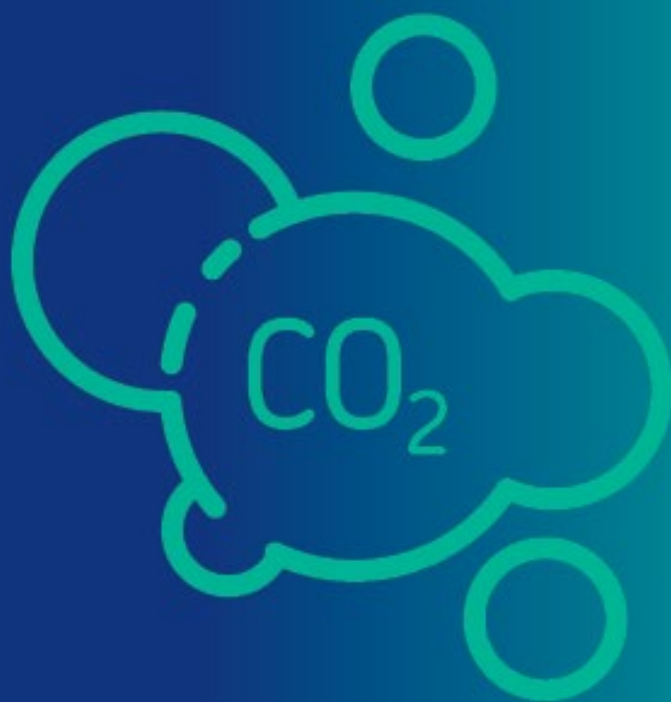seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

ENERGY-RELATED CO$_2$ EMISSIONS IN IRELAND 2020

Companion Note to
2020 National Energy Balance
October 2021

2020 Highlights

Economy, energy use and CO_2

• The public health measures taken to combat the COVID-19 pandemic had far-reaching impacts on all aspects of society during 2020, including on our energy use and resulting CO_2 emissions.

• Economic activity reduced by 5.4%, final energy use reduced by 9.6% and energy related CO_2 (including international aviation) reduced by 11.5%, or 4.3 million tonnes.

• There were significant restrictions on personal mobility during 2020 which had direct effects on transport energy use, especially on international aviation and private cars.

• Energy related CO_2 emissions from electricity generation also fell, despite an increase in electricity generated.

• Energy related CO_2 emissions from heat increased, despite it being a slightly warmer year.

• Energy related CO_2 emissions excluding international aviation decreased by 6.35% (2.2 million tonnes).

• This is less than the amount that will need to be achieved every year from 2021 to 2030 to meet our long term decarbonisation goals.

CO_2 from Transport

• The greatest impact of the COVID-19 pandemic on energy use was in transport, where energy related CO_2 emissions were down by 26.5% or 4.0 million tonnes.

• The largest reductions were observed in aviation, with a 78% reduction in passenger numbers and a 65% reduction in flight numbers. As a result energy related CO_2 emissions were down by 64.3%, or 2.1 million tonnes.

• Excluding international aviation, energy related CO_2 emission from transport were down by 16.0%, or 1.9 million tonnes.

• CO_2 emissions from private car use were down by 21%, or 1.3 million tonnes of CO_2 and emissions from heavy goods vehicles were down by 8.8%, or 0.2 million tonnes.

CO_2 from Heating

• Energy related CO_2 emissions from heating increased by 2.8% or 0.4 million tonnes, due mostly to increase in residential oil use.

• The proportion of heat derived from renewables remained constant at 6.3%, well below the 2020 target of 12%.

• CO_2 emissions from residential heating increased by 9.1% or 0.6 million tonnes and the sector was responsible for 53% of CO_2 emissions from heating.

• There was little change in services and a small decrease in industry.

• Total CO_2 emissions from oil products for heating increased by 6.0% or 0.4 million tonnes.

• In contrast CO_2 emissions from natural gas for heating decreased by 2.8% or 0.1 million tonnes.
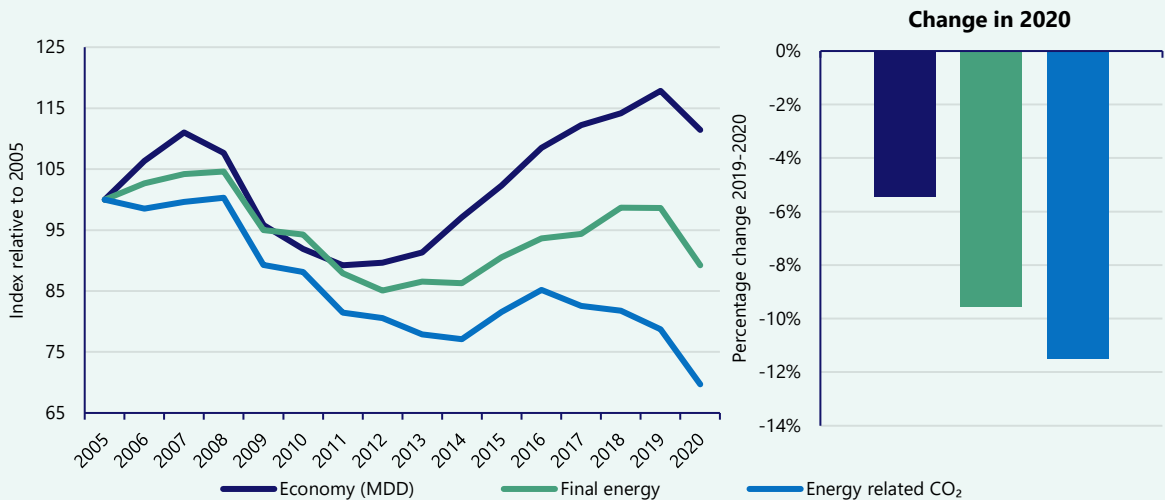
CO_2 from Electricity

• CO_2 emissions from electricity generation declined by 0.6 million tonnes in 2020, despite growth in electricity demand.

• This was because emissions from peat-fired power fell by 49.5% or 1.1 million tonnes of CO_2, due mostly to two of the three peat power stations being offline for half the year.

• The reduction in electricity generated from peat was made up for largely by increased zero carbon renewable generation, with smaller increases in electricity generated from gas, coal and oil.

• There has been a strong reduction in the CO_2 intensity of electricity generation, especially after 2016, with intensity falling below 300 gCO_2/kWh for the first time in 2020. It is now less than a third of its 1990 value.

• Renewable energy sources generated 42% of all electricity in 2020, up from just 7% in 2005.

Energy related CO_2

Impact of pandemic on economy, energy use and energy related CO_2 emissions

The public health measures taken to combat the COVID-19 pandemic had far-reaching impacts on all aspects of society during 2020, including on our energy use and resulting CO_2 emissions.

The graphs below show the historical trends for economic growth (modified domestic demand), energy use (final energy) and energy related CO_2 emissions (including international aviation), expressed as an index relative to the year 2005, and the percentage change in 2020. Economic activity reduced by 5.4% in 2020, final energy use reduced by 9.6%, and energy related CO_2 reduced by 11.5%, or 4.3 million tonnes of CO_2 ($MtCO_2$).
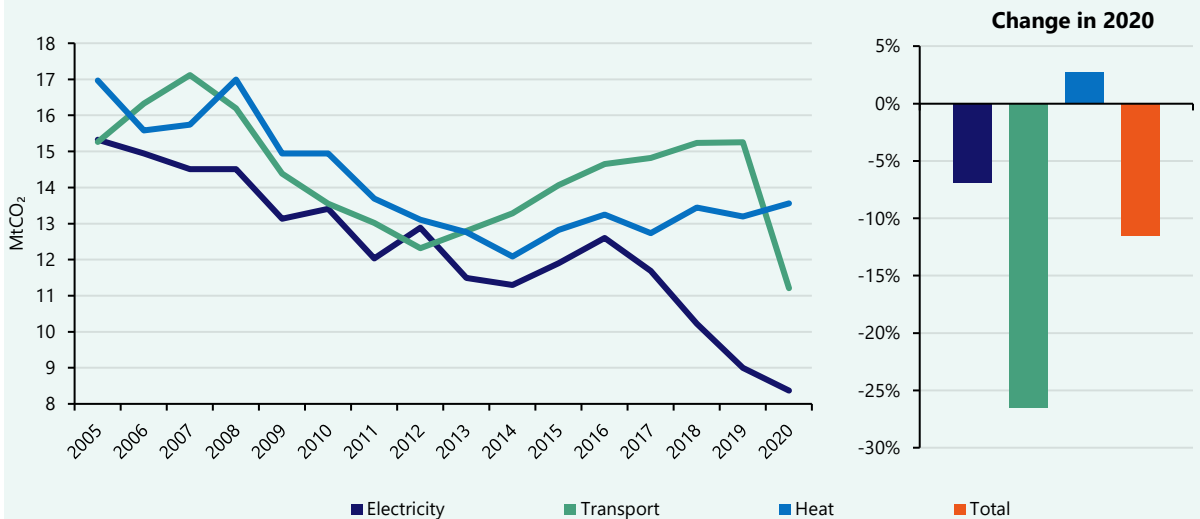

Transport, heat and electricity*

The greatest impact of the COVID-19 pandemic on energy use was in transport, where energy related CO_2 emissions were down by 26.5%, or 4.0 $MtCO_2$.

CO_2 emissions from electricity generation were also down in 2020 by 6.9% or 0.6 $MtCO_2$, but this was unrelated to COVID-19, as electricity generated increased by 2.0%. The reduction in CO_2 was because of continuing improvements in the mix of fuels used for electricity generation, with more renewables and less coal and peat.

Energy related CO_2 emissions from heating increased in 2020 by 3.8% or 0.4 $MtCO_2$, due mostly to increase in residential oil use.
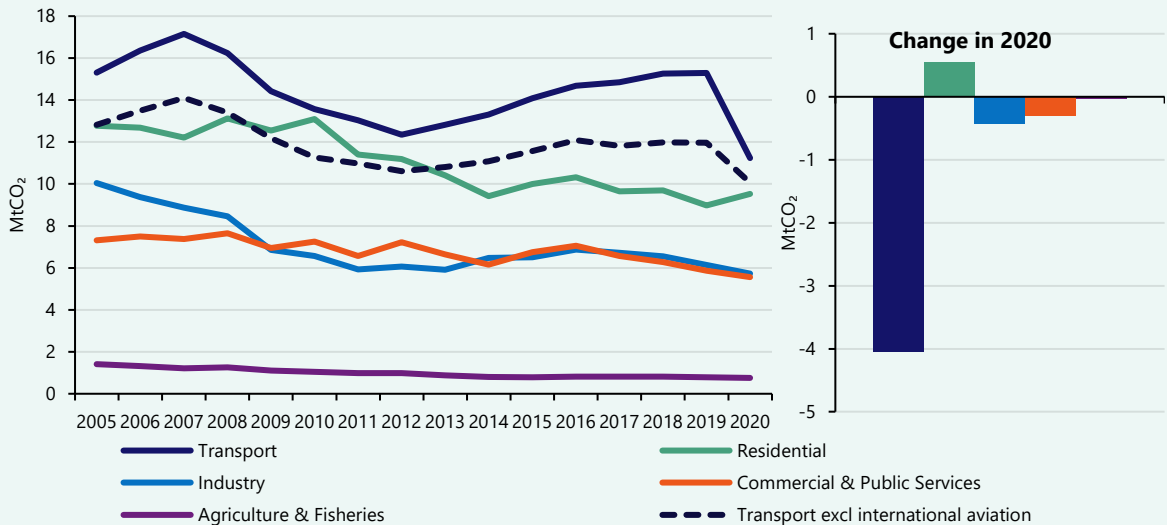

* Where heat or transport energy is provided by electricity this is counted under electricity. Heat is a catch all term for total energy use minus electricity and transport.

Energy related CO_2

CO_2 by sector

Looking at energy related CO_2 emissions by sector, again transport experienced the most dramatic reduction, dropping by 26.5%, or 4.0 $MtCO_2$. In contrast energy related CO_2 emissions from the residential sector were up by 6.1%, or 0.5 $MtCO_2$. Industry and services were down by 6.8% (0.4 $MtCO_2$) and 5.2% (0.3 $MtCO_2$) respectively.

Legend:
- Transport
- Industry
- Agriculture & Fisheries
- Residential
- Commercial & Public Services
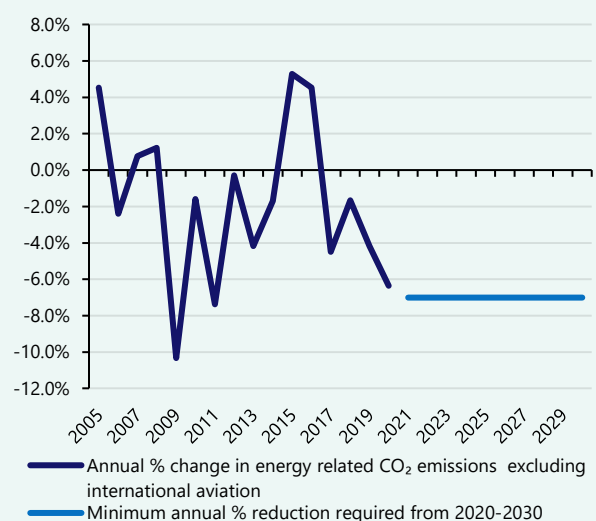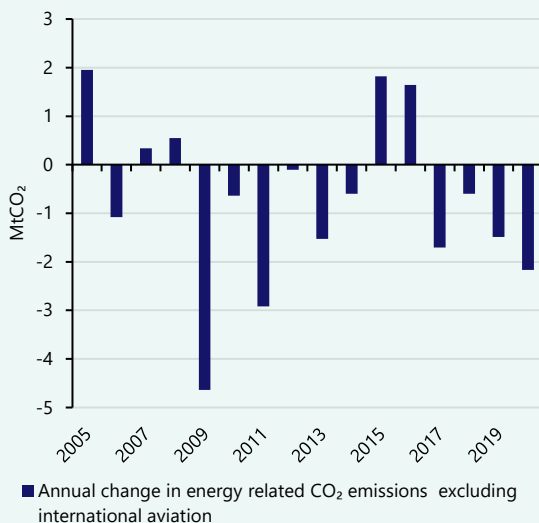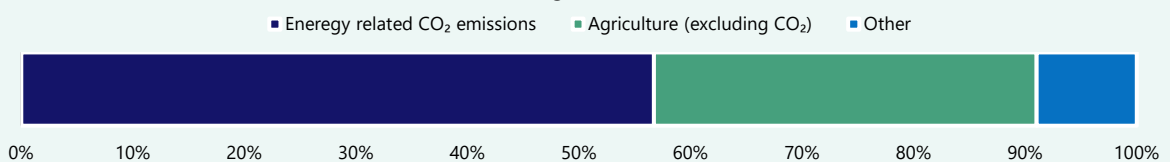- Transport excl international aviation

Change in 2020

Reductions in greenhouse gas emissions required from 2021 - 2030

Ireland's 2030 greenhouse gas reductions target requires an average reduction in total greenhouse gas emissions of over 7% every year between now and 2030. This target includes all greenhouse gases including non-energy sources such as agriculture, but does not include international aviation.

Excluding international aviation, energy related CO_2 emissions fell by 6.35% or 2.1 $MtCO_2$ in 2020. This was less than the minimum 7% average annual reduction required between now and 2030. In absolute terms it was significantly lower than the reduction of 4.6 $MtCO_2$ seen in 2009 as a result of the global financial crisis.

2019 Greenhouse gas emissions (Source: EPA)

- Eneregy related CO_2 emissions
- Agriculture (excluding CO_2)
- Other

Annual change in energy related CO_2 emissions excluding international aviation

Annual % change in energy related CO_2 emissions excluding international aviation

Minimum annual % reduction required from 2020-2030

CO$_2$ emissions from transport

Transport CO$_2$ by subsector

There were significant restrictions on personal mobility during 2020 which had direct effects on transport energy use, especially on international aviation and private cars. Overall transport CO$_2$ emissions, including international aviation, were down by 26.5% in 2020, or by 4.0 MtCO$_2$.

The largest reduction in CO$_2$ emissions in 2020 was in international aviation, where emissions were down by 64.3%, or 2.1 MtCO$_2$. This was a result of a 78% reduction in passenger numbers and a 65% reduction in flight numbers. CO$_2$ emissions from private car use were also down by 21% in 2020, or 1.3 MtCO$_2$ and emissions from heavy goods vehicles were down by 8.8%, or 0.2 MtCO$_2$. Excluding international aviation, transport CO$_2$ emissions were down by 16.0%, or 1.9 MtCO$_2$.

* Other includes light goods vehicles, buses, taxis, rail, navigation, fuel tourism and unspecified.

Transport CO$_2$ by fuel

Looking at the split between fuel types, the largest reduction was in jet kerosene used in aviation, which was down by 64%, or 2.1Mt.

CO$_2$ emissions from road diesel were down by 14% or 1.3 MtCO$_2$ in 2020, and from petrol were down by 26% or 0.6 MtCO$_2$. Emissions from diesel reduced by less than petrol because the activity of heavy goods vehicles and commercial vehicles reduced by less than private cars, and those vehicles virtually all use diesel.
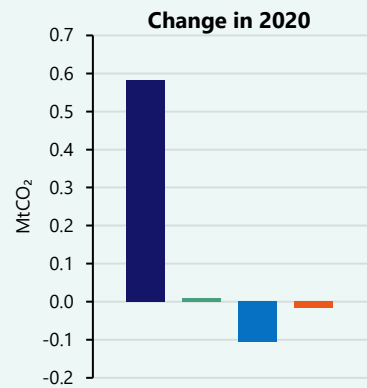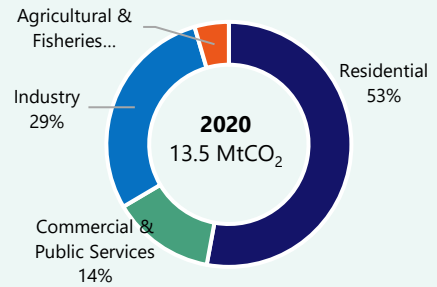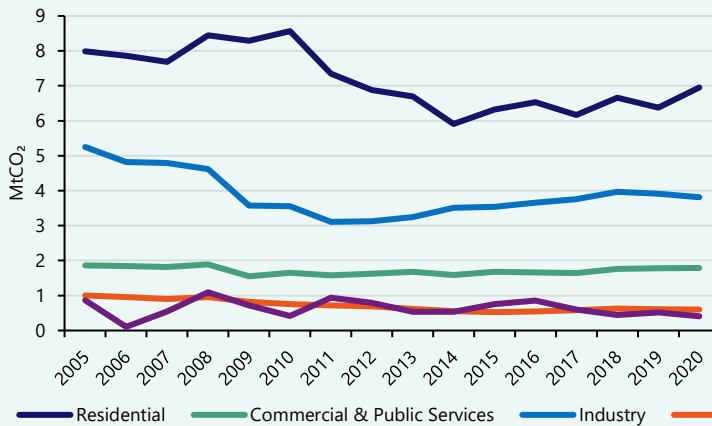
CO$_2$ emissions from heat

Heating CO$_2$ by sector

Energy related CO$_2$ emissions from heating increased in 2020 by 2.8% or 0.4 MtCO$_2$, despite it being a slightly warmer year on average. This was due mostly to an increase in residential oil use. CO$_2$ emissions from residential heating increased by 9.1% or 0.6 MtCO$_2$ in 2020, and the sector was responsible for 53% of CO$_2$ emissions from heating. There was little change in services and a small decrease in industry.
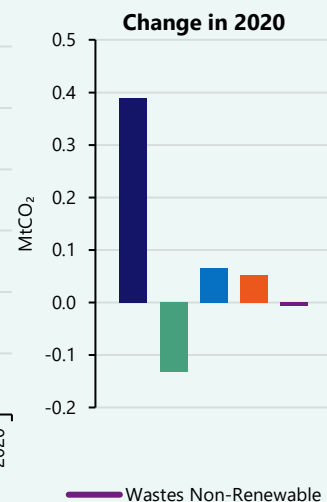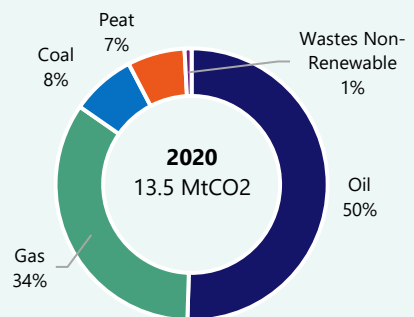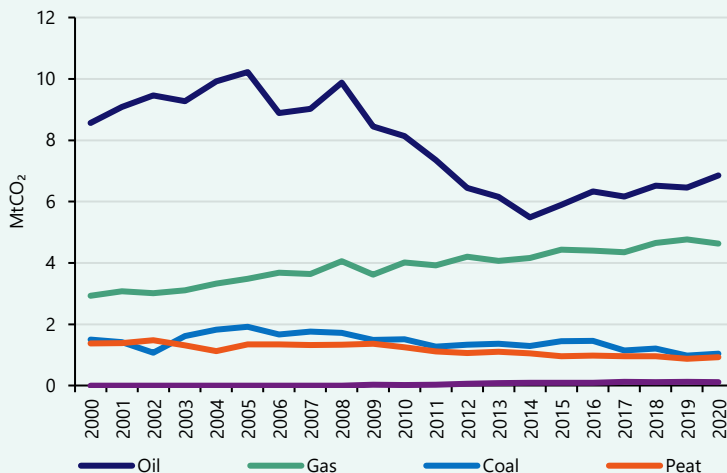
CO$_2$ emissions per dwelling for heating (weather corrected) were 29.4% lower in 2020 than in 2001, having fallen from 5.6 to 4.0 tonnes CO$_2$ per dwelling. During the same period the number of homes increased by 38.7%.

2020
13.5 MtCO$_2$

Agricultural & Fisheries...

Industry 29%

Residential 53%

Commercial & Public Services 14%

Change in 2020

MtCO$_2$

Residential — Commercial & Public Services — Industry — Agricultural & Fisheries — Other

Heating CO$_2$ by fuel

50% of CO$_2$ emissions from heating came from oil products, and a further 34% from natural gas. Coal and peat usage accounted for 8% and 7% respectively.

Total CO$_2$ emissions from oil products for heating increased by 6.0% or 0.4 MtCO$_2$. CO$_2$ emissions from coal and peat use also increased by 6.7% and 5.9% respectively, almost all of this increase was in the residential sector. In contrast CO$_2$ emissions from natural gas for heating decreased by 2.8%.
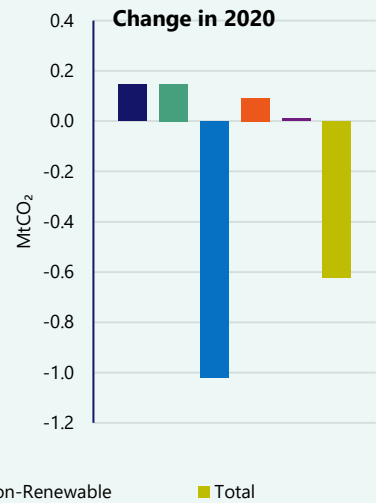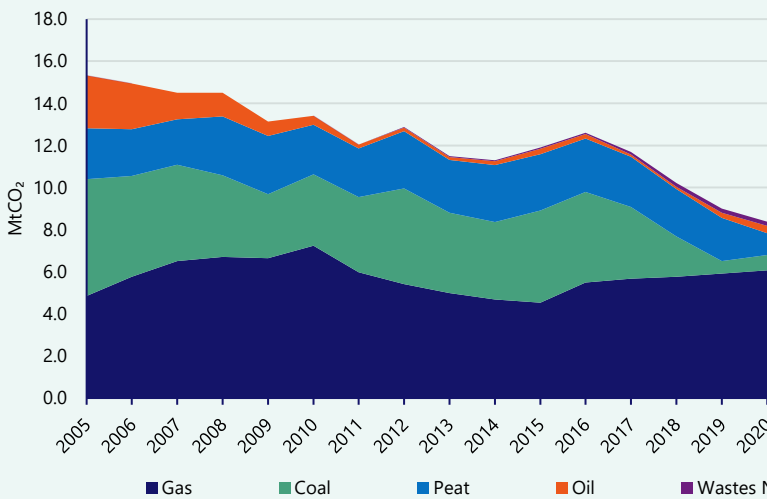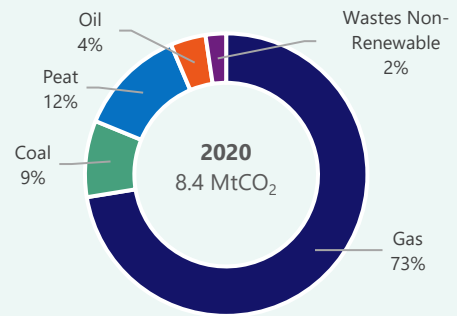
Peat 7%

Coal 8%

Wastes Non-Renewable 1%

2020
13.5 MtCO2

Gas 34%

Oil 50%

Change in 2020

MtCO$_2$

Oil — Gas — Coal — Peat — Wastes Non-Renewable

CO$_2$ emissions from electricity

Electricity CO$_2$ by fuel

Emissions of CO$_2$ from fossil fuel combustion for electricity generation declined by 6.9% in 2020, despite generation increasing by 1.6% to 31.9 TWh, the highest level ever.

This was because emissions from peat-fired power fell by 49.5% or 1.1 MtCO$_2$, due mostly to two of the three peat power stations being offline for 6 months of the year. The reduction in electricity generated from peat was made up for largely by increased zero carbon renewable generation, with smaller increases in electricity generated from gas, coal and oil. This resulted in small increases in the CO$_2$ emissions from gas, coal and oil, but a large overall reduction in CO$_2$ emissions.

2020
8.4 MtCO$_2$

Oil 4%
Peat 12%
Coal 9%
Gas 73%
Wastes Non-Renewable 2%

Gas | Coal | Peat | Oil | Wastes Non-Renewable | Total

Change in 2020

Electricity CO$_2$ intensity

Electricity CO$_2$ intensity continued its impressive improvement since 2016 in 2020, falling another 8.1% to reach 295 g/kWh. This is 39% less than in 2016 and 54% less than in 2005. This is the result of several factors including the seven-fold growth of renewable generation since 2005, which has seen the percentage of renewable generation increasing from 7% in 2005 to 42% in 2020. In addition to this, use of oil, peat and coal declined from 44% of generation and 68% of emissions in 2005, to contribute only 6% of generation and 25% of emissions in 2020.

Gas | Coal | Peat | Oil | Wastes Non-Renewable | Total
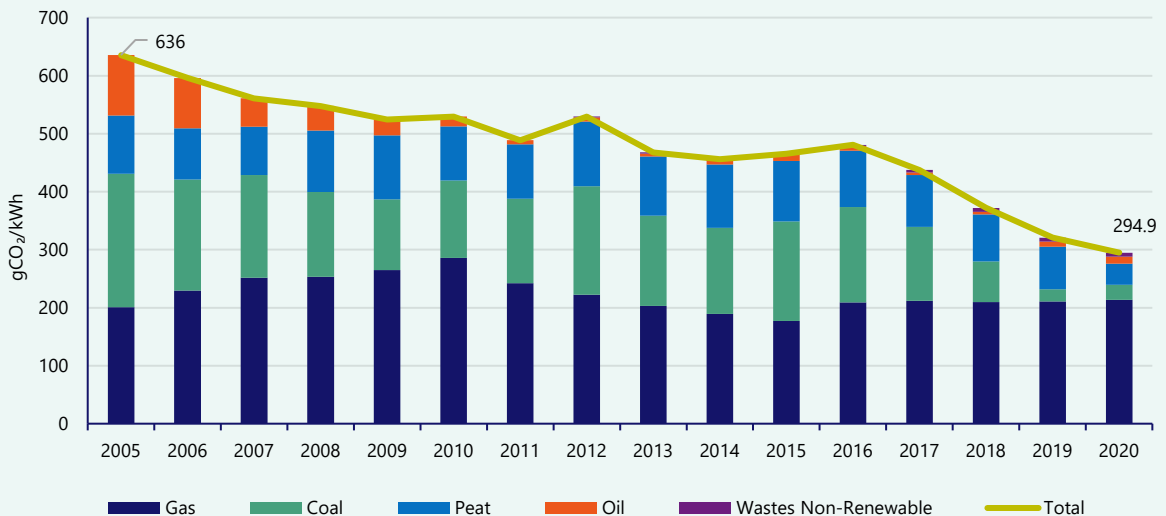
Ireland's National Energy Balance

The National Energy Balance is the official record of how energy is used in Ireland each year. It shows how over thirty different fuels are used in seven different sectors of society, including residential, transport, industry and services. It shows the flow of energy from imports and production to transformation and on to final consumption. The National Energy Balance is our primary statistical release and is the basis of much of the further analysis we do. The data is shown in the form of a table.

To download the 2020 National Energy Balance and for more information visit:

www.seai.ie/NationalEnergyBalance.

Developing the National Energy Balance is a continuous and ongoing process, and revisions are made whenever improved data becomes available. We welcome feedback sent to epssu@seai.ie.

About SEAI

SEAI is Ireland's national energy authority, investing in and delivering appropriate, effective and sustainable solutions to help Ireland's transition to a clean energy future. We work with Government, homeowners, businesses and communities to achieve this, through expertise, funding, educational programmes, policy advice, research and the development of new technologies. SEAI is funded by the Government of Ireland through the Department of the Environment, Climate and Communications.

SEAI is the official source of energy data for Ireland. We develop and maintain comprehensive national and sectoral statistics for energy production, transformation and end-use. These data are a vital input in meeting international reporting obligations, for advising policymakers and informing investment decisions. SEAI's core statistics functions are to:

- Collect, process and publish energy statistics to support policy analysis and development in line with national needs and international obligations
- Conduct statistical and economic analyses of energy services sectors and sustainable energy options
- Contribute to the development and promulgation of appropriate sustainability indicators

An electronic version of this and other statistical reports, are available on SEAI's website at:

https://www.seai.ie/data-and-insights/seai-statistics

Acknowledgements

SEAI gratefully acknowledges the cooperation of all the organisations, agencies, energy suppliers and distributors that provided data and responded to energy and pricing questionnaires throughout the year.