



**WESTERN
DEVELOPMENT
COMMISSION**

Making the Transition to a Low Carbon Society in the Western Region

Key Issues for Rural Dwellers

Background Report



August 2020

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1. Introduction

The Western Development Commission (WDC) is focused on the needs of, and opportunities for, rural areas in the Western Region¹. Rural areas are places of employment and make an important contribution to the economy. The WDC recognises that energy and climate action will bring important opportunities for our largely rural region, but at the same time it will bring challenges that need to be addressed for the region to make the transition.

Rural development as outlined in the Action Plan for Rural Development² is government policy and is a National Policy Objective of the National Planning Framework³). Climate action before 2030 is essential to achieving the national goal of a low carbon economy in Ireland by 2050. The government launched the [Climate Action Plan](#)⁴ which focuses on actions and targets to 2030 and the [Programme for Government](#)⁵ expands and develops many of the actions in the Climate Action Plan. In the context of ongoing WDC policy analysis work, a clear need has emerged in relation to rural low carbon transition to ensure that the needs, impacts, options and opportunities for rural dwellers are considered and actions developed to focus on particular issues for them. Meeting that need is reflected in both national and organisational strategy and this piece of work was commissioned.

This background study on the issues to be considered in the transition of the region to a low carbon economy and society is one of eleven pieces of research under Action 160 to “Assess the economic and employment implications of the transition to a low-carbon economy” which fall under the Citizen Engagement, Community Leadership and Just Transition under the [Climate Action Plan](#). The report has been prepared by the Policy Analysis team of the WDC.

The Western Region is largely rural which takes in some of the most remote parts of the state. Using the CSO definition 64.7% in of the population live outside of towns of 1,500 or more. Using the definition in Ireland 2040 the National Planning Framework⁶ 80% of people in Western Region live outside of towns of 10,000. The five most rural counties in Ireland are in the Western Region (Leitrim (89.6% of the population live in rural areas), Galway county (77.4%), Roscommon (74%), Donegal (72.5%) and Mayo (71%)). The Western Region also has a higher share of the population living in smaller towns. Thus the WDC has a particular focus on the needs of, and opportunities for, more rural and peripheral areas. It should be remembered, however, that urban/rural is a rather simplistic division, which ignores the ‘suburban’ and the differences between rural towns and the open countryside which all have distinctive emission patterns.

There is no significant body of work (internationally as well as nationally) on climate change and emissions issues for rural dwellers in developed countries and yet there are important differences in energy use patterns and emissions. While it is often acknowledged that rural dwellers have higher individual emissions the ways of addressing these are not usually explored, partly because emissions reductions may be more difficult to achieve in rural areas, and partly because the focus is usually on larger populations and ways to reduce the emissions of individuals living in more densely populated areas.

¹ There are seven counties in the Western Region under the remit of the WDC: Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Clare

² <https://www.ruralireland.ie/action-plan/>

³ <http://npf.ie/project-ireland-2040-national-planning-framework/>

⁴ <https://www.dcaea.gov.ie/en-ie/climate-action/topics/climate-action-plan/Pages/climate-action.aspx>

⁵ <https://static.rasset.ie/documents/news/2020/06/programmeforgovernment-june2020-final.pdf>

⁶ <http://npf.ie/project-ireland-2040-national-planning-framework/>

It is therefore important that we understand the situation for rural people including the areas that must be the focus of change, the long term options, the opportunities and challenges and the scale and scope of the actions required to reduce rural dwellers emissions and increase the use of renewable energy in rural areas.

It is recognised⁷ that climate actions such as increasing carbon taxes particularly affect rural areas while the options for rural dwellers to change their behaviour are limited. Rural dwellers have different energy needs and often have reduced or more costly choices than their urban equivalents. Rural individuals are thought to have a larger carbon footprint than their urban counterparts⁸ and need greater access to cleaner energy choices. At the same time the sources of clean energy for all citizens are largely rural based.

While the focus of this work is on the changes needed to be made to reduce the emissions produced by rural dwellers, it is also important to be aware that people's carbon footprints are closely linked to their incomes and consumption patterns and so do not necessarily relate directly to their location (urban or rural). In fact recent research in Finland⁹ has highlighted higher emissions from urban dwellers arising from their higher consumptions patterns.

In this background study we consider key climate mitigation issues from a Western Region perspective. As the region is predominantly rural the findings and the analysis are relevant to other Irish rural areas. The study brings together available data to give us a better understanding of where we are starting from and the issues to be addressed.

What is covered?

This is the background report 'Making the Transition to a Low Carbon Society in the Western Region —Key issues for rural Dwellers' which focuses on the data and more detailed background discussion of the issues. The recommendations are contained in the main report and the summary report.

Discussion of rural emissions often focuses on the emissions from agriculture, which is the single largest contributor to Ireland's greenhouse gas emissions, accounting for 34% of total national emissions in 2018¹⁰. Teagasc, also under Action 160 in the Climate Action Plan, is undertaking an assessment of the implications of climate mitigation options on the socio-economic value of agricultural production and the rural economy focussing agricultural emissions. This study therefore examines the implication of the transition for 'rural dwellers' and the focus is on people living in rural areas rather than agriculture. The work concentrates the need for climate mitigation rather than climate adaptation which is the responsibility of the Climate Action Regional Offices (CAROs) which have prepared county adaptation plans. The focus in this work, therefore, is on the three aspects of *energy use* by rural dwellers which can have significant climate implications:

- Heat and energy efficiency rural homes
- Transport
- Electricity (both supply and demand).

⁷ <https://www.esri.ie/publications/carbon-taxation-in-ireland-distributional-effects-of-revenue-recycling-policies>

⁸ See more discussion on <https://wdcinsights.wordpress.com/2015/12/15/rural-dwellers-and-climate-change-mitigation/>

⁹ Heinonen J and S Junnila, 2011 A Carbon Consumption Comparison of Rural and Urban Lifestyles *Sustainability* 2011, 3, 1234-1249

¹⁰ <http://capreform.eu/climate-measures-in-irish-agriculture/>

2. Rural Homes—Energy Efficiency and Heating

2.1 Introduction

The built environment accounts for more than 12% of Ireland's GHG emissions, and the energy used in buildings accounts for more than a third of our energy demand¹¹, so increasing efficiency in the built environment and changing the way we heat our buildings will both be significant climate actions.

Increasing energy efficiency is covered in detail in the Climate Action Plan with a focus on the energy standards for new build, energy efficiency rating in homes and other buildings, regulation¹² and retrofitting to improve energy efficiency¹³. One of the most important elements of the transition to a low carbon rural region will be emissions reduction from homes in the Western Region by improving energy efficiency and switching to renewable energy sources for heating in particular. The government, in the [Climate Action Plan](#)¹⁴ 2019, has set very ambitious targets for improving energy efficiency including retrofitting 500,000 buildings to a much higher level of efficiency (BER B2 or cost optimal or carbon equivalent) and moving to more renewable heat sources with a target to install 600,000 heat pumps (of which 400,000 will be in existing buildings).

Meeting the high-level target to complete half a million retrofits is a challenge but it should have important benefits in rural areas, both in terms of improving energy efficiency and comfort and heat for many rural dwellers, as well as in the potential for up skilling and employment throughout the country. The issues of financing and cost have yet to be addressed in detail. There is significant future potential for renewable heat in rural areas, but rural dwellers may lack the financial resources to switch to low carbon or carbon free alternatives.

The way buildings are heated has important rural dimensions. Homes in rural areas are more likely to use oil boilers, or rely on solid fuel (including peat which is a significant source of heat energy in some counties) For homes the focus in the Climate Action Plan is largely on the installation of heat pumps (600,000 heat pumps to be installed of which 400,000 are to be in existing buildings). Given that heat pumps are not suitable for many existing dwellings other heating options must also be explored. The use of other renewable energy sources may be particularly appropriate in rural dwellings with more space for storage and with easier access to wood fuels and other renewable energy.

This chapter sets out, in detail, some of the baseline information on homes in the Western Region. Knowing the current situation means that we can make better decisions about what we need to do to make the transition possible and ways to make it happen. To understand the challenge it is first useful to look at the number and types of homes in the seven county Western Region.

¹¹ Thermal/heat energy is the second largest of the three modes of energy. It accounted for 37% of the final energy demand in 2017 <https://www.seai.ie/publications/Renewable-Energy-in-Ireland-2019.pdf>

¹² Action 60 and 61 on oil and gas boilers

¹³ See for example Actions 43-51

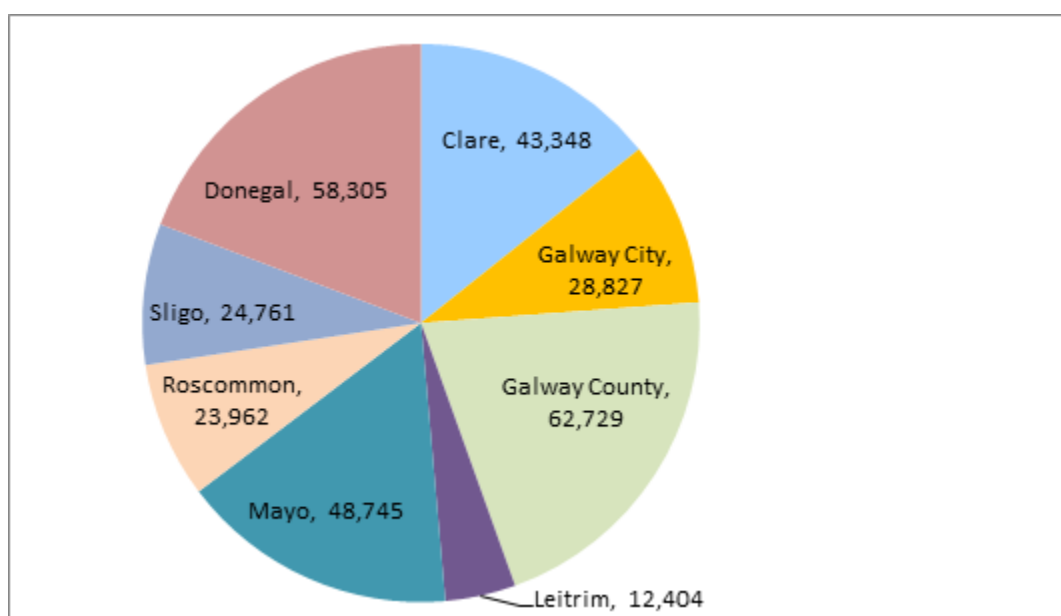
¹⁴ <https://www.dccae.gov.ie/en-ie/climate-action/topics/climate-action-plan/Pages/climate-action.aspx>

2.2 Homes in the Western Region

According to Census 2016 there were 303,081 'permanent housing units', that is all permanent residents excluding caravans, mobile homes and other temporary structures, (these accounted for 987 residences in 2016). While newer homes have been built since the Census in 2016, the numbers are relatively small and those homes are not the focus of the efficiency and energy upgrades envisaged in the Climate Action Plan, so the Census remains the key data source. The Western Region, in 2016, accounted for 17.98% of the permanent homes in Ireland which is in line with the share of the population living in the region (17.4%).

Galway county had the largest number of homes (62,729) and when combined with Galway city (as it is in some data discussed below) it has significantly more homes (91,556) than other Western Region counties. Leitrim, the smallest Western Region county, had 12,404 homes (see Figure 1 below).

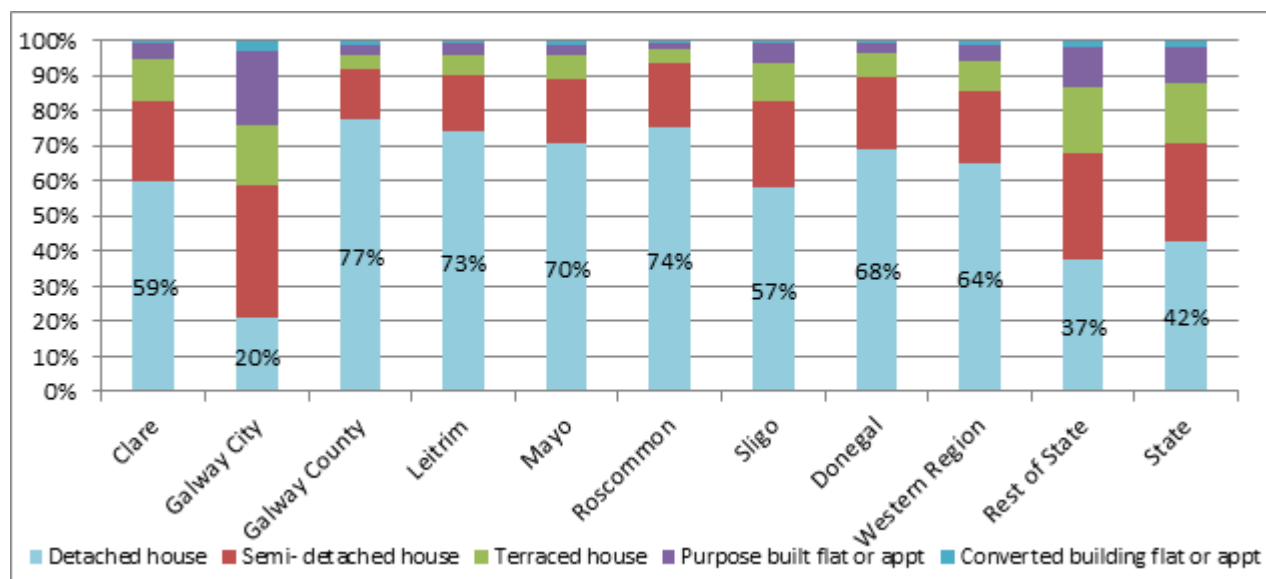
Figure 1: Permanent homes by county in the Western Region, 2016



Source: CSO Census of Population 2016, Profile 1: Housing in Ireland Table E1002

The types of homes in the Region are also important, given that different types have different levels of energy efficiency and can have different options for switching to more renewable energy sources. For example, terraced houses will have lower heat loss than detached houses while flats and apartments are more suited to a central or district heating systems than more dispersed housing. Figure 2 shows the significance of different housing types in the region and state.

Figure 2: Type of permanent housing units in the Western Region, 2016

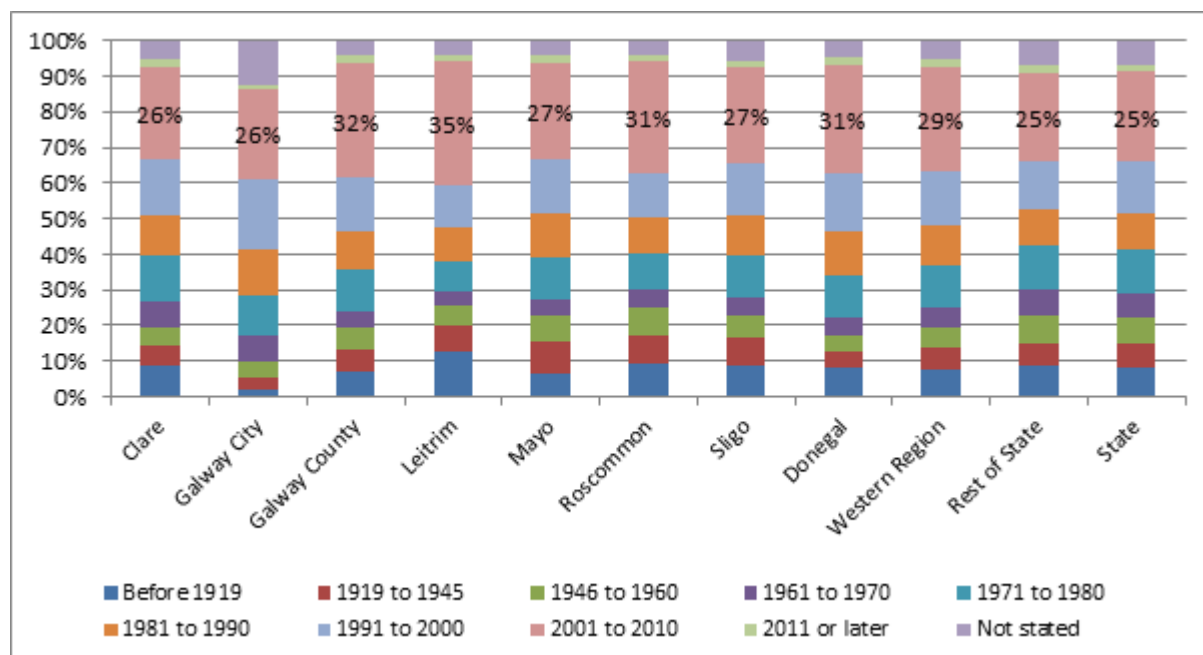


Source: CSO Census of Population, Profile 1: Housing in Ireland Table E1002

Clearly, with the exception of Galway city, detached houses are the most common housing type in the region, accounting for 64% of all homes in the region compared to 37% of homes in the rest of the state. As would be expected the more rural counties have an even higher proportion of detached homes (Leitrim 73%, Roscommon 74%). Counties with a higher urban population (Clare 59%, Sligo 57%) have a smaller proportion of detached homes but all are still above the state average (42%). As noted above this has implications for the types of changes we need to make in relation to efficiency and heat sources.

The age of homes in the region is also important to planning the transition. Figure 3 shows when homes in the different counties were built. Significant house building in all counties between 2001 and 2010 is very apparent, with more than 30% of homes in Galway County (32%), Leitrim (35%), Roscommon (31%) and Donegal (31%) built in that period, while all other Western Region counties also have a higher proportion of homes built in that period than the rest of the state (25%). Homes built in the different periods have different requirements for energy efficiency upgrades, and will face different costs and challenges. More than a quarter of homes in Leitrim (26%) were built before 1960 while only 17% of those in Donegal were. In Galway City only 10% of homes were built before 1960. The oldest homes will often face the most significant challenges, though it should also be recognised that they are not necessarily the least efficient.

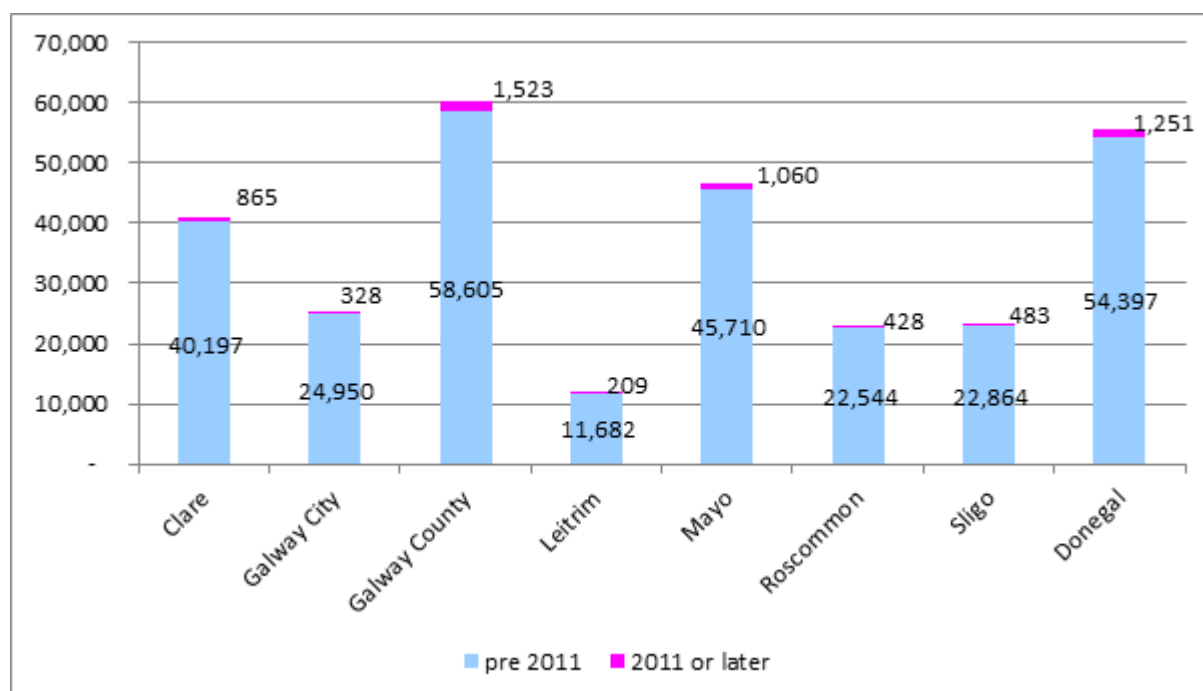
Figure 3: Age of homes in the Western Region, 2016



Source: CSO Census of Population, Profile 1: Housing in Ireland Table E1005

While there will be different requirements for transforming homes from different eras, given the more recent improvement in building standards it is generally assumed that homes built after 2010 will require least upgrading and therefore the focus of the SEAI grants, for example for heat pump installation, is on homes built before 2011. Figure 4 shows the proportions of homes in the Western Region built before and after 2011 (excluding those not stated). In most counties, and in the State, only 2% of homes were built from 2011 onward (the exceptions are Galway City (1%) and Galway County (3%).

Figure 4: Number of Homes built pre and post 2011 in the Western Region, 2016



Source: CSO Census of Population, Profile 1: Housing in Ireland Table E1005

Evidently there is a very significant amount of work ahead with almost 98% of homes likely to require energy efficiency upgrades and fuel switching to complete a move to low carbon. There are of course some pre 2011 exceptions such as the small number of homes which were built to higher efficiency standards than required or which have completed the process already).

2.3 Efficiency of Homes: Building Energy ratings (BER)

A [Building Energy Rating](#) (BER) certificate indicates a building's energy performance rates on a scale of A to G. A-rated homes are the most energy efficient and G-rated are the least energy efficient. It is calculated through energy use for space and hot water heating, ventilation, and lighting. Figure 5 shows the different energy ratings given to buildings covered in each county up to Q1 2020. Nationally 90% of homes achieve a B3 rating or less. All Western Region counties perform worse than this, in Galway city and county and Clare 94% of homes with a BER rating of B3 or less, 95% in Mayo, Sligo and Roscommon, 96% in Donegal and 98% in Leitrim). While this data is very useful, in many areas fewer than a third of homes (often considerably fewer) have had a BER assessment (see inset of map Fig 6)¹⁵ and so it is not clear if the homes which have been assessed accurately reflect the housing stock. Assessment by the CSO¹⁶ indicates that for dwellings with a

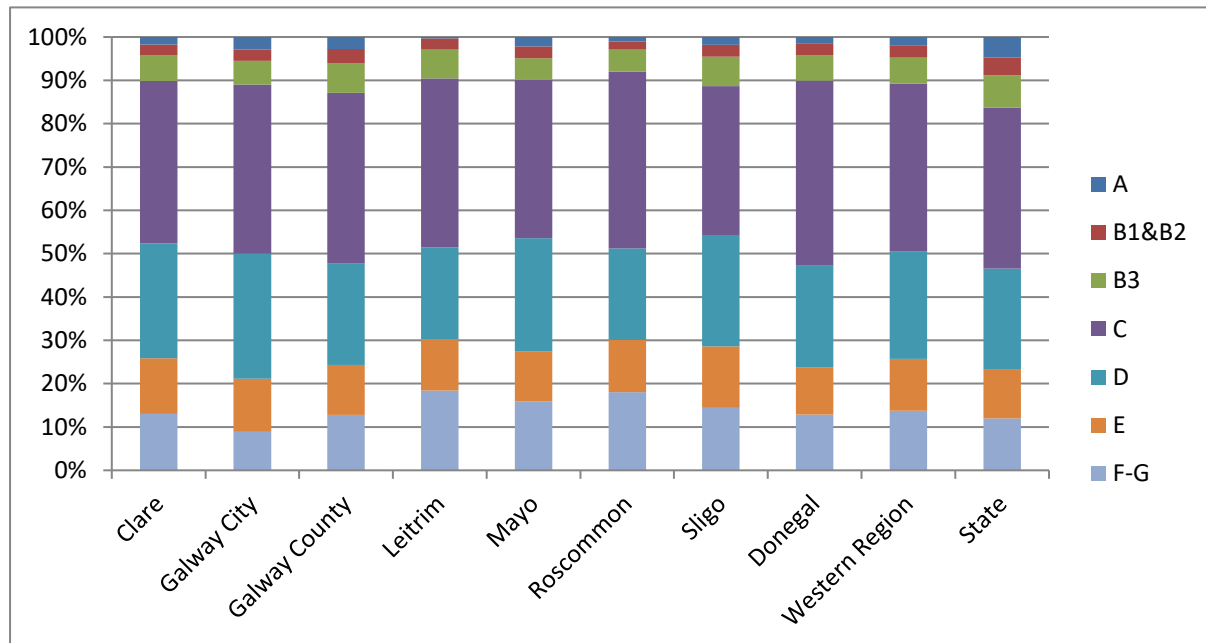
¹⁵ BERs are usually done because a home is to be sold or for a new home or on that had been retrofitted. BER certificates are required for these.

¹⁶ CSO BER Q1 2020. See Table 15 and discussion

<https://www.cso.ie/en/releasesandpublications/er/dber/domesticbuildingenergyratingsquarter12020/>

BER, there are fewer in the lower rating categories than might be the case if all dwellings were included, while there are more dwellings in the higher rating categories than might have been expected,. This generally indicates that dwellings which have had a BER assessment are performing slightly better than what would be expected of all dwellings.

Figure 5: Percentage of rated buildings in each BER class for Western Region counties



Source: CSO, 2020, Domestic Building Energy Rating Table EBA02

The [Climate Action Plan](#) focus is on improving homes to a BER rating of at least B2 (or cost optimal or carbon equivalent). Currently in the Western Region 5% of homes with a BER rating achieve B2 and above (Table 1). Galway city and Galway county (6%) perform best, followed by Mayo and Sligo with 5% of homes with a BER rating achieving B2 while only 3% in Leitrim and Roscommon do so. In contrast 9% of dwellings with a BER nationally achieve B2 and above.

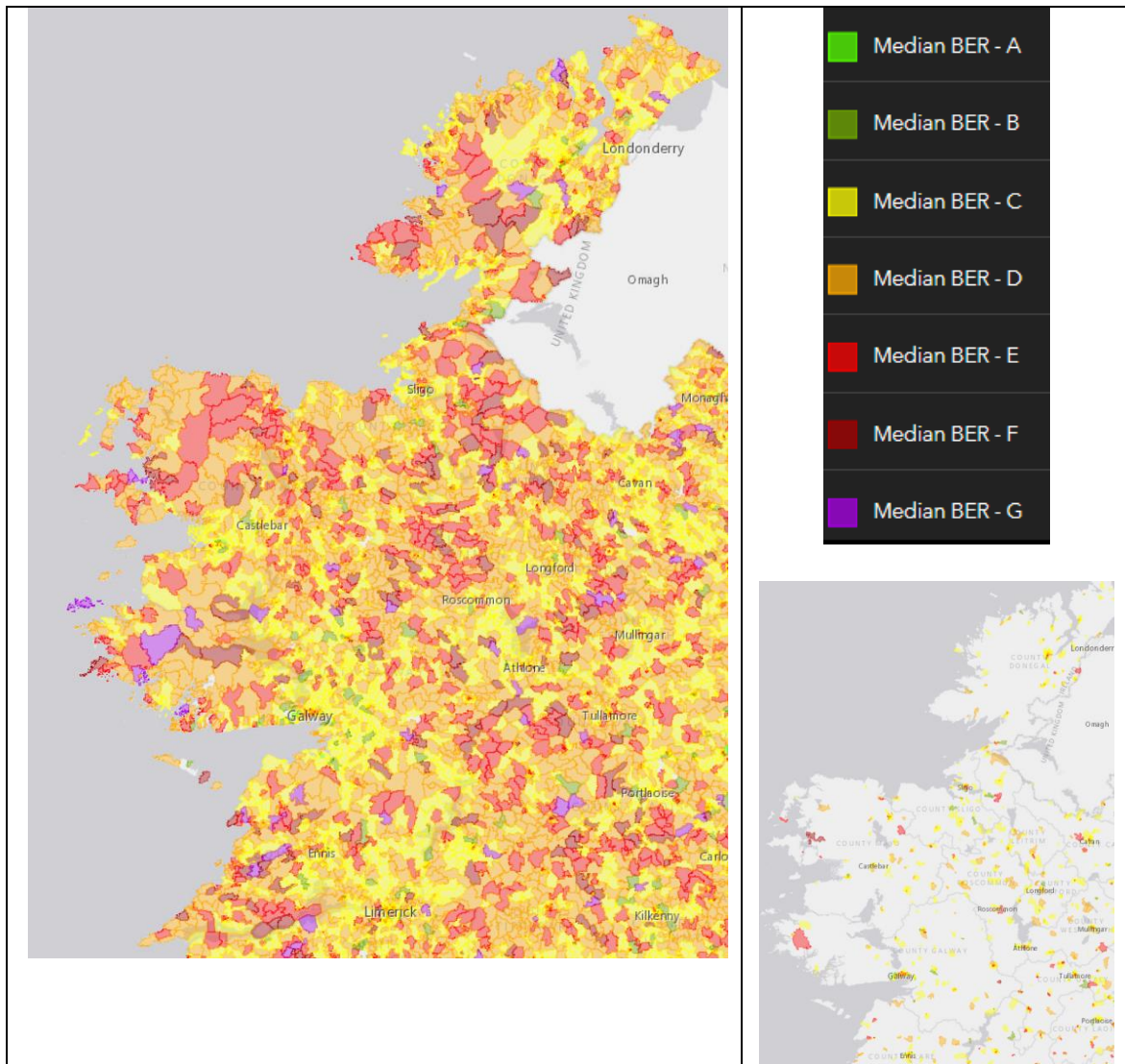
Table 1: Percentage of Dwellings with a BER rating of B2 and above.

	Clare	Galway City	Galway County	Leitrim	Mayo	Roscommon	Sligo	Donegal	Western Region	State
A, B1, B2	4%	6%	6%	3%	5%	3%	5%	4%	5%	9%
A&B	10%	11%	13%	10%	10%	8%	11%	10%	11%	16%

Source: CSO, 2020, Domestic Building Energy Rating Table EBA02

The SEAI has recently produced an interactive map of BER ratings and with detailed BER data mapped at small area level. Figure 6 below is a snapshot the national map where green DEDs have a median rating of B and above (there are not many on the map), while yellow shows DEDs with A median C rating, orange is D, Red is E, Dark red, F and purple G. The map should be viewed with caution as most EDs have fewer than 25% of their homes with a BER rating (see inset) and so the data may be skewed. It is, however, useful for planning and can be viewed in full [on the SEAI website](https://www.seai.ie/technologies/seai-maps/ber-map/)¹⁷.

Figure 6: Map of median BER ratings by ED



Source: SEAI <https://www.seai.ie/technologies/seai-maps/ber-map/> 04/20 update. The inset shows EDs where more than 25% of homes have had a BER assessment

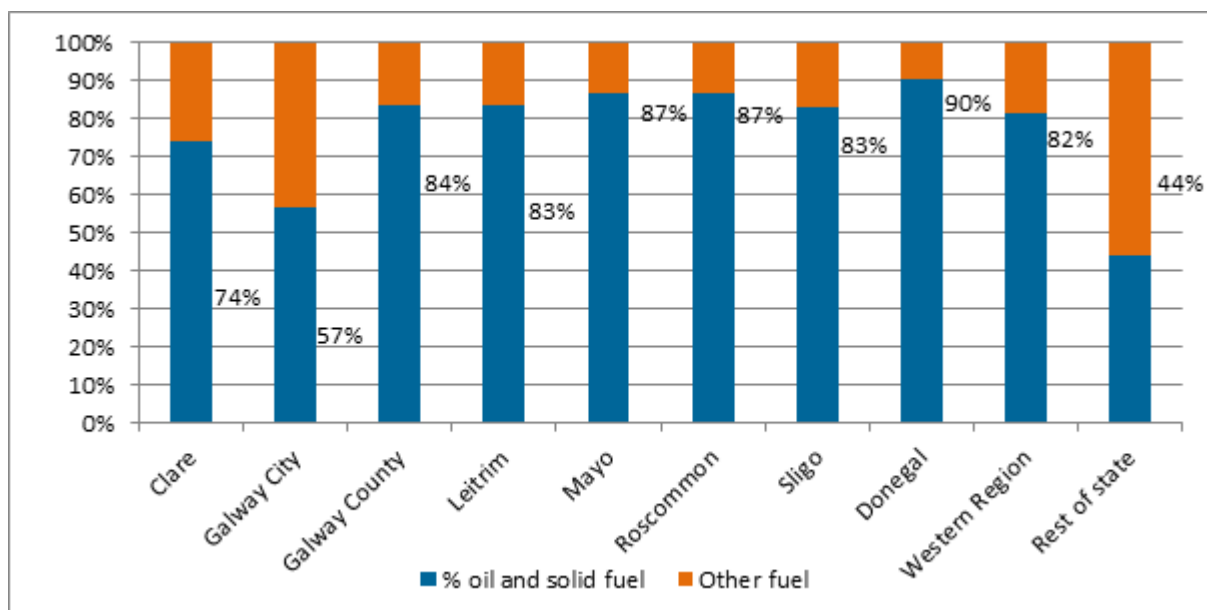
¹⁷ <https://www.seai.ie/technologies/seai-maps/ber-map/>

2.4 Fuels used in home heating

While much of the discussion above has related to improving energy efficiency in homes, the other element necessary for reducing the carbon footprint of our homes is the fuel used for heating. We will need to decarbonise the fuels used, by switching to renewable energy which may be electrical (generated from wind, solar or, in future, ocean energy), or bioenergy (e.g. wood energy, biogas from anaerobic digestion or a liquid biofuel).

The highest priorities for change are buildings heated using the most carbon intensive fuels (oil, coal and peat) and homes in the Western Region are particularly reliant on these, being rural, with little access to the natural gas grid and often using very traditional forms of central heating. Figure 7 below shows the percentage use of oil and solid fuels (excluding wood energy) used in homes in the Western Region (from Census 2016). In the Western Region as a whole more than 80% of homes use oil, coal or peat for central heating, compared with 44% of homes in the rest of the state. In Donegal 9 out of 10 homes use these fuels, with Mayo and Roscommon almost as high (each 87%). Galway city has the lowest use of these fuels in the region (57%) and even that is higher than in the rest of the state. Clearly homes in Western Region counties need to be prioritised in the switch to low carbon heating.

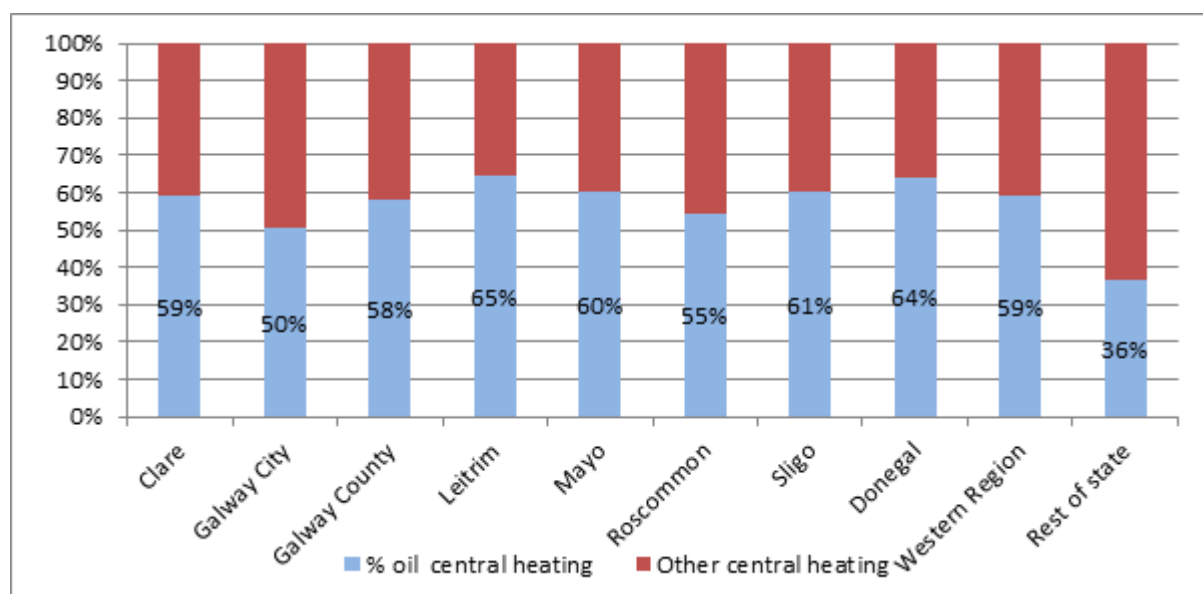
Figure 7: Oil and solid fuel as a percentage of central heating fuels in Western Region counties



Source: CSO Census of Population, Profile 1: Housing in Ireland Table E1053

While much of the discussion on home heat (e.g. in the [Climate Action Plan](#)) has focussed on heat pump installation, it may be that for homes heated using coal and peat a switch to other renewable solid biomass such as wood energy (pellets or logs) might be more appropriate. This is especially in older homes which will need very significant retrofitting and may have particular ventilation requirements. The focus of heat pump installation may therefore be on homes heated using oil. Figure 8 below shows the percentage of homes in Region which use oil for central heating.

Figure 8: Oil as a percentage of central heating fuels in Western Region counties



Source: CSO Census of Population, Profile 1: Housing in Ireland Table E1053

Almost 60% of homes in the Western Region use oil for central heating compared to 36% in the rest of the state. Again Galway city is lowest (at 50%) with the highest oil use in Leitrim (65%) and Donegal (64%). A fifth of homes in Galway city (21%) are using electricity for heating which reflects the higher number of flats and apartments there (21%). Roscommon has relatively low oil use (55%) because of the very significant use of peat (27%) to fuel central heating. Homes in Galway county also commonly use peat (23%).

2.5 Heat Pump ready?

While it is important to change the type of energy used to heat homes in the Region, as discussed above, energy efficiency and good insulation are the first steps which need to be taken with a 'fabric first' approach¹⁸ advocated by SEAI for home energy improvement. This is particularly important when heat pumps are to be installed as the home must be well insulated in order for heat pumps to work properly.

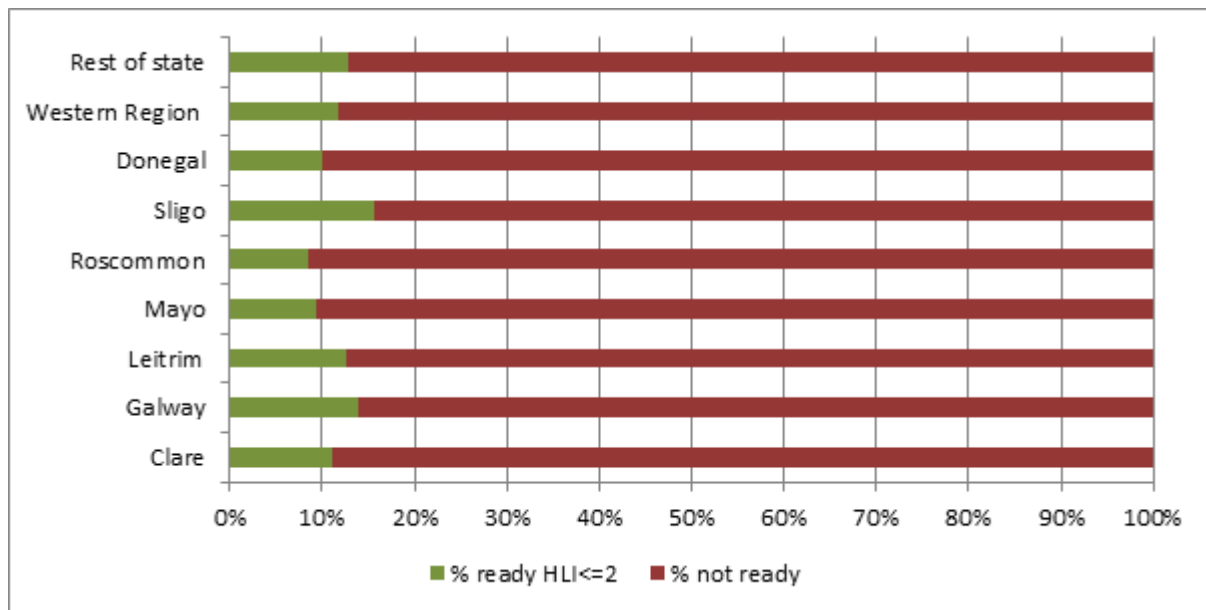
In 2019 SEAI used Heat Loss Indicator (HLI) data from BER certifications¹⁹ to assess how many homes built prior to 2010 are ready to have heat pumps installed. A prerequisite for heat pump installation is a HLI of $\leq 2 \text{ W/K/m}^2$ and the percentage of homes ready for heat pump installation in the Western Region is shown in Figure 9 below. Interestingly, this is a similar percentage of homes²⁰ in the Western Region (11.7%) as in the Rest of the State (12.8%). Sligo is the Western Region county with the highest proportion of heat pump ready homes (15.6%) followed by Galway (14.0%) and Leitrim (12.6%). Roscommon (8.6%) and Mayo (9.3%) have the lowest number of homes ready for heat pumps.

¹⁸ <https://www.seai.ie/blog/the-two-step-approach-to/>

¹⁹ <https://www.seai.ie/blog/opportunities-for-heat-pu/>

²⁰ Heat pump ready homes by county is shown as a percentage of permanent homes built before 2011 from CSO Census of Population 2016

Figure 9: Heat Pump ready homes (HLI ≤ 2) by Western Region county



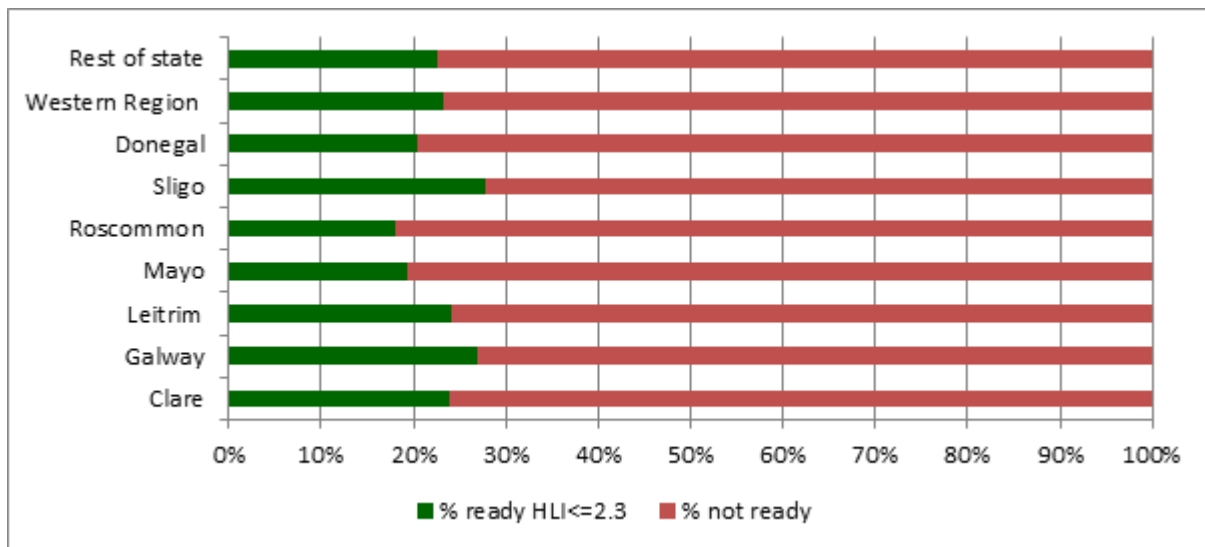
Source: <https://www.slideshare.net/SustainableEnergyAut/key-learnings-from-the-seai-heat-pump-programme> and CSO Census of Population, Profile 1: Housing in Ireland Table E1002. Own calculations.

The HLI of ≤ 2 is the most stringent measure of heat pump readiness, but given the very significant target for heat pump installation in the Climate Action Plan (400,000 in existing homes by 2030) it is also useful to look at other homes which are close to this level of readiness. SEAI have, therefore, also estimated the number of homes which are heat pump ready using a HLI of ≤ 2.3 with certain caveats (see [this](#) for the detail of these).

Using this measure there are a considerably higher proportion of heat pump ready homes (see Figure 10) in the Western Region (23.2%)²¹ which is higher than the rest of the State (22.5%). Again, Sligo has the most heat pump ready homes (27.8%) with Galway (23.9%), Leitrim (24.1%) and Clare 23.9% all higher than the Region average. The lowest proportion of homes ready for a heat pump is in Roscommon (18%) and Mayo (19.4%).

²¹ This figure includes all those homes with a HLI of ≤ 2.0

Figure 10: Heat Pump ready homes (HLI ≤ 2.3) by Western Region county



Source: <https://www.slideshare.net/SustainableEnergyAut/key-learnings-from-the-seai-heat-pump-programme> and CSO Census of Population, Profile 1: Housing in Ireland Table E1002. Own calculations.

Although only 23% of homes are currently heat pump ready in the Western Region this still amounts to 65,187 homes in total in the region (and 351,295 in total for the state). Prioritising these homes would make a very significant start on meeting the target in the Climate Action Plan.

This summarises the baseline information necessary for planning the transformation of our Western Region homes to more energy efficient, low carbon dwellings. Clearly the scale of the transformation required is enormous and some of the issues which need to be addressed and actions which might be put in place are discussed next.

2.6 Energy efficient homes: some thoughts on retrofit.

The government target of improving home energy efficiency through the retrofitting of 500,000 buildings by 2030 (see the [Climate Action Plan](#) 2019) is ambitious. It is therefore useful to look at the retrofits in more depth, and consider the target and issues from a rural Western Region perspective.

While new buildings have significant potential to incorporate the reduction or elimination of energy consumption for space heating and cooling purposes into their design, a focus on existing buildings is essential. The longevity of buildings and the building stock (typically 50–100 years) means that for a very long time ahead the majority of the building stock will be from an era with less stringent energy efficiency regulations. In the last section, the baseline information on homes in the Western Region was set out, here some of the issues associated with retrofitting these homes is considered in more detail.

Energy efficiency in Western Region homes

As discussed in previously, recent improvement in building standards mean that it is generally assumed that homes built after 2010 will require least upgrading and therefore the focus for retrofitting is likely to be on homes built before 2011. In the Western Region, the Census of population 2016 shows that there are 280,949 homes built before 2011, that is 93% of all the homes in the Western Region²². Currently, only 5% of homes in the region, with a BER, have a rating of B2 and higher (the target energy rating in the Climate Action Plan is BER B2 or cost optimal or carbon equivalent). If these BER ratings already recorded are translated to the Western Region housing stock, it means that almost 267,000 homes would need to be retrofitted. The challenge to improve energy efficiency is, therefore, very significant. It is likely, however, that the BER ratings we have are not reflective of the general housing stock, as they are mainly comprised of houses which are to be sold and new homes and therefore may show higher BER levels than would be the case if all homes had been rated. On the other hand, some homes have been improved and while some of them will have a new BER rating (included in figures above), others will be better than recorded.

What is retrofit?

Before considering the targets and how they might be applied in the Western Region it is useful to understand what ‘retrofit’ means in an energy efficiency context. Retrofits are often referred to as ‘shallow’ or ‘deep’.

Shallow retrofit may include cavity wall insulation, window replacement, attic insulation, draught proofing, energy efficient lighting and improved heating controls, and these may be done one at a time and not as part of a complete plan.

In contrast, the Deep retrofit of a home means carrying out multiple energy upgrades all at once to achieve a BER of A-rating. The SEAI provides the following [information on Deep Retrofit](#):

- Firstly, you will need to reduce the level of heat loss so that you keep heat in the home for longer. This involves some or all of the following: wall insulation, roof insulation, floor insulation, window upgrades.
- The next step is to look at an efficient renewable heating system to support the transition away from fossil fuels. The typical heating system installed on a Deep Retrofit Pilot Project is an air-source heat pump.
- It also includes mechanical ventilation to maintain good indoor air quality.
- Other renewable energy technologies such as solar water heating panels and solar photovoltaic panels may be appropriate for your home.

The government target to bring 500,000 to a BER B2 equivalent does not specify the kind of retrofit required, but it is likely to be closer to a ‘deep’ retrofit approach (although not to an A rating but to a B2), particularly as a proposal is to be developed to phase out grants for ‘shallow’ energy efficiency measures by 2022 (Action 52)²³.

²² excluding ‘not stated’

²³ [Climate Action Plan, Annex of Actions](https://www.dccae.gov.ie/documents/Climate%20Action%20Plan%202019%20-%20Annex%20of%20Actions.pdf) <https://www.dccae.gov.ie/documents/Climate%20Action%20Plan%202019%20-%20Annex%20of%20Actions.pdf> (718KB)

How much will the homeowner save?

Improving the energy efficiency of the home through retrofit should provide energy savings, the larger the move up the BER scale the larger the savings. The SEAI has provided an indication of energy costs for different house types at different BER ratings ((see Figure 11 below). According to this table, an owner of an F rated '3 Bed Semi Detached House' could save €2,400 in energy costs a year, while an F rated 'Large House' could save €7,200 annually following retrofit.

Figure 11: SEAI Indicative annual CO₂ emissions and running costs for different rating bands for space and water heating

Rating	2 Bed Apartment		3 Bed Semi-D		4 Bed Semi-D		Detached House		Large house	
	Area (m ²)	75	Area (m ²)	100	Area (m ²)	150	Area (m ²)	200	Area (m ²)	300
	Tonnes CO ₂	Cost (€)	Tonnes CO ₂	Cost (€)	Tonnes CO ₂	Cost (€)	Tonnes CO ₂	Cost (€)	Tonnes CO ₂	Cost (€)
A1	0.4	€140	0.5	€190	0.8	€280	1.1	€400	1.6	€600
A2	0.8	€280	1.1	€380	1.6	€560	2.2	€800	3.2	€1,100
A3	1	€350	1.4	€470	2	€700	2.7	€900	4.1	€1,400
B1	1.3	€440	1.7	€590	2.5	€900	3.4	€1,200	5	€1,800
B2	1.6	€570	2.2	€800	3.3	€1,100	4.3	€1,500	6.5	€2,300
B3	2	€700	2.7	€900	4	€1,400	5.3	€1,900	8	€2,800
C1	2.4	€800	3.1	€1,100	4.7	€1,600	6.3	€2,200	9.4	€3,300
C2	2.8	€1,000	3.7	€1,300	5.5	€1,900	7.4	€2,600	11	€3,900
C3	3.2	€1,100	4.2	€1,500	6.3	€2,200	8.4	€2,900	12.7	€4,400
D1	3.7	€1,300	5	€1,700	7.5	€2,600	10	€3,500	14.9	€5,200
D2	4.4	€1,500	5.8	€2,000	8.8	€3,100	11.7	€4,100	17.5	€6,100
E1	5	€1,800	6.7	€2,300	10.1	€3,500	13.4	€4,700	20.1	€7,000
E2	5.7	€2,000	7.6	€2,600	11.4	€4,000	15.1	€5,300	22.7	€7,900
F	6.8	€2,400	9.1	€3,200	13.6	€4,700	18.2	€6,300	27.2	€9,500
G	8.5	€3,000	11.3	€4,000	17	€5,900	22.7	€7,900	34	€11,900

Source: <https://www.seai.ie/publications/Your-Guide-to-Building-Energy-Rating.pdf> This table gives estimated annual fuel cost and CO₂ emissions on the basis of typical occupancy and heating the entire dwelling to a comfortable level. The Tables above are based on fuel and electricity factors from February 2014.

It should be noted, however, in relation to potential savings, the energy cost estimates usually refer to heating a whole house to 'a comfortable level'. It has been found that people living in less efficient homes may not be heating the house to that level, while those in more efficient, upgraded homes may not be achieving the savings estimated as people's everyday practices and norms of comfort are often changed in parallel to retrofitting of the home²⁴. In other words they may heat their home more (see reference in footnote for more discussion). In addition, the recent falls in oils prices mean that savings will be less than predicted and payback periods longer than predicted for homes heated with oil.

²⁴ Kirsten Gram-Hanssen, 2014, Retrofitting owner-occupied housing: remember the people. <https://www.tandfonline.com/doi/full/10.1080/09613218.2014.911572>

How much does a deep retrofit cost?

It is difficult to find generalised cost estimates for deep retrofitting given the significant variation among house types, size and the upgrades required, but it is usually agreed that it is very expensive.

[Information from the SEAI pilot deep retrofitting programme](#)²⁵ found that for 250 homes that completed deep retrofits under SEAI's pilot programme the average cost to upgrade a home from an average BER rating of F rating to an average A3 rating was €48,417.

[Information from Superhomes](#)²⁶ (a retrofit service providing a 'one stop shop' for energy retrofit projects) again highlights the variation in costs depending on the extent of the retrofit. It notes that the lowest cost for a SuperHomes retrofit in 2019 was €35,000. A grant of €11,000 was secured, bringing the net cost down to €24,000. This retrofit included a heat pump, wall & attic insulation, external door replacement, airtightness measures and a demand control ventilation system.

[SuperHomes](#) suggests that the typical cost of a full scale deep retrofit to BER A3 standard in 2019 was between €50,000 and €70,000 (before grants). These retrofits would include a heat pump, wall and attic insulation, external doors, airtightness measures and a demand control ventilation system. They may also include a mix of external wall insulation, floor insulation, Solar PV and full window replacement. [SuperHomes](#) applied for and secured grant funding of a minimum of 35% of costs on all these retrofits. As a result the net spend was typically between €30,000 and €45,000.

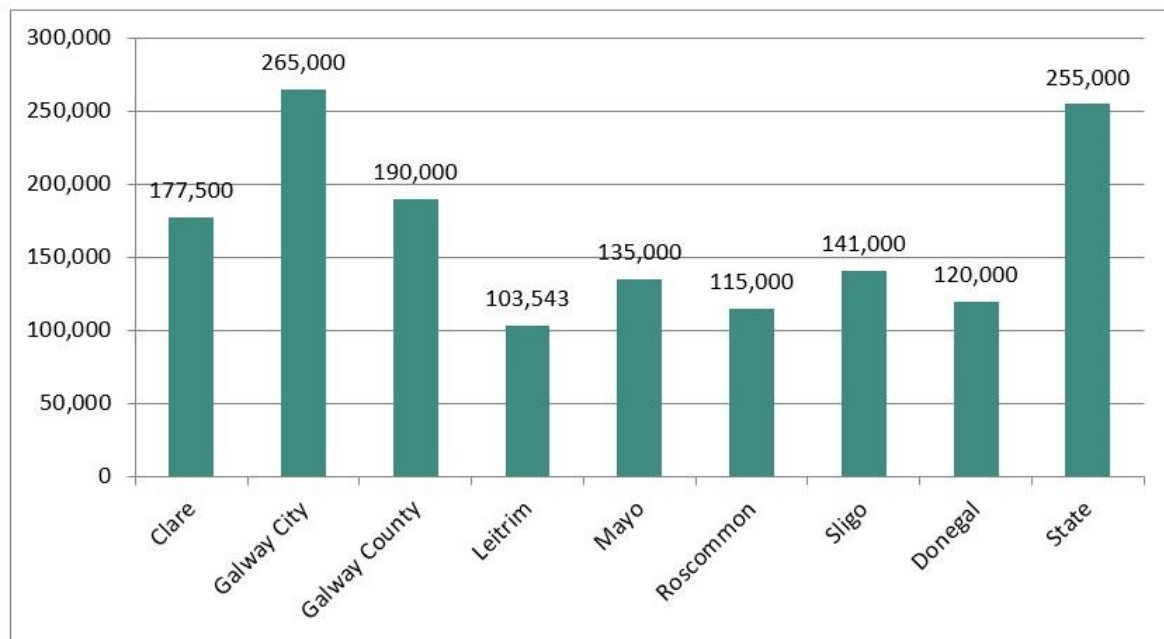
The government retrofit target is a B2 energy rating, rather than the A3 ratings being achieved above. Thus the cost should be somewhat less, though it is not clear by how much as data on costs to achieve a B2 rating do not seem to be available. Overall costs of achieving the target will, of course, depend on the type and size of houses which are being retrofitted. This in turn will partially depend on the incentives available.

However, it should be noted that the cost of the retrofit is very significant, and when compared to the value of homes in Western Region it is clear that it would be equivalent to a large proportion of the home value. While in more expensive areas the cost of the upgrade may account for less than 10% of the home's value, it could be double that in counties like Leitrim and Roscommon where house prices are lower (see Figure 12²⁷). This disincentivises borrowing for the upgrade as any borrowings to finance the upgrade would represent a more substantial portion of the home value, while the retrofit could be felt to add less to the home's value.

²⁵ <https://www.seai.ie/grants/home-energy-grants/deep-retrofit-grant/key-findings/>

²⁶ <https://superhomes.ie/>

²⁷ While the price of homes sold in the last 12 months in each county is not the same as the average value of homes in the county it gives a useful indication of relative values.

Figure 12: Median House price by county 12 months to August 2019

Source: CSO residential Property Price index <https://www.cso.ie/en/releasesandpublications/ep/p-rppi/residentialpropertypriceindexaugust2019/additionalindicators/>

There is little data available as yet on the impact of the BER rating on the value of a house though it would be expected to become more important as the carbon tax increases. The level of increase in a home's value following a retrofit will also become clearer over time.

The full suite of mechanisms to be used to achieve the government retrofitting target have not been finalised, but it is clear that it is ambitious. The cost of retrofits, the means of paying for such energy efficiency, the incentives which will be provided have not yet been fixed. There are a huge range of issues to be considered when deciding how we should best reduce our emissions for the built environment. It is important that particular issues for rural regions and the Western Region are considered.

2.7 Other renewable heat

The focus of the Climate Action Plan is on improved energy efficiency and a switch to heat pumps. While energy efficiency is important, deep retrofitting is very costly and can be complex in a non-standard home. In many situations a shallow retrofit, addressing the most important energy efficiency issues may be the best option. These, also with a direct renewable energy source of heat such as pellet or log boilers may be the most suitable low carbon options in many rural homes.

The WDC has been active in developing measures to promote the use of energy (in particular heat) from biomass, assessing biomass availability and the development of supply chains for its local use. Our experience has shown that strategic policy interventions must recognise the wider market environment in order to design and deliver effective, value for money policy and identify actions which result in sustainable market growth.

The WDC has shown that the renewable heat market has the potential to create considerable levels of employment across the Western Region and to provide long-term stable markets for low value wood fuels which can compete with fossil fuels and stabilise energy prices for end users. Bioenergy brings local jobs, benefits local businesses, helps local economies and replaces imported fuels so it provides important opportunities for rural and remote areas²⁸.

An OECD report *Linking Renewable Energy to Rural Development*²⁹ contains a useful examination of policy options and actions in fifteen OECD regions. It shows how bioenergy can provide greater local and national economic benefits than other renewable energies and notes that bioenergy policy interventions are typically most effective when delivered at a regional and/or local level where they can be tailored to local resources and conditions.

2.8 Conclusions

Energy efficiency is important and the WDC welcomes the ambition in the Climate Action Plan to increase the number of homes with a BER rating of B2 and above is very welcome. However, the most recent BER ratings data (Q1 2020) from the CSO³⁰ shows that currently only 9% of homes assessed nationally have a rating of B or above. In the Western Region only 5% achieve this and it is as low as 3% in Roscommon and Leitrim. This highlights the need to specifically address energy efficiency and home heating issues in more rural and less well-off regions. For dwellings in the lowest rating categories the costs and difficulties of achieving upgrade to a B2 rating are most significant.

Decarbonisation of heating in homes and other buildings is one of the principal challenges in the move to low carbon. The first step towards a low carbon region must be to deliver improved insulation in rural homes. While deep retrofit may be ideal it will also be important to consider energy efficiency measures which improve the insulation and warmth of the home and move from BER of F or G, even if they do not include all measures and remain at C or D rather than A or B.

Most homes in our region use oil for heating. There needs to be a specific effort to encourage change in rural areas which are oil dependent. While many of the incentives are for the installation of heat pumps it should be remembered that the use of wood biomass for heating brings very significant local economic benefits and may be more appropriate for those dwellings least likely to engage in deep retrofit.

²⁸ See <https://www.wdc.ie/publications/renewable-energy-reports/> for WDC work on renewable energy

²⁹ <http://www.oecd.org/regional/linkingrenewableenergytoruraldevelopment.htm>

³⁰ <https://www.cso.ie/en/statistics/climateandenergy/domesticbuildingenergyratings/>

3. Rural Transport and Travel

One of the key elements of the transition to a low carbon Western Region will be emissions reduction from transport. In this chapter transport in rural areas, and the Western Region in particular, is examined, setting out what we know about why and how people travel and considering options for reducing emissions from rural transport.

Addressing transport emissions is a key element of the Climate Action Plan. There is specific focus on the need to address rural issues under the transport heading (e.g. Action 94 to review public and sustainable transport policy and to publish a public consultation on public/sustainable transport policy³¹, including rural transport). This recognises that rural transport needs are different. Under the Plan, Action 100 also addresses the need for a vision for low carbon rural transport and commits to develop a new rural transport strategy and to conduct a comprehensive assessment of rural travel demand, and methodologies for determining it.

This new rural transport strategy is to include:

- a comprehensive assessment of rural travel demand, and methodologies for determining same
- set a target for modal shift and emissions reductions for 2021-2025
- develop proposals for an integrated public transport network
- develop a pilot scheme for a city and its regional hinterland to develop a best practice model pilot a car sharing initiative such as a vehicle bank in rural Towns

There has already been significant investment in, and development of, rural transport options including the significant development of the Local Link bus service which brings an important public transport option to many rural dwellers.

In addition to the review of rural transport options outlined above, the Climate Action Plan has a number of specific actions particularly relating to Electric Vehicles (EVs) which will impact rural dwellers. The government has targeted an increase in the number of EVs to 936,000 comprised of 840,000 passenger EVs, 95,000 electric vans and trucks; and 1,200 electric buses. Changes in transport will require different fuelling and charging options. In relation to EV charging (see for example Actions 72-75) and to a Compressed Natural Gas (CNG) network (Action 76). It is crucial that both of these networks are rolled out all over Ireland so that the adoption of EVs and CNG fuelled vehicles is easy in all rural locations, and that the links between more urban areas and rural areas are seamless. CNG vehicles must be able to deliver and pick up loads in all parts of Ireland; visitors (e.g. tourists, friends and those in business) who are using EVs must be able to travel to all parts of Ireland confident of an available, reliable charging network.

One of the best ways to plan for reducing emissions from travel is to use the 'Avoid, Shift, Improve' (ASI) framework. This is a hierarchy that emphasises reducing journeys in the first place, achieving modal shift, and improving mode efficiencies³². The approach advocates, first of all, that we should *Avoid* or reduce the need to travel or the journey length in the first place (reduce demand) and can

³¹ <https://www.gov.ie/en/consultation/f1b503-public-consultation-on-a-review-of-sustainable-mobility-policy/>

³² See more discussion on ASI in the NESC paper [Advancing the Low-Carbon Transition in Irish Transport](#)

also include a focus on increasing vehicle occupancy. The second part of the framework promotes a modal *Shift* for remaining journeys to more active (walking and cycling) and public transport modes and alternative freight transport modes. Finally, the ASI framework seeks to *Improve* the efficiency of all transport modes in a way that reduces their environmental footprint, primarily through technological developments in vehicles and the energy sources that they use for example by switching to EVs or increased biofuel use.

Addressing transport and travel in rural regions is complex³³. In order to understand what needs to be done to reduce emissions from rural travel, we need to know what our travel patterns actually are. This chapter sets out, in detail, some of population issues and some of the available baseline information on journeys and transport in rural areas and the Western Region. In doing this we must recognise that transport is not an end in itself; it is a means for accessing employment, and other services and amenities that contribute to healthy and fulfilling lives³⁴. Understanding transport as an enabling economic and social practice is essential to promoting positive behaviour change. Knowing the reasons for and the ways we travel means that we can better understand what we need to do to make the transition possible and ways to make it happen.

3.1 Why are rural areas different?

Reducing transport emissions in rural areas may be difficult, for a variety of reasons relating to population size and density, distance to services and to employment and amenities. Understanding patterns of population growth and decline and population density provide the background for much of the discussion of transport and journeys.

The Rural Population

Looking at population, some of the transport issues are immediately brought into focus. In Ireland just over a third (37%) of the population lived in rural areas (that is outside towns of 1,500)³⁵. In contrast, in the Western Region showed the opposite pattern and 65% live in rural areas (Figure 13).

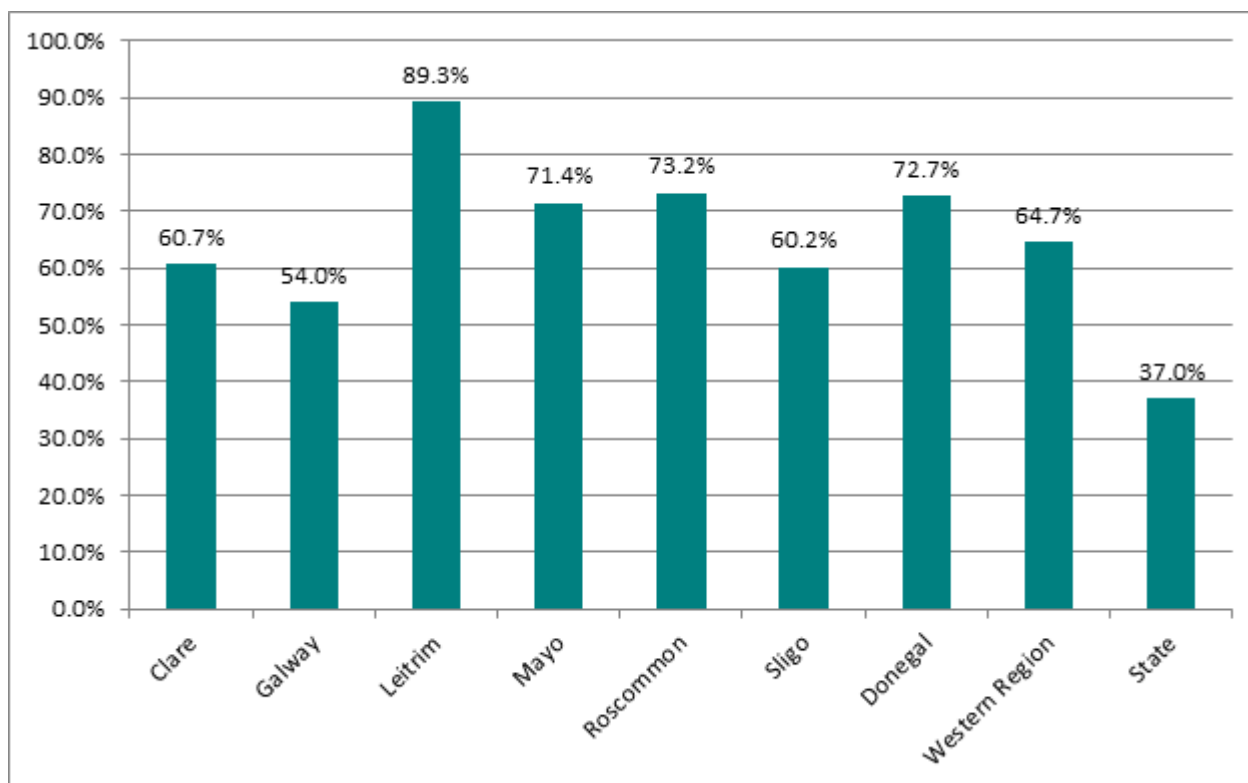
The rural population of the seven counties varies from almost 90% in Leitrim (where there is only one urban centre over 1,500) to 54% in Galway which of course includes the largest settlement of Galway City. After Leitrim, Roscommon, Donegal and Mayo are the most rural of the Western Region counties. Sligo and Clare, along with Galway are slightly less rural. It should be noted that Galway county (i.e. excluding the city) is one of the most rural with almost 78% of the population living in rural areas.

³³ Some of the issues discussed in this chapter have also been considered by the Joint Oireachtas Committee on Rural and Community Development in their report on Regional and Rural Transport Policy https://data.oireachtas.ie/ie/oireachtas/committee/dail/32/joint_committee_on_rural_and_community_development/reports/2019/2019-07-17_report-on-regional-and-rural-transport-policy_en.pdf

³⁴ See the Climate Challenge paper (no.3) of the public consultation on sustainable mobility policy [here](#)

³⁵ CSO, Census of Population 2016

Figure 13: Percentage of Population living in rural areas in the Western Region and State.

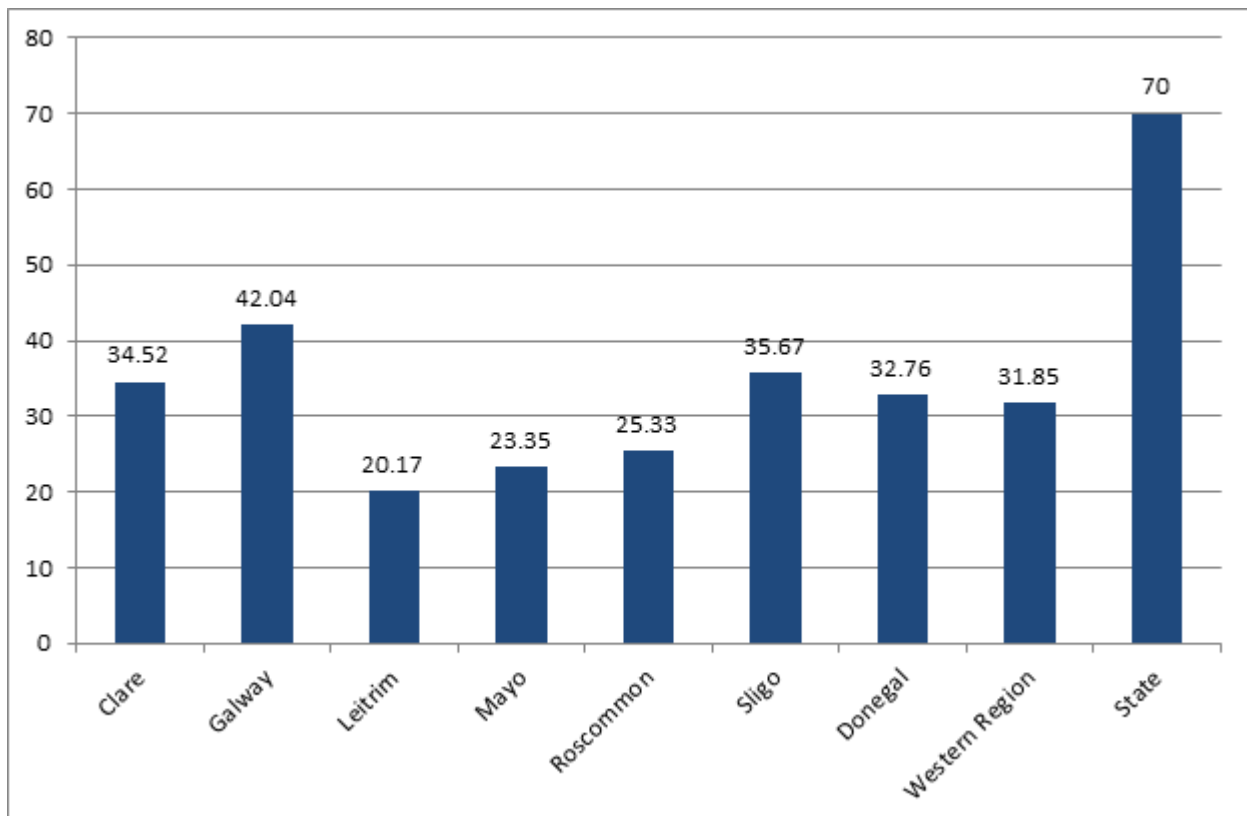


Source: CSO Census 2016 Profile 2 E2008: Population Percentage in the Aggregate Town Areas and Aggregate Rural Areas

Population Density

Density is another key indicator of rurality and it certainly is important in considering the provision of services. The population density of the State is 70 people per square kilometre and in the more rural Western Region it is just under 32 people per km². Again there is considerable variation by county and as can be seen in Figure 14 below, this largely mirrors the rurality of each of the seven counties.

Figure 14: Population Density in the Western Region and State (persons per sq km)



Source: CSO Census 2016 Profile 2 E2013: Population Density and Area Size 2011 to 2016

Galway (county and city) has the highest population density (42 people per square km) and Leitrim has the lowest with just over 20 people per square kilometre.

Population in Towns

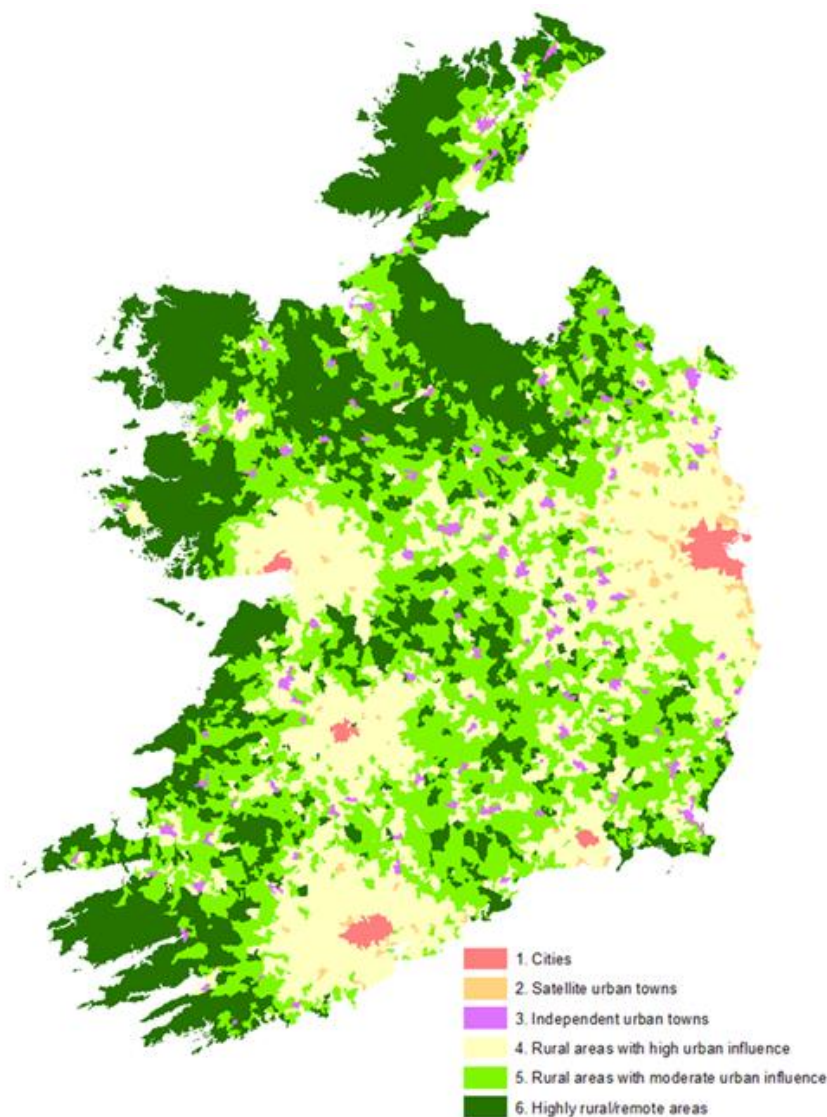
The population of towns across is also important and looking at towns across the Western Region the dispersed urban structure of the region is evident. Galway is the significant city, with a population of 79,934 in 2016. Only five towns in the Region have a population of more than 10,000 people (Ennis, Letterkenny, Sligo, Castlebar and Ballina), and there are a further seven towns with a population of more than 5,000 giving a total of 13 towns including Galway in that size category (5,000+). Another 27 towns in the Western Region have a population of more than 1,500 and which are therefore categorised as urban. This give a total of 42 'urban' settlements, that is, places with a population of over 1,500 in the 2016 Census of Population.

While these urban populations are significant in the context of the region, it should be remembered that more than half a million people (535,953) are living in rural areas (in small settlements and open countryside) in the Region. The CSO also provides population details of a further 201 settlements in the Region, (the smallest of these is Malin, population 92) and 103,936 people live in these. A total of 440,888 (53%) therefore live in more open countryside (and in even smaller settlements).

Rural Categorisation

The CSO has recently published *Urban and Rural Life in Ireland*³⁶ which includes a six way classification of urban and rural areas in, from urban to remote areas and these are shown in Figure 15 below. Most of the Western Region, with the exception of the area around Galway city, falls into the most rural classifications 'Rural areas with moderate urban influence' and 'Highly rural/remote areas' (green on the map). These areas are likely to be the most difficult to address transport emissions, with few public transport options, longer distances to services and often lower household incomes than some of the other rural categories.

Figure 15: Population distribution by six way urban/rural classification using Census 2016 results



Source: CSO Ireland

Source: [CSO Ireland, 2019](https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/). To view the interactive version of the below map, click [here](https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/). The map can be used to find the urban and rural six-way classification assigned to a particular address (searchable by Eircode or address).

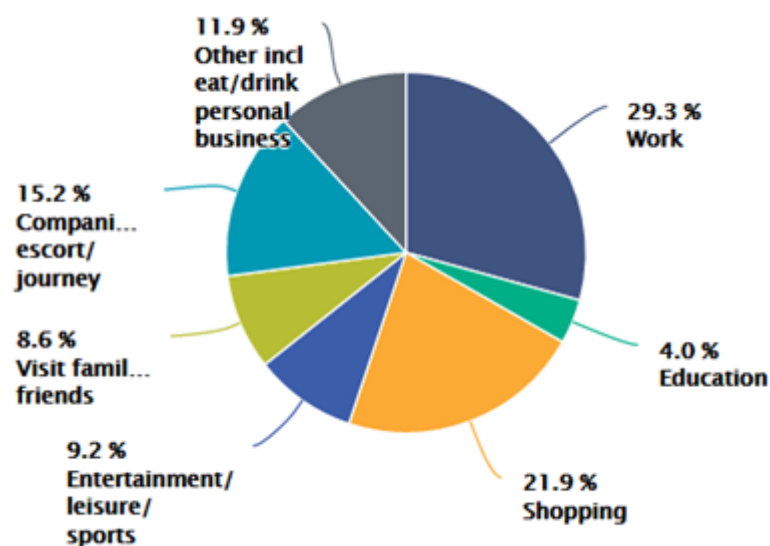
³⁶ <https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/>

3.2 Travel patterns- why we travel

The rural nature of the Western Region has implications for how we reduce transport emissions, but the reasons we travel are also very important, both in terms of options for reducing journey numbers and types, and the distances and nature of the journeys. In this section why we travel and some of the factors influencing the journeys made in rural areas are considered. This will allow us to better understand how we might influence a change in travel patterns in order to reduce emissions from transport.

The CSO's National Travel Survey (2016) gives a breakdown of the reasons for journeys made (Figure 16). The most significant reason for a journey was for work at almost 30% but shopping (almost 22%) and companion and escort journeys (15%) were also quite significant.

Figure 16: Distribution of journeys by purpose, 2016



Source: CSO Ireland

Source: CSO Ireland, 2017, [National Travel Survey](#)

The importance of these reasons has been quite stable over other years when the survey has been conducted, but the increased importance of work journeys since 2012 and 2013 is clear (see Table 2), and consistent with the growth in the economy and employment between 2013 and 2016. This link between journey numbers and economic growth, which has significant implications for climate emissions, has proved difficult to address.

Table 2: Percentage distribution of journeys by purpose, 2013, 2014 and 2016

Purpose	2013	2014	2016
	%	%	%
Work	24.8	25.0	29.3

Education	4.6	4.5	4.0
Shopping	22.7	24.0	21.9
To eat or drink	1.9	1.8	2.4
Visit family / friends	10.2	10.8	8.6
Entertainment / leisure / sports	9.8	9.9	9.2
Personal business	6.4	5.2	5.7
Companion / escort journey	15.2	13.8	15.2
Other	4.2	5.1	3.8
All purposes	100.0	100.0	100.0

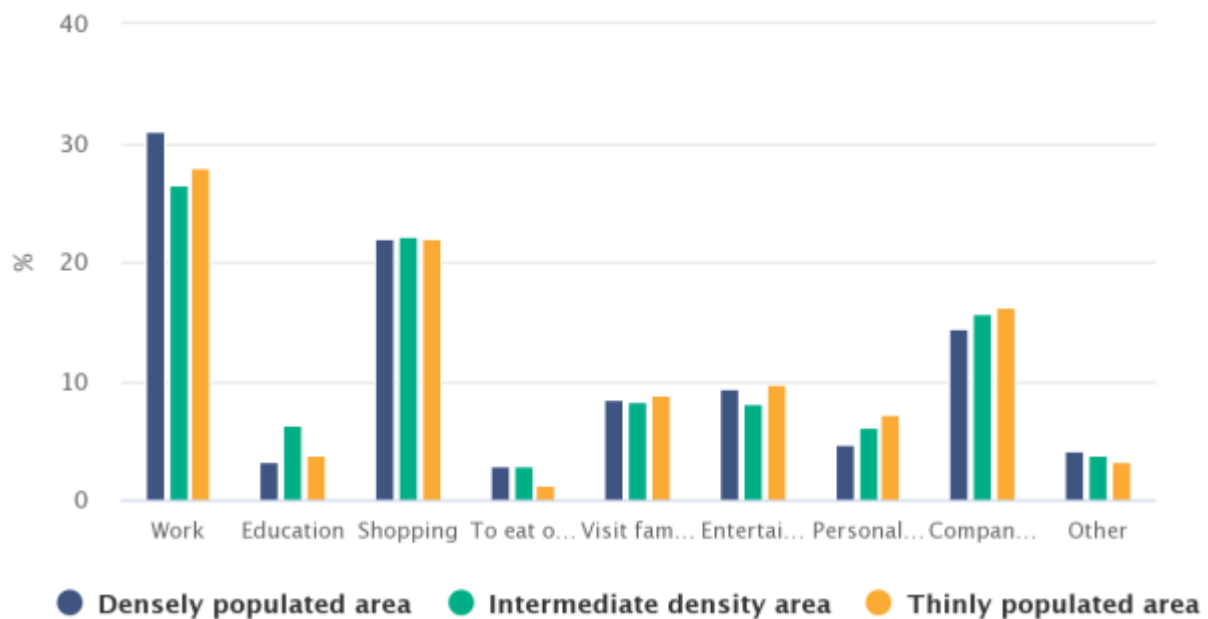
Source: CSO Ireland, 2017, [National Travel Survey 2016 Table 1.3 \(XLS 11KB\)](#)

In that survey the reasons for travel are also broken down by the type of area where the journeys are made (See Figure 17). In this the CSO used three categories³⁷, thinly populated area (rural); Intermediate density area (towns and suburbs); densely populated area (cities, urban centres and urban areas). Journeys to 'visit family and friends', 'companion and escort' journeys and 'entertainment' are more important in rural areas than in the other categories. This may reflect the age profile of rural regions, with more older people (and often a higher child population) but with fewer in the working age categories³⁸.

³⁷ This classification is created from an aggregation of population density estimates derived from the Census of Population.

³⁸ <https://wdcinsights.wordpress.com/2017/06/01/census-2016-profiling-age-and-dependency/>

Figure 17: Distribution of journeys by Purpose and Degree of Urbanisation



Source: CSO Ireland

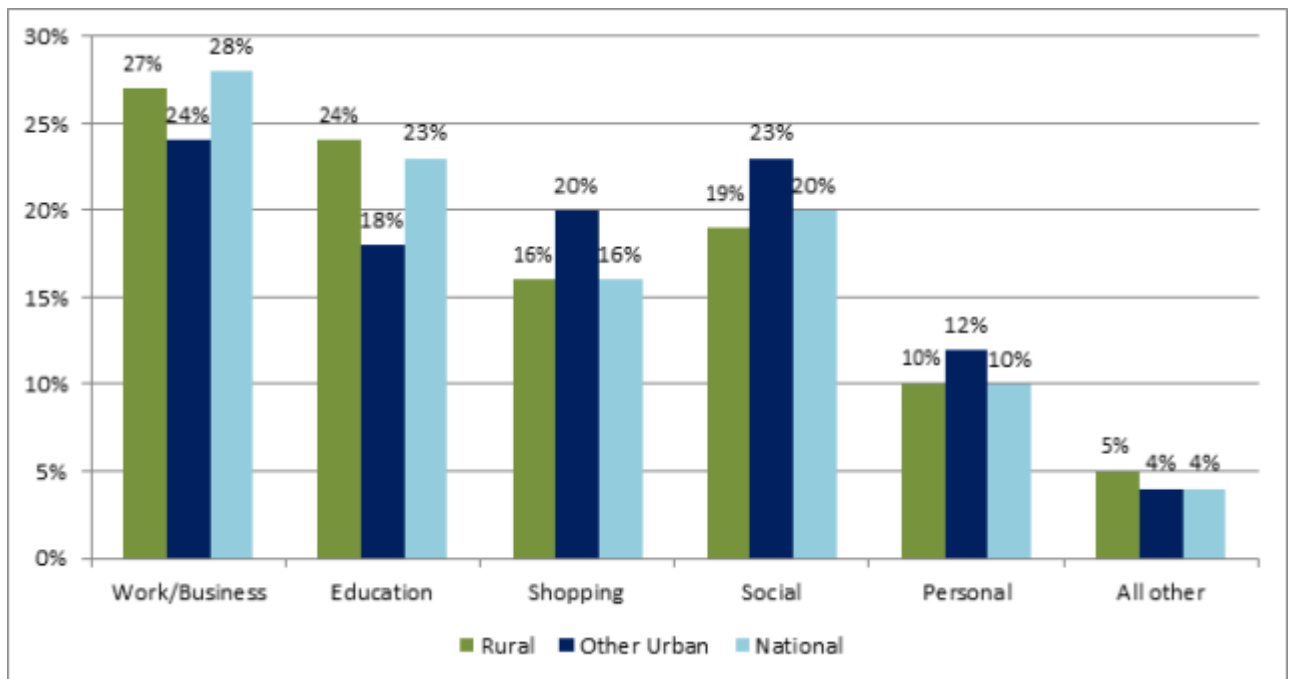
Source: CSO Ireland, 2017, [National Travel Survey](#)

More information on travel patterns comes from the National Transport Authority which conducted a National Household Travel Survey in 2017³⁹. Reasons for trips were analysed across six different urban and rural categories (National, Rural and 'Other Urban' (population between 1,500-10,000)) as shown in Figure 18 below.

Again, travel for work or business is the most important category across all three areas, with travel for education significantly more important in this survey (23% nationally), than in the CSO's National Travel Survey (4% in 2016). Education related travel was highest in rural areas (24%) again, perhaps relating to the relatively lower numbers in the working age cohort.

³⁹ The [Household Travel Survey](#) was also conducted in 2012 and is expected to be carried out every five years.

Figure 18: Reasons for Trips, National Household Travel Survey, 2017



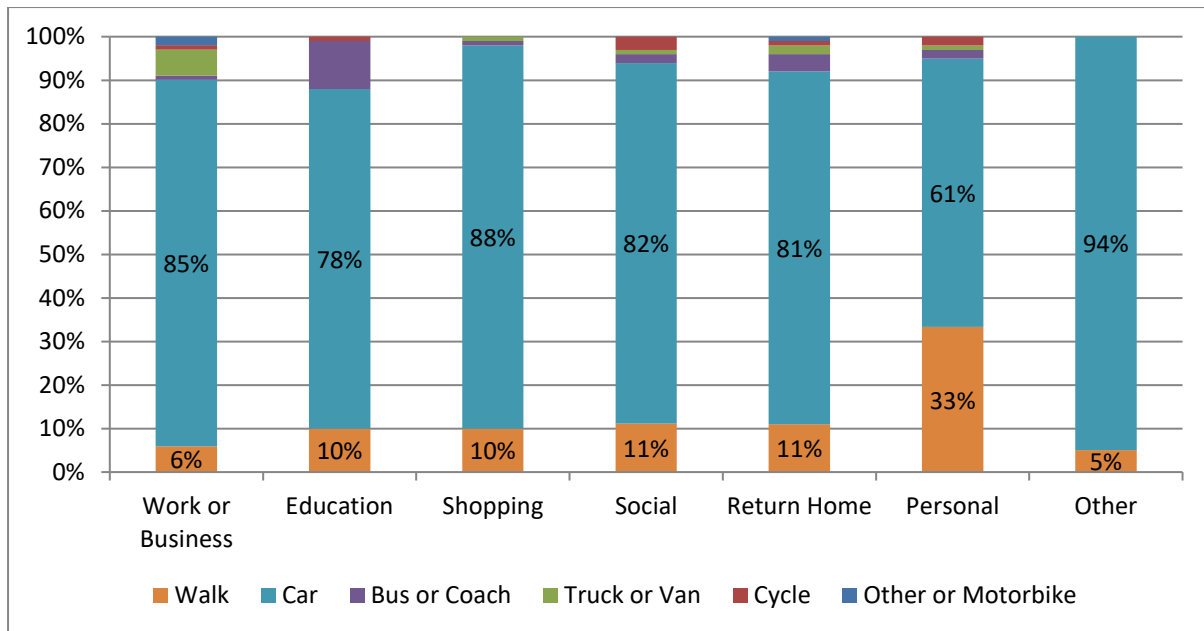
Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

The reason for travel also influences the mode of travel used. While car usage is significantly higher in rural areas (outside population centres of 1,500 or more) compared to all other regions and all other modes of transport, it does vary with reason for travel (Fig 19). Its use is greatest for travel to work (85%) and 'Other'⁴⁰ (94%) and is least for education (78%), which has more bus and coach use than any other reason (11% of journeys).

In general walking is the second most popular mode, accounting for more than one in ten journeys (except for work). It is important to recognise this, and to further promote opportunities for active travel in rural areas (discussed in more detail later).

Figure 19: Trip Purpose by mode of transport in Rural Areas

⁴⁰ This is a mixed category of more exceptional or rarer journey types.



Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf Fig 44.

Car travel is a particularly dominant mode for work and shopping. Potentially, both remote working and delivery from supermarkets, pharmacies and other local retailers which increased during the Covid 19 lockdown, may maintain its increased levels even as shopping and travel become less restricted. This would contribute to a reduction in journey numbers.

Travel for Work

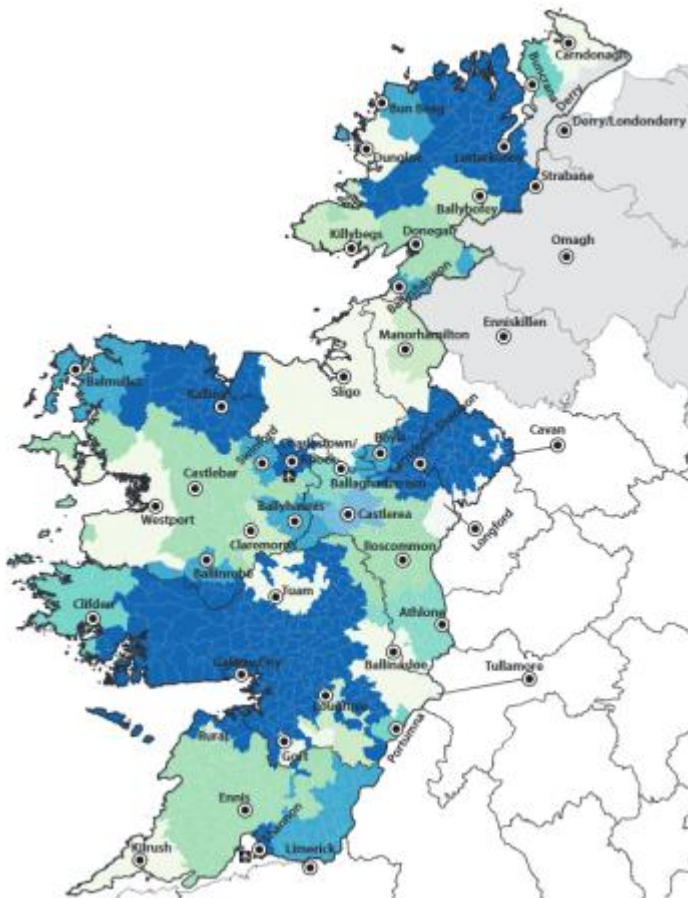
Commuting to work was significantly dependent on car travel, but the changed work patterns and the increase in 'Working from Home' (WFH) during the pandemic are likely to remain, at least to some extent and will reduce car travel. There is likely to be a return to work, and so it is useful to consider patterns of travel to work in the Western Region to better understand the variability in travel needs. People commuting in rural areas without a dominant city travel to a variety urban centres for work.

Analysis by AIRO of the 2016 Census of Population for the WDC⁴¹ examined labour catchments for the 42 towns in the Western Region (towns of over 1,500) to improve our understanding of journey patterns and the importance of smaller urban areas in employment in the region⁴². The map of local labour catchments (Figure 20) gives a good overview of travel patterns for employment purposes.

⁴¹ https://www.wdc.ie/docs/TraveltoWork_LabourCatchments_WesternRegion2016_FullDoc.pdf

⁴² Read more about it on the blog [here](#) or [here](#) and download the 2018 report [here](#))

Figure 20: Labour Catchments of 42 Towns in the Western Region, 2016



Source: WDC, 2018, *Travel to Work and Labour Catchments in the Western Region: A Profile of Seven Town Labour Catchments*

This ties in with the CSO findings, from the recently released *Urban and Rural Life in Ireland*⁴³, that more than three in four workers from rural areas do not work in a City. More than 90% of workers who lived in 'Independent urban towns', 'Rural areas with moderate urban influence' and 'Highly rural/remote areas' worked outside of the five cities while 76.1% of workers from 'rural areas with high urban influence' and 60.9% of workers in 'Satellite urban towns' did not work in a City.

Remote Working

Interestingly, that same publication (*Urban and Rural Life in Ireland*) also showed that one in ten workers in 'Highly rural/remote areas' work mainly from home (Figure 21). There were 94,955 people aged 15 and over at work in 2016 who worked mainly from home, 4.8% of the total 1,970,728 people at work. The proportion of people working mainly from home was highest at 9.8% in 'Highly rural/remote areas', compared to the lowest percentage of 2.3% in 'Cities'. Twice as many people worked from home in the three rural areas (63,728) than in the three urban area types (31,227). This relates in part to the number of farmers in these areas.

⁴³ <https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/commuting/>

Figure 21: Proportion of persons who were working from home by area type, 2011, 2016



Source: CSO, 2019, [Urban and Rural Life in Ireland, 2019 Table 8.2](#) The chart is also [here](https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/commuting/)

The Government have recently published a paper on Remote Work in Ireland which was a deliverable of Future Jobs Ireland 2019⁴⁴, which places a focus on fostering participation in the labour force through flexible working solutions.

The WDC has been active in the area of remote working (previously termed e-work and telework) for many years, researching the practice, as well as operating an e-work policy for over two decades.

The pattern of home working in the Western Region⁴⁵ and other patterns of remote and e working⁴⁶ have been analysed in detail by the WDC. The most recent data suggest that 18% of workers declared they worked from home⁴⁷,

Examining e-Working in rural Ireland, a report commissioned by Vodafone, found that nearly one in four broadband users in rural Ireland use the internet at home in relation to work. More detail is available in the WDC Policy Briefing *e-Working in the Western Region* in March 2017⁴⁸.

There is no doubt that the practice is widespread and on the increase. While it has been somewhat hidden from official statistics, the quality of the data is beginning to improve.

Another aspect of e-working or remote working involves working from a hub rather than home. The success of initiatives variously called e-working spaces/ co-working spaces/ hubs also suggests e-working is on the increase. Some working spaces are funded by Department of Business, Enterprise and Innovation and some by the Department of Rural and Community Development. The hubs are variously classed as innovation, enterprise or community hubs, and many are focussed on start-ups and incubation spaces as well as providing e-working spaces for individual employees.

⁴⁴ <https://dbe.gov.ie/en/Publications/Publication-files/Remote-Work-in-Ireland.pdf>

⁴⁵ <https://wdcinsights.wordpress.com/2017/07/20/home-based-working-in-the-western-region/>

⁴⁶ <https://wdcinsights.wordpress.com/2019/11/18/e-work-remote-work-and-hubs-some-recent-evidence/>

⁴⁷ See here for more detail <https://wdcinsights.wordpress.com/2019/11/18/e-work-remote-work-and-hubs-some-recent-evidence/>

⁴⁸ https://www.wdc.ie/wp-content/uploads/WDC_Policy-Briefing-no-7.pdf

The Western Development Commission is coordinating an initiative with the Department of Community and Rural Development (DCRD) called the Atlantic Economic Corridor (AEC) Enterprise Hubs project. This three year project aims to create an interconnected community network from the 101 hubs identified in the AEC region (the region from Donegal to Kerry) along the Western seaboard.

Increasing the prevalence of working from home, and in alternative work places which require shorter journeys, is likely to be an important part of policy to reduce emissions from transport in rural areas in the future. Following the rapid increase in the practice during the Covid 19 pandemic it would be expected to be a more common option for many workers.

There seems to be higher rates of those usually working from home in the more rural regions⁴⁹, such as the Border and West regions, while the more urban region of Dublin has the lowest rate of 6.4% in 2019. Working from home is most common on a one or two-day week basis. For example, the CSO conducted a pilot survey⁵⁰ in September 2018. This found that among those at work, 18% declared they worked from home. Working from home 1 day per week was the most popular practice (35%), followed by 2 days a week (13%) and 5 days per week (by 11%).

The most recent CSO data on working from home measuring the current situation arising from the Covid-19 pandemic, (data only at a national level) shows that, over two-thirds (69.0%) of enterprises indicated that they implemented remote working over the five-week period from 16 March to 19 April 2020. Almost three in every ten businesses (29.0%) had the majority of their workforce working remotely during that period⁵¹. The practice of enforced home working is likely to change the overall levels of working from home, with huge sections of the workforce experiencing it for the first time.

The WDC in partnership with Whitaker Institute NUIG has just published initial findings of its survey Remote Working in Ireland During COVID-19⁵² which covered both working from home and from hubs. The survey results show that 87% of respondents are now working remotely because of Covid-19. Over half of those surveyed (51%) had never worked remotely before the Covid-19 pandemic. Of those who had never worked remotely, 78% would like to work remotely for some or all of the time after the crisis is over. In the short to medium term there will be physical/social distance requirements that will likely impact on the numbers who can return to their workplace. So, it is likely that for a transition period at least, there will be much higher levels of working from home than pre Covid-19. This represents an opportunity to reduce emissions from rural travel to work.

Trips taken by Duration and Distance

Having considered the issues of population and population density, and well as the reason for travel in rural areas and Western Region counties it is also useful to look at distance and duration of journeys. The collation and examination of this data will allow us better understand the reasons for and nature of rural journeys, which is in itself essential to design policies to reduce emissions and

⁴⁹ Read a more detailed analysis here: <https://wdcinsights.wordpress.com/2020/05/07/working-from-home-what-are-the-regional-patterns/>

⁵⁰ https://www.cso.ie/en/media/csoie/census/census2021/Census_Pilot_Survey_Report_2018_V1.pdf

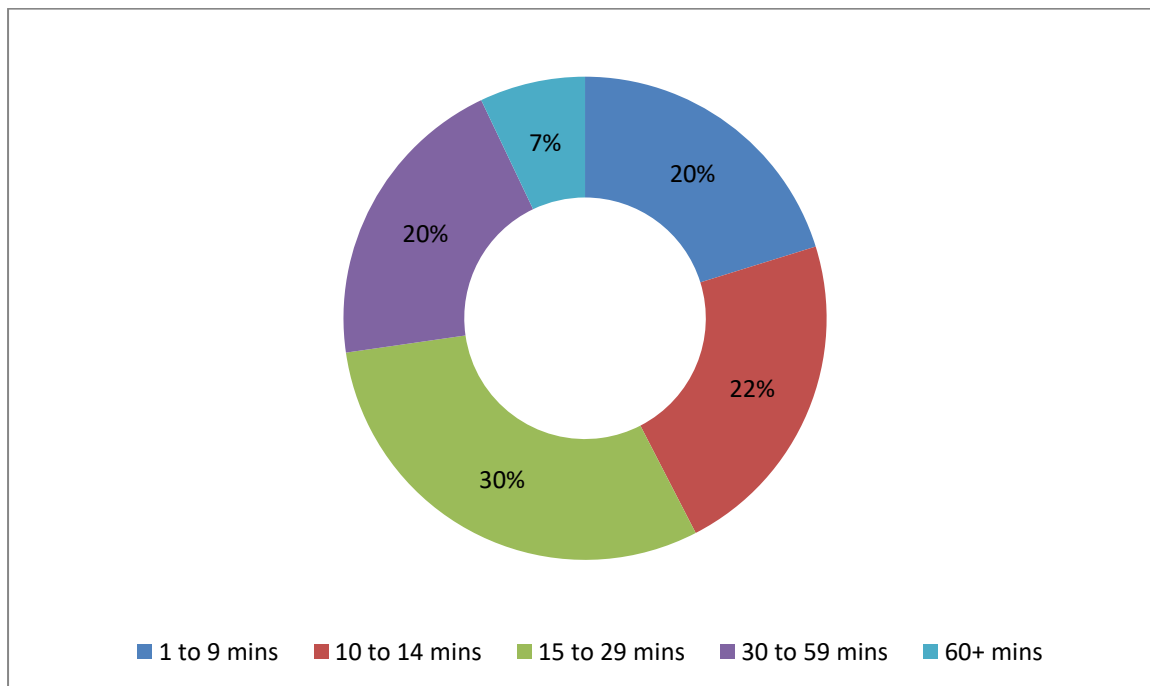
⁵¹ <https://www.cso.ie/en/releasesandpublications/er/bic19/businessimpactofcovid-19survey16marchto19april2020/>

⁵² <https://www.wdc.ie/wp-content/uploads/2020/05/Remote-Working-National-Survey-Report-May-2020-final.pdf>

help us to meet our transport targets as well as developing develop more sustainable rural transport options.

The National Household Travel Survey⁵³, carried out by the NTA in 2017 (and published in 2018) provides a useful breakdown of trips taken by distance and duration for people in rural areas (those areas outside settlements of 1,500). In rural areas trips are most likely to take between 15 and 29 minutes (30% of trips), and the rest of the trips are spread fairly evenly by duration (Figure 22) but not surprisingly only 7% are longer than an hour.

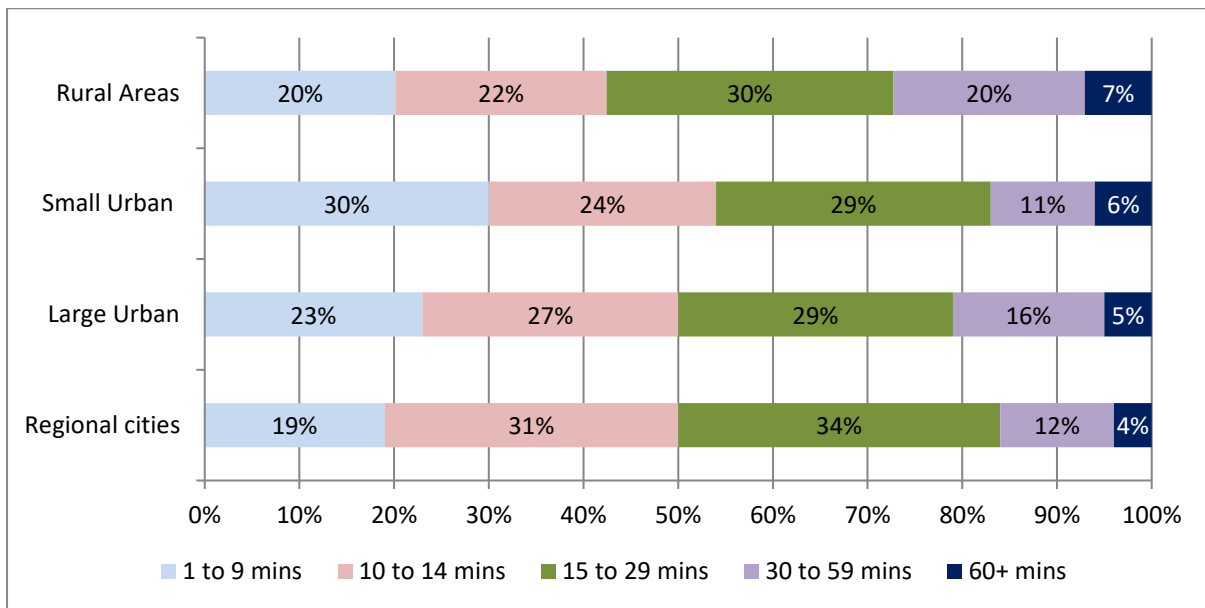
Figure 22: Duration of trips Taken- Rural Areas



Source: [https://www.nationaltransport.ie/wp-content/uploads/2019/01/National Household Travel Survey 2017 Report - December 2018.pdf](https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf) Fig 47

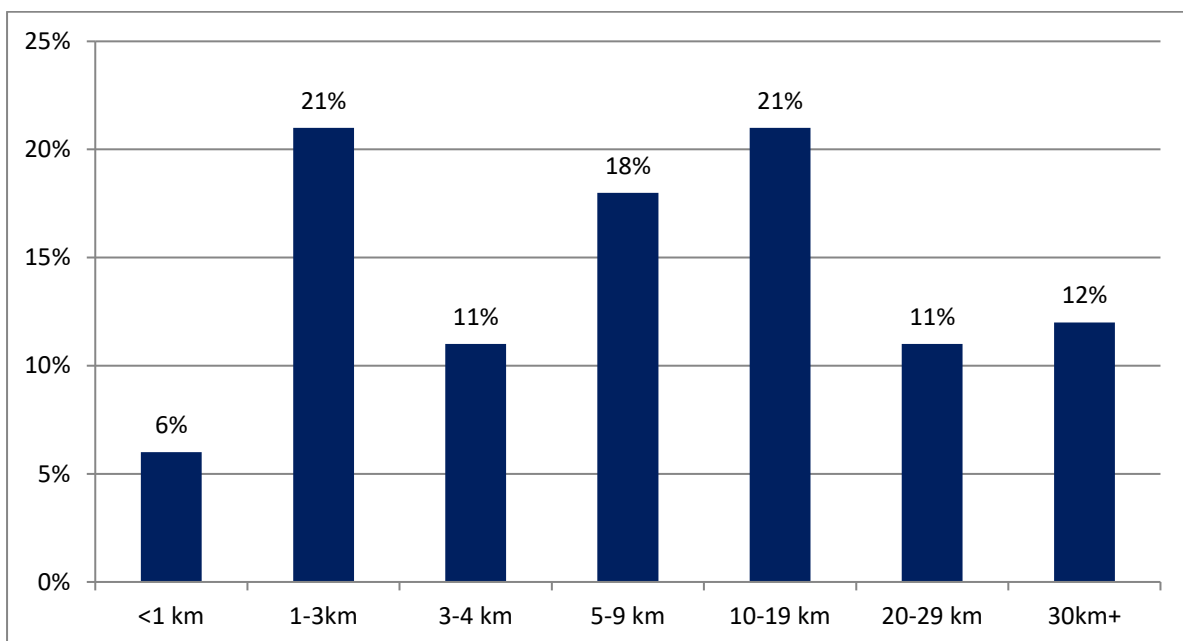
Trips made by people living in rural areas tended to take longer than those in urban areas (Fig 23), most with 80% of rural trips are 10 minutes of more., Regional cities (population over 10,000) tended to have the shortest journeys (84% under half an hour) with small urban centres being quite similar (83%) while in rural areas it was 72%.

⁵³ [https://www.nationaltransport.ie/wp-content/uploads/2019/01/National Household Travel Survey 2017 Report - December 2018.pdf](https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf)

Figure 23: Duration of Trips Taken- by area type

Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

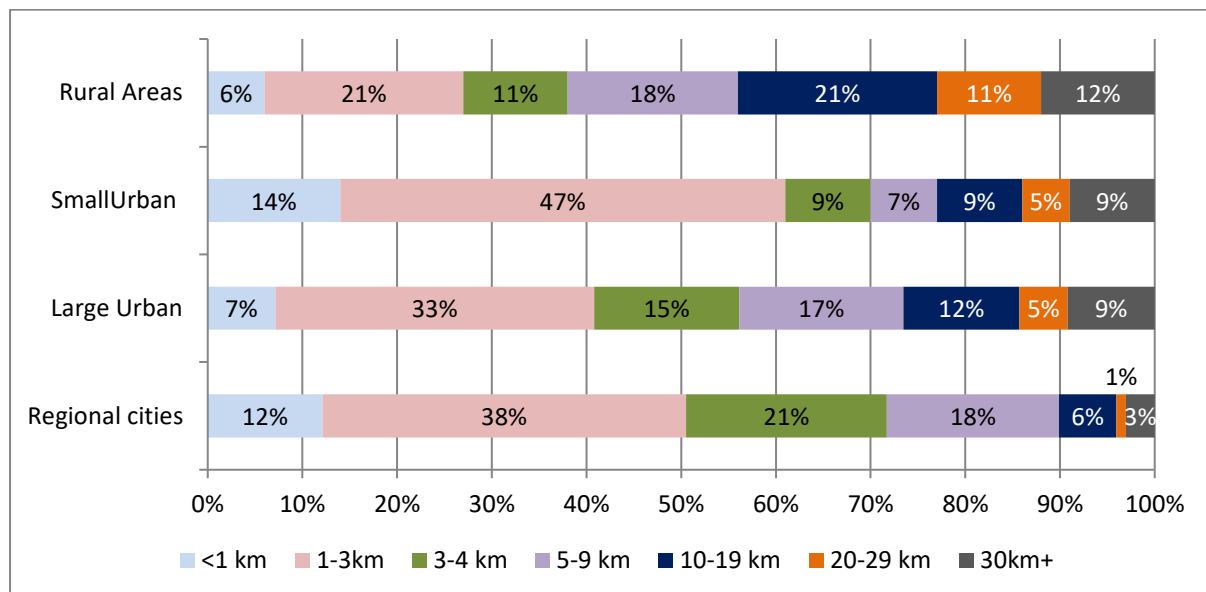
Duration is of course influenced by distance travelled. Very few (6%) of rural trips were less than a kilometre, although 56% were under 10km. This is significant in relation to active travel options, which are discussed later. Up to 10km could be considered a reasonable distance to cycle while the option to walk could be considered up to 3km for many people.

Figure 24: Distance Travelled per Journey- Rural Areas

Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf Fig 50

It is noticeable that in small urban centres (population 1,500 to 10,000) 63% of trips were less than 3km, only 27% of those in rural areas were (Figure 25). Short distance trips were also more common in other urban centres (40% in larger urban centres and 50% in regional cities). In all urban centres trips under 10km were the significant majority (89% in regional cities; 72% in larger urban centres, and 77% in smaller urban centres. This compares to 56% in rural areas.

Figure 25: Distance of Trips Taken- by area type



Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

Rural locations are more reliant on car transport than the rest of the country with more than 8 in 10 trips involving a car⁵⁴. This is likely to be for a combination of reasons including the longer distances to be travelled, lack of public transport options and relatively uncongested roads. Reducing the need for rural travel, for example through increased remote working and supermarket and other delivery options will help reduce reliance on cars. Shifting journeys to public transport by increasing rural services, and promoting active travel modes such as walking and cycling, will also be important in developing the low carbon rural economy. These should be a focus of climate action along with reducing the emissions from car travel with a switch to EVs.

3.3 Distance to rural services and the need for rural journeys

Understanding the reasons rural dwellers travel is essential to ensuring we can take focused, effective, and fair climate action and aid a transition to low carbon rural regions. Currently there is little choice as to whether to make a journey. Travel for services is important and the need to

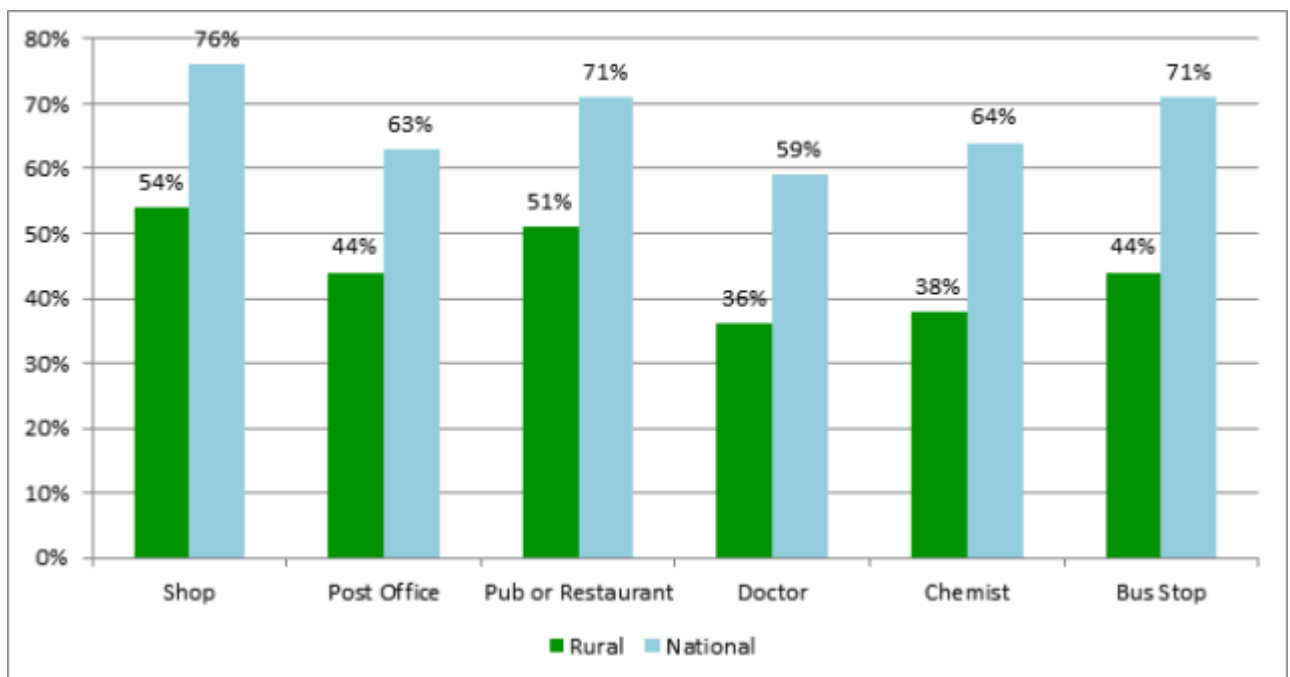
⁵⁴ : https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

travel to services, the distance many rural dwellers live from everyday services, and the reasons why some journeys are not made are all considered in this section.

In the previous section on transport, the importance of travel for work and education were outlined along with the other reasons we make journeys. Travelling for work and business are clearly important, but most journeys are made to reach services of varying kinds. People living in rural areas tend to be at a greater distance from services than their urban counterparts and so the journeys made tend to be longer and more car based. Greater distance to services tends to reduce options for travel, while a lack of public transport options and the distance to public transport services increases reliance on car travel in rural areas.

This is highlighted in Figure 26 below, which compares the proportion living within 15 minutes' walk of key services in rural areas compared with the national picture. Indeed the National Household Travel Survey also found that 40% of all rural respondents did not live within 15 minutes of *any* of these services.

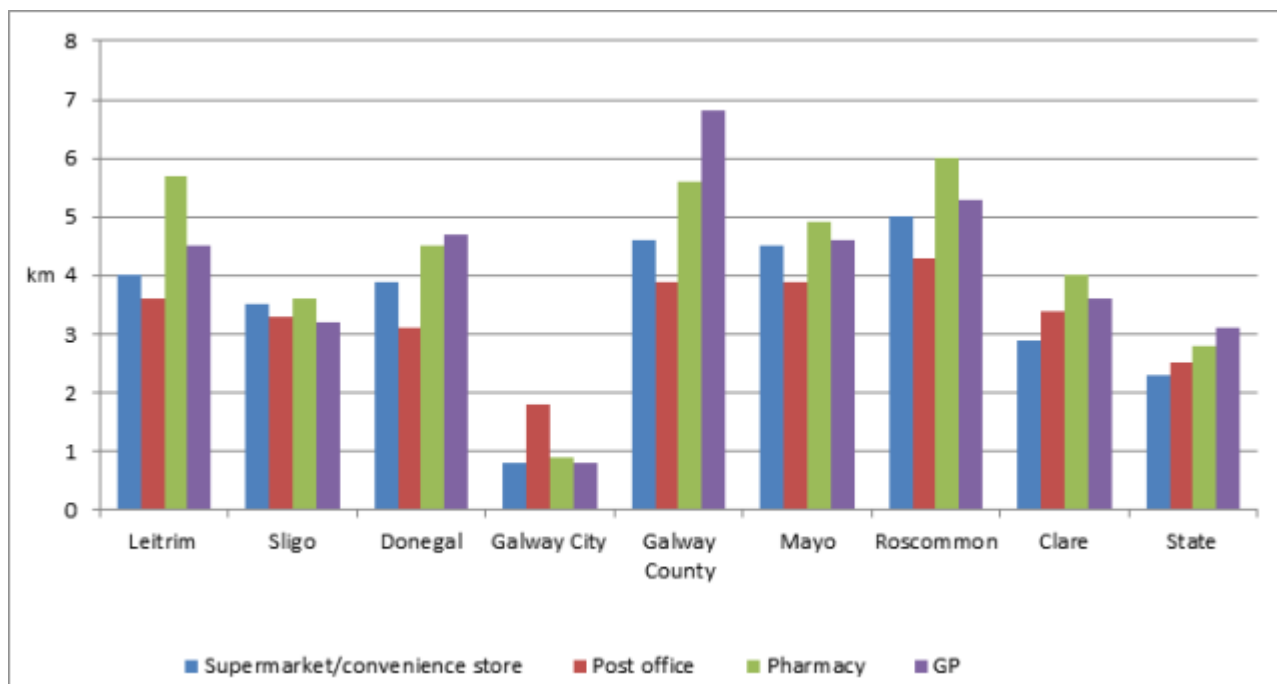
Figure 26: Percentage living within 15 minute walk of services, National Household Travel Survey, 2017



Source: https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

This can be seen more specifically at a county level (Figure 27) which shows the average distance (km) of residential dwellings to everyday services. This higher average distance to services for rural people means that rural dwellers are travelling further and for longer periods are more likely to need a car, which is the only way to access most of these services.

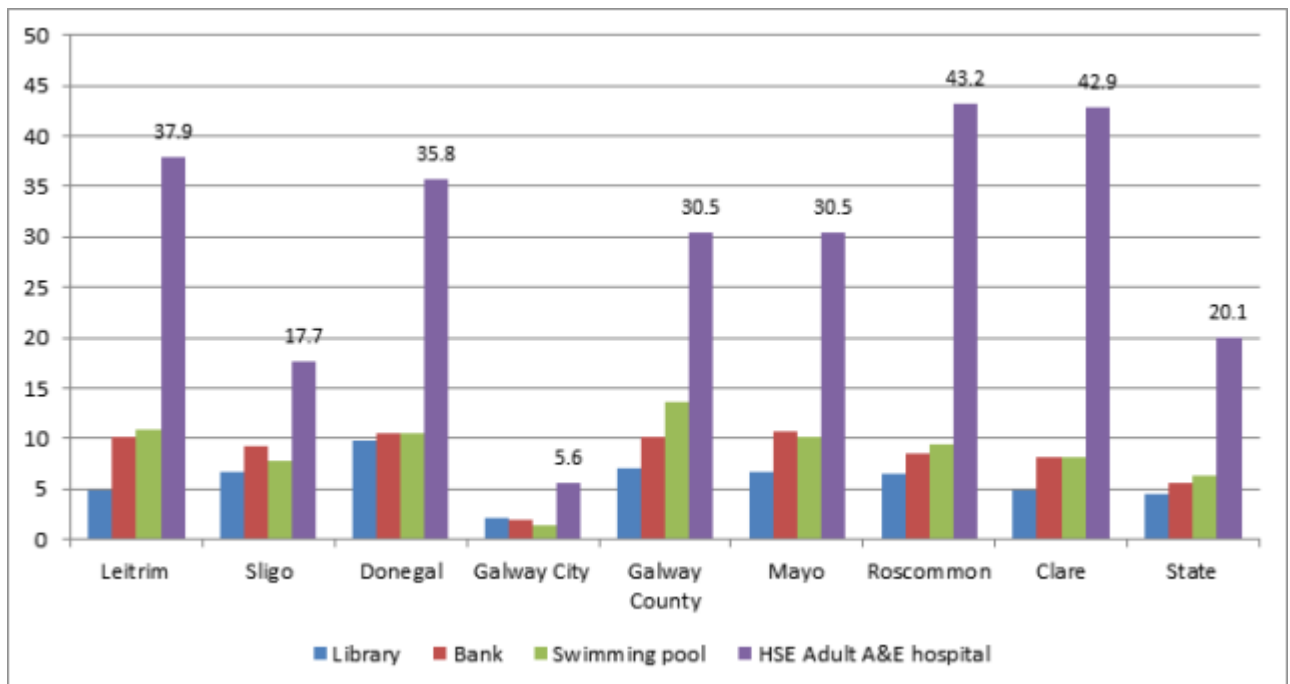
Figure 27: Average km distance to key everyday services for Western Region counties



Source: CSO, 2019 <https://www.cso.ie/en/releasesandpublications/ep/p-mdsi/measuringdistancetoeverydayervicesinireland/> Statbank Table [MDS02](#)

The services shown in Figure 27 above are ones that may need every day access. Other services such as banking, libraries and leisure services like swimming pools may be used less often but have much higher average distances, again increasing the need for motorised transport (most likely a car). These are shown in Figure 28. The distance to hospital is greatest and, while some outreach services are provided, many people will need to attend appointments and treatment services in these hospitals. Some transport services are available but many will, where possible or necessary, use private transport of their own or with a friend, relative or volunteer.

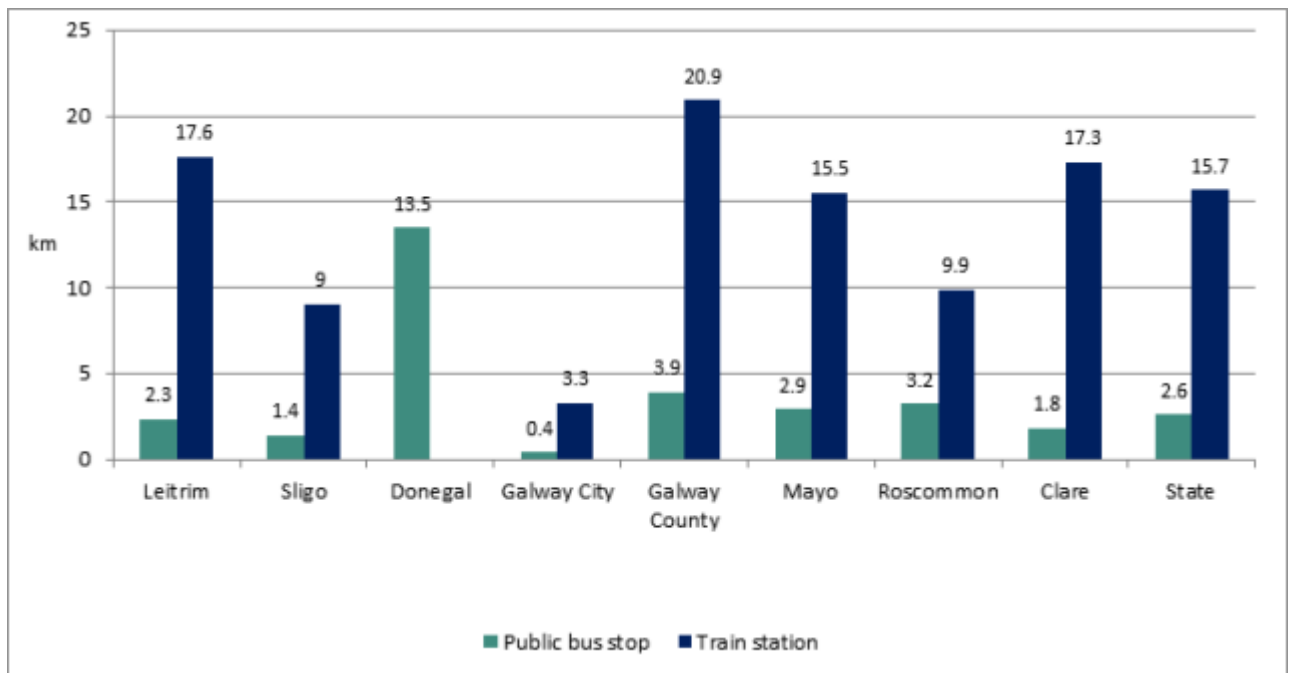
Figure 28: Average distance (km) to other services which may be used regularly for Western Region counties



Source: CSO, 2019 <https://www.cso.ie/en/releasesandpublications/ep/p-mdsi/measuringdistancetoeverydayservicesinireland/> Statbank Table [MDS02](#)

The need for car travel is partly a function of the distances to be travelled but it also relates to difficulty accessing public transport. The average distance to a train station and a public bus stop is shown in Figure 29 below. For most of these counties, these distances are greater than most people are likely to be able or wish to walk. Even where the distance is not too great, people may be deterred by the hazards of walking on rural roads and the probability that many of the journeys in winter will not be in daylight.

Figure 29: Average distance to a bus stop and train station in Western Region counties (km)

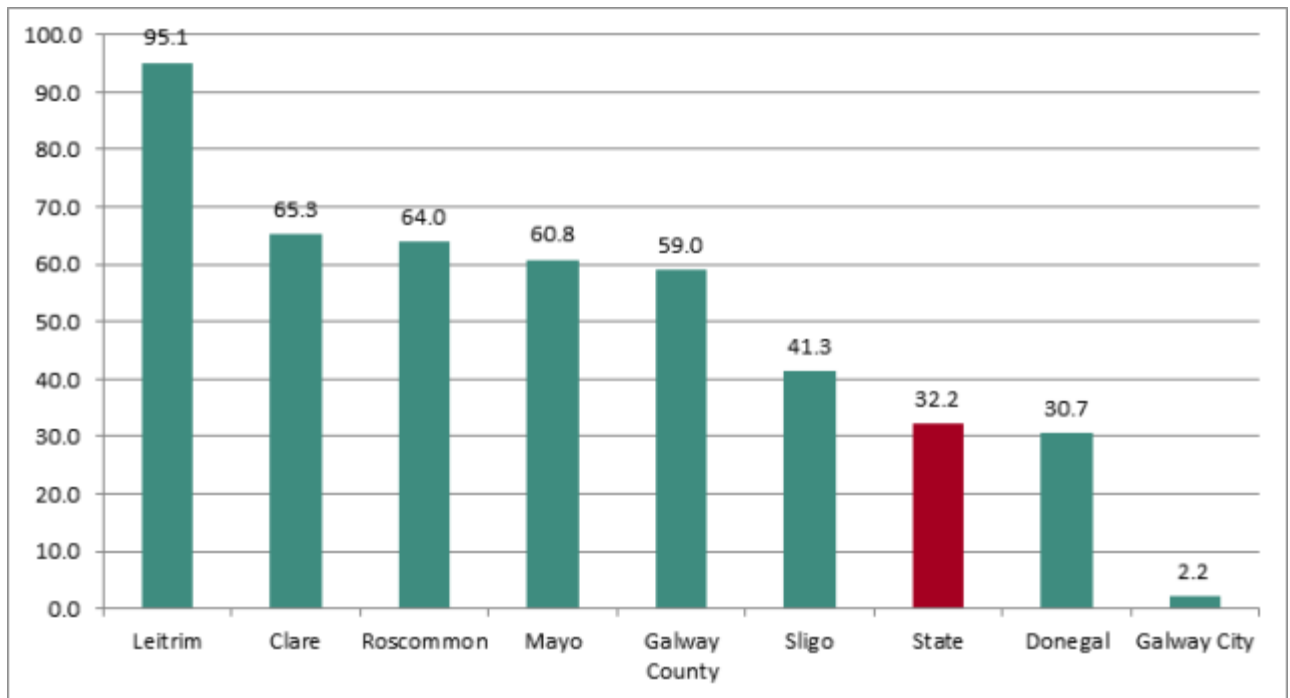


Source: CSO, 2019 <https://www.cso.ie/en/releasesandpublications/ep/p- mdsi/measuringdistancetoeverydaysservicesinireland/> Statbank Table [MDS02](#) Note: Average distance to a train station is not shown for Donegal as there is no station in that county and the distance is too large for the chart (113km).

Even if people do walk many of these bus stops have very few services. All counties have even greater average distances to train stations although in certain situations (e.g. for work or business and hospital appointments or to Dublin) travelling by train may be a preferred option.

Levels of service are very important. Figure 30 below shows the percentage of the population whose nearest Public Transport stop has a low service frequency. This gives a clear indication of why so few rural journeys are by public transport. In most Western Region counties, the closest public transport stop for more than half of the population has fewer than ten services a day.

Figure 30: Percentage of the Population in Western Region counties whose nearest Public Transport stop has a frequency of fewer than 10 services per day.

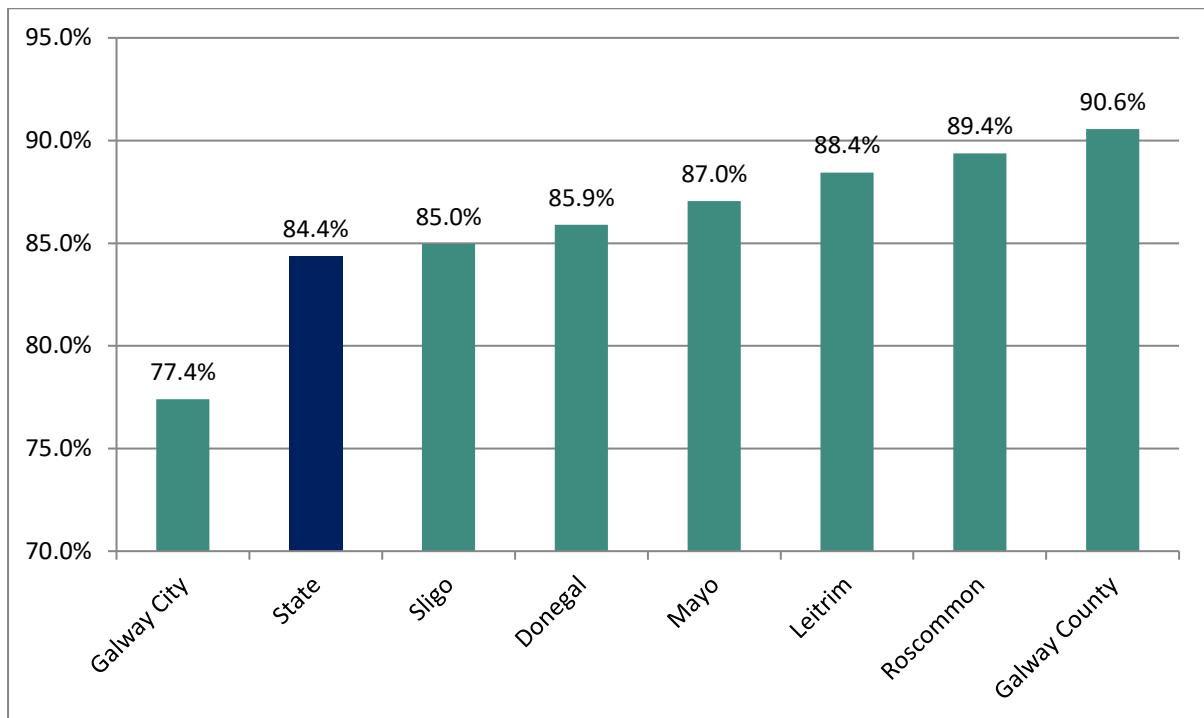


CSO Ireland, 2019, Measuring distance to everyday services 2019 Table 2.3 (XLS 14KB)

Most of those living in Leitrim (95%), Clare (65%), Roscommon (64%) and Mayo (61%) all have low frequency of service from their nearest stop. This compares with 32% of the population nationally. The difficulty of reducing car travel in these counties is very clear.

How do we travel?

It is also useful to consider in more detail the way people travel, or the mode they use. Given that much travel is essential, and therefore harder to 'Avoid' (in line with the Avoid, Shift, Improve (ASI) framework) understanding the mode used is necessary before considering how we might 'shift' that, or in the shorter term 'improve' it. As discussed above, car travel is particularly important in rural areas and, as would be expected, access to a car is higher in Western Region counties than for the state as a whole (Figure 31), with the trend generally in line with rurality. These are not the highest rates nationally, as Meath (92.3%), Cork county (91.0%) and Kildare (90.6%) are all higher.

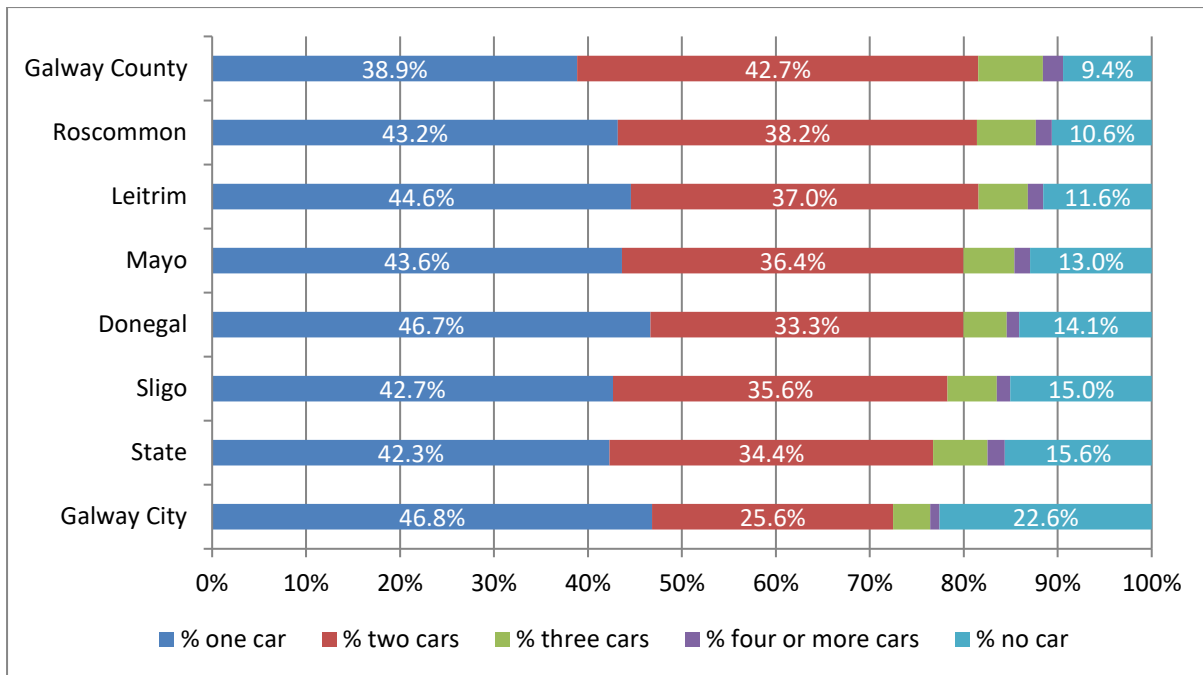
Figure 31: Percentage of households with access to a car (excluding not stated), 2016

CSO Ireland, Census of Population 2016 Table [EZ047](#)

Galway city households have lower rates of car access than the rest of the region, and although it is higher than in Dublin city (64.1%) and Cork City (69.1%) it declined by 1% between 2011 and 2016. The percentage of households with access to a car during that period grew in all other Western Region counties with the highest growth (0.7%) in Mayo.

It is also useful to look at how many households have access to more than one car. Given the difficulties of travel without a car in many parts of the region, more than one car per household is likely to be necessary, particularly if more than one member of the household works outside the home (Figure 32). Again, with the exception of Galway city all of the Western Region counties have higher levels of access to more than one car with Galway county (51.7%) and Roscommon (46.2%) most likely to have access to two or more cars. This compares to 42% for the State as a whole. Of the Western Region counties Donegal has the highest percentage with access to only one car (46.7%), which is a similar rate to Galway city (46.8%).

Figure 32: Households with one or more motor cars



Source: CSO Ireland, Census of Population 2016 Table [EZ047](#)

Electric Vehicles and Vehicle Stock

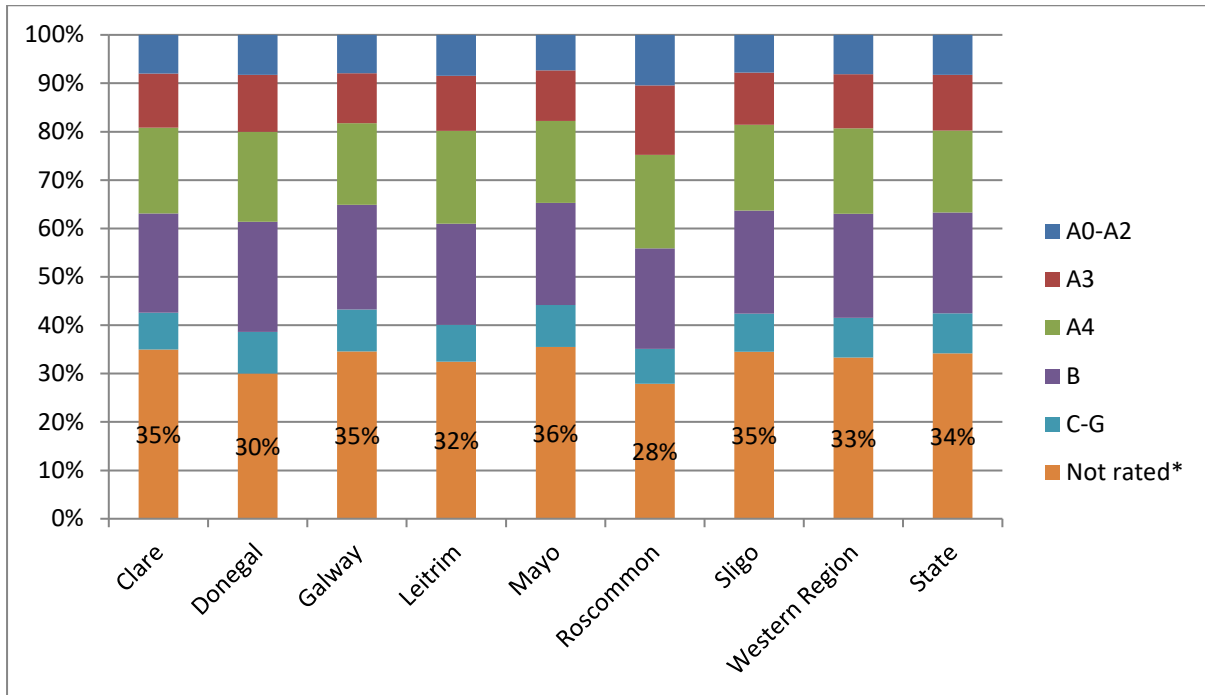
The most recent Bulletin of Vehicle and Driver Statistics⁵⁵ gives an overview of the vehicle stock in 2018. Nationally, in 2018, 43% of private cars were fuelled by petrol, 55% by Diesel and only 2% were hybrids, PHEV, Electric or used ethanol.

Looking at the stock of vehicles in the Western Region, the percentage in each emissions band is similar to that for the State as a whole (Fig 33). About a third of private cars were not rated for CO₂ emissions (the majority of these were pre 2008 and subject to Motor Tax rates based on engine size). In all counties more than a third of private cars were in the A categories for CO₂ emissions, with this as high as 39% in Donegal and 44% in Roscommon⁵⁶.

⁵⁵ <http://www.dttas.old.gov.ie/press-releases/2019/bulletin-vehicle-and-driver-statistics>

⁵⁶ Some of the licensing data for Roscommon may be influenced by the presence of the HQ of a large vehicle hire firm. <https://wdcinsights.wordpress.com/2016/01/25/here-is-the-reason-there-are-so-many-new-cars-in-roscommon/>

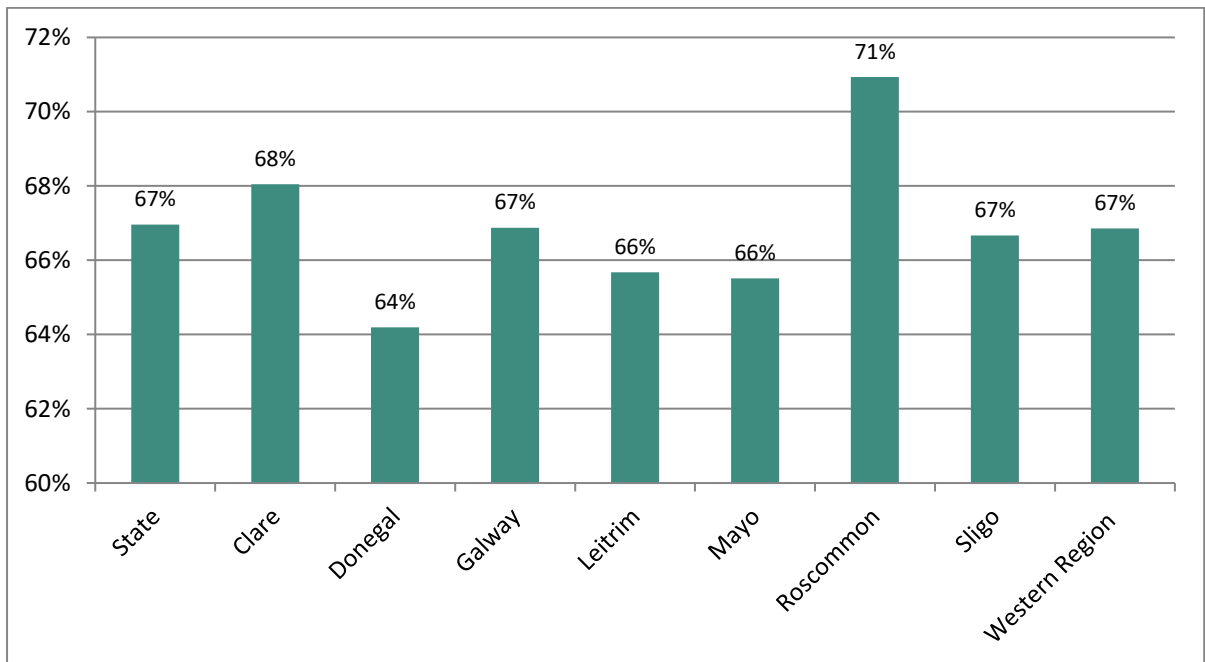
Figure 33: Number of Private Cars by CO₂ Emission Band in each Licensing Authority Area



Source: Table 5a Irish Bulletin of Vehicle and Driver Statistics, DTTAS 2019. *Not rated are mostly pre2008 vehicles for which old Motor Tax rates apply.

More recent figures from the CSO show that between 2017 and 2019 almost two thirds of private cars licensed in Ireland for the first time (both new and imported), were in the A emissions classes (Figure 34), a clear improvement on previous years.

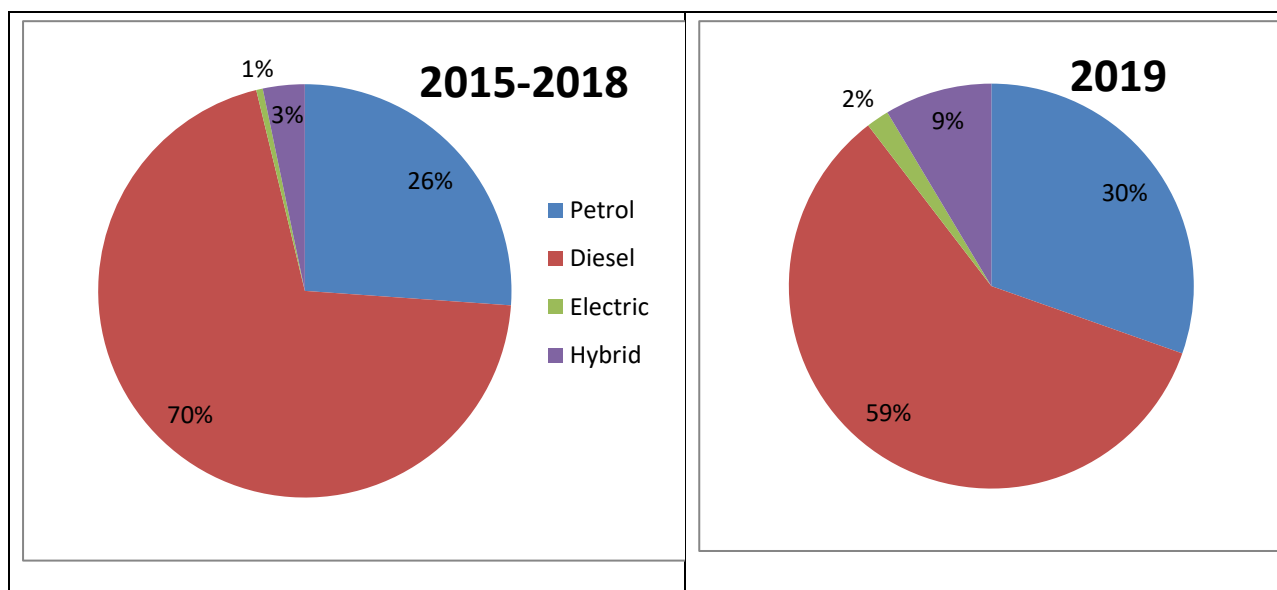
Figure 34: Percentage of Private Cars Licensed for the First Time in the A categories.



Source: CSO, 2020, [Vehicle Licensing Statistics Annual Series / TEA29](#).

Thus the trend is clearly for cleaner cars. However, as shown in Fig xx the significant majority of vehicles licensed for the first time (this includes new cars and imported cars which may not be new) between 2015 and 2018 were Diesel (70%) and petrol (26%) while EVs only accounted for 1% (4,193 of the 820,562) of the private cars sold in that 4 year period. There were indications of change in 2019, however, with almost as many EVs sold (4,054) in that year as the previous four years and they accounted for 2% of private car sales. Hybrids also increased market share from 3% in the period 2015-2018 to 9% in 2019. Nonetheless almost 60% of the private cars sold were fuelled by diesel with 30% fuelled by petrol.

Figure 35: Fuel type of private cars licenced for the first time 2015-2018 and 2019



Source: <https://www.cso.ie/en/releasesandpublications/er/vlftm/vehicleslicensedforthefirsttimedecemberandyear2019/>

Looking more closely at fuel type, data for new cars purchased in Ireland in 2019⁵⁷ shows that, compared cars licenced for the first time in Ireland shows that proportionally more petrol cars were purchased here (40% of purchases) but similar percentages of EVs (3%) and Hybrids (8%) while PHEVs account for 1%. Only 47% of new cars purchased in Ireland were diesel powered.

The mixing of biofuels with fossil fuels for transport under the Biofuels Obligation Scheme has significantly reduced emissions from petrol and diesel vehicles. While there is some controversy about the source of the biofuels, measurement methods and what is counted, this remains an important emissions reduction option. Given the likely slow transition to electric vehicles, and the life expectancy of the current car fleet (to 2030 and beyond), this scheme could be enhanced and a move to the higher E10 and B7 or potentially B12 standards could be considered.

The high level of access to one or more cars is indicative of the reliance on cars for transport in rural areas. While the avoidance of travel, for example through promoting increased remote working or local retail delivery), should be a key focus of policy to reduce carbon intensity, encouraging households with more than one car to choose an EV as their second vehicle would also be useful. Given the distances many rural people regularly travel, some may feel reluctant to make the switch

⁵⁷ CSO, 2020, New Vehicles Licensed for the First Time (Number) by Type of Vehicle Statbank [TEM12](#)

to an EV as a primary household vehicle, but potentially, if the second vehicle is used for shorter journeys, EVs would be more attractive. Of course, EVs are expensive, even with grant aid, and people may be cautious about second hand purchases, which puts them beyond the reach of many rural dwellers.

To achieve government targets for EVs charging investment needs to be early and widespread throughout the country. This will not just benefit those living in rural areas but will be important for those for those visiting for business or pleasure. Lack of charging points could in future become a disincentive for visitors and could further concentrate tourism and other economic activities in areas near larger urban centres.

3.4 Developing other Rural Travel options: Car Sharing, Public Transport and Active Travel

Breaking the direct link between journey numbers and economic growth will be essential to successful climate action. There are opportunities for rural dwellers (and others of course) for more home working and e- working in hubs and other locations which would tie in with the first part of the ASI framework (Avoid). In this section the potential for shifting or changing the way we travel promoting car and ride sharing, public transport and active travel in rural areas is considered.

Car and Lift sharing

Car sharing is an important option for increasing sustainable mobility. It can take the form of 'ride sharing' when a driver is already making a journey, or shared access to a car which people use as needed. Car sharing may be a useful substitute for owning a second or third vehicle, though access to the car share location may require a journey. Different models of car sharing may be in operation, some commercial (though these are less common in rural areas) and some are community based. The cars use petrol or diesel but EVs also have significant potential in this role, with charging taking place between uses.

Lift sharing is a common, informal operation in many communities and among relatives, friends and acquaintances. There is significant potential for car sharing and the co-ordination of it both locally and countrywide though specific apps (see [Bla Bla Car](#) for example, which is particularly popular in France (read more about it [here](#)) and through social media (see [this example from Clare](#)).

For more formal community-based car sharing and lift sharing to work a critical number of members is crucial. To convince non-users their needs and potential motives to join must be understood and ways to address them be found. Additionally, analysing supporting legal, organisational and policy frameworks for car sharing communities helps developing measures to foster the foundation of new groups.

There are likely to be other barriers too, people may not feel comfortable in a car with a person they don't know very well or not at all, they may not trust another person's driving or sometimes the car

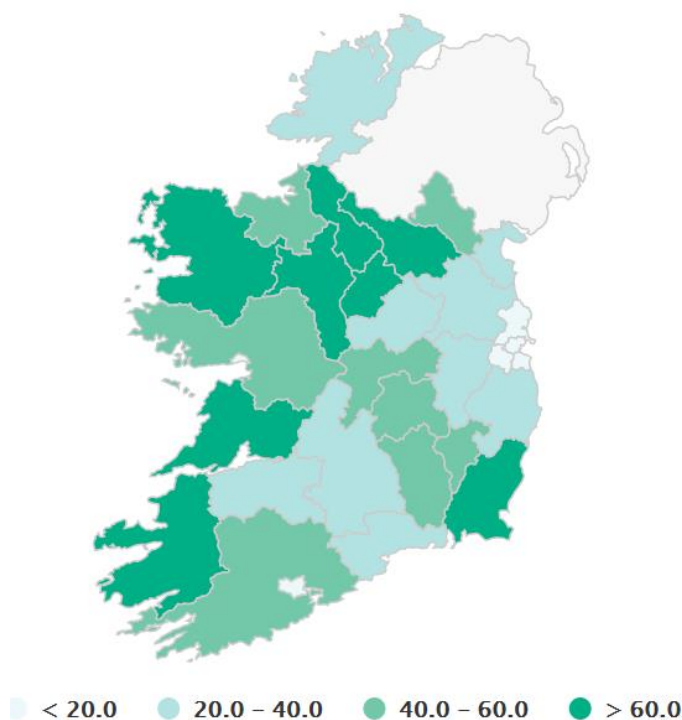
is a place where people prefer to be alone. It seems⁵⁸ that social media cannot substitute face-to-face contact within communities which seems to be an important pre-condition for some sharing rides. In other words knowing, or knowing of the person offering or accepting the car share is important for some. Ride sharing as a driver or passenger may also be regarded as reducing flexibility. For those with no alternatives it may be a welcome option, changing long held patterns of behaviour for others may be more difficult. Nonetheless it is not that long since hitching was a very common rural transport option.

Developing pilot models and examining what works in rural Ireland will be an important step in increasing the use of this option.

Bus and Rail transport

While there are fewer public transport services in rural areas, and car travel is more common, the public transport system remains very important, particularly for those without access to a car, and for linking with larger towns and cities. Rail, regional bus services and the Local Link are all important options for reducing emissions. While the data on distance to public transport services was discussed above the map below reminds us how far many rural dwellers in the Western Region are from effective public transport services (Fig 36).

Figure 36: Percentage of persons with < 10 departures at their closest public transport stop, by county



Source: CSO Ireland

Source: <https://www.cso.ie/en/releasesandpublications/ep/p-mdsi/measuringdistancetoeverydayservicesinireland/publictransportservices/>

⁵⁸ F Dorner and M Berger, 2018, Community-based mobility: a transport option for rural areas? Proceedings of 7th Transport Research Arena TRA 2018, April 16-19, 2018, Vienna, Austria

Rail Services

The lowest average distance for Western Region counties⁵⁹ to the nearest train station is 9km (in Sligo), this increases to 21 km in Galway county. This is further than that average distance to buses. Nonetheless, for those who are in proximity to a rail service it is an important option, especially for travel to Dublin, to cities and larger towns.

The attractiveness of the rail service is also dependent on the service level. While the mainline routes in the region (Dublin-Sligo; Dublin-Ballina; Dublin-Galway and Dublin-Limerick/Ennis) have reasonable frequency to Dublin, the services are not usually designed to bring people into the region early in the morning (the first train of the day arrives in Sligo at 10.15, in Ballina at 11.04 and in Galway at 10.08). This also reduces the possibility for its use as a commuter service. Additionally, the pricing on the intercity service means that a trip taking 30 minutes on the intercity line is more expensive than a trip of similar duration into Dublin, (e.g. Boyle to Sligo, which takes about 36 mins costs €13.05 standard single fare while Kilcock to Dublin (on the same line) takes a similar time and costs €4.90). It is therefore considerably more expensive to travel by train than making the journey by car would be.

Bus services

Regional bus services are also important transport options, Local Link is discussed in more detail below, but the longer distance services are provided by Bus Éireann and also, significantly, by a variety of commercial operators. Bus Éireann journeys peaked in 2007 with more than 40m passenger journeys, and declined to just over 28.5 in 2011-2013 before increasing to 35m journey in 2018⁶⁰. Bus Éireann provides a variety of services through its commercial Expressway services that are licensed by the NTA and a network of subsidised public bus services under a Direct Award contract with the NTA. The subsidised services serve many rural towns with frequencies varying from several times a day to a weekly service⁶¹.

There is a shortage of data on public transport provided by commercial operators. These account for a significant proportion of scheduled services between cities and towns in the Western Region but there is little data on passenger numbers or frequency. This can lead to underestimation of the use of public transport in the region. It would be useful to have some sub national – regional/county or other breakdown of the extent of commercial bus service provision as well as an indication of trends. Integration, at least to some extent, of the timetables of the different bus operators would also be helpful to users, who may be connecting across different services.

Local Link

The Rural Transport Programme provides a nationwide community based public transport system in rural Ireland which is responsive to local needs. The services are operated and managed by 15 local offices throughout the country. Each office manages the day to day requests and delivery of bus services in that area on behalf of the National Transport Authority (NTA). The Rural Transport Programme operates under the brand name [Local Link](https://www.localink.ie/) and they operate two types of bus services:

⁵⁹ Excluding Donegal where there is no train service

⁶⁰ NTA Bus and Rail Statistics

⁶¹ https://www.localink.ie/media/1351/ll_rural-transport-programme_online.pdf

Door-to-Door (demand responsive) routes and scheduled routes. Passenger journeys have increased from 1.76m in 2015 to 2m in 2018⁶², an increase of 13.6% in that period. There was a 5% increase in usage between 2017 and 2018.

The Local Link service provides public transport in places which don't have access to other services. The demand responsive, door to door services aim to meet the needs of older people, people with disabilities and others with particular transport access issues. The scheduled services are often developed following suggestion or input from potential users which means they are often important in serving a particular need (such as trips to a local town for shopping or other services). While there has been considerable growth in the service and service use there is potential for even greater uptake, especially in the context of low carbon transport.

The School Transport Scheme

In addition to the bus services mentioned above, the School Transport Scheme also already provides a very extensive network of bus services throughout rural regions travelling from rural areas to local towns each morning and returning in the afternoon. The service is limited to use by school children, and so even those students attending Post Leaving Cert courses (PLCs) in the town, other students, and workers or those needing to use services in the town are excluded from using it. While there are limitations to the service (it doesn't run in school holidays, and there is long time between arrival in the town and return home (but not as long as a work day)) the options for broadening this service to allow other users should be considered.

Multi Modal Journeys.

Journeys by public transport are often multi modal, people need to get to the train station or bus stop (by walking, cycling, driving or taking a bus). Each of these methods of access needs to be considered to increase public transport use. For example, some railways stations are a little bit outside the town they service. Is there good pedestrian access? Are there footpaths with lighting? This is particularly important given that in the middle of winter in many parts of the region it does not get bright until 9am and gets dark from 4.30 onwards. Likewise, to encourage cycling there needs to be secure, dry bike parking facilities. Is the bus service timetable designed to coincide with the train service? Where the railway station is at a distance from the town is there an easy way to get there (by bus, taxi or taxi share)?

Similar issues can arise with access to bus stops though deterrents for use are more often related to the danger and discomfort of standing by a busy road waiting for a bus. The provision of physical bus stops with timetables and information could help to increase the visibility of public transport and allow people to consider the possibility of walking or cycling to the stop. The provision of simple bus shelters at bus stops would improve safety and comfort for those waiting. Such rural bus shelters are common in many parts of Europe (they are usually of different design to urban shelters) providing shelter and a place to sit. These could also be used by those waiting for a lift/car share. It would be important to include the private bus routes and stops as part of the criteria in considering the deployment of shelters.

⁶² <https://www.nationaltransport.ie/public-transport-services/rural-transport-programme/>

Finally, the term 'Park and ride' should include parking at train stations or places to catch bus services. These need to be improved in many locations. Lack of safe, available parking can be a disincentive to longer public transport journeys and so should receive more investment. The service provider may need to receive targeted grant to allow for this.

Many journeys are multi modal, and yet there is very little information on such journeys with the main mode often being the only information gathered. Better data on multi modal journeys would allow for infrastructure and services to be planned taking it into account and also, with better understanding of the roles of different modes in different journey types, the more sustainable modes can be encouraged as elements of a journey.

Developing Active Travel

Active Travel (walking and cycling) brings an important range of benefits both for the traveller and for the wider community as well as a reduction in travel related emissions. Discussion of Active travel and increasing participation, often focuses on densely populated urban areas or on intermediate areas but it can also provide useful options for rural dwellers.

Active travel tends to be less popular in rural areas and in small urban settlements. There are a number of reasons for this, including the need to travel longer distances to employment or services, a lack of walking and cycling facilities, motorised transport travelling at higher average speeds giving rise to concerns about personal safety, greater exposure to wind and rain, and absence of artificial lighting meaning that many journeys are difficult in the hours of darkness. The lack of congestion and predictable car travel times also reduce the incentive to walk or cycle.

In rural areas where roads are narrow and road surfaces can be poor, walking and cycling can be unattractive options. Improvements in infrastructure can help them become part of the package of travel options for people making journey to work, school or to services. Normalising walking and cycling as viable travel options in rural areas is essential. They shouldn't be considered unusual, risky or the preserve of a small minority. This normalisation will of course occur as participation increases but also as the infrastructure for active travel is improved and the options are more visible and safer.

Active travel infrastructure should not just be available in urban or congested areas but in rural and smaller towns and villages. Even where the demand does not currently appear to exist the facilities should be put in place. The design of infrastructure for walking and cycling should be good. It should not increase the distance a pedestrian must travel and cycle lanes should be consistent, on road or on pavements (not continually switching between them) and they should not stop abruptly or deliver the cyclist into the middle of a traffic junction. Short stretches of cycle way are not useful unless they are bypassing a particular travel hazard. In rural areas they should not be less than 500m as otherwise the delay caused by stopping and starting for the cyclist going on and off the cycle lane may mean that they are not used.

While in many situations people have no option but to drive to their local town, there should be an effort to encourage walking between shops or services within the town, leaving the car parked in one spot for the duration of the visit. Some of the design of roads and crossings in towns (including smaller rural towns) militates against walking, with poor junction design making it hard to cross the

road. Similarly shopping facilities usually prioritise car routes and do not provide short direct options for walkers, instead expecting them often to take a long way around. Any planning for new retail or other services should require good access for walking and cycling.

Greenway developments are important and promote a positive low-carbon cycling culture, but they often have a focus as a tourist attraction and may not connect to town centres although they could function as a viable low-carbon transport mode for work, education and social activities⁶³. Interestingly, access to a bicycle is lower than that for a car, with 37% of those surveyed in the National Household Travel Survey owning a bicycle⁶⁴.

Active travel is particularly important in the context of multi modal journeys. In rural areas the number of people who walk or cycle to public transport (bus or train) should be targeted for increase. As discussed this would include provision of footpaths around train stations and linking towns to train stations, and safe places to wait in the vicinity of bus connection options or stopping places.

To encourage cycling as part of multi modal journeys, it is important that secure, dry cycle parking is available, which is of good design so that bicycles may be locked without damage. In areas where there is significant commuting by public transport to urban centres there should be large cycle park facilities made available for free to incentivise cycling over car travel to the local station.

3.5 Conclusion

Reducing transport emissions in rural areas faces different challenges and will be more difficult than in urban areas. The reason for this relate to population, population density, distance to services and to employment and amenities. The rural nature of the Western Region affects how we transition to a low carbon economy and society with implications for how we reduce transport emissions, but the reasons we travel are also very important, both in terms of options for reducing journey numbers and types, and the distances and nature of the journeys.

Travelling for work and business are clearly important, but most journeys are made to reach services of varying kinds. People living in rural areas tend to be at a greater distance from services than their urban counterparts and so the journeys made tend to be longer and more car based. Greater distance to services tends to reduce options for travel and in particular, given the lack of public transport and the distance to public transport services, increases reliance on car travel in rural areas.

As we have seen, employment is only one factor generating trips and the National Travel Survey shows that majority of travel is associated with non-work trips. The importance of these non-work trips and the potential for change in this demand needs to be more central to climate action planning.

The Avoid-Shift-Improve (ASI) framework should be used to plan reductions in emissions from transport, otherwise the predominant focus tends to be on the improving how we travel (e.g. shifting to electric cars from combustion engine cars), at the expense of avoiding and shifting travel

⁶³ See more discussion on greenways in NESCC's [Advancing the Low-Carbon Transition in Irish Transport](#) (p21) Research Series, Paper 13, May 2019.

⁶⁴ https://www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

options to facilitate systemic change. In general avoidance of use will have the biggest beneficial impacts. Pursuing a low carbon vision for transport will not only contribute to achieving Ireland’s climate change commitments but can also deliver wider benefits. These include improved energy security, economic opportunities from renewable and indigenous fuels and significant benefits in the areas of health, lifestyle, travel costs, local environment and air quality. Rural dwellers need to gain these benefits too.

As long ago as 2001, the Interdepartmental Working Group on Rural Transport⁶⁵ noted that there are already many players – public and private, commercial and non-commercial – involved in rural transport provision. Any future national policy and delivery framework will need sub-national co-ordination to ensure an integrated service on the ground to fill essential gaps, and to avoid any overlap or duplication. The Working Group view was that, within a nationally agreed framework, Local Authorities had a potential new co-ordination role to play in this regard, working in partnership with public and private transport providers, with other State bodies, and importantly with the community and voluntary organisations who already do much working this area

In future electricity may fuel the majority of passenger cars⁶⁶, commuter rail and taxis while natural gas and biofuels may play an increasingly important role for larger vehicles like HGV and buses. Services such as EV charging points and CNG fuelling points must be widely available in rural areas where population is dispersed. Without these services being available, and reliable, rural dwellers could be reluctant to adopt the new technologies. Similarly it could deter visitors who might be concerned about the availability of charging/fuelling points. In the case of HGVs and buses, lack of refuelling options could increase costs of delivery or services in more rural and peripheral regions.

While EVs are one low-carbon transport solution, public transport and cycling also have a role to play in rural areas. The options for promoting these in ways tailored to the needs of rural dwellers should form an important part of the new rural transport strategy to be developed as part of the Climate Action Plan.

Breaking the direct link between journey numbers and economic growth will be essential to successful climate action. Most people will continue to live in current settlement pattern so it is important to plan services for where people live now. Encouraging employment where people are living will reduce the need for travel. Home working and hub working should form part of this.

Remote working reduces the numbers of journeys made quite significantly, as well as having considerable benefits such as improved quality of life as a result of reduced time spent commuting, and it also reduces congestion at peak times⁶⁷. Further promotion of this option, following the Covid 19 pandemic, is important. Likewise there is significant potential for car sharing and the co-ordination of it both locally and countrywide through community groups and specific apps. Additional demand management measures to promote them should be undertaken.

⁶⁵ <https://www.gov.ie/en/publication/f65170-report-of-the-interdepartmental-working-group-on-rural-transport/>

⁶⁶ *National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland 2017-2030*

⁶⁷ The WDC examined some of these issues in 2017 in its Policy Brief “[e-Working in the Western Region A Review of the Evidence⁶⁷](#)” and in a short paper on [Home based working⁶⁷](#).

In relation to public transport, existing provisions like school bus services and other transport services (health) should be open to all rural dwellers, making the most of the existing services. Where a service exists bus stops, signage and information should be available including covered bus shelters. An Information app on availability/ timing could be developed. Sometimes it can be difficult to find information about an existing service or predict when it might arrive.

The term 'Park and ride' should include parking at train stations or places to catch bus services. These need to be improved in many locations. Lack of safe, available parking can be a disincentive to longer public transport journeys and so should receive more investment. Bike parking stops which is secure and dry should be provided at rail stations and key bus stops .

If we are to reduce the carbon intensity of rural travel there needs to be a clear focus on finding solutions in rural areas, piloting infrastructural investments in rural areas and small towns and trying novel approaches to encouraging sustainable travel. We need to find out what works in rural areas in relation to lift sharing, public transport use and active travel so potential solutions need to be encouraged and then tested and learned from.

4. Electricity—Demand and Supply from Rural Dwellers

Electricity is the final of the three modes of energy use (and so emissions) associated with rural living, and one which is likely to increase in importance with greater electrification in the move to a low carbon society, it is useful to consider rural household demand for electricity. Unlike heat and transport, there are few significant differences between urban and rural dwellers in the type and way we use electricity. While patterns of electricity use may not differ significantly between urban and rural areas, there are differences in relation to the supply of electricity in terms of generation, distribution and transmission which all have significant rural impacts and opportunities. These are considered in this chapter.

Previous chapters on the built environment and transport have highlighted the importance of electrification of heating and transport options so our way of using electricity will change and we will use more electricity. Under the Climate Action Plan the government has set a 2030 target of 70% of our electricity needs will come from renewable sources by 2030.

Developing an enabling framework for microgeneration (Action 30) will potentially have benefits for all areas but there are clear opportunities for rural dwellers, although, as with many climate action measures, they are likely to be of most benefit to those who can afford to make the investment.

Ensuring that the Community Framework to accompany the Renewable Electricity Support Scheme (RESS) is established and that there are “measures in place to ensure that the community benefit fund is equitable and there is strong citizen participation in renewable projects” (Action 28) is also essential.

Ensuring that ESB Networks and EirGrid plan the network and deliver on connecting renewable energy sources to meet the 2030 target of 70% renewable electricity (RES-E) capacity will mean more grid development in rural areas. This will be essential to meeting climate action targets and enabling significant electrification of heat and transport. The use of local rural energy sources is important to Irelands move to low carbon, so it will be important that the financial, employment and enterprise benefits of using local rather than imported energy are felt throughout rural areas. This will be important to increasing local acceptance of this infrastructure.

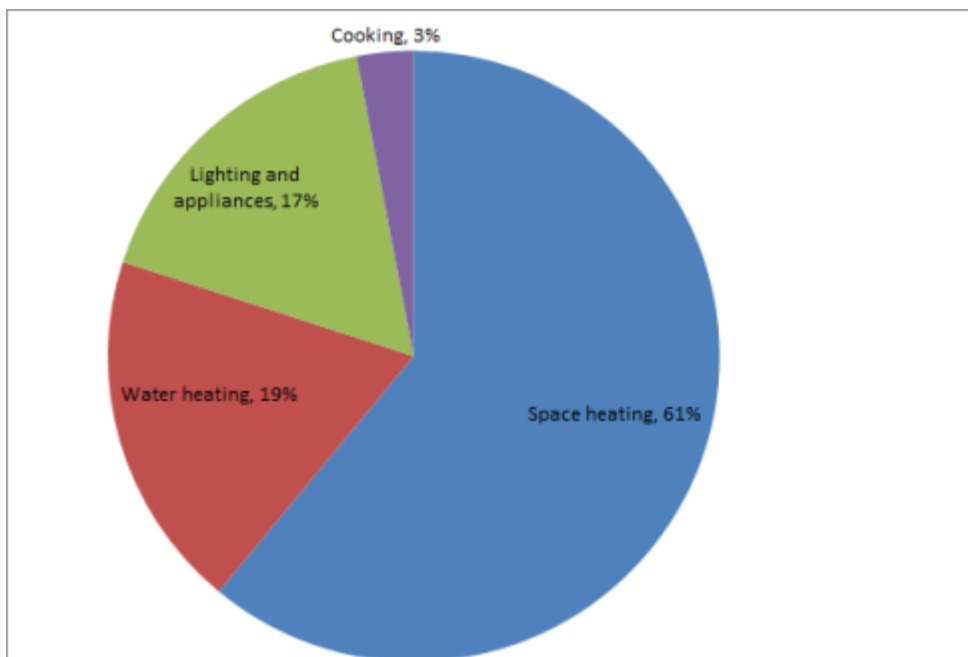
4.1 Electricity consumption in rural households

In 2018 the residential sector accounted for 30.1% of final electricity consumption, similar to that in 2005 (30.8%), with the significant difference that, in 2005, 7.2% of the electricity consumed came from renewable sources, while in 2018 it was 33.2%⁶⁸ and, as noted above, it is targeted to be 70% by 2030. As there is little specific information about rural electricity demand and patterns of consumption, it is useful to look at what we know about household electricity consumption, before considering some of the potential difference between urban and rural households.

⁶⁸ [SEAI Energy Statistics 2019](#) report

In 2018, SEAI published Energy in the Residential Sector⁶⁹ which gives details data for energy use in the home in 2016. This shows that electricity accounted for 25% of Irish household final energy usage 2016 (compared to 37% from oil and 21% from gas). As was considered in the previous chapter on the built environment, most of this household energy was used in heating (Fig. 37) and oil and gas are the dominant fuels for this. The focus of this chapter is on electricity use in appliances and cooking (20%). Water heating was largely considered along with space heating as much of it can be done by the central heating system, though this may change with a move to any increased use of solar energy.

Figure37: Energy use in an average Irish home, 2016



Source: SEAI, 2018, [Energy in the Residential Sector](#)

Between 2007 and 2014 final energy use of electricity per dwelling reduced by 16% having increased by 31% between 1990 and 2007 but more recent data⁷⁰ show an increase in residential electricity consumption between 2016 and 2018⁷¹.

The Commission for Regulation of Utilities (CRU) provides a figure⁷² of 4,200 kWh electricity usage per year as an average for all households. Moneyguide Ireland⁷³ estimates typical annual usage in could be from 2,100 kWh in a 1-2 bed apartment to 8,000 kWh 4-6 bedroom large house. As rural homes tend to be larger and detached consumption is more likely to be at the higher levels.

⁶⁹ SEAI, 2018, [Energy in the Residential Sector](#)

⁷⁰ SEAI, [Energy in Ireland 2019](#)

⁷¹ Data for 2007-2016 has been weather corrected but not for 2016-2018 so these are not completely comparable.

⁷² <https://www.cru.ie/wp-content/uploads/2017/07/CER17042-Review-of-Typical-Consumption-Figures-Decision-Paper-1.pdf>

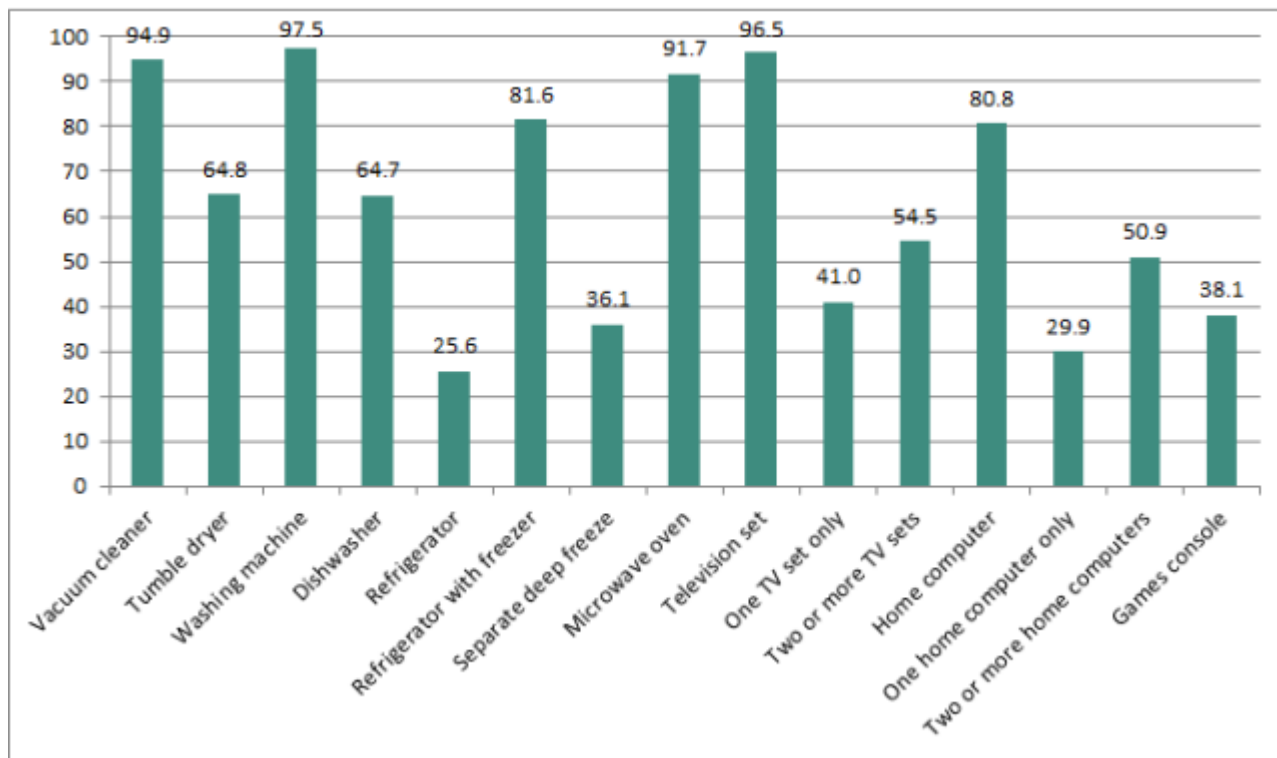
⁷³ <http://www.moneyguideireland.com/much-average-electricity-bill.html>

What are we using electricity for?

The lighting and appliances which account for 17% of energy use in the home are almost all powered by electricity. To understand what will change with a move to a low carbon household it is useful to remind ourselves about the appliances we have and what electricity they use.

Data from the CSO Household Budget Survey⁷⁴ (Fig. 38) shows how common the different appliances were in our homes in 2015-2016. Almost all households have a washing machine, a television and a vacuum cleaner. Dishwashers and tumble dryers are less common, but nonetheless almost two thirds of households have them.

Figure 38: Percentage of households with select household appliances 2015-2016



Source: CSO [Household Budget Survey 2015-2016](https://www.cso.ie/en/releasesandpublications/ep/p-hbs/hbs20152016/hfa/)

The box below gives a sense of how we use energy with these appliances with an estimate of how long it takes each appliance to use 1 unit of electricity (1kWh). Each unit currently costs about 20c on average including VAT.

⁷⁴ <https://www.cso.ie/en/releasesandpublications/ep/p-hbs/hbs20152016/hfa/>

Household Appliance use of Electricity

How long it takes for household appliances to use 1kWh (costing about 20c)

- Using a 10,000 watt electric shower for **6 minutes**
- Keeping an immersion heater (2,000) on for **20 minutes**
- Cooking in a 2,000 watt oven for **30 minutes**
- Ironing with a 1,500 watt iron for **45 minutes**
- Using a dishwasher (1,000-1,500 watts) for **40 minutes to 1 hour**
- Watching a plasma TV (280-450 watts) for **about 3 hours**
- A fridge-freezer (200-400 watts) for **about 3 hours**
- Keeping an electric blanket (130-200 watts) on **all night**
- Using a laptop (20-50 watts) **all day**
- Keeping a 5 watt LED light bulb on for **200 hours**

Source: [Moneyguide Ireland](#)

Over time the energy efficiency of our household appliances is improving (see SEAI's Energy in the Residential Sector⁷⁵ for discussion) and this in turn should contribute to reducing energy consumption in our homes. Lighting, in particular, has seen very significant increases in efficiency with the move away from incandescent bulbs, and new tumble dryers with heat pumps are much more efficient (though also more expensive to purchase). However at the same time, if the number of appliances continues to increase, for example more televisions, more tumble dryers or more dishwashers, overall household consumption from appliances could increase.

Differences in rural and urban electricity consumption.

There is little data on differences in rural and urban electricity consumption but in 2013 (the most recent data⁷⁶) 31 % of customers (634,306) were classified as 'rural domestic' (paying the higher rural standing charge⁷⁷) but rural domestic customers accounted for 34% of domestic demand (2,908 GWh). The definition of 'rural domestic' is assigned by ESB Networks and so there will be people living in rural areas classified as 'urban' customers (especially in small towns and villages).

There is little information on the reasons for higher rural electricity demand (though it is something that should be explored further in future) but there are a number of likely reasons. As seen before rural homes in the Western Region and elsewhere tend to be larger and are more likely to be detached. Larger homes use more energy of all forms will have more lighting and more space for, and demand from, other appliances. In contrast, however, they are less likely than urban homes (apartments in particular) to use electricity as their primary heating source. With most rural homes not connected to the natural gas grid, electricity is more likely to be used for cooking, although

⁷⁵ <https://www.seai.ie/publications/Energy-in-the-Residential-Sector-2018-Final.pdf>

⁷⁶ [ESB Networks Key Statistics 2014 https://www.esbnetworks.ie/docs/default-source/publications/esb-networks-key-statistics-2014.pdf?sfvrsn=2f4533f0_4](https://www.esbnetworks.ie/docs/default-source/publications/esb-networks-key-statistics-2014.pdf?sfvrsn=2f4533f0_4)

⁷⁷ There is a useful comparison of current rural electricity charges here <http://www.moneyguideireland.com/rural-electricity-charges-compared-to-urban.html>

bottled gas is also an important cooking fuel in rural areas. Some farms which may be using a lot of electricity (dairy farms in particular) may be included in this rural domestic group.

In terms of appliances, again there is little information on the differences between urban and rural households, and such differences are likely to be more related to house size, household size and income, than to urban and rural factors. Rural homes may also have other specific uses of electricity such as for water pumps from private wells and for certain domestic wastewater treatment systems, as well as for ground source or air source heat pumps (discussed below).

The Future

The discussion of electricity demand and appliances here relates to current electricity consumption issues and patterns but significant changes in these are expected in the future with the move to greater electrification of heat and transport. As the SEAI notes⁷⁸

Increasing the electrification of thermal and transport loads, much of which can be shiftable and controllable, facilitates much greater quantities of variable supply (e.g. wind / ocean energy). *SEAI, Smartgrid roadmap, pg 7*

Increases in electricity consumption for heating and vehicle charging are, however, likely to be tempered somewhat by increased energy efficiency in electricity use, in appliances and other electrically powered items alongside a reduction in distribution and transmission energy losses.

A significant move to EVs will increase domestic demand. Most EV charging will take place at home, probably overnight (or when electricity is cheap (see below)). Rural homes with off street parking are particularly well suited to this and the lack of other transport options is likely to mean, in the longer term, a higher number of EVs per rural household than urban, as is the case with cars at present. Similarly the longer distances to be travelled will mean higher electricity consumption by rural vehicles.

The electrification of heating with a greater use of heat pumps will also increase electricity consumption, though of course it will mean lower overall household energy consumption.

Alongside these changes are likely to be developments in smart appliances and smarter charging allowing for the use of many electricity appliances to be determined by the cost of electricity at a particular time, either because of lower demand on the system (such as at night) or cheaper generation (e.g. windy days). Increasing the electrification of domestic space and hot water heating, and personal transport will increase the use of electricity, but automating use decisions will increase the proportion of *renewable* electricity consumed in the home. This potential is also noted in SEAI's Smart Grid Roadmap⁷⁹:

Automating and increasing the electrification of domestic space and hot water heating, coupled with the CO₂ monitoring of energy consumption, creates a flexible and supply responsive load maximising the penetration of renewable electricity. *SEAI, Smartgrid roadmap, pg 7*

⁷⁸ <https://www.seai.ie/publications/Smartgrid-Roadmap.pdf>

⁷⁹ <https://www.seai.ie/publications/Smartgrid-Roadmap.pdf>

A more detailed discussion of potential changes in electricity demand and consumption patterns is also available in EirGrid's Tomorrow's Energy Scenarios⁸⁰.

To plan for the shift to electrification, changes which may be needed in domestic electricity connections and their capacity are being addressed under Action 174 of the Climate Action Plan. This will involve the introduction, as required, of new urban and rural domestic connection design standards, and infrastructure sizing and design standards, to meet the needs of domestic scale low-carbon technologies

4.2 Changes in electricity generation and supply—some impacts for rural dwellers

As we move towards a lower carbon society one of the key trends will be increased electrification and using renewable electricity to fuel our heat and transport. In this section some issues of supply, including generation, distribution and transmission, as they relate to rural dwellers, are considered.

There are significant changes expected in the way we will generate, store, transmit, distribute and use electricity in the coming decades. Many of these will impact on rural life, providing opportunities and challenges for rural dwellers and changing the way we use energy. EirGrid's Tomorrow's Energy Scenarios⁸¹ shows many of the areas of change and how they link with each other. Decarbonisation will change the energy used for generation with an increase in renewable generation and a phase out of fossil fuel generation. This will take place alongside more efficiency in how we use and transmit electricity.

Decentralisation is another aspect of the change in generation with a move from fewer, large scale generators to a more dispersed system with smaller scale generation and microgeneration by homes and businesses. Generation will often be closer to the site of consumption, sometimes at small scale, including domestic level, and storage options will become more important. Finally the digitalisation of systems using smart technology will provide for different control methods and make consumption decisions based on price, carbon intensity and other issues easier for the user.

Opportunities for rural dwellers- electricity generation

These changes provide opportunities for those rural dwellers who can afford it to become involved at the individual home scale, at community level and as shareholders in the commercial generation projects.

Rural areas are the site of most electricity generation and with the move to more renewables, the location of generation will often be in areas with most wind or potential for solar generation. This means that some rural dwellers are, and more will be, living in proximity to wind and solar farms and the infrastructure needed to transmit and distribute electricity from them. This has, on occasion, given rise to concerns for rural dwellers and delays in electricity infrastructure development. It is to be hoped that improved ways of consulting, planning and building such as EirGrid's new strategy to

⁸⁰ <http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-Report.pdf>

⁸¹ <http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-Report.pdf>

2025⁸², new draft wind energy guidelines⁸³ and the Renewable Electricity Support Scheme⁸⁴ (RESS) will allow people living in rural areas to contribute to the planning and development of renewable electricity generation in their areas and to benefit from the investments in their locality.

At a small scale there are significant opportunities for rural dwellers to become involved in microgeneration. Installing solar panels for electricity generation or solar thermal systems for water heating are likely to be the best options but small scale hydro and wind may be installed where the conditions are good. More information about grants for solar electricity (PV)⁸⁵ and solar water heating⁸⁶ is available from SEAI

The microgeneration of electricity can be for ‘self-consumption’ purposes, with the electricity generated first going to power home appliances, electric heating systems (such as heat pumps) and to charge EVs. Electricity generated can also be stored for use later —perhaps after sunset in the case of solar— in batteries, including those in EVs or stored in other energy forms such as hot water and in heating systems. Finally, excess electricity generated can be exported into the national electricity grid. In many other places, Germany and the UK for example, the householder is paid for this electricity (there are a variety of possible mechanisms including a feed in tariff) but in Ireland this is not common policy (the exception being Electric Ireland which has a microgeneration pilot scheme⁸⁷ for existing customers).

Developing an enabling framework for microgeneration will potentially have benefits for all areas but there are clear opportunities for rural dwellers, although, as with many climate action measures, they are likely to be of most benefit to those who can afford to make the investment. The Climate Action Plan, commits to the launch of a finalised policy and pricing support regime for micro-generation (under Action 30) which will mean householders will be paid for the electricity they produce and do not use themselves. In future domestically generated electricity may be provided to other electricity users. Thus many rural dwellers who live in detached, unshaded houses, and who have capital to invest, are in a good position to become involved in small scale electricity generation.

At a community level, there are also options for rural areas (and other places) to become involved in the Sustainable Energy Community (SEC)⁸⁸ network. There are currently over 350 communities in the network with a target of increasing this to 1,500 in the Climate Action Plan. As well as householders the SEC can include a range of different energy users such as homeowners, sports clubs, community centres, local businesses and churches. Each community develops an energy use masterplan covering all aspects of energy use and resources. The focus is not just on electricity but on increasing the efficiency and sustainability of all energy use.

In line with the Climate Action Plan goal of ensuring that there are “measures in place to ensure that the community benefit fund is equitable and there is strong citizen participation in renewable projects” (Action 28) and in order to increase local participation in electricity generation the new

⁸² <http://www.eirgridgroup.com/about/strategy-2025/>

⁸³ https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf

⁸⁴ <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/ress/Pages/default.aspx>

⁸⁵ <https://www.seai.ie/grants/home-energy-grants/solar-electricity-grant/>

⁸⁶ <https://www.seai.ie/grants/home-energy-grants/solar-water-heating-grant/>

⁸⁷ <https://www.electricireland.ie/residential/help/efficiency/electric-ireland-micro-generation-pilot-scheme>

⁸⁸ <https://www.seai.ie/community-energy/sustainable-energy-communities/community-network/>

Renewable Electricity Support Scheme⁸⁹ (RESS) will have a specific strand for projects with a majority community ownership and whose primary purpose is community benefit (environmental, economic or social) rather than financial profit. In addition to this option, every project developer will be obliged to contribute to a Community Benefit Fund at a rate of €2 per MWh every year (which could be more than €200,000 annually for a community from a 40 MW wind farm) and potentially, in future, a community investment scheme may allow people to invest in their local project⁹⁰.

These will help to ensure more local involvement in generation projects (either community projects or as shareholders in projects developed by others) through these mechanisms and will provide opportunities for rural people to share the benefits of the move to greater electrification and renewable generation in rural Ireland.

The future: electricity distribution and transmission

The dispersed rural population means that Ireland has four times the European average of length of network per capita⁹¹. The electricity distribution network is the low voltage used to supply electricity (to 2.3m customers, including rural households), and to connect small scale generation and microgeneration. It is being developed to make it ready for a lower carbon energy future with the move to a 'smart network'⁹². This includes smart metering⁹³ which will allow customers to become more actively involved in managing their electricity, delivering benefits for themselves and the wider system. The phased rollout across Ireland was targeted to deliver 250,000 new meters by the end of 2020 (though it is now likely to be delayed as a result of Covid 19 restrictions),. It is expected that from 2021 electricity supply companies will begin to offer new smart products and services and households will be able to shift some consumption to times of the day when electricity is cheaper. Users may also be able to gain a better understanding of how and when they are consuming electricity and to manage it, reducing consumption and taking advantage of cheaper pricing times.

In reality though, people have different capacities to engage with detailed management of their electricity consumption. While some of the consumption management will in future be integrated into the appliances being used, it is important that pricing and electricity management structures do not significantly disadvantage those consumers using older equipment, with less money to invest in more expensive electricity appliances, or who are less able to engage with and respond to the information provided by smart meters.

In terms of transmission, the Climate Action Plan target for 70% of electricity to be generated from renewable sources by 2030 means that up to 10,000 megawatts of additional renewable generation, mainly from rural areas, will need to be connected to the electricity system⁹⁴. EirGrid's stated goal is to achieve the required increase in renewables while minimising the addition of new infrastructure, but there will have to be an increase in the large-scale infrastructure of pylons, substations and overhead wires. The way that these are rolled out across Ireland and the engagement with those

⁸⁹ <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/ress/Pages/default.aspx>

⁹⁰ https://www.dccae.gov.ie/documents/RESS_Investment_Scheme_Supplementary_Note.pdf

⁹¹ [ESB Networks 2027 Lighting the way to a better energy future](https://www.esbnetworks.ie/who-we-are/our-strategy)

⁹² Read more here: <https://www.esbnetworks.ie/who-we-are/our-strategy>

⁹³ <https://www.esbnetworks.ie/existing-connection/meters-readings/smart-meter-upgrade>

⁹⁴ [EirGrid Strategy 2020-2025, Transforming the Power System for Future Generations](#)

living in areas affected by it will be important. While the need to resolve the climate crisis provides an urgent rationale for investment, and the shift to renewable energy has important benefits for our society, locally, nationally and globally, it is important that the benefits of the investment and infrastructure are shared with rural areas and that there is a true participative approach to consulting, planning and building the required network.

4.3 Electricity Generation in the Western Region- A Renewable Story

This chapter has considered electricity consumption in households, with a particular focus on rural households, and some of the ways increased renewable generation may impact them. In this section the issues of generation and supply are considered in terms of the Western Region as a low carbon region. The focus here is broader than rural dwellers, but the changing nature of generation and supply and the needs for significant increases in generation and transmission in the region are important for all those living in the Western Region and nationally.

The Western Region has some of the best resources for on shore wind generation in Europe, and in the future, as technology improves, for offshore renewable energy. In 2018 the WDC commissioned a review of electricity transmission infrastructure in the Western Region⁹⁵. It examined current and future needs for transmission infrastructure in the Region and considered how increased renewable electricity generation, along with new ways of using and managing electricity and new methods of improving the use of existing transmission infrastructure, might impact on need for investment⁹⁶. In this section electricity supply and demand across the whole Western Region and for each of the seven Western Region counties is examined.

Electricity Generation in the Western Region

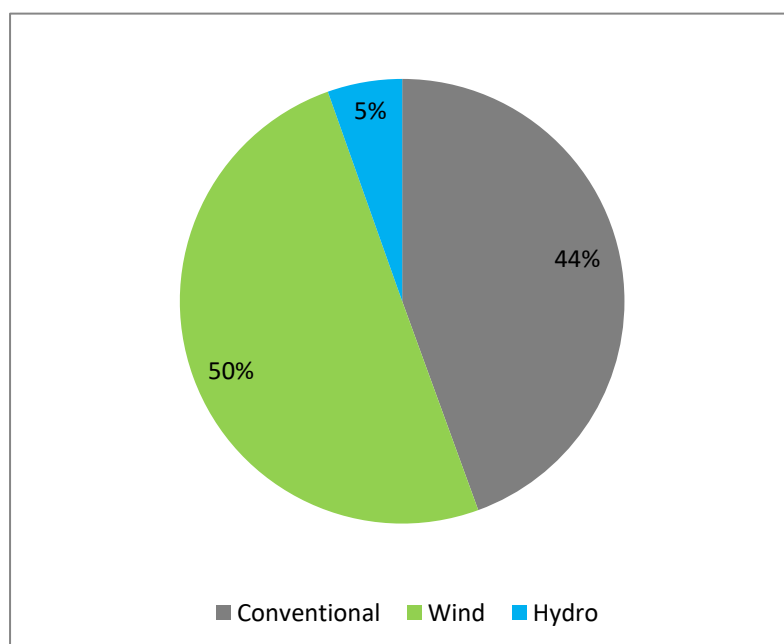
The Western Region already has a significant connected renewable generation; more than half (55%) of the generation in the Region is renewable (Figure 39). There was 1,359 MW of conventional generation capacity. This capacity is mainly in the Moneypoint coal fired power station in Co. Clare (855MW) although it should be noted that this has been off line or operating below capacity in recent years⁹⁷. Tynagh gas fired power station in Co. Galway (400MW) and Tawnaghmore oil fired peaking plant in Co. Mayo (104 MW) are the other sites of conventional generation in the Region..

⁹⁵ The Electricity Transmission Infrastructure Review for the Western Development Commission was conducted by [MullanGrid Consulting](#)

⁹⁶ We have published a summary of its findings in *WDC Insights Electricity Transmission for Renewable Generation- What's needed in the Western Region?* <https://www.wdc.ie/publications/reports-and-papers/>

⁹⁷ The Climate Action Plan includes a commitment to end the burning of coal in Moneypoint by 2025, and replace coal-fired generation with "low-carbon and renewable technologies".

Figure 39: Generation Capacity in the Western Region, 2019



Source: <http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Group-All-Island-Generation-Capacity-Statement-2019-2028.pdf>

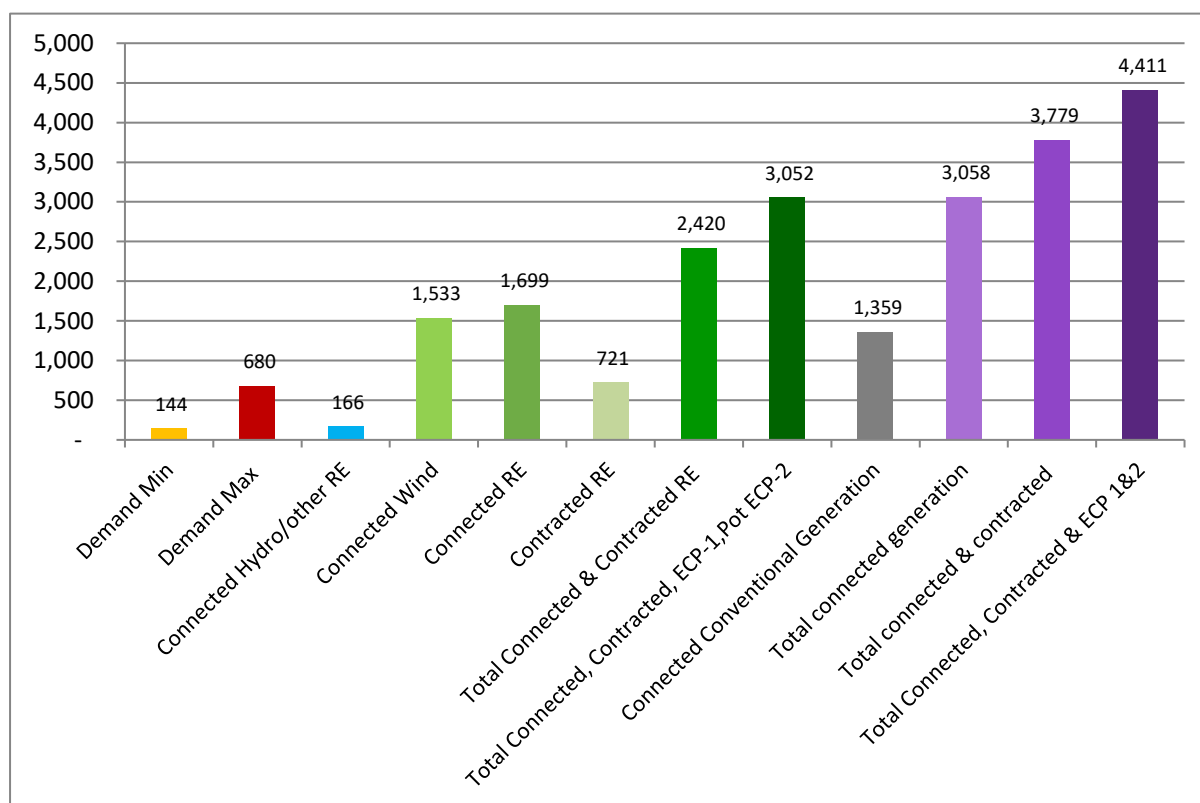
There is 165MW of hydro generation in the WDC region. This capacity is mainly at Ardnacrusha hydro station in Co. Clare (86MW) and the Erne stations (65MW) in Co. Donegal. On shore wind generation makes up the rest of the renewable electricity generation in the Region (the locations are discussed further below).

In the future with the ending of coal fired generation, as committed to in Climate Action Plan⁹⁸, the majority of electricity generation in the Western Region will be renewable, coming from onshore wind and other developing sources including solar and potentially offshore wind and marine generation.

There is greater generation capacity (both renewable and conventional) than demand in the region. Renewable generation currently connected (1,699 MW) produces approximately 4,690 GWh of renewable electricity. Considering total peak demand of 680MW and assuming the nation-wide demand factor of 65%, the total demand in region is approximately 3,870 GWh. It can be concluded, therefore, that on an annual basis the Western Region is currently producing enough renewable generation to meet 120% of its own demand. The Region is thus a net provider of renewable electricity to the rest of Ireland making a significant contribution to the 2020 RES-E targets.

Figure 40 shows the levels of connected renewable generation in the region (1,699MW) and conventional generation (1,359MW) as discussed above. Maximum demand (at peak) was estimated by MullanGrid as 680 MW with minimum demand 144MW.

⁹⁸ Moneypoint is due to close in 2025, and it is likely that it will be operating well below capacity in the coming years

Figure 40: Current Generation and Demand in the Western Region (MW)

Source: www.esb.ie, www.eirgrid.com and MullanGrid Consulting

There is currently 1,699MW of connected renewable generation with a further 721MW contracted, so by 2021 there could be 2,420MW of renewable generation (wind, hydro and some solar) connected in the Western Region (as shown in Figure 2 above). There is another 437MW of further potential on shore wind connections in the short term (as allocated under the Enduring Connection Policy Phase 1 (ECP-1)) and potentially 195MW under ECP 2.

Clearly the potential for renewable generation and the opportunities the Region provides are significant with the total connected, contracted and potential (ECP) generation capacity of 3,052MW. By the end of 2025, much of this could be in place and with Moneypoint to close in 2025 (leaving 504MW of conventional generation capacity, if Tawnaghmore remains in place), renewable generation could then account for 86% of the 3,556MW capacity in the Western Region. This does not include any 'microgeneration'⁹⁹.

Generation and Demand at County level

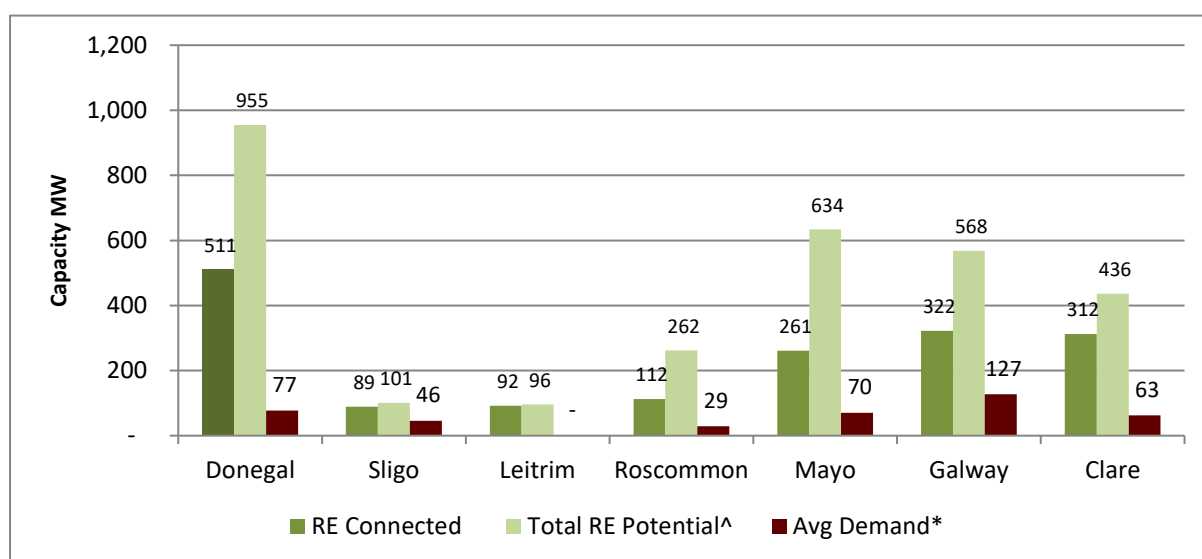
It is interesting to look briefly at the patterns of generation and demand at county level in the Western Region (Figure 41). Donegal, which has the third largest connected capacity of on shore

⁹⁹ It is hard to estimate the potential of microgeneration without any clarity on incentives or likelihood of investment. A generous assumption would be that 5% of houses (not flats and apartments) could have Solar PV installed by the end of 2025. In the Western Region this would be almost 42MW of installed capacity (assuming each household installs 3kW of panels).

wind generation in Ireland, is clearly significant force in the Region's transition to renewable electricity.

It currently has 511 MW of connected renewable generation with significant hydro generation (75MW) and 436MW capacity of wind generation and a further 223MW of contracted generation. Galway and Clare and the next most important counties for renewable generation, with Ardnacrusha making a significant contribution (87MW) in Clare, while most of Galway's renewable generation (322MW) from wind. These counties have high levels of contracted wind generation which could be connected in the short to medium term. Mayo currently has 260MW of connected wind capacity and has 294MW of contracted generation to be connected (including ECP¹⁰⁰).

Figure 41: Generation and Demand in Western Region counties



Source: www.esb.ie, www.eirgrid.com and MullanGrid Consulting [^] Total RE potential generation capacity includes connected, contracted, ECP-1 and ECP-2; *This is a simple average of Min and Max demand. Leitrim demand is included with Sligo

In all Western Region counties currently connected renewable generation is well above the average county demand¹⁰¹. Table 3 below gives the detail of the connected, contracted and ECP-1 capacity in each county in the Western Region alongside the estimated demand in each county (although Sligo and Leitrim are considered together).

¹⁰⁰ ECP-Enduring Connection Policy is a new system for issuing connection offers for new generation and storage capacity. This replaces the older systems of "Gates" and "non-GPA". Read more [http://www.eirgridgroup.com/site-files/library/EirGrid/2018-Batch-\(ECP-1\)-Eligible-Applications-Joint-SO-Publication-31.8.18.pdf](http://www.eirgridgroup.com/site-files/library/EirGrid/2018-Batch-(ECP-1)-Eligible-Applications-Joint-SO-Publication-31.8.18.pdf) and <https://www.cru.ie/wp-content/uploads/2019/11/CRU19143-ECP-2-Proposed-Decision-002-1.pdf>

¹⁰¹ Note this refers to capacity and capacity is not available at all times.

Table 3: Connected, contracted and future renewable generation and demand in Western Region counties.

County	Connected Wind (MW)	Connected Hydro and other RE (MW)	Total Connected RE (MW)	Contracted (MW)	Total Connected & Contracted (MW)	Total Connected & Contracted & ECP (MW)	Demand Max (MW)	Demand Min (MW)
Donegal	436	75	511	223	734	955	132	21
Sligo	86	3	89	0	89	101	69	23
Leitrim	92	0	92	4	96	96		
Roscommon	112	0	112	14	126	262	48	10
Mayo	260	1	261	294	555	634	116	24
Galway	321	1	322	150	472	568	211	44
Clare	225	87	312	36	349	436	104	22
Western Region	1,533	166	1,699	721	2,420	3,052	680	144

Source: www.esb.ie, www.eirgrid.com and MullanGrid Consulting, Feb. 2020

Transmission Capacity

The transmission system has been essential in enabling the Western Region to achieve relatively high levels of renewable generation. There has been substantial investment in the transmission network in the Region¹⁰² the majority of which, recently, has been in upgrading the existing electricity transmission network to provide additional capacity. There is capacity in the current transmission system for more renewable generation in areas of the Western Region including large parts of Co. Roscommon, Co. Clare and Co. Galway. However there is concern about the pace and scale of development of new transmission circuits elsewhere in the Region. The areas of particular concern in the medium term are Co. Donegal and North Mayo.

To allow for the continued growth of renewable generation in the Region, which will be necessary to meet the National Climate Action Plan target of 70% renewable electricity generation by 2030 (with up to 8.2GW of on shore wind generation, up to 1.5 GW of grid-scale solar energy and at least 3.5 GW of offshore renewable energy), further investment in new transmission infrastructure is required.

4.4 Conclusions on electricity use, and generation

There is little information on the differences between urban and rural dwellers in the type and way they use their electricity. It would be useful to have more information about rural household demand for electricity and how this will change with greater electrification in the move to a low carbon society. It is also important to recognise that even if Ireland does meet the 2030 target of 70% electricity generation from renewable sources, it still leaves 30% of the electricity non-renewable, so electrification is not a complete solution.

¹⁰² EirGrid and ESB Networks, regulated by the Commission for the Regulation of Utilities (CRU), invest in and develop the electricity grid.

There is significant future potential for electrification of heat and transport in rural areas, many rural dwellers lack the financial resources to switch to low carbon or carbon free alternatives. It is important that we recognise this, alongside understanding rural differences in electricity and other energy use when we are planning for a low carbon rural economy and society.

The potential for rural householders to become involved in electricity supply was considered in this chapter, alongside some of the changes in how electricity will be generated and supplied across the country. The need to act in the climate crisis and move to a low carbon region is clear. Greater use of renewable electricity will be an important part of that. Rural dwellers have a role to play in this, in terms of making contribution to electricity supply, through microgeneration and involvement in community renewable electricity generation projects or, potentially, as shareholders in other renewable projects.

Rural areas are the site of most renewable generation and the infrastructure associated with it. The rural areas where the infrastructure is located need to benefit from it, not only in terms of sharing the commitment to addressing the climate crisis, but also in relation to economic benefits and community gain and, perhaps most importantly, as a means of increasing employment in rural communities.

5. Conclusions

Electricity, heat and transport are the three forms of energy use and the so source of emissions for rural dwellers. The focus of this study was on rural energy use. It was highlighted that the first step in tackling climate change should be to increase energy efficiency and so reduce the amount of energy being used (in all three modes) bearing in mind that improved energy efficiency will also contribute to improved comfort and health outcomes in many situations.

Rural Homes: Energy Efficiency and Heating

Decarbonisation of heating in homes and other buildings is one of the principal challenges in the move to low carbon. The first step must be to deliver improved insulation in rural homes. While deep retrofit may be ideal it will also be important to consider energy efficiency measures which improve the insulation and warmth of the home and move from BER of F or G, even if they do not include all measures and remain at C or D rather than A or B. .

Energy efficiency is important and the WDC welcomes the ambition to increase the number of homes with a BER rating of B2 and above. However, the most recent BER ratings data from the CSO shows that currently only 9% of homes assessed nationally have a rating of B2 and above. In the Western Region as a whole only 5% achieve this and it is as low as 3% in Roscommon and Leitrim. This highlights the need to specifically address energy efficiency and home heating issues in more rural and less well-off regions. For dwellings in the in lowest rating categories and the costs and difficulties of achieving upgrade to a B rating are most significant.

Most homes in our region use oil for heating. There needs to be a specific effort to encourage change in rural areas which are oil dependent. While many of the incentives are for the installation of heat pumps it should be remembered that the use of wood biomass for heating brings very significant local economic benefits.

Transport

Rural people rely on car based transport, they have less available public transport and tend to travel greater distances. Rural dwellers' transport demand patterns need to be central to planning for climate change mitigation. There must be detailed consideration of transport issues for smaller settlements and rural areas which currently account for 48% of all trips (compared with 32% for the four main cities)¹⁰³. The majority of the population will continue to live in the historical settlement pattern and spatial planning will not change that pattern significantly even in the long term (to 2050). Thus any national climate action needs to focus on current spatial patterns as well as any future growth in demand.

In Ireland, a very high proportion of transport emissions are associated with rural and long-distance commuting. In order to address the challenge of reducing emissions in Ireland there should be a focus on solutions that can address the needs of rural drivers and those making longer commutes to

¹⁰³ For more information on rural travel patterns see above and <http://www.wdc.ie/wp-content/uploads/WDC-Submission-to-DTTAS-on-SFILT-Consultation-October-2014.pdf> and also http://www.wdc.ie/wp-content/uploads/WDC_Policy-Briefing-no-6-Commuting-Final.pdf and <http://www.wdc.ie/wp-content/uploads/Supplementary-Note-WDC-Policy-briefing-No6.pdf>

urban areas. In addressing this issue it is important to consider the underlying presumption that employment will be concentrated in cities. There are opportunities for employment to be more dispersed, in line with current population patterns. Towns, smaller centres and rural areas provide a variety of opportunities as locations for employment across many sectors (not just agri-food and tourism). Already more than 60% of rural dwellers (excluding farmers) worked in towns or rural areas illustrating the potential to stimulate employment closer to where people live.

Alongside these more dispersed employment opportunities there is significant potential to make the most of the opportunities provided by trends in technology development, with greater remote and home working opportunities as well as incentives for enterprises to offer different work arrangements (timing of day, tele-working). These trends will change the way people work and how often they actually travel for work. We need to recognise that active policies to encourage and facilitate new work practices can help manage and reduce future travel demand in a sustainable and cost effective way that also has quality of life benefits.

But employment is only one factor generating trips; 70% of trips are *not* related to employment. The importance of these non-work trips and the potential for change in this demand needs to be more central to climate change mitigation planning.

Better spatial planning with more people living in urban areas will provide more concentrated transport demand which can be better served by public transport with can help lower emissions but, in addition to this planning for future development, there is a need to manage emissions arising in current settlement patterns. People will continue live where they are living, and any alteration of alter Ireland's historically dispersed settlement pattern will only occur in the long term, especially in the Western Region and other rural regions.

Electricity

The way we use electricity in our rural homes, and the opportunities for change, are important considerations for how we to transition to low carbon living. Unlike heat and transport, there are few significant differences between urban and rural dwellers in the type and way we use our electricity. However, developments in electricity generation and storage which reduce or eliminate carbon emissions from generation should, by 2050, will have significant benefits for the heating sector and also, significantly, in personal transport with increased use of electric vehicles.

In terms of appliances, again there is little information on the differences between urban and rural households, and such differences are likely to be more related to house size, household size and income, than to urban and rural factors. Rural homes may also have other specific uses of electricity such as for water pumps from private wells, and for certain domestic wastewater treatment systems.

While patterns of electricity use may not differ significantly between urban and rural areas, there are significant changes expected in the ways we will generate, store, transmit, distribute and use electricity in the coming decades. Many of these will impact on rural life, providing opportunities for rural dwellers or changing the way we use energy.

Decarbonisation will change the generation portfolio with increased renewable generation and a phase out of fossil fuel generation alongside more efficiency in how we use and transmit electricity.

Decentralisation is another aspect of the change in generation with a move from fewer, large scale generators to a more dispersed system with smaller generation sites and microgeneration by homes and businesses. Generation will often be closer to the site of consumption, sometimes at small scale, including domestic level, and storage options will become more important. Finally the digitalisation of systems using smart technology will provide for different control methods and consumption decisions based on price, carbon intensity and other issues important to the user.

These changes provide opportunities for those rural dwellers who can afford it to become involved at the individual home scale, at community level and as shareholders in the commercial generation projects.

Conclusion

The WDC believes that it is essential that climate policy should have a specific focus on issues for rural areas, and actions to ensure that rural areas are in a position to benefit from a move to low carbon (and there are many opportunities for them to do so) and that rural dwellers make a fair contribution to national goals for renewable energy and to actions to mitigate climate change. However, in order to make this happen we suggest that high level targets and actions should be translated into a regional and local context so they can drive the delivery of a thriving low carbon economy and spread the benefits throughout the country.

This report provides background data and discussion of issues affecting rural dwellers in the Western Region. The focus is on the three aspects of rural dwellers energy use which can have significant climate implications: Heat and Energy Efficiency, Transport and Electricity issues.

It is hoped that we will, in future, be able to examine these issues as they affect rural enterprises, the changes they will need to make, the opportunities they may embrace and the employment issues associated with these changes. The WDC believes that the renewable energy and climate action have the potential to create considerable employment across the Western Region and to provide long term stable markets for many low value biological outputs, as well as ensuring that much of the money spent on energy remains in Ireland.

In conclusion, the WDC believes that it is essential that planning for Climate Action should have a specific focus on issues for rural areas, and on actions to ensure that rural areas are both in a position to benefit from a move to a low carbon society and to meet the challenges of doing so. This will enable them to make a fair contribution national goals in relation to renewable energy and to actions to mitigate climate change.

The WDC will be continuing this work on the transition to a low carbon economy and society. This study provides a baseline, using available data, to show where we are now in relation to the three key aspects of energy use. This, along with discussion with wider stakeholders will direct us to key issues for future Western Development Commission work.