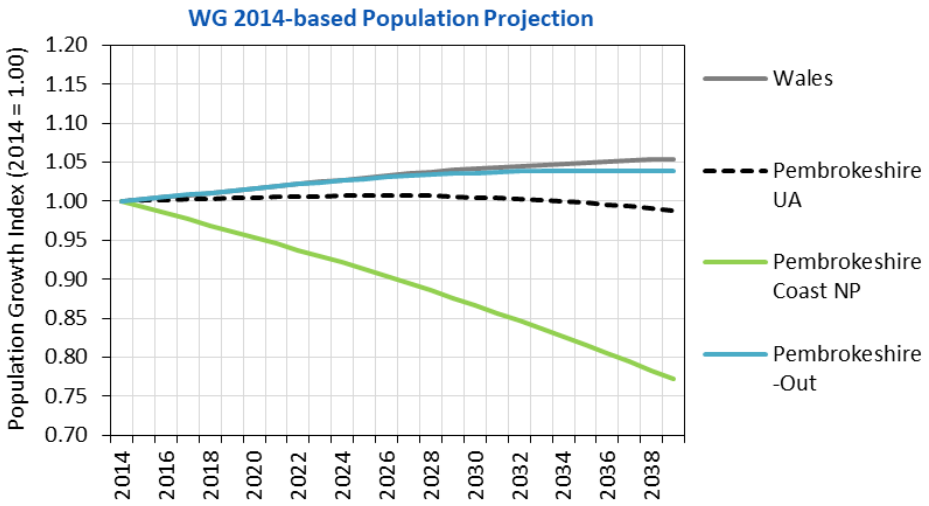


Figure 10: WG 2014-based population projections for Pembrokeshire-Out, UA, PCNP & Wales (Source: StatsWales)

[6] https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/National-Park

3.6 The components of population change which underpin the 2014-based projection for Pembrokeshire-Out are presented in Figure 11, with historical components of change for 2001/02 to 2013/14 included for comparison[7]. Net migration is estimated to remain positive throughout the projection period averaging +304 per annum, lower than annual historical net migration recorded in Pembrokeshire-Out (notwithstanding 2011/12).

3.7 Conversely, natural change is estimated to have a reducing impact on population change in Pembrokeshire-Out over the projection period, driven by a fall in births operating in tandem with a notable annual rise in deaths. This reflects the naturally ageing population profile estimated under the WG 2014-based projection.

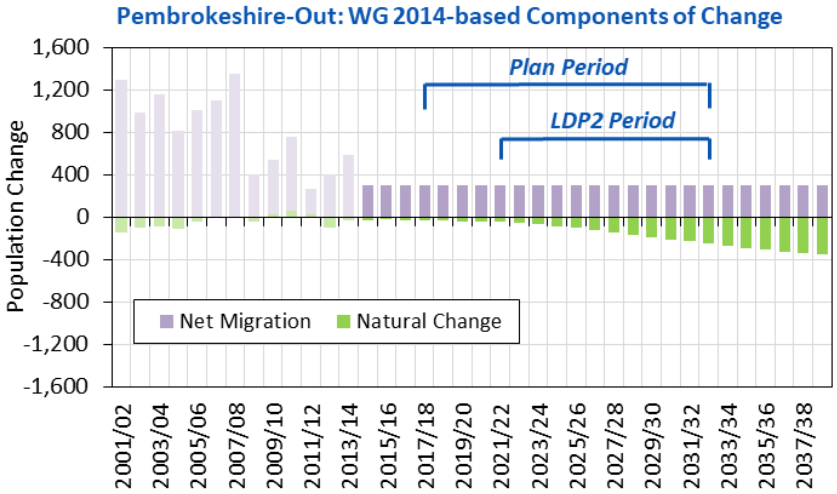


Figure 11: WG 2014-based Components of Population Change for Pembrokeshire-Out (Source: StatsWales)

3.8 Under the official WG 2014-based population projection for Pembrokeshire UA, Pembrokeshire-Out and PCNP, the 16–64 age group represents the greatest proportion of the total population in both 2017 and 2033 for each area, however it is the older 65+ age groups that are expected to experience the greatest increase (Table 2).

3.9 For Pembrokeshire-Out, the population aged 65+ is estimated to increase by +7,688 (32%) over the 2017–2033 period, whilst the 0–15 age group is estimated to decline by -442 (-2%). Whilst a smaller proportional increase is estimated in the 65+ age groups for Pembrokeshire UA (+27%, +8,459 people), a greater decline is expected in the younger 0–15 age groups (-5%, -1,161 people) over the plan period. For PCNP, population decline is estimated in all but the 65+ age group, which estimates an increase of +607 (+9%) over the 2017–2033 period.

[7] These refer to the pre-revised MYEs (2012–2014) preceding the WG 2014-based projection

Table 2: WG 2014-based Population Age Profile (2017 & 2033)

Age Group	2017			2033		
	Pembrokeshire UA	Pembrokeshire Out	PCNP	Pembrokeshire UA	Pembrokeshire Out	PCNP
0–15	21,195	18,212	3,013	20,034	17,770	2,423
16–64	71,417	59,224	12,169	63,985	55,066	8,971
65+	31,344	24,373	6,982	39,803	32,061	7,590
TOTAL	***123,957***	***101,810***	***22,165***	***123,822***	***104,898***	***18,983***

It is noted that the population of Pembrokeshire-Out and PCNP do not sum to Pembrokeshire UA totals. Population sourced directly from StatsWales.

3.10 The latest 2014-based population projection for Pembrokeshire-Out indicates a lower rate of population growth than that evidenced under the 2008-based projection, which suggested a 12% increase over the 2008–2033 period (Figure 12).

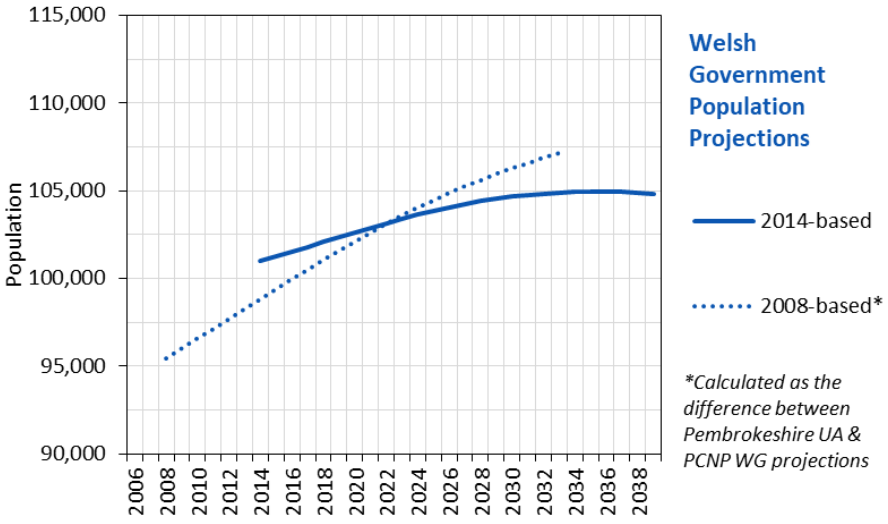


Figure 12: Population projections for Pembrokeshire-Out[8]

Household Projections

3.11 The WG 2014-based household projections provide the 'starting point' in the assessment of housing need, underpinned by the 2014-based population projection model (Figure 13)[9]. Over the 2017–2033 period, the 2014-based household projection model suggests an increase of

[8] WG only published 2014-based population projections for areas outside of the National Parks. However, as WG published 2008-based population projections for the National Parks in Wales, the area of Pembrokeshire outside of PCNP can be calculated.
[9] http://gov.wales/docs/statistics/2017/170726-household-projections-national-parks-2014-based-en.pdf

+2,918 households (+182 per annum), with the greatest increase estimated in the '1 person' and '2 person no children' category (+2,622 and +607 respectively).

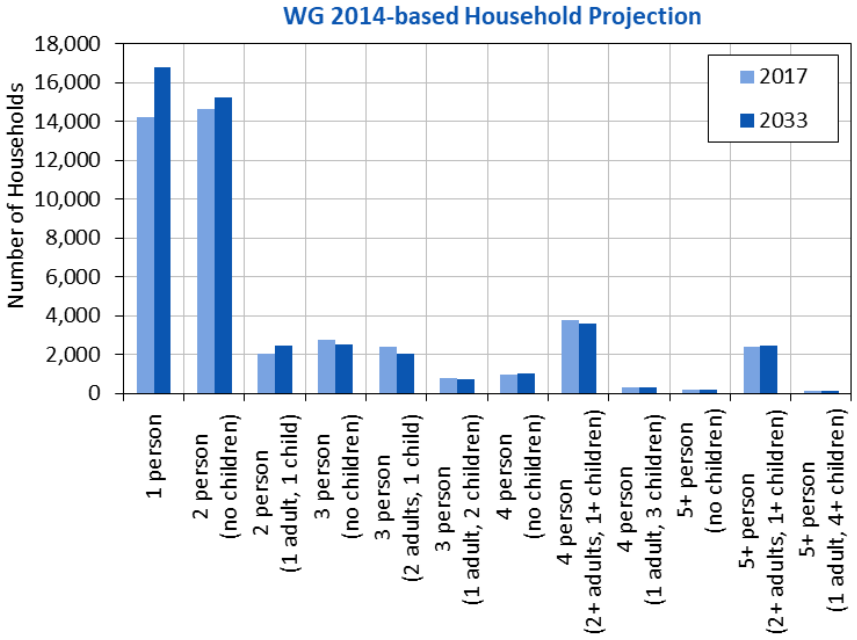


Figure 13: WG 2014-based household projection for Pembrokeshire-Out 2017 & 2033 (Source: StatsWales)

3.12 Underpinning the household projection for Pembrokeshire-Out are assumptions on membership rates and average household size. Membership rates calculate the proportion of the household population (i.e. excluding the population in communal establishments) in each household category (Figure 13). The average household size then determines the number of households required to support the estimated household population.

3.13 Over the 2017–2033 period, the WG 2014-based household projection estimates a decline in average household size for Pembrokeshire-Out, from 2.25 to 2.16 (-0.09), driven by increased population in the older age groups. This decline in average household size under the WG 2014-based household projections is a common feature across the local authorities in Wales (Figure 14); with PCNP and Pembrokeshire UA estimated to reduce by 0.09, whilst a smaller decline of 0.07 is estimated for Wales (2017–2033).

3.14 For context, Figure 14 presents the estimated average household size under the WG 2014-based projections at the start and end of the plan period for all Welsh local authorities, ranked in order of *change* (highest to lowest). Rhondda Cynon Taf and the Vale of Glamorgan are expected to experience the greatest decline in average household size (-0.11), whilst Denbighshire,

Ceredigion and Merthyr Tydfil are estimated to experience the smallest decline (-0.03, -0.04 and -0.04 respectively).

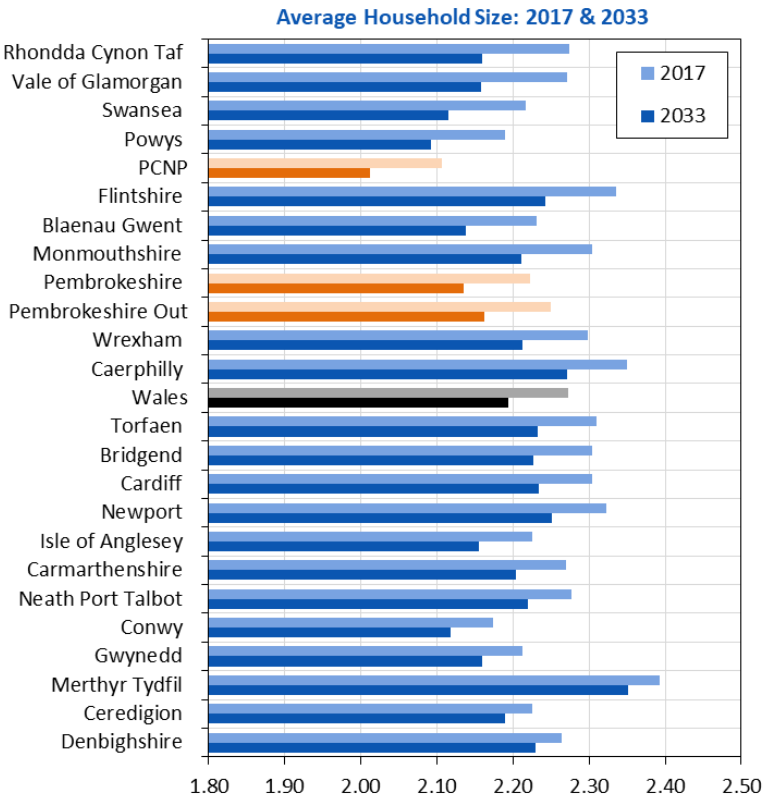


Figure 14: WG 2014-based household projections – average household size by local authority in Wales 2017 & 2033 (Source: StatsWales)[10]

3.15 The household projections are underpinned by the population projections, providing key assumptions on future household membership rates and average household size. The WG 2014-based household projection for Pembrokeshire-Out, estimates lower household growth than the 2008-based projection (for an equivalent 25-year period). This lower household growth is driven by both lower population growth and different membership rate and average household size assumptions (Figure 15).

3.16 Under the 2008-based projection, higher membership rates in the young adult age groups, together with smaller average household size on the 5+ person household categories (i.e. 5.34 compared to 5.40 under the WG 2014-based projections), results in a greater number of households forecast over the 25-year projection period. The smaller average household size in

[10] Areas are ranked in order of change in average household size (2017–2033), highest to lowest

the 5+ household categories under the 2008-based projection means a greater number of households would need to form, to support the estimated household population.

3.17 Under the 2008-based projection, the number of households is estimated to increase by 26% over the 25-year projection period (2008–2033), compared to 9% under the 2014-based household projections (2014–2039).

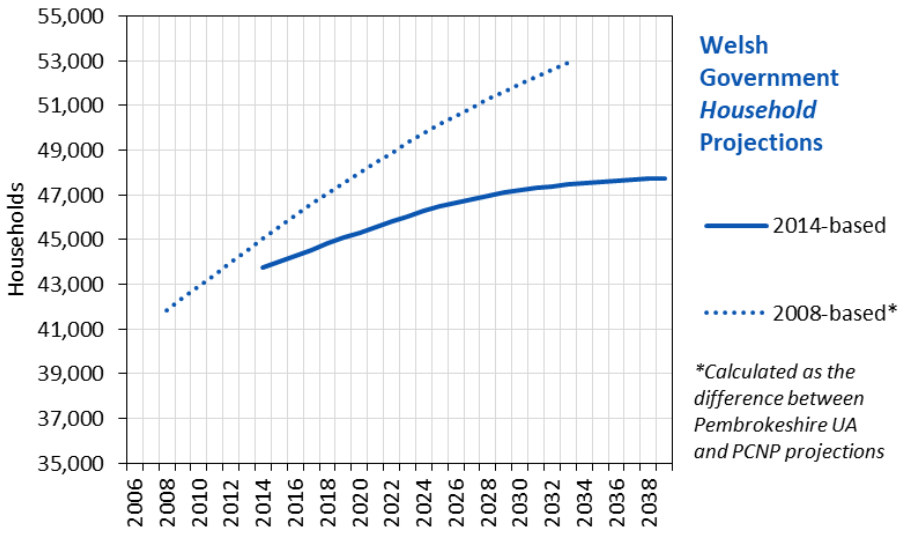


Figure 15: Household projections for Pembrokeshire-Out[11]

3.18 Dwelling growth associated with the projected household growth is calculated using a dwelling vacancy rate which takes account of the number of vacant or second properties in Pembrokeshire-Out. Pembrokeshire-Out has a vacancy rate of 8.1% (Table 3); whilst this is lower than PCNP (26.7%) it remains higher than the average figure for Wales in total (5.6%).

Table 3: Census vacancy rate

Area	2001	2011
Pembrokeshire-Out	7.6%	8.1%
PCNP	22.6%	26.7%

[11] WG only published 2014-based household projections for areas outside of the National Parks. However, as WG published 2008-based household projections for the National Parks in Wales, the area of Pembrokeshire outside of PCNP can be calculated.

4 Demographic Scenarios

Approach

4.1 There is no single definitive view on the likely level of growth expected in Pembrokeshire-Out. Ultimately, a mix of demographic, economic and local policy issues will determine the speed and scale of change.

4.2 POPGROUP v4.0 has been configured for Pembrokeshire-Out. A range of scenarios has been developed for the 2017–2033 period and presented alongside the WG 2014-based population and household projections. These scenario forecasts incorporate mid-year population, births and deaths estimates for 2001–2016, with the WG 2014-based projection rebased to reflect the latest estimates.

4.3 Household and dwelling growth under each of the demographic scenarios has been estimated using assumptions from the WG 2014-based household projection model and the 2011 Census dwelling vacancy rate of 8.1%. Under the dwelling-led scenarios, these assumptions are used to estimate the size of the population required to support the defined annual housing growth over the plan period.

Scenario Definition & Outcomes

4.4 The **WG 2014 (Rebased)** population projection provides the 'benchmark' growth outcome, to which other scenarios are compared. Three trend scenarios have been developed using migration assumptions based on: (1) a ten-year (2006/07–2015/16) history; (2) a fifteen-year (2001/02–2015/16) history; and (3) balanced net migration. Three 'dwelling-led' scenarios have also been developed in which population growth is determined by the annual growth in the number of

dwellings, derived from the LDP (2013) annual target[12] and an historical 5-year and 10-year average.

4.5 All demographic and dwelling-led scenarios include historical population for the 2001–2016 period. Under the dwelling-led scenarios, the annual change in dwellings has been defined from 2016/17 onward.

- **WG-2014 (Rebased):** Welsh Government 2014-based population projection for Pembrokeshire, rebased to the latest 2016 MYE.
- **PG 10yr:** Migration assumptions based on the last ten-years of migration history (2006/07–2015/16).
- **PG Long Term:** Migration assumptions based on the last fifteen-years of migration history (2001/02–2015/16).
- **Net Nil:** Migration inflows and outflows are balanced over the forecast period, resulting in zero net migration.
- **Dwelling-led (LDP Target):** Annual dwelling growth of +572 per year is applied in each year of the forecast period, based on the LDP target.
- **Dwelling-led (10yr Average):** Annual dwelling growth of +416 per year is applied in each year of the forecast period, based on the last ten years of completions data.
- **Dwelling-led (5yr Average):** Annual dwelling growth of +443 per year is applied in each year of the forecast period, based on the last five years of completions data.

Pembrokeshire-Out Scenario Outcomes

4.6 The population growth trajectories for all scenarios are presented in Figure 16 for the 2001–2033 time-period. In Table 4, each of the scenarios is summarised in terms of population and household growth for the 2017–2033 period, together with the average annual net migration and dwelling growth outcomes.

[12] LDP (2013) identified a total housing growth target of 5,724 over the 2011–2021 plan period (+572 per annum).

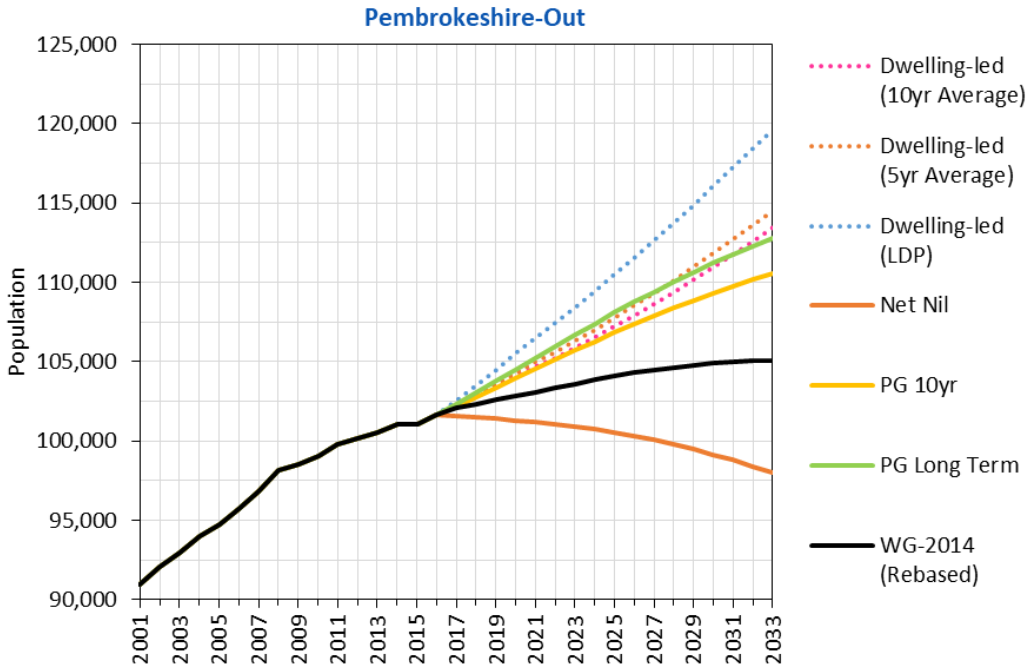


Figure 16: Pembrokeshire-Out population growth outcomes 2001–2033

Table 4: Pembrokeshire-Out scenario outcomes 2017–2033

Scenario		Change 2017–2033				Average per year		Total Dwelling Growth
		Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	
Dwelling-led	LDP	17,032	16.6%	8,408	18.7%	1,099	572	9,152
	5yr Av	12,222	12.0%	6,509	14.5%	842	443	7,085
	10yr Av	11,228	11.0%	6,116	13.7%	789	416	6,658
Demographic	PG Long Term	10,500	10.3%	5,998	13.4%	767	408	6,529
	PG 10yr	8,405	8.2%	5,003	11.2%	626	340	5,445
	WG-2014 (Rebased)	3,008	2.9%	2,878	6.4%	386	196	3,132
	Net Nil	-3,529	-3.5%	85	0.2%	0	6	93

Note: Scenarios ranked in order of population change

4.7 Population change over the 2017–2033 period ranges from -3.5% under the **Net Nil** scenario to 16.6% under the **Dwelling-led (LDP)** scenario.

4.8 Under each of the trend-based scenarios (excluding **Net Nil**), population change is higher than estimated under the **WG-2014 (Rebased)** scenario, driven by increased annual net migration to the area and a reduced annual impact of natural change. Of the demographic scenarios, **PG Long Term** estimates the highest population growth rate over the plan period (10.3%), capturing the

larger net migration flows evidenced over the 2001/02–2007/08 historical period. The **PG 10yr** scenario estimates a slightly lower population growth over the plan period (8.2%), driven by lower annual net migration. The population growth range estimated under the PG scenarios results in an average annual dwelling growth of +340 and +408 per annum (**PG 10yr** and **PG Long Term** respectively). This compares to +196 pa under the **WG-2014 (Rebased)** scenario.

4.9 The **Net Nil** scenario provides an indication of the importance of migration in supporting population growth in Pembrokeshire-Out. Under the **Net Nil** scenario, a balanced migration flow results in population decline (-3.5%) over the plan period, as net in-migration is required to replace the population lost through natural change (i.e. an excess of deaths over births). This results in a dwelling growth estimate of +6 per annum.

4.10 Under the dwelling-led scenarios, population growth is determined by the annual change in dwellings. Population growth is highest under the **Dwelling-led (LDP)** scenario, driven by increased migration flows (+1,099 per annum) to fulfil the Local Development Plan (2013) housing target of +572 pa. A continuation of past average housing completions would result in a population growth range of 11.0%–12.0% (**Dwelling-led 10yr Average** and **5yr Average** respectively), driven by lower net in-migration required to fulfil the defined annual housing growth.

Population Age Structure

4.11 The ageing population of Pembrokeshire-Out is a key factor when considering future housing requirements of the area. The *change* in population age profile over the 2017–2033 plan period for each of the scenarios is presented in Figure 17.

4.12 Over the 2017–2033 plan period, there is substantial population growth projected in the 60+ age groups under all scenarios. The trend-based scenarios estimate a decline in the 25–29 age groups, likely associated with a net out-migration linked to housing and employment opportunities. Under the **Net Nil** scenario, a notably greater population decline is evidenced in the young adult and subsequently child (0–4) age groups, driven by the reduced migration flows.

4.13 The decline in the young adult age groups is reduced under the dwelling-led scenarios, reflecting the larger net in-migration to the area required to meet the defined annual housing growth. The larger growth estimated in the 30–39 age groups under the dwelling-led scenarios, is mirrored by growth in the 0–14 age groups. Under all scenarios, a decline in population aged 50–59 is

estimated over the plan period, associated with cohort effects and a net out-migration flow in these age groups.

4.14 Under all scenarios, the OAD (i.e. balance between population aged 15–64 and 65+) is estimated to increase from approximately 41% in 2017 to 51%–61% by 2033 (**Dwelling-led LDP** and **Net Nil** scenario respectively). The estimated population growth and age structure under the **PG** scenarios result in OAD of 54% by the end of the plan period.

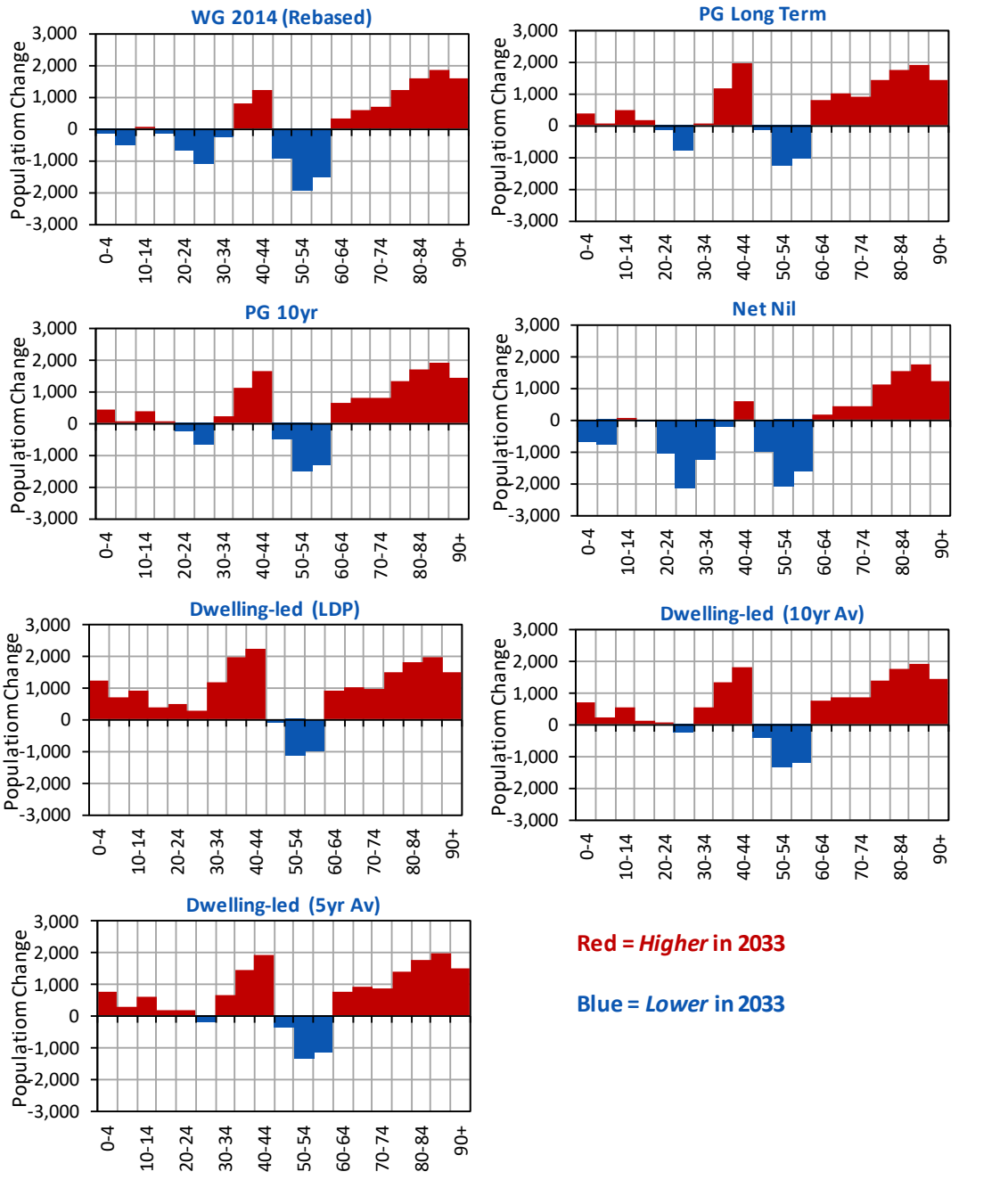


Figure 17: Population change by 5-year age group (2017–2033)

Membership Rate Sensitivity

4.15 The latest WG 2014-based household projection model suggests lower household growth for Pembrokeshire-Out compared to the 2008-based equivalent[13], which was underpinned by assumptions for higher rates of household formation. To evaluate the potential impact of higher household formation on housing growth in Pembrokeshire-Out, each of the demographic scenarios has been configured using membership rate assumptions from the WG 2008-based household projection model.

4.16 Under the demographic scenarios, changes to the household membership rates and household size influence the level of household and dwelling growth required to support the estimated change in population. Under the WG's 2008-based membership rate and household size assumptions, a greater level of household growth is estimated, resulting in notably increased dwelling growth over the 2017–2033 period compared to the 2014-based equivalent (Table 5). This is driven by a greater number of smaller households (i.e. '1 person' and '2 person' categories), operating in tandem with fewer '5+ person' households.

4.17 Under the **WG 2014 (Rebased)** scenario, the application of the 2008-based membership rates to the population size and age structures results in +314 dwellings per year, an additional +118 to the estimated dwelling growth under the 2014-based membership rates. The **PG Long Term** scenario results in the highest dwelling growth of +552 under the 2008-based membership rates, an uplift of +144 additional dwellings.

Table 5: Membership rate sensitivity scenario outcomes 2017–2033

Scenario	2017–2033			
	Population Change	Population Change %	Average Annual Dwelling Growth	
			2014-based	2008-based
PG Long Term	10,500	10.3%	408	552
PG 10yr	8,405	8.2%	340	478
WG-2014 (Rebased)	3,008	2.9%	196	314
Net Nil	-3,529	-3.5%	6	99

Scenarios ranked in order of dwelling growth

[13] The WG only published 2014-based household projections for the areas outside of the national park, using membership rates consistent with UA level assumptions. Therefore, comparisons have been made with the 2008-based projection model UA membership rates.

5 Summary

Approach

5.1 Pembrokeshire County Council has commissioned Edge Analytics to provide a range of alternative demographic and dwelling-led scenarios, for comparison with the WG 2014-based population projection taking account of the latest mid-year population estimates (MYE).

5.2 Scenarios have been developed in POPGROUP v4.0, configured for Pembrokeshire-Out (i.e. outside of PCNP). Demographic statistics have been derived from Unitary Authority and Census Output Area statistics.

5.3 The latest 2014-based population projection from the WG has been presented, rebased to the latest 2016 MYE. For comparison with the WG projection, three alternative demographic scenarios based on variant migration assumptions and three dwelling growth scenarios in which population change is determined by the annual dwelling growth trajectories, have also been developed.

5.4 All scenarios are based on historical evidence for the 2001–2016 period, with forecasts presented for the 2017–2033 period and emerging LDP 2021–2033 plan period in Appendix A. All scenarios consider household and dwelling growth using assumptions from the WG 2014-based household projections and a 2011 Census vacancy rate for Pembrokeshire-Out.

5.5 Scenarios have also been developed to consider the impact of the WG 2008-based membership rates on the relationship between population under the demographic scenarios and dwelling growth in Pembrokeshire-Out.

Growth Outcomes

5.6 Excluding the hypothetical **Net Nil** scenario, population growth ranges from 2.9% under the **WG-2014 (Rebased)** projection to 16.6% under the **Dwelling-led (LDP)** scenario, driven by higher annual housing growth targets. Over the 2017–2033 plan period, this estimated level of population change could support an average annual dwelling growth range of 196–572 dpa under the 2014-based membership rate assumptions (Figure 18).

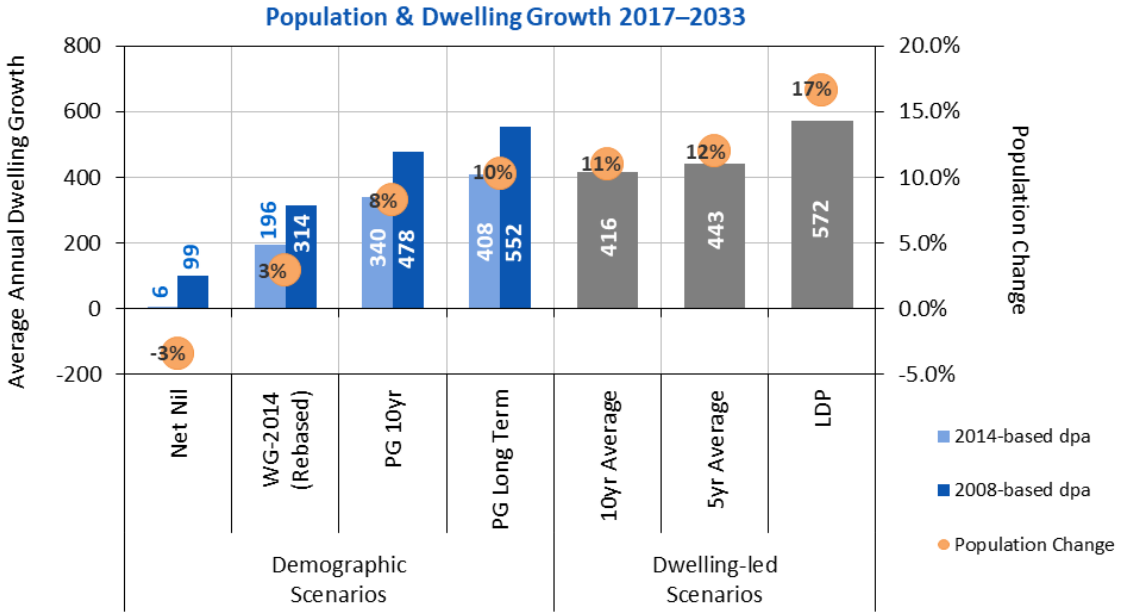


Figure 18: Pembrokeshire-Out population change and average annual dwelling growth under the demographic and dwelling-led scenarios (2017–2033)

5.7 The demographic scenarios indicate a population growth range of -3.5% to 10.3%. The Net Nil scenario provides an indication of the extent to which migration is key driver of population change in Pembrokeshire-Out. The Net Nil scenario indicates that a balanced net migration flow would result in population decline in Pembrokeshire-Out, along with a more rapidly ageing population profile.

5.8 The **PG Long Term** and **PG 10yr** growth scenarios are reflective of the fifteen (2001/02–2015/16) and ten-year (2006/07–2015/16) historical periods, from which their migration assumptions have been calibrated. Higher net migration to Pembrokeshire-Out was recorded in the earlier years of the historical period, resulting in the **PG Long Term** scenario estimating the highest population and dwelling change over the plan period. The **PG 10yr** scenario results in a slightly lower population and dwelling growth change, driven by lower net in-migration to Pembrokeshire-Out.

However, a continuation of past migration trends would suggest a level of population and dwelling growth that is higher than estimated by the **WG-2014 (Rebased)** projection.

5.9 Under the demographic scenarios, the significantly higher membership rates under the 2008-based household projection model, increase the average annual dwelling growth range from 6–408 to 99–552 per annum.

5.10 The dwelling-led scenarios result in the highest population growth outcomes, driven by increased net migration flows required to support the annual change in dwellings. The LDP (2013) target of +572 dpa would suggest a population growth rate of 16.6% over the 2017–2033 plan period, whilst a lower annual dwelling growth of +416 pa indicates a population growth of 11.0%.

5.11 The dwelling-led scenarios presented in this analysis take no account of higher household formation rates (as suggested under the WG 2008-based household projection model). Accounting for higher household formation under the dwelling-led scenarios would reduce the net migration required to support the annual change in dwellings, thus reducing population change by approximately 5.0 percentage points over the 2017–2033 forecast period.

5.12 The scenarios presented in this report have used an 8.1% vacancy rate derived from the 2011 Census to convert between households and dwellings. This means that a proportion of second or vacant properties have been factored into the analysis. If the Council were to reduce the vacancy rate, then fewer dwellings would be required to support the estimated population growth trajectory under each of the demographic scenarios, and a smaller population growth would be required to support the annual change in dwellings defined in the dwelling-led scenarios.

5.13 The scenarios presented in this report are designed to provide a range of demographic and dwelling growth outcomes for Pembrokeshire County Council to consider in the development of its emerging Local Development Plan (LDP2). The report has not sought to make a specific scenario recommendation for the Local Plan but has provided the basis from which a preferred outcome for housing and population growth can be selected for the area.

Appendix A

LDP2 Plan Period 2021–2033

A.1 The emerging LDP2 will outline housing growth for the 2021–2033 plan period. The population, household and average annual net migration and dwelling growth over the emerging LDP plan period are presented for each of the scenarios in Table 6.

A.2 Household and dwelling growth under the demographic scenarios has been estimated using the WG 2014-based household projection model assumptions. Under the dwelling-led scenarios, these assumptions have been used to estimate the population growth required to support the defined annual change in dwellings.

Table 6: Pembrokeshire-Out Scenario outcomes 2021–2033

Scenario		Change 2021–2033				Average per year		Total Dwelling Growth
		Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	
Dwelling-led	LDP	13,109	12.3%	6,306	13.4%	1,132	572	6,864
	5yr Average	9,505	9.1%	4,882	10.5%	886	443	5,314
	10yr Average	8,760	8.4%	4,587	9.9%	835	416	4,993
Demographic	PG Long Term	7,588	7.2%	4,267	9.2%	767	387	4,645
	PG 10yr	6,051	5.8%	3,519	7.6%	626	319	3,830
	WG-2014 (Rebased)	1,979	1.9%	1,898	4.2%	391	172	2,066
	Net Nil	-3,174	-3.1%	-270	-0.6%	0	-25	-294

A.3 Figure 19 presents the estimated change in the population age profile under the demographic and dwelling-led scenarios over the 2021–2033 LDP2 plan period. The different age profiles are a result of variant net migration flows to Pembrokeshire-Out.

A.4 Under the **PG 10yr** and **PG Long Term** scenarios, a continuation of historical migration trends to Pembrokeshire-Out, result in smaller net migration flows to the area than estimated under the dwelling-led scenarios. As a result, the PG scenarios result in lower population growth in the

younger age groups, and population decline in the 25–34 and 50–64 age groups. Under the Dwelling-led scenarios, larger net in-migration flows are required to support the annual change in dwellings, resulting in a notably smaller decline in the 25–34 age groups, with subsequent larger growth estimated in the 0–9 age groups.

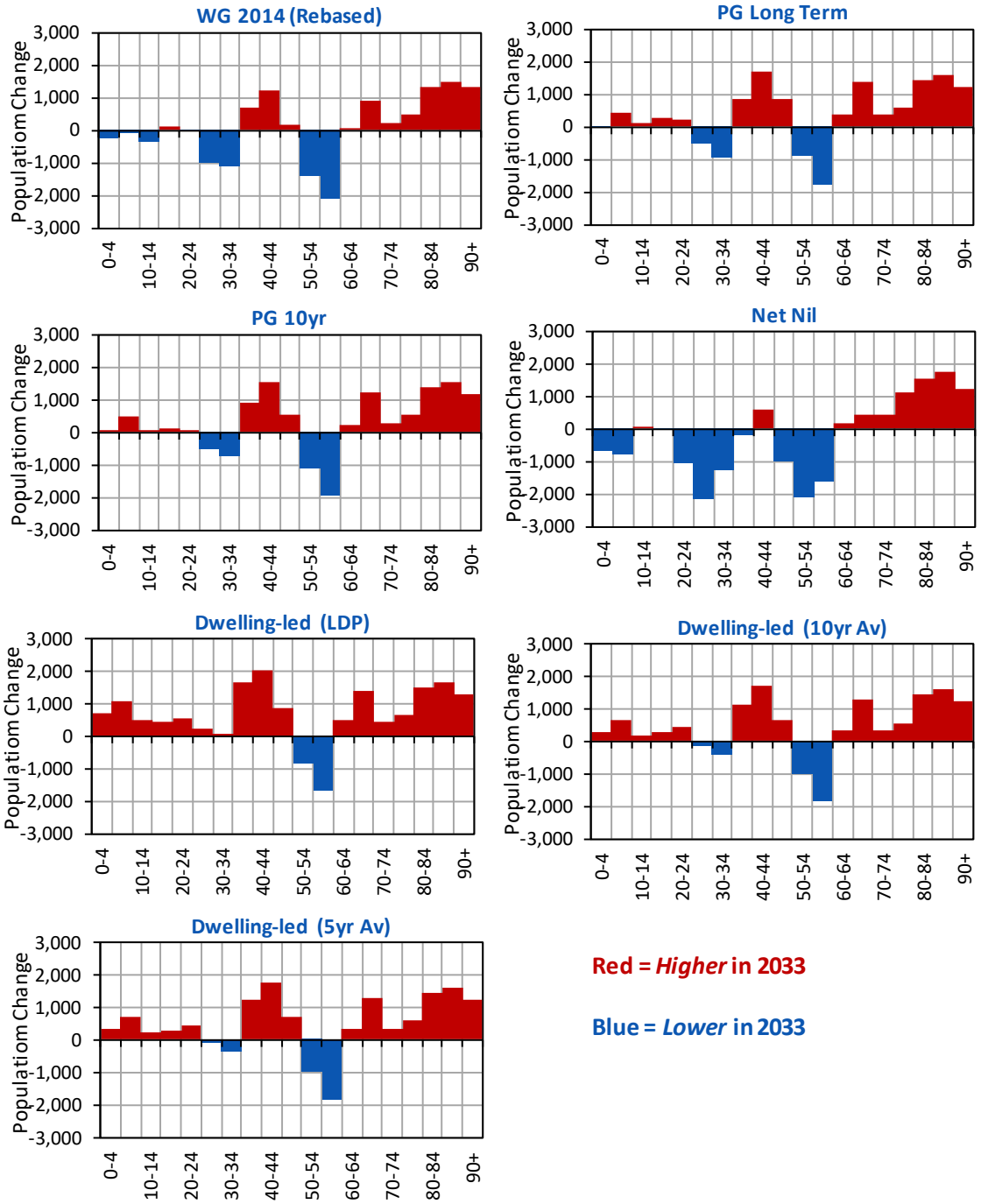


Figure 19: Population change by 5-year age group (2021–2033)

A.5 To consider the potential implications of higher household formation on housing growth, each of the demographic scenarios has been configured using the 2008-based membership rates (refer to Section 4 in the main body of the report). The average annual dwelling growth outcomes under the 2008-based membership rate sensitivity are presented for the 2021–2033 LDP2 plan period in Table 7.

Table 7: Membership rate sensitivity Pembrokeshire-Out scenario outcomes 2021–2033

Scenario	2021–2033			
	Population Change	Population Change %	Average Annual Dwelling Growth	
			2014-based	2008-based
PG Long Term	7,588	7.2%	387	533
PG 10yr	6,051	5.8%	319	457
WG-2014 (Rebased)	1,979	1.9%	172	289
Net Nil	-3,174	-3.1%	-25	67

Appendix B

Pembrokeshire UA

B.1 PCNP authority has identified a dwelling growth target of +960 (60 per annum) over their 2015–2031 plan period[14]. Pembrokeshire County Council has requested that the population growth trajectory under each of the scenarios developed in this report is presented for Pembrokeshire UA (i.e. including PCNP). This includes the population growth trajectory estimated for Pembrokeshire-Out in addition to the population required to support an annual dwelling growth of 60 dpa in PCNP.

B.2 Figure 20 presents the population growth trajectory under each of the scenarios for Pembrokeshire UA to 2033. Population and household change, along with average annual net migration and dwelling growth is presented in Table 8 and Table 9 for the 2017–2033 period and 2021–2033 LDP2 plan period respectively.

B.3 Assumptions from the WG 2014-based household projection model for PCNP and Pembrokeshire-Out have been applied to consider the relationship between population and dwelling growth.

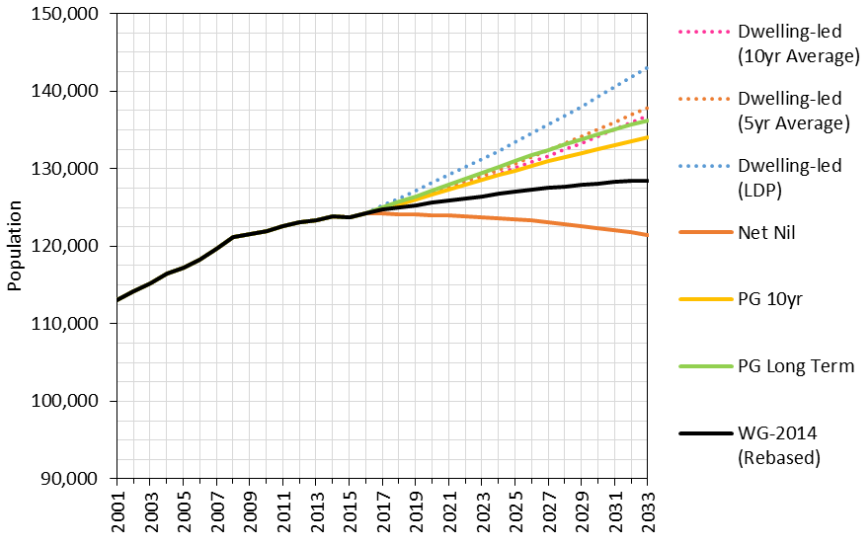


Figure 20: Pembrokeshire UA population growth 2001–2033

[14] https://www.pembrokeshirecoast.wales/Files/files/Dev%20Plans/LDP2/Deposit/Deposit%20Local%20Development%20Plan%20POST%20NPA%2028th%20of%20March.pdf

Table 8: Pembrokeshire UA scenario outcomes 2017–2033

Scenario		Change 2017–2033				Average per year		Total Dwelling Growth
		Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	
Dwelling-led	LDP	17,813	14.2%	9,111	16.4%	1,279	632	10,112
	5yr Average	13,003	10.4%	7,212	13.0%	1,023	503	8,045
	10yr Average	12,009	9.6%	6,820	12.3%	970	476	7,618
Demographic	PG Long Term	11,282	9.0%	6,701	12.1%	948	468	7,489
	PG 10yr	9,187	7.4%	5,706	10.3%	806	400	6,405
	WG-2014 (Rebased)	3,789	3.0%	3,581	6.5%	567	256	4,092
	Net Nil	-2,748	-2.2%	788	1.4%	181	66	1,053

Table 9: Pembrokeshire UA scenario outcomes 2021–2033

Scenario		Change 2021–2033				Average per year		Total Dwelling Growth
		Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	
Dwelling-led	LDP	13,783	10.7%	6,834	11.8%	1,327	632	7,584
	5yr Average	10,179	8.0%	5,409	9.5%	1,081	503	6,034
	10yr Average	9,434	7.4%	5,115	9.0%	1,030	476	5,713
Demographic	PG Long Term	8,262	6.5%	4,795	8.4%	963	447	5,365
	PG 10yr	6,725	5.3%	4,046	7.1%	821	379	4,550
	WG-2014 (Rebased)	2,653	2.1%	2,425	4.3%	587	232	2,786
	Net Nil	-2,500	-2.0%	257	0.5%	195	35	426

Appendix C

Pembrokeshire UA Migration Flows

C.1 This Appendix provides an indication of the origin and destination of internal migration flows to and from Pembrokeshire UA and the rest of the UK. As sub-county origin-destination flows are not published by ONS, the summary presented here provides the Council with the best indication of migration flows within the County.

C.2 Over the full 2001/02–2015/16 historical period, Ceredigion has contributed the greatest average annual net inflow (+26 per annum), with Birmingham, Caerphilly and Powys also recording a positive annual net inflow to the UA. Conversely, the largest average net outflows from Pembrokeshire UA have been to Cardiff (-65 people per year), Swansea (-36 people per year) and Bristol (-10 per year).

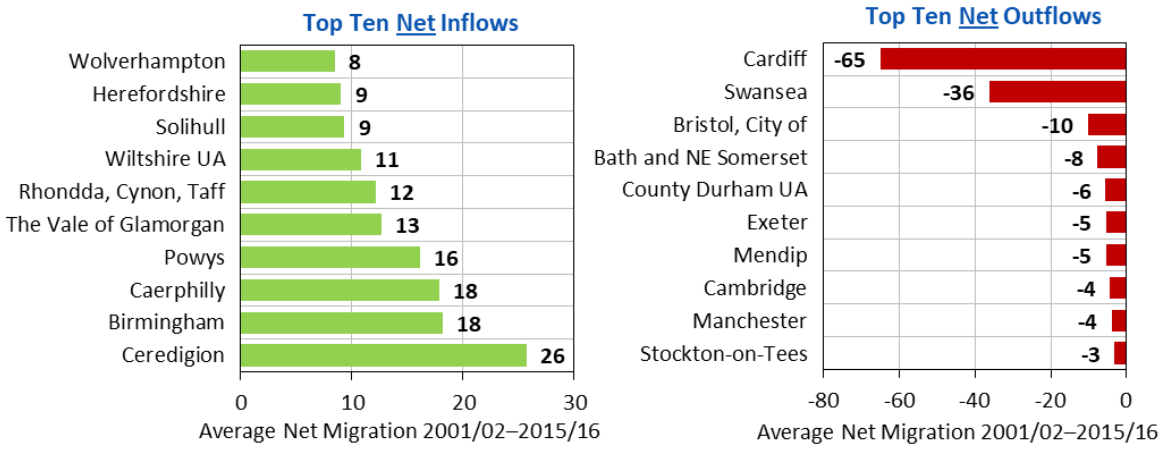


Figure 21: Top ten net internal migration flows 2001/02–2015/16 (Source: ONS)

C.3 Figure 22 presents key annual migration flows between Pembrokeshire UA and Welsh local authorities. Carmarthenshire has the greatest inflows (averaging +417 pa) and outflows (averaging 415 pa) to and from Pembrokeshire UA, resulting in a relatively small net flow of -2 per year over the historical 2001/02–2015/16 period. A spike in flows from Carmarthenshire to Pembrokeshire UA in 2015/16 resulted in a net in-migration flow of +348, the highest recorded over the historical period.

C.4 Conversely, whilst the second greatest outflows recorded over the historical period have been to Cardiff (averaging 350 pa), smaller inflows (averaging 285) results in an average annual net out-migration flow of -65 per year.

C.5 The balance between inflows and outflow between Pembrokeshire UA, Ceredigion and Rhondda Cynon Taff results in a small average annual net inflow to the UA, increasing toward the latter half of the historical period with Ceredigion. Larger annual outflows to Swansea than recorded inflows to Pembrokeshire resulted in an annual net outflow in all years of the historical period, notwithstanding 2010/11 and 2013/14 which recorded a balanced or small net inflow.

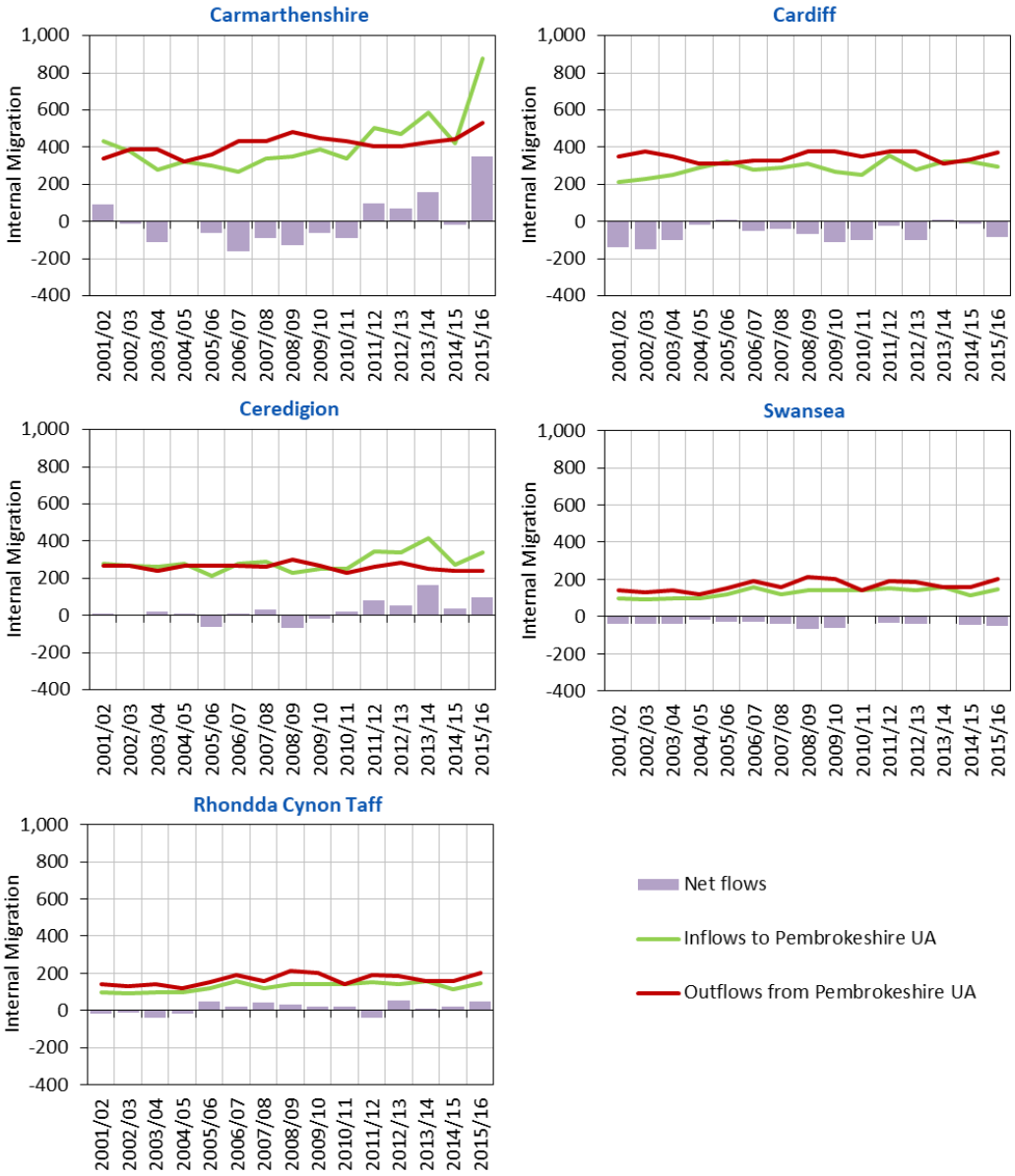


Figure 22: Migration flows between Pembrokeshire UA and other Welsh authorities 2001/02–2015/16 (Source: ONS)

C.6 National Insurance Number (NINo) registrations provide an indication of the number of foreign nationals that have registered to work in Pembrokeshire UA since 2002 (Figure 23). Historically, migrant workers from Poland have represented a large proportion of total NINo registrations (28% of total NINo registration 2002–2017). However since 2012, the number of workers from Poland has fallen, whilst Romanian NINo registrations have increased.

C.7 Whilst total NINo registrations have increased since 2012, they remain notably lower than the peak in 2008 (782 registrations). The latest 2017 NINo registration total of 319 indicates only a small reduction from the previous year, whilst national trends indicate a more significant fall in numbers.

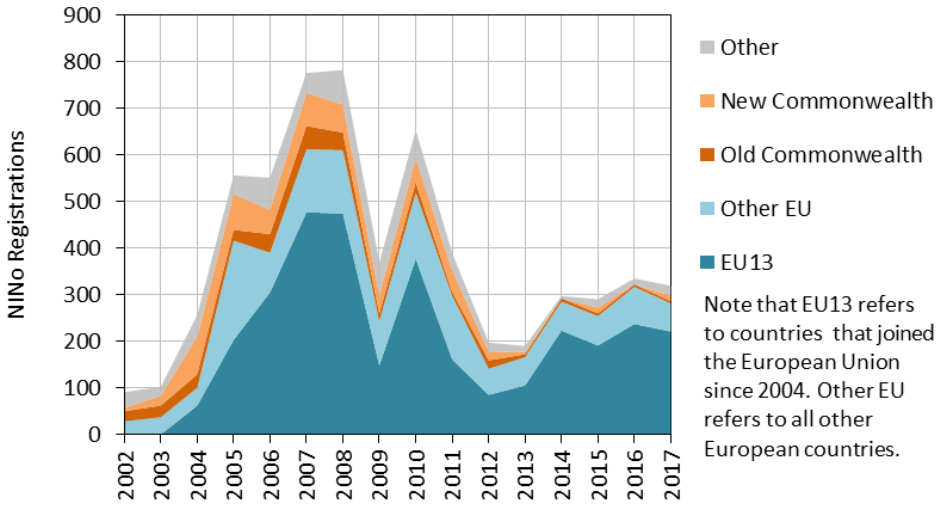


Figure 23: NINo registrations for Pembrokeshire UA 2002–2017 (Source: DWP)

Appendix D

POPGROUP Methodology

Forecasting Methodology

D.1 Evidence is often challenged on the basis of the appropriateness of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which incorporates an industry-standard methodology (a cohort component model) removes this obstacle and enables a focus on assumptions and output, rather than methods.

D.2 Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, and households, for areas and social groups. The main POPGROUP model (Figure 24) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

D.3 The Derived Forecast (DF) model (Figure 25) sits alongside the population model, providing a membership rate model for household projections.

D.4 For further information on POPGROUP, please refer to the Edge Analytics website (http://www.edgeanalytics.co.uk/).

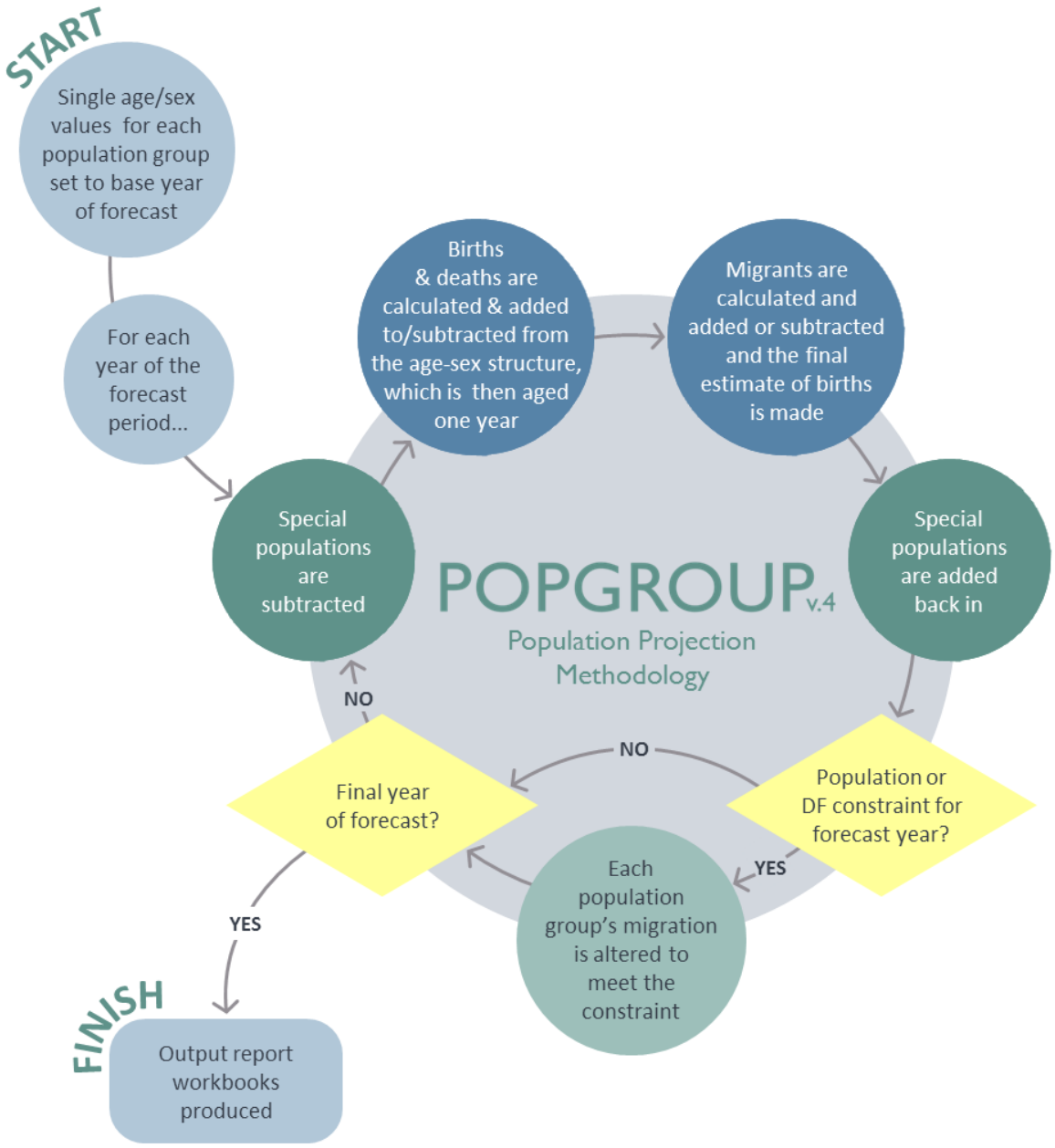
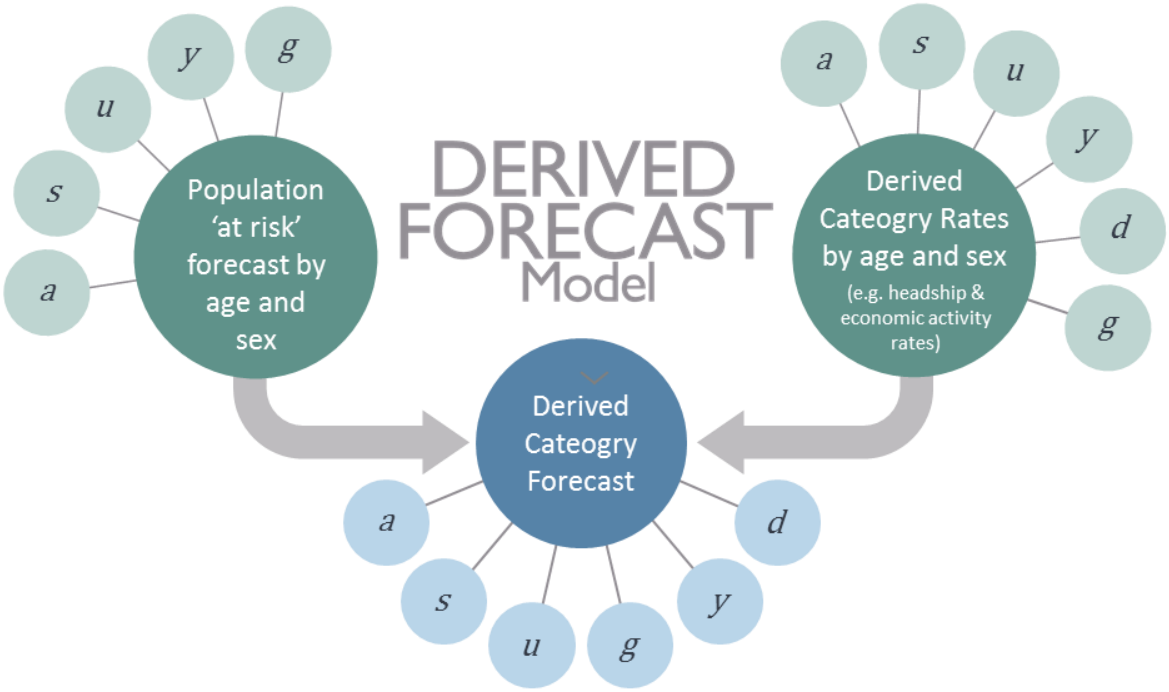


Figure 24: POPGROUP population projection methodology



$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g}\ R_{a,s,u,y,d,g}}{100}$$

D	Derived Category Forecast	y	Year
P	Population 'at risk' Forecast	d	Derived category
R	Derived Category Rates	g	Group (usually an area, but can be an ethnic group or social group)
a	Age-group		
s	Sex		
u	Sub-population		

Figure 25: Derived Forecast (DF) methodology

Appendix E

Data Inputs & Assumptions

Introduction

E.1 Using historical evidence in conjunction with information from the ONS, Census and Welsh Government, a series of assumptions have been derived which drive population and dwelling forecasts for Pembrokeshire-Out.

E.2 The following scenarios have been produced for Pembrokeshire-Out:

- WG 2014 (Rebased)
- PG 10yr
- PG Long Term
- Net Nil
- Dwelling-led (5yr Average)
- Dwelling-led (10yr Average)
- Dwelling-led (LDP)

Population, Births & Deaths

Population

E.3 In each scenario, historical population statistics are provided by the mid-year population estimates (2001–2016) for Census Output Areas. These data have been scaled to reflect the Unitary Authority MYE revisions for the 2012–2016 period (March 2018).

E.4 In the **WG-2014 (Rebased)** scenario, historical population is provided up to 2016, with future population counts provided by single-year of age and sex thereafter to ensure consistency with the population growth trajectory of the WG 2014-based projection.

Births & Fertility

E.5 In all scenarios, historical mid-year to mid-year counts of births by sex have been sourced from ONS, aggregated and apportioned to Census Output Area statistics. Under all scenarios, historical births are provided for the 2001/02–2015/16 period.

E.6 In combination with the 'population-at-risk' (i.e. all women between the ages of 15–49), the assumptions listed below provided the basis for the calculation of births in each year of the forecast period:

(a) A Pembrokeshire age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age in 2016/17, derived from the WG 2014-based population projection for the unitary authority.
(b) A fertility differential for Pembrokeshire-Out, derived from the historical births data up to 2015/16.
(c) Long-term assumptions on changes in age-specific fertility rates from the WG 2014-based population projections for Pembrokeshire.

E.7 Under the **WG-2014 (Rebased)** scenario historical births are provided up to 2015/16. From 2016/17 an ASFR from the WG 2014-based projection is used to ensure consistency with the population growth trajectory for Pembrokeshire-Out.

Deaths & Mortality

E.8 In each scenario, historical mid-year to mid-year counts of deaths have been sourced from ONS, aggregated and apportioned from Census Output Area statistics. Under all scenarios, historical deaths are provided for the 2001/02–2015/16 period.

E.9 In combination with 'population-at-risk' (i.e. the total population of Pembrokeshire-Out, the assumptions listed below provide the basis for the calculation of deaths in each year of the forecast period:

(d) A Pembrokeshire age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex in 2016/17, derived from the WG 2014-based population projection.
(e) A mortality differential for Pembrokeshire-Out, derived from the historical deaths data up to 2015/16.

(f) Long-term assumptions on changes in age-specific mortality rates from the WG 2014-based population projection for Pembrokeshire.

E.10 In the **WG 2014 (Rebased)** scenario, historical deaths are provided up to 2015/16. From 2016/17, an ASMR from the WG 2014-based projection is used, to ensure consistency with the WG 2014-based population growth trajectory for Pembrokeshire-Out.

Migration

E.11 Other than Census statistics, there are no historical migration statistics available for the area of Pembrokeshire that is outside of the National Park. Therefore, migration is calculated as the 'residual' of annual population change, after taking account of births and deaths.

E.12 Using the Census statistics, historical estimates of migration are derived for Pembrokeshire-Out comparing the migration implied by the schedule of rates with the pattern of migration observed in the Census statistics. Once historical estimates of migration have been derived, a weighted average of the last ten years (2006/07–2015/16) of estimated migrant counts is used directly as input to scenario forecasts for all years after the latest 2016 mid-year population estimate. Under the **PG Long Term** scenario, historical estimates of migration have been derived from the last fifteen years (2001/02–2015/16) of estimated migration counts. Under the **Net Nil** scenario, inflows and outflows are balanced, resulting in zero net migration.

E.13 The **Dwelling-led** scenarios calculate their own migration assumptions to ensure an appropriate balance between the population and the targeted increase in the number of new homes in each year of the *forecast* period (2016/17–2032/33). A higher level of migration will occur if there is insufficient population to meet the forecast dwelling target. The profile of migrants if defined by an age-specific ASMigR schedule derived using a weighted average of the last ten years of estimated migrant counts.

E.14 In the **WG-2014 (Rebased)** scenario, historical counts of migrants are used from 2001/02 to 2015/16. From 2016/17, future counts of migrants are specified along with an ASMigR, to ensure consistency with the WG 2014-based population growth trajectory.

Households & Dwellings

E.15 The 2011 Census defines a household as:

> *"one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area."*

E.16 In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

E.17 Apart from in the **Dwelling-led** scenarios, the household and dwelling implications of the population growth trajectory have been evaluated through the application of membership rates, average household size, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the WG 2008-based and 2014-based household projection models and 2011 Census.

E.18 In the **Dwelling-led** scenarios, these assumptions are used to determine the level of population growth required by the defined dwelling growth trajectory.

Membership Rates

E.19 The membership rates are used to calculate the proportion of the household population in each household category by age group and sex (Table 10), taken from the WG 2014-based household model for Pembrokeshire-Out. The household population is then converted into households using average household size assumptions, taken from the WG 2014-based household model. Under the sensitivity scenarios, membership rate assumptions are taken from the WG 2008-based household projection model.

Table 10: Household Categories

Household Category
1 person
2 person (No children)
2 person (1 adult, 1 child)
3 person (No children)
3 person (2 adults, 1 child)
3 person (1 adult, 2 children)
4 person (No children)
4 person (2+ adults, 1+ children)
4 person (1 adult, 3 children)
5+ person (No children)
5+ person (2+ adults, 1+ children)
5+ person (1 adult, 4+ children)

Communal Population Statistics

E.20 Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the WG 2014-based household projections for Pembrokeshire-Out. Examples of communal establishments include prisons, residential care homes and student halls of residence.

E.21 For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–85+, the proportion of the population not-in-households is recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

E.22 The relationship between households and dwellings is modelled using a 'vacancy rate', derived from the 2011 Census using statistics on households (occupied household spaces) and dwellings (shared and unshared).

E.23 A vacancy rate of 8.1% for Pembrokeshire-Out has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated.