



# **Key Insights from SEAI's 2022 National Energy Balance**

5<sup>th</sup> September 2023

Version 1.1

## Foreword

SEAI's National Energy Balance is the definitive source of data for the supply, transformation, and demand of energy in Ireland. It is produced by SEAI's Energy Statistics Team and is based on the direct surveying of hundreds of energy suppliers, as well as public administrative data from the Central Statistics Office (CSO), Environmental Protection Agency (EPA), Department of the Environment, Climate and Communications (DECC), Revenue Commissioners, and others.

In addition to providing insights into Ireland's energy landscape, the Energy Balance is a key input into the EPA's Greenhouse Gas (GHG) inventory, and so directly informs emission results against our legally binding carbon budget and sectoral ceiling obligations. The Energy Balance is used to determine Ireland's results against national and European targets on Renewable Energy Share (RES), and our targets mandated by the EU Energy Efficiency Directive (EED). Data from the Energy Balance is also used to satisfy Ireland's international reporting obligations to the International Energy Agency (IEA) and the European Commission under Regulation (EC) No 1099/2008 on Energy Statistics.

This short note provides key insights from the 2022 National Energy Balance. It identifies the most significant changes in Ireland's energy demand by energy-type and by sector, and the emissions arising from that energy demand. It also presents provisional estimates of Ireland's Renewable Energy Shares in Electricity, Transport, and Heat, and their 2030 targets, and a series of short sector summaries on energy demand and emissions:

1. Energy Demand Summary
2. Energy-related Emissions
3. Renewable Energy Shares
4. Energy Balance Sector Summaries

The National Energy Balance data from 2022 to 1990 can be found here:

<https://www.seai.ie/data-and-insights/seai-statistics/key-publications/national-energy-balance/>

Provisional monthly data on the supply of electricity, gas, and oil can be found here:

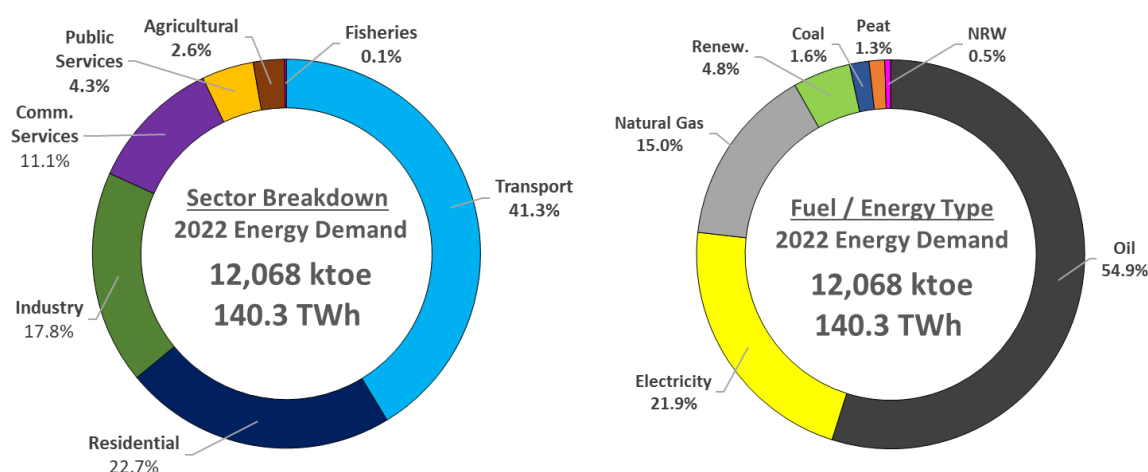
<https://www.seai.ie/data-and-insights/seai-statistics/monthly-energy-data/>

Fuller analysis of 2022 National Energy Balance, and provisional monthly data from 2023, will be published by SEAI in December 2023, at the launch of the 2023 Energy in Ireland report.

## 1. Energy Demand Summary

Ireland's energy demand in 2022 was 4.8% higher than in 2021. This overall year-on-year increase was largely driven by a 20.1% increase in energy demand in the transport sector, as Covid-19 impacts on travel continued to decline, partially counteracted by an energy demand reduction in the residential sector. Residential energy demand in 2022 was 12.0% lower than in 2021. There were demand reductions across coal (-33.1%), peat (-12.7%), oil (-16.0%), natural gas (-9.3%) and electricity (-5.9%). The strongest driver of this demand reduction was likely the higher cost of energy in 2022, but return-to-office behaviours, fuel-switching, efficiency improvements, and weather effects likely played a role too.

Oil remained the largest source of Ireland's energy in 2022. Over half of Ireland's final energy demand (54.9%) was satisfied by oil products. The transport sector was responsible for 71.4% of oil demand, with residential heating demand accounting for 16.4% of oil. Total oil demand in 2022 was 10.8% higher than in 2021, mainly driven by a 19.9% rebound in oil demand for transport, partially counteracted by a 16.0% decrease in oil demand for residential heating.



Electricity accounted for a little over one-fifth (21.9%) of total energy demand in 2022. Demand for electricity in 2022 was 2.5% higher than in 2021, mainly driven by a 11.8% increase from the commercial services sector, largely due to increased demand from datacentres. This was partially counteracted by a 5.9% decrease in electricity demand from the residential sector.

Transport accounted for 41.3% of total energy demand in 2022. Over three quarters (76.8%) of transport demand in 2022 came from road transport – private cars, heavy & light goods vehicles, buses, taxis, etc. Aviation accounted for 20.4% of transport energy demand in 2022.

The non-electricity heating used in our homes, offices, farms, and factories accounted for just over a third (36.9%) of total energy demand in 2022. This heating demand in 2022 was 7.2% lower than in 2021. Almost all (>95%) of the heat demand reduction observed in 2022 came from the residential sector.

The amended European Energy Efficiency Directive (EED) effectively sets an energy demand cap for Ireland in 2030. The EED was formally agreed in July 2023, and is expected to enter into force in September or October 2023. While Ireland's EED target has not yet been finalised, it is expected to cap Ireland's 2030 final energy demand to approximately 80% of its 2019 level. For reference, Ireland's final energy demand in 2022 was 97% of its 2019 level, indicating that significant net energy demand reductions are needed over the period to 2030.

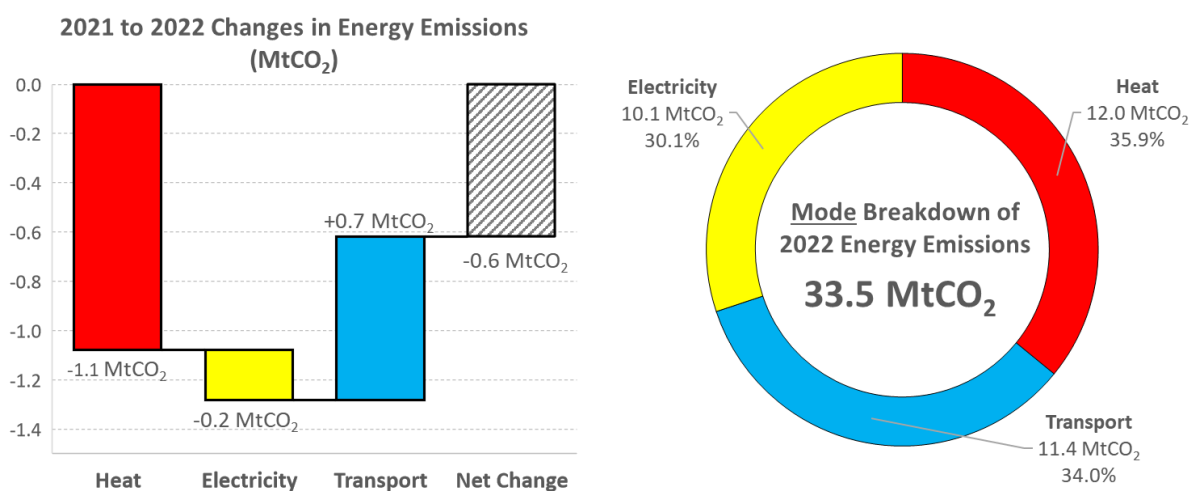
Reducing Ireland's energy demand will help our sustainable transition. Every unit of energy demand that can be removed from the economy is a unit of energy that no longer creates emissions, and that no longer needs to be displaced by investment in renewable energy generation.

For example, upgrading the insulation in our homes and offices helps drive down the use of fossil fuels in heaters and boilers. CAP23 calls for an equivalent of 120,000 dwellings retrofitted to BER B2 (or cost optimal or carbon equivalent) by 2025, and 500,000 dwellings by 2030. In parallel, avoiding unnecessary travel and shifting necessary journeys from private cars to walking, cycling, and public transport helps drive down the use of fossil fuels on our roads. The *Avoid-Shift-Improve* strategy for transport outlined in CAP23 calls for a 20% reduction in total vehicle-kms, a 50% reduction in vehicle fuel use, a 50% increase in "active travel" journeys, and a 130% increase in public transport journeys by 2030.

The Government's Climate Action Plans (CAPs) detail an expanding suite of measures aimed at reducing energy demand across all energy using sectors.

## 2. Energy-related Emissions

Despite final energy demand increasing in 2022, energy-related emissions<sup>1</sup> were 1.8% lower than in 2021. This overall net reduction in energy-related emissions originates from the sum of a decrease in heat demand emissions (-8.3%), a decrease in electricity generation emissions (-2.0%), and an increase in transport emissions<sup>1</sup> (+6.2%). In 2022, heat demand was responsible for 35.9% of energy-related emissions, transport was responsible for 34.0% of energy-related emissions, and electricity was responsible for 30.1% of energy-related emissions.



In 2022, the four most significant sources of energy-related emissions were petrol and diesel used for road transport (10.9 MtCO<sub>2</sub>), electricity generation for the commercial and public services (4.9 MtCO<sub>2</sub>), oil for home heating (3.3 MtCO<sub>2</sub>), and electricity generation for the residential sector (2.8 MtCO<sub>2</sub>).

Private car use accounted for almost half (44.8%) of transport emissions. Despite demand rebounds in 2021 and 2022, transport emissions remain 5.0% below pre-Covid 2018 levels, possibly due to the impact of work-from-home arrangements on commuting journeys.

Residential emissions accounted for 25.4% of all energy-related emissions. Residential emissions are mainly due to oil (38.5%), electricity (32.5%), natural gas (15.1%), peat (8.0%) and coal (6.0%). Residential emissions in 2022 were 14.1% lower than in 2021, driven by a combination of higher fuel costs, return-to-office behaviours, fuel-switching, efficiency improvements, and weather effects.

SEAI's Energy Balance is a key input to the EPA's GHG inventory and helps determine Ireland's progress against our carbon budgets and sectoral emission ceilings. Energy-related emissions account for about 60% of Ireland's overall emissions, but they account for practically 100% of the *transport*, *electricity*, *buildings (residential)*, and *buildings (public and commercial)* sectors within the carbon budget framework. In July 2023, using data from SEAI's Energy Balance, the EPA reported Ireland's 2022 emissions as shown in the following table<sup>2</sup>:

<sup>1</sup> International aviation and international maritime navigation are excluded from national energy emission calculations because they are reported separately in accordance with guidance from United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC).

<sup>2</sup> <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-provisional-greenhouse-gas-emissions-1990-2022.php>

Carbon Budget Sector (Source: EPA)	2022 Emissions (MtCO <sub>2</sub> e)
Agriculture	23.3
Transport	11.6
Electricity	9.8
LULUCF	7.3
Industry	6.6
Buildings (Residential)	6.1
Other	1.9
Buildings (Commercial and Public)	1.4

EPA analysis shows that 2-years into the first 5-year carbon budget (2021-2025) Ireland has already emitted 46.6% of its allowable GHG, which means we have used 46.6% of our budget in the first 40% of the time. This mismatch shows that Ireland is over-emitting with respect to its guideline trajectories. Further EPA analysis shows that all sectors in the carbon budgets are “off trajectory” to satisfy their 2021-2025 sectoral emission ceilings (SECs). For example, the *electricity* sector has emitted 49% of its SEC in the first 40% of the 2021-2025 carbon budget, the *industry* sector has emitted 46% of its SEC, the *buildings (residential)* sector has emitted 45% of its SEC, and *transport* has emitted 42% of its SEC.

EPA projections<sup>3</sup>, informed by SEAI’s National Energy Projections (NEPs), indicate that without an increased suite of policies and measures, Ireland could emit between 340 MtCO<sub>2</sub>e (WEM<sup>4</sup>) and 332 MtCO<sub>2</sub>e (WAM<sup>5</sup>) in the 2021-2025 period. Given the legally binding carbon budget for that period is 295 MtCO<sub>2</sub>e, this indicates a potential overshoot of 12-15%, or 37-45 MtCO<sub>2</sub>e (cumulative). It should be noted that any such exceedance in the first carbon budget must be “carried over” and addressed in the second carbon budget period (2026-2030). This will result in lower sectoral emission ceilings for the second carbon budget, requiring steeper decarbonisation trajectories.

<sup>3</sup> <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-greenhouse-gas-emissions-projections-2022-2040.php>

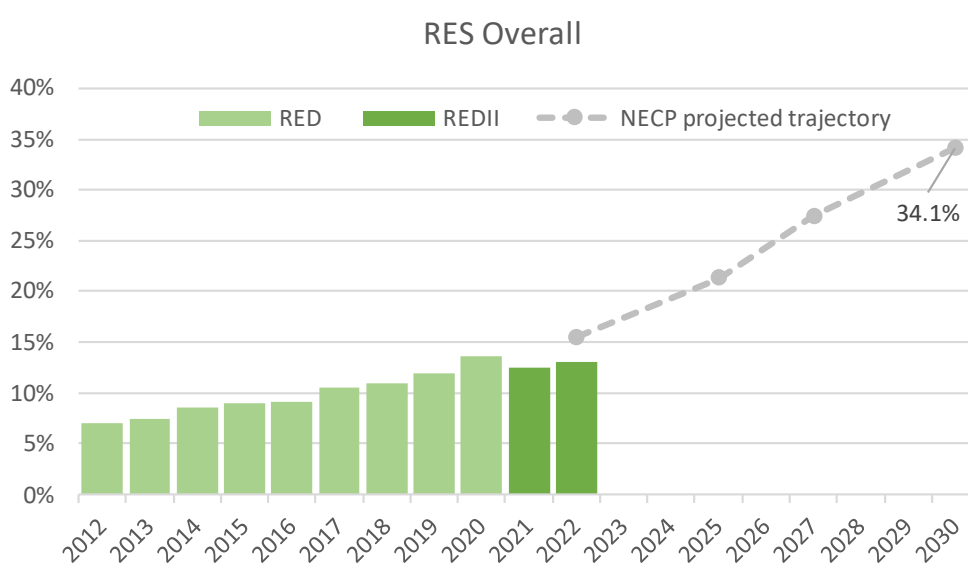
<sup>4</sup> WEM - With *existing* measures for demand reduction and decarbonization

<sup>5</sup> WAM - With *additional* measures for demand reduction and decarbonization

### 3. Renewable Energy Shares

Ireland's energy mix contains more renewable energy than ever before. 2022 was the first year in which Ireland's indigenous production of renewable energy (*i.e.* wind, hydro, biomass, ambient heat from heat pumps, *etc.*) exceeded our indigenous production of fossil fuels (*i.e.* natural gas, peat, *etc.*). Renewable energy acts to displace fossil fuels and reduce energy-related CO<sub>2</sub> emissions.

Ireland's overall renewable energy share (RES-O) is calculated under a methodology set out in the EU's second Renewable Energy Directive (REDII). Ireland's 2022 RES-O result was 13.1%<sup>6</sup>, which is a small increase over the 2021 RES-O result of 12.5%. Ireland's overall use of renewable energy in 2022 helped avoid 6.8 MtCO<sub>2</sub>. Ireland's 2020 RES-O target was 16%, and its current 2030 RES-O target is 34.1%, as per the most recent National Energy and Climate Plan (NECP)<sup>7</sup>. Under proposed amendments to RED II<sup>8</sup>, there is a provisional agreement to increase the EU-wide RES-O target for 2030 from 32% to at least 42.5%, under the REPowerEU plan<sup>9</sup>.



By far the largest vector of renewable energy into our homes, schools, and businesses is renewable electricity. Renewable electricity provided 62.6% of all renewable energy used in Ireland in 2022. The use of renewable electricity helped avoid 5.5 MtCO<sub>2</sub> of emissions from fossil fuels in 2022. Ireland's 2022 renewable energy share of electricity (RES-E) result was 36.8%, which is a small increase over the 2021 RES-E result of 36.4%. Ireland's RES-E results in 2021 and 2022 are lower than in 2020 due to changes in the REDII calculation methodology, and because electricity demand increases in Ireland have outpaced our deployment of renewable generation. Ireland has set itself a 2030 RES-E target of 80% in CAP23. Achieving this target will involve more than trebling installed capacity for renewable electricity generation in the next 8 years, along with a strengthening of the transmission and distribution networks,

<sup>6</sup> The RES-O, RES-E, RES-T and RES-H values in this note are provisional. Official RES values are calculated by Eurostat's EU-SHARES tool, not by SEAI. SEAI will finalise the dataset submitted to Eurostat for the calculation of the 2022 RES values in advance of the December 2023 deadline. SEAI will update this dataset with any new or updated values it receives from energy suppliers in advance of the submission deadline. These updates may relate to renewable energy quantities or the sustainability status of biomass fuels under REDII rules.

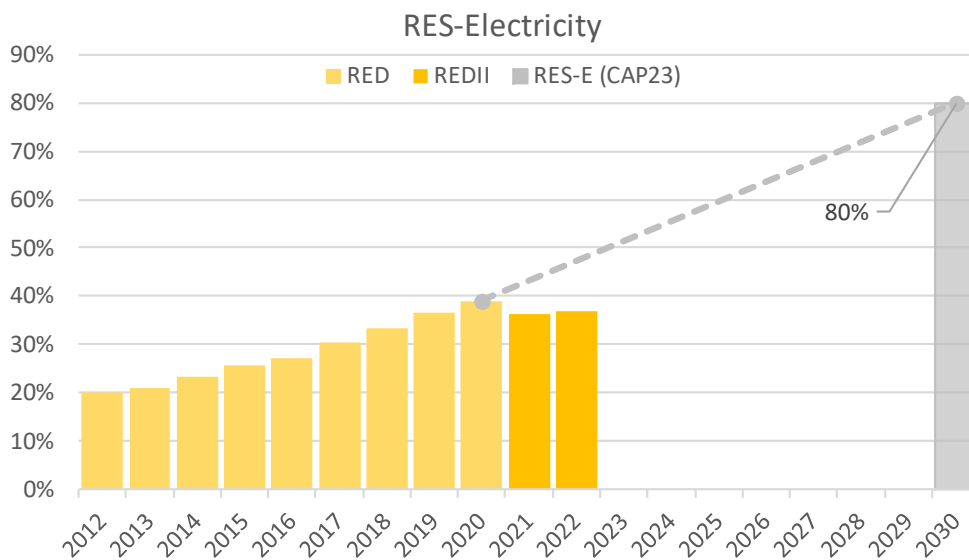
<sup>7</sup> Ireland's National Energy and Climate Plan 2021-2030. Available from: <https://www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/>

<sup>8</sup> Press release from the EU Commission is available from: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_23\\_2061](https://ec.europa.eu/commission/presscorner/detail/en/IP_23_2061).

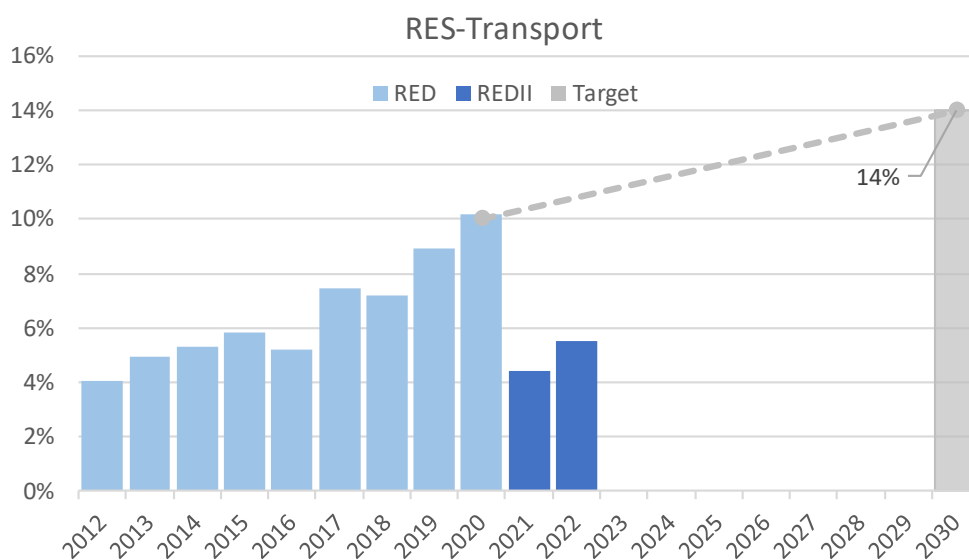
Latest version of the proposed EU legislation is available from: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil:ST\\_10794\\_2023\\_INIT](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil:ST_10794_2023_INIT).

<sup>9</sup> REPowerEU: [affordable, secure and sustainable energy for Europe \(europa.eu\)](https://ec.europa.eu/energy/en/repower-eu)

and the deployment of storage and other technical solutions to help manage intermittency of variable generation from wind and solar. CAP23 sets 2030 targets of 9 GW of electricity from onshore wind, 8 GW from solar, and at least 5 GW from offshore wind, to help achieve the 2030 RES-E target.



Ireland’s 2022 renewable energy share in transport (RES-T) result was 5.5%, which is an increase over the 2021 RES-T result of 4.4%. Ireland’s RES-T results in 2021 and 2022 are lower than in 2020, mainly because of the revised REDII calculation methodology, which limits the countability of biofuels, depending on their feedstock. For example, the combination of UCO and tallow towards the RES-T result is limited to a maximum of 1.7% of gross final consumption in road and rail transport. This means that some biodiesel used in Ireland is not countable towards the RES-T result, though it does count towards the RES-O result and does help avoid CO<sub>2</sub> emissions.

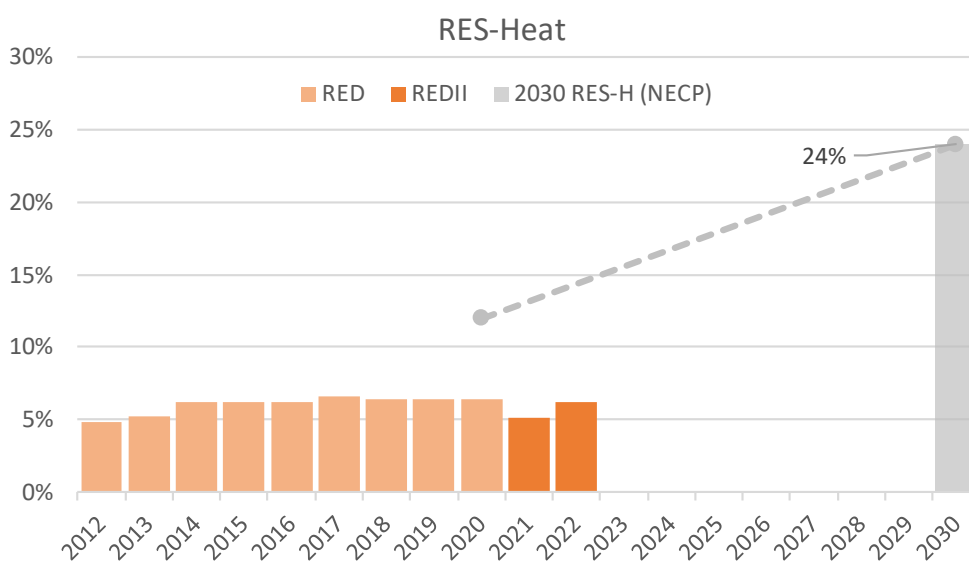


The biofuels blended into our diesel and petrol accounted for 95% of the renewable energy in transport. The remainder of renewable energy in transport is due to the RES-E component of electricity demand for our electric vehicles and electric rail services (*i.e.* DART and LUAS). The use of biofuels in transport helped avoid 0.7 MtCO<sub>2</sub> of emissions from fossil fuels in 2022, and renewable electricity in transport



helped avoid an additional 0.04 MtCO<sub>2</sub>. REDII requires Ireland (and all other EU member states) to set an obligation on fuel suppliers to ensure that the renewable energy share in transport is at least 14% by 2030. Achieving this target will involve a step-change in the number of EVs on our roads, and a significant increase in the biofuel blend-rate of our diesel and petrol (while ensuring that the feedstock for those biofuels is countable under the limits of the REDII methodology and future regulations). CAP23 sets 2030 targets of 845,000 private EVs, 95,000 commercial EVs, and 1,500 EV buses, as well as a transition to E10 (up to 10% by volume bioethanol blend in petrol) and B20 (up to 20% biodiesel blended into diesel) fuel blends for non-EV vehicles.

Ireland’s 2022 renewable energy share in heating and cooling (RES-H) was 6.2%, which is an increase over the 2021 RES-H result of 5.2%. The RES-H result captures the renewable share of energy demand that does not go to transport and does not come from electricity. The largest contributions to Ireland’s 2022 RES-H result were the use of heat pumps (36% of RES-H), biomass for wood production (20%), and the renewable portion of waste-derived fuels in cement production (19%). The use of these renewable energy sources for heating helped avoid 0.5 MtCO<sub>2</sub> of emissions from fossil fuels in 2022. Ireland’s NECP 2021-2030<sup>10</sup> sets out a planned RES-H result of 24% by 2030. Additionally, REDII requires Ireland (and all other EU member states) to endeavour to increase the share of renewable energy in heating and cooling by an indicative 1.1 percentage-points as an annual average (calculated for the periods 2021 to 2025 and 2026 to 2030).



The following table summarises Ireland’s recent renewable energy share results, and their 2030 targets:

	2021 Result	2022 Result	2030 Target/Ambition
RES-E	36.4%	36.8%	80%
RES-T	4.4%	5.5%	14%
RES-H	5.2%	6.2%	24% (+1.1pp/pa)
<b>RES-Overall</b>	<b>12.5%</b>	<b>13.1%</b>	<b>34.1%</b>

<sup>10</sup> Ireland’s National Energy and Climate Plan 2021-2030. Available from: <https://www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/>

## 4. Energy Balance Sector Summaries

### 4.1 Transport

Transport has the highest energy demand of any sector. The transport sector accounted for 41.3% of total energy demand in 2022. Transport energy demand in 2022 was up by 20.1% on 2021 levels, as Covid-19 impacts on travel continued to decline, particularly in aviation. Transport has the same energy demand as the residential, public services, commercial services, agriculture, and fisheries sectors combined. Road transport, *i.e.* the private cars, road freight, light goods vehicles, and public passenger services on our roads, accounted for 76.8% of all transport energy. Oil products accounted for 94.8% of transport energy demand, with 4.5% coming from renewable biofuels, and 0.3% coming from electricity (electric rail and EVs). The use of renewable energy in transport helped avoid 0.7 MtCO<sub>2</sub> of emissions from fossil fuels in 2022. Within the framework of the carbon budget accounting, the *transport* sector emitted 11.6 MtCO<sub>2e</sub> in 2022. The *transport* sector has already emitted 42% of its sectoral emission ceiling (SEC) in the first 40% of the 2021-2025 carbon budget period, showing that its emission trajectory is “off track” to stay within its SEC. Note that emissions from the *transport* sector would have been an even higher fraction of its SEC in 2022, were it not for Covid-related travel restrictions in 2021.

### 4.2 Residential

The residential sector has the second highest energy demand of any sector and accounted for 22.7% of total energy demand in 2022. Residential energy demand in 2022 was 12.1% lower than in 2021 due to a combination of higher fuel costs, return-to-office behaviours, fuel-switching, efficiency improvements, and weather effects. Almost all (>95%) of the heat demand reduction observed in 2022 came from the residential sector. Residential energy demand in 2022 was mainly satisfied through oil (39.7%), electricity (26.1%), natural gas (19.7%), peat (5.7%), and coal (4.5%). Within the framework of the carbon budget accounting, the *buildings (residential)* sector emitted 6.1 MtCO<sub>2e</sub> in 2022. The *buildings (residential)* sector has already emitted 45% of its sectoral emission ceiling (SEC) in the first 40% of the 2021-2025 carbon budget, showing that its emission trajectory is “off track” to stay within its SEC.

### 4.3 Industry

The industry sector accounted for 17.8% of total energy demand in 2022. Industry energy demand in 2022 was 4.3% lower than in 2021, mainly driven by reduced demand for natural gas. Industry energy demand in 2022 was mainly satisfied by natural gas (42.4%), electricity (27.5%), and oil (15.1%). Biomass and renewable wastes accounted for 8.5% of industry energy demand in 2022. Within the framework of the carbon budget accounting, the *industry* sector contains a mixture of energy and non-energy emissions and emitted 6.6 MtCO<sub>2e</sub> in 2022. The *industry* sector has already emitted 46% of its sectoral emission ceiling (SEC) in the first 40% of the 2021-2025 carbon budget, showing that its emission trajectory is “off track” to stay within its SEC.

### 4.4 Commercial and Public Services

In 2022, commercial services accounted for 11.1% of total energy demand and public services accounted for 4.3% of energy demand. Commercial services energy demand in 2022 was 8.7% higher than in 2021. This increase was almost entirely driven by a 24.5% increase in electricity demand from the ICT sub-sector due to datacentre demand. The commercial services sector is the most highly electrified of all sectors with 76.2% of its energy demand satisfied by electricity. Commercial services accounted for

38.8% of all electricity demand in Ireland in 2022. The electricity demand of the commercial services sector was greater than that of the residential, the public services, and agriculture sectors combined.

Public services energy demand in 2022 was comparable to that in 2021, reducing by 0.7%. Almost half (48.9%) of public services energy demand in 2022 was satisfied by electricity, followed by natural gas (28.3%) and oil (19.7%). Public services accounted for 9.7% of all electricity demand in Ireland in 2022. Within the framework of the carbon budget accounting, the *buildings (commercial and public)* sector emitted 1.4 MtCO<sub>2e</sub> in 2022. The *buildings (commercial and public)* sector has already emitted 41% of its sectoral emission ceiling (SEC) in the first 40% of the 2021-2025 carbon budget, showing that the emission trajectory is slightly "off track" to stay within its SEC (though it is the "least off track" of all sectors).