



Annual Compendium of Scottish Energy Statistics 2020

August 2020 Update



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Introduction - Scottish Energy Statistics

The Annual Compendium of Scottish Energy Statistics (ACSES) provides an overview of energy statistics for Scotland. It has been designed in line with the targets and priorities in the Scottish Energy Strategy. In 2019 ACSES replaced the Energy In Scotland publication.

All statistics presented in the report are from published sources, including publications by the UK Department for Business, Energy & Industrial Strategy (BEIS), National Grid and the Scottish Government.

The data in this publication is subject to revision. As such, further resources on Scottish energy statistics are available, and are updated on a quarterly basis with the latest figures. They can be found [here](#) and include:

- The [Energy Statistics Hub](#) is a new online interactive tool which is a 'one-stop shop' for all Scottish energy data. The Hub will be updated when new or revised data is available, so will always show the latest picture of Scottish energy statistics. Each page in the Hub has an interactive chart, commentary and data, with options to download charts and data. On each page in this publication, this icon in the top right corner is a clickable link to the relevant page in the Hub.
- [Quarterly bulletins](#) with Scottish specific figures from BEIS's Energy Trends publications
- [Renewable planning data](#) provides data on renewable electricity projects in Scotland that are operational and in the pipeline



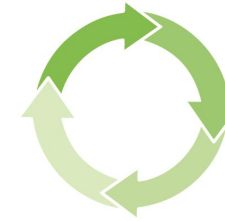
If you would like to be updated about forthcoming statistical publications, please register your interest on the Scottish Government ScotStat website [here](#).

Introduction - Scottish Energy Strategy

In December 2017, the Scottish Government published the [Scottish Energy Strategy](#) which sets out the **Scottish Government's vision** for the **future energy system** in Scotland. It is guided by **three core principles**:



AN INCLUSIVE
ENERGY TRANSITION



A WHOLE-SYSTEM
VIEW



A SMARTER
LOCAL ENERGY MODEL

The Strategy is built around **six energy priorities**:



RENEWABLE AND LOW CARBON SOLUTIONS

Using Scotland's renewable energy potential to meet heat, transport and electricity needs in order to achieve emissions reductions targets.



LOCAL ENERGY SYSTEMS

Development of integrated local energy systems and networks within communities in Scotland.



ENERGY EFFICIENCY

Improving the use and management of energy in Scotland's homes, buildings, industrial processes and manufacturing.



CONSUMER ENGAGEMENT AND PROTECTION

Protecting consumers from excessive or avoidable costs and promoting the benefits of smarter domestic energy applications and systems.



SYSTEM SECURITY AND FLEXIBILITY

Scotland's capacity, connections, flexibility and resilience to maintain secure and reliable supplies of energy to all homes and businesses.



OIL AND GAS INDUSTRY STRENGTHS

Supporting investment, innovation and diversification across the oil and gas sector to advance key priorities.

This document summarises the key statistics in each of these areas in order to track Scotland's progress.





Energy productivity target

Energy productivity is a combination of **energy consumption** and the **output of the economy**.

Target: ↑ 30% from 2015 to 2030.

Energy productivity ↑ 0.6% between 2015 and 2018.

This is despite a ↑ 3.1% increase in energy consumption.

Renewable Energy Target

50% Target of **heat, transport** and **electricity** consumption to be supplied from **renewable** sources by **2030**.

21.1% of total Scottish energy consumption came from renewable sources in **2018**

↑ 1.8 percentage points from 2017



The equivalent of powering and heating more than **1.9 million households** in Scotland



Energy Economy



£20.8 billion in **gross value added** in 2018

↑ 11.7% on 2017



£40.8 billion in **turnover** in 2018

↓ 7.8% on 2017

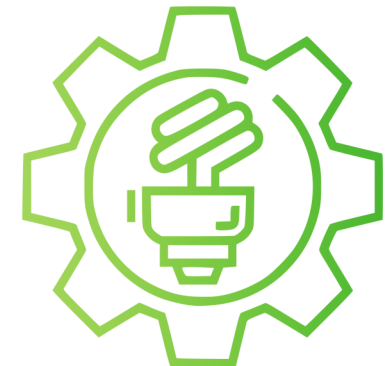


Scotland exports **78.8%** of its **primary energy** in 2018.

Revenue from exports was **£14.6 billion**.



67,000 were **employed** in the Scottish energy sector in 2018.





Renewable electricity



Target

Equivalent of **100%** of Scotland's gross electricity consumption to be generated from renewable sources by 2020.

In 2019,



came from renewable sources.

↑ **13.4** percentage points from 2018.

Capacity



11.9 GW of renewable electricity projects operational as of March 2020

↑ **0.4 GW** from March 2019.

13.5 GW of projects currently consented in the pipeline



Renewable Heat

Scotland generated **5,230 GWh** of renewable heat in 2018, ↑ **14.5%** of 2017.

This is the equivalent of supplying almost **387,000** Scottish homes with gas for the year.

6.3% of all non-electrical heat demand.

Transport

As of **March 2020**, there were **17,873** ultra low emission vehicles (ULEVs) licenced in Scotland.



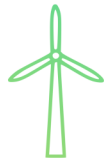
↑ **44.8%** from March 2019.

4.0% of all newly registered vehicles in Q1 2020 were ULEVs.

Renewable electricity generation



2019 was a **record year** for renewable electricity generation.



Scotland generated **30.5 TWh** of renewable electricity.

73.1% was from wind



The equivalent of powering **all households** in Scotland for **over 3 years**.



Renewables makes up **54.9%** of all electricity generated in **Scotland** in 2018

28.9% in England and Wales

Low Carbon Economy

In 2018, low carbon and renewable energy directly supported



23,100 full-time equivalent jobs in Scotland



Generated **£6.4 billion** in turnover





Local Energy Systems

Community and locally owned renewables

Scotland has **0.73 GW** of installed **capacity** of community and locally owned renewables in **2018**.



0.8 GW is in development.

Heat networks

Approximately **30,000** Scottish homes **connected** to district or communal heat networks in **2018**.



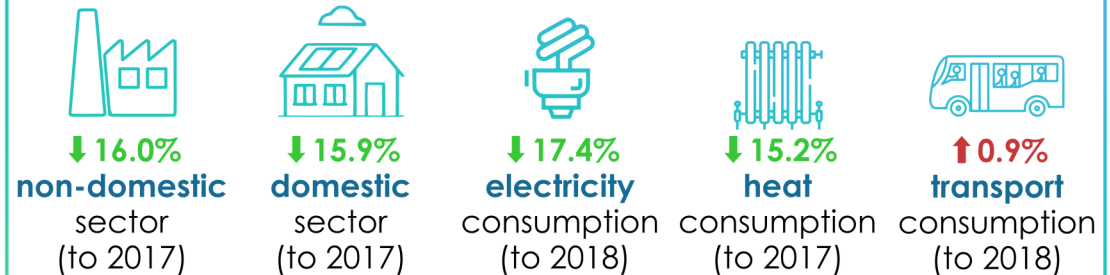
They supplied an estimated **1.18 TWh** of **heat and cooling** demand.





Demand Reduction

From a 2005-07 baseline, Scottish energy consumption **↓ 12.2%** in **2018**.



Recently, energy consumption **increased** in all sectors – in **2018** it was **↑ 3.1%** on **2015**, mirroring trends witnessed in other European countries.

Efficiency measures

Overall **decreases in energy consumption** were aided by **improvements** in the **energy efficiency** of buildings.



43%

of Scottish homes had a **good energy efficiency rating** (EPC band C or better)



59%

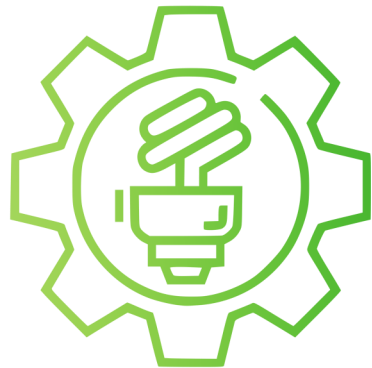
of dwellings had some form of **wall insulation**



94%

of homes had **100mm or more of loft insulation**





Switching



One in five (20.3%) Scottish consumers **switched** their electricity or gas supplier in **2019**.



Smart meters

1.10 million smart meters were **installed** in Scotland by **June 2020**, **39.2%** of all Scottish meters.



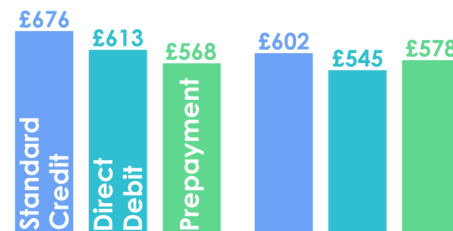
Fuel Poverty

Households in **fuel poverty** is **stabilising**. In 2018, **25.0%** of Scottish households are in **fuel poverty**, **11.3%** in **extreme fuel poverty**.

Energy Bills

Electricity and **gas prices have risen** substantially in real terms from the early 2000s.

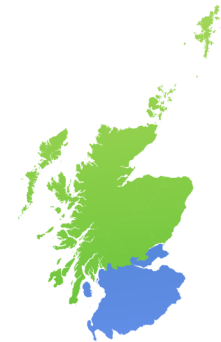
Standard credit customers in Scotland **pay the most** of all customer types. The **prepayment price cap** may be **keeping electricity bills down** for prepayment customers



Geographical differences

Geography seems to play a role in the **differences** in experiences of Scottish consumers. Those in **North Scotland**:

- **Pay more** for their **electricity**
- Are **less likely** to **switch** energy supplier and **more likely** to be with their **'home'** supplier, so may not be on the best deal for them
- Are **less likely** to have a **smart meter**



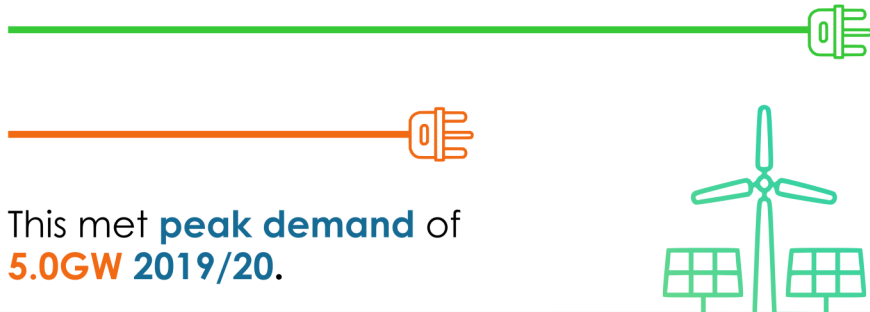
than those in **South Scotland**



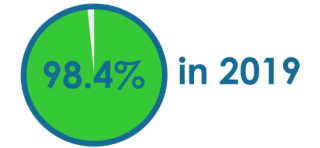


Electricity Security

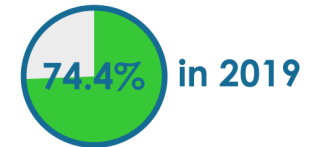
In Winter **2019/20**, Scotland had a **secure non-intermittent electricity supply** capacity of **10.0 GW**



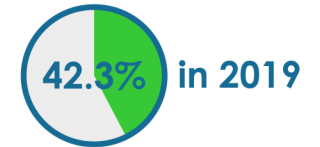
Scotland's **own electricity generation** is **sufficient to meet demand** almost all of the time



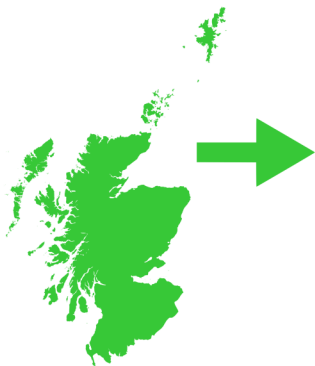
Demand met **only** with **low carbon** generation



Demand met **only** with **renewable** generation



Electricity Exports



In 2019, there was a **net export** of **15.9 TWh** of **electricity**.

This had an estimated **wholesale market value** of **£0.74 billion**

Gas Security



Scottish **supply of gas** is **secured** via the gas that flows into **St Fergus gas terminal**, which accounts for about a **quarter** of Scotland's **gas demand**





Economy

The **oil and gas sector** was **worth** an estimated



in **Gross Value Added (GVA)** to Scotland's economy in 2018

This represented

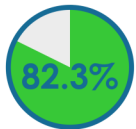


of total **Scottish GDP** (including share of UK Extra Regional activity)

It **supported** approximately



101,400 jobs in Scotland in 2018



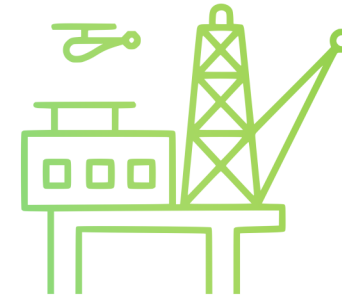
of Scotland's oil and gas is **exported**

This is worth **£25.0 billion**

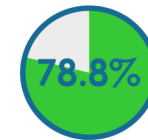


in **turnover** in 2018.

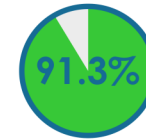
Consumption



Oil and gas makes up:



of all Scottish **energy consumption**



of **heat demand**



Energy in real life

Scotland generated **30.5 TWh** of electricity from **renewable sources** in **2019**, equivalent to:



- Charging **almost 6.7 billion** mobile phones **for a year**



- Boiling approximately **700 billion** kettles

Scotland generated **5.2 TWh** of **renewable heat** in **2018**, equivalent to:



- Gas use of **every building** in **Glasgow City**



- Heating **all educational establishments** for roughly **2 years**

Scotland **consumed 149 TWh** of **energy** in **2018**, equivalent to:



- **24,200** flights **around the world**



- The **UK's road and rail energy use** for **four months**

Scotland's annual **energy consumption** dropped by **20.5 TWh** between **2005-07** and **2018**, equivalent to the energy required:



- For **13.7 billion** showers



- To cook meals for **every household** in **Scotland** for **9 and a half years**



“Whole system”
view of energy



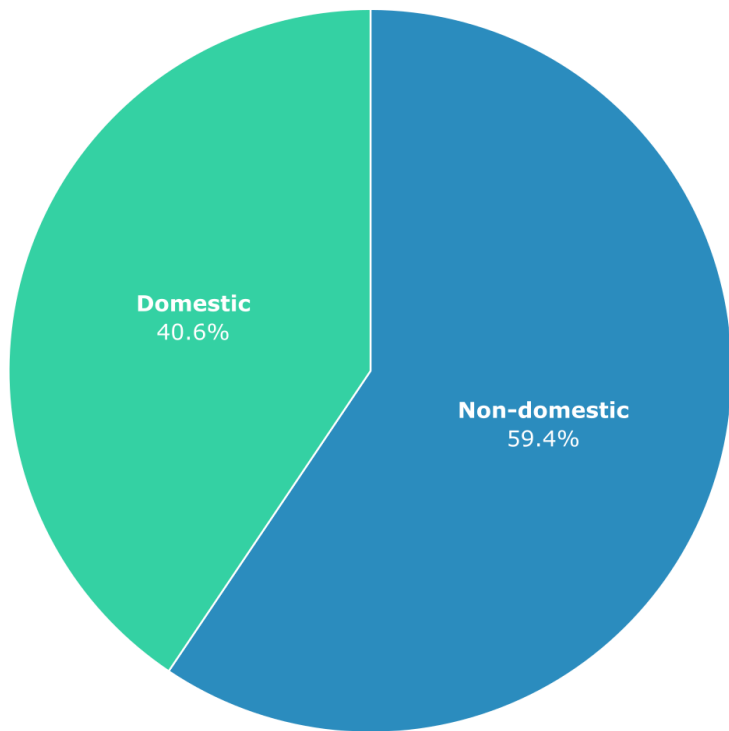
What does the “whole system” view of the Scottish energy system mean?

One of the core principles of the Energy Strategy is that it advocates a “whole-system” view of energy in Scotland. This means that the focus of the Scottish Government’s energy policy covers **heat** and **transport**, alongside **electricity** and **energy efficiency** and the interactions between these sectors. It also

considers the interaction of energy with the broader economy and society.

Total final energy consumption domestic and non-domestic

2017



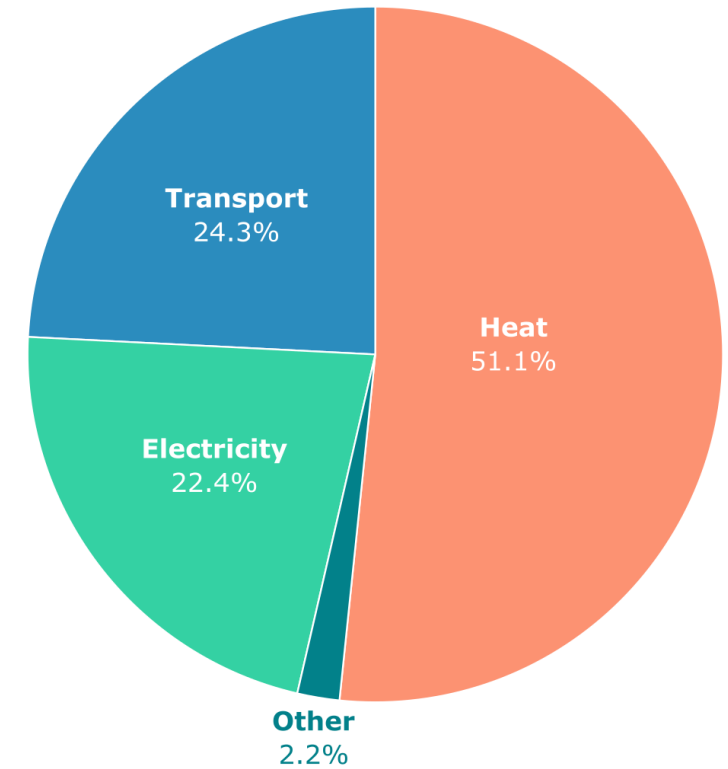
Source: BEIS

A whole-system view means that we should be considering all sectors including **domestic** and **non-domestic** (i.e. industrial and commercial) sectors. A breakdown of electricity and heat consumption by sector shows that **three-fifths** of is accounted for by the **industrial** and **commercial** sectors and **two-fifths** consumed **domestically**.



Total final energy consumption by sector

2017



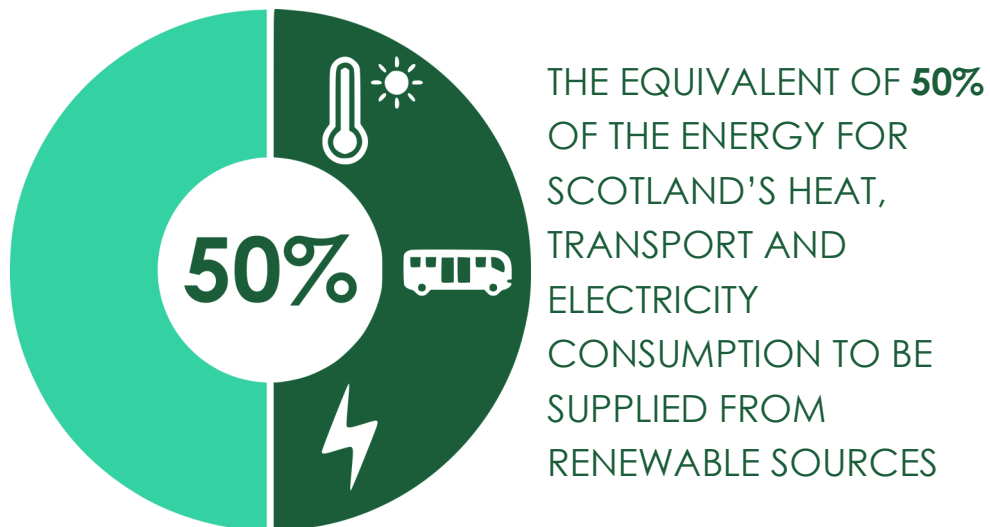
Source: BEIS



How do we **measure** Scotland's 'whole system' energy performance?



In order to measure the performance of Scotland's energy system as a whole, the Energy Strategy identifies two whole-system **targets** to be achieved by 2030:



Renewable energy:

This is the amount of renewable energy generated in Scotland as a percentage of Scottish gross energy consumption. This includes renewable energy used for electricity, heat and transport. It is also one of Scotland's 81 indicators in the [National Performance Framework](#).



AN INCREASE BY **30%** IN THE PRODUCTIVITY OF ENERGY USE ACROSS THE SCOTTISH ECONOMY

Energy productivity:

This puts the emphasis on curbing energy consumption while still growing the Scottish economy.

The keys to meeting these targets will be to continue to **grow Scotland's renewable capacity** and to **reduce energy consumption**.

The following section tracks progress towards these targets .



How is Scotland performing in terms of renewable energy?

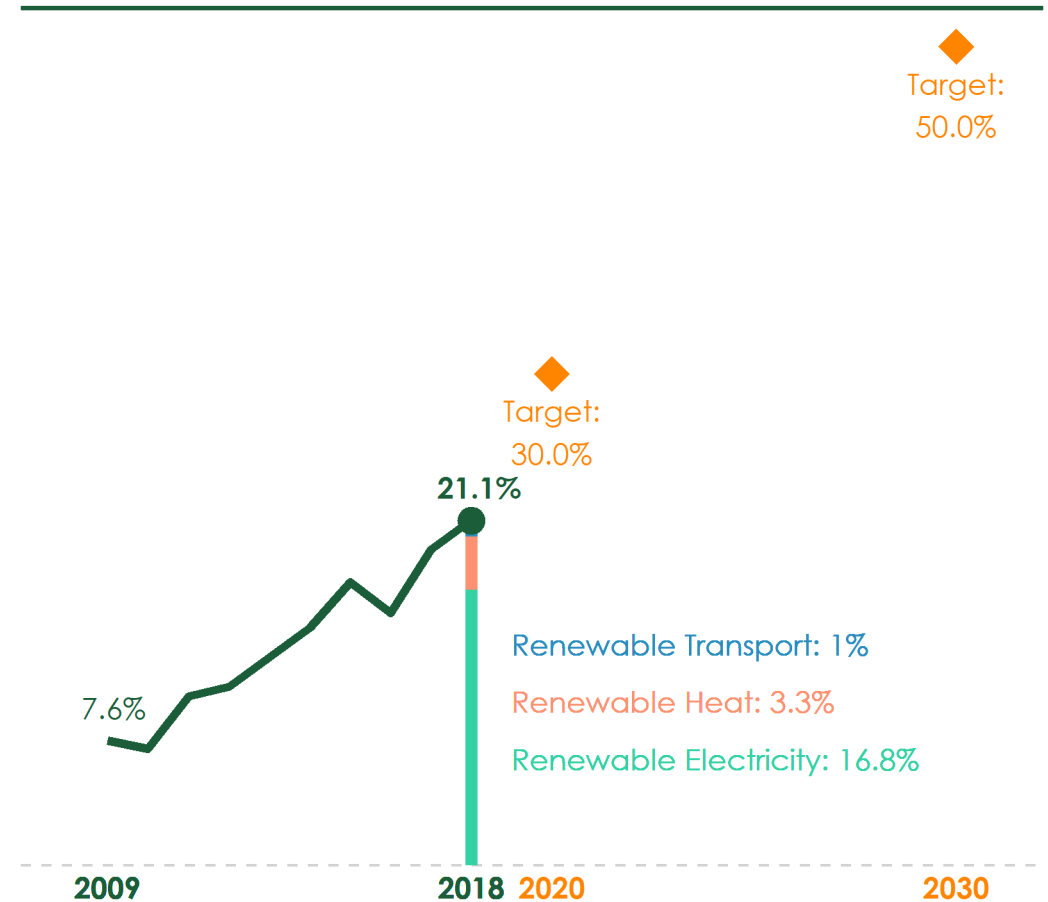


Scotland's renewable energy target is calculated by the sum of renewable electricity and heat generation and estimated biofuel use in transport in Scotland, divided by Scotland's gross electricity consumption, non-electrical heat demand and energy used for transport. Therefore, progress towards the target will come from **increasing renewable generation** and **reducing energy consumption**.

Provisional figures for **2018** indicate that **21.1%** of total Scottish energy consumption came from renewable sources; the highest level to date. It **increased** from **19.3%** in **2017**. Renewable energy generated **increased** by more than **2,500 GWh** between **2017** and **2018**. This includes over **1,500 GWh** extra renewable **electricity** generated thanks to an additional **0.7 GW** installed capacity between 2017 and 2018, mainly from onshore and offshore wind. Renewable electricity contributes about four-fifths of all Scotland's renewable energy, followed by renewable heat and biofuels in transport.

The total amount of renewable energy generated in 2018 (**33,652 GWh**) is the equivalent of powering and heating more than **1.93 million households** in Scotland, assuming average electricity and gas usage for households in Scotland.

Share of renewable energy in gross final energy consumption Scotland, 2009 - 2018



Source: BEIS, Energy Saving Trust, DfT



How is Scotland performing in terms of energy productivity?

The 2030 energy productivity target is a measure of the **combination of energy consumption and the output of the economy**. It is measured by the **gross value added* (GVA)** achieved in the economy from the **input of one gigawatt hour of energy**. Higher energy productivity means you get more economic activity for each unit of energy used, in other words, squeezing more value added out of every unit of energy consumed across the economy.

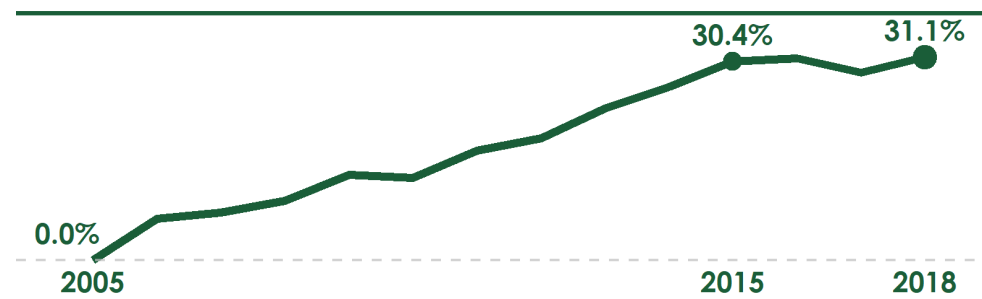
The target is a **30% increase** in energy productivity by **2030** from a baseline of **2015**. This mirrors the improvement in energy productivity between **2005** and **2015** (energy productivity increased by **30.4%** in this period, from **£0.741m GVA per GWh** consumed to **£0.967m**). This was driven by **reducing energy consumption (down by 16.7%)** and **increased GVA (up by 8.6%)**.

Provisional figures for **2018** estimate that energy productivity in Scotland is **£0.972m GVA per GWh**, **0.6%** above the 2015 baseline. The reason for the slower progress from 2015 is that **energy consumption increased by 3.1%** between **2015** and **2018**. Energy productivity still increased because Scottish **GVA rose by 3.7%** in this period. Compared to **2017**, energy productivity improved by **1.9%** in **2018**, mainly due to growth in GVA.

*GVA used is adjusted based on chained volume measures.

Estimated change in energy productivity

Scotland, 2005 - 2018



Source: BEIS, SG

Energy productivity target progress

Scotland, 2015 - 2018



Source: BEIS, SG



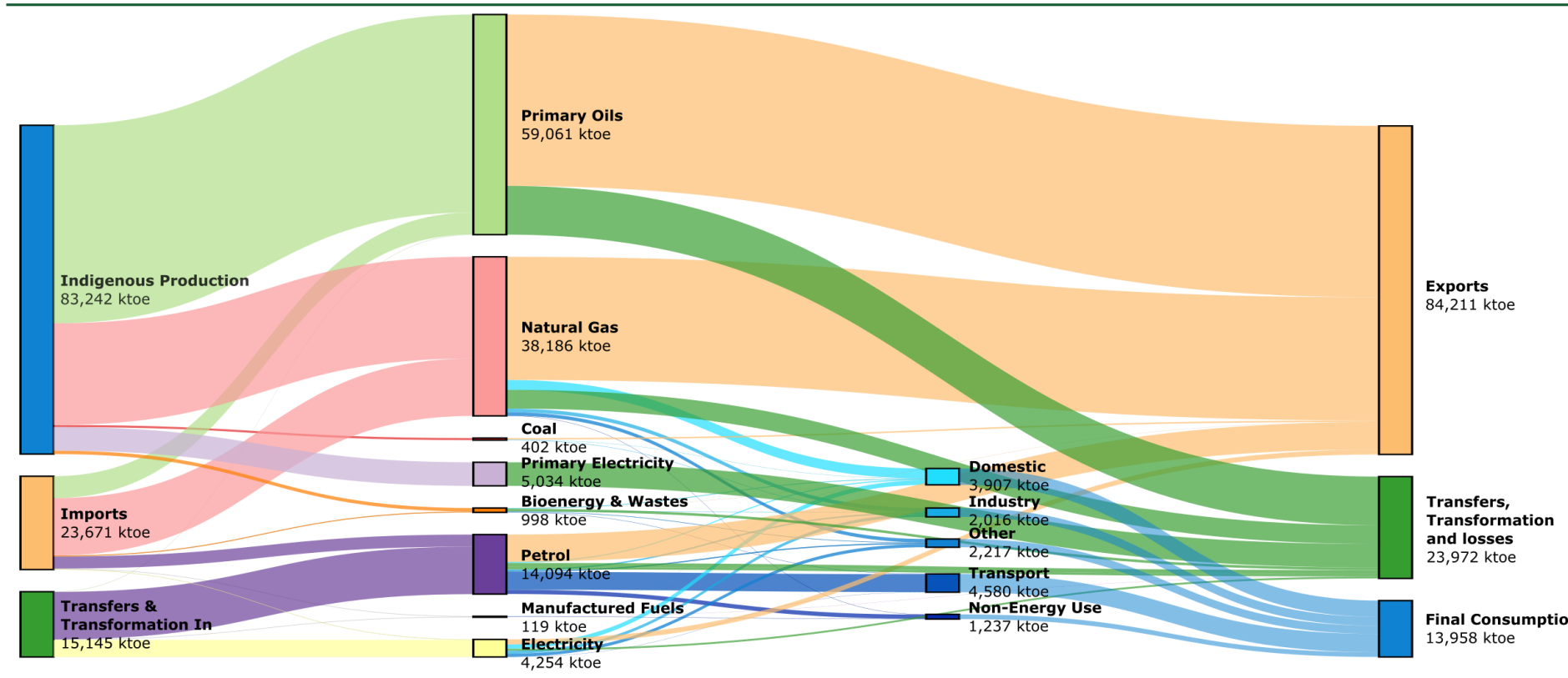
How can we represent all of Scotland's energy system?

We can represent Scotland's entire energy system as an **energy balance**, represented as a **Sankey** diagram. This provides a global picture of energy in Scotland, showing the flow from **inputs** (indigenous production and imports), to **transformation** to **outputs** (exports, losses and consumption). The widths of the bands are proportional to the size of the flow they represent.

It shows Scotland indigenously produces a vast amount of energy, and the majority of Scotland's energy is eventually exported.

Scottish energy balance

2018



Source: BEIS, SG, HMRC

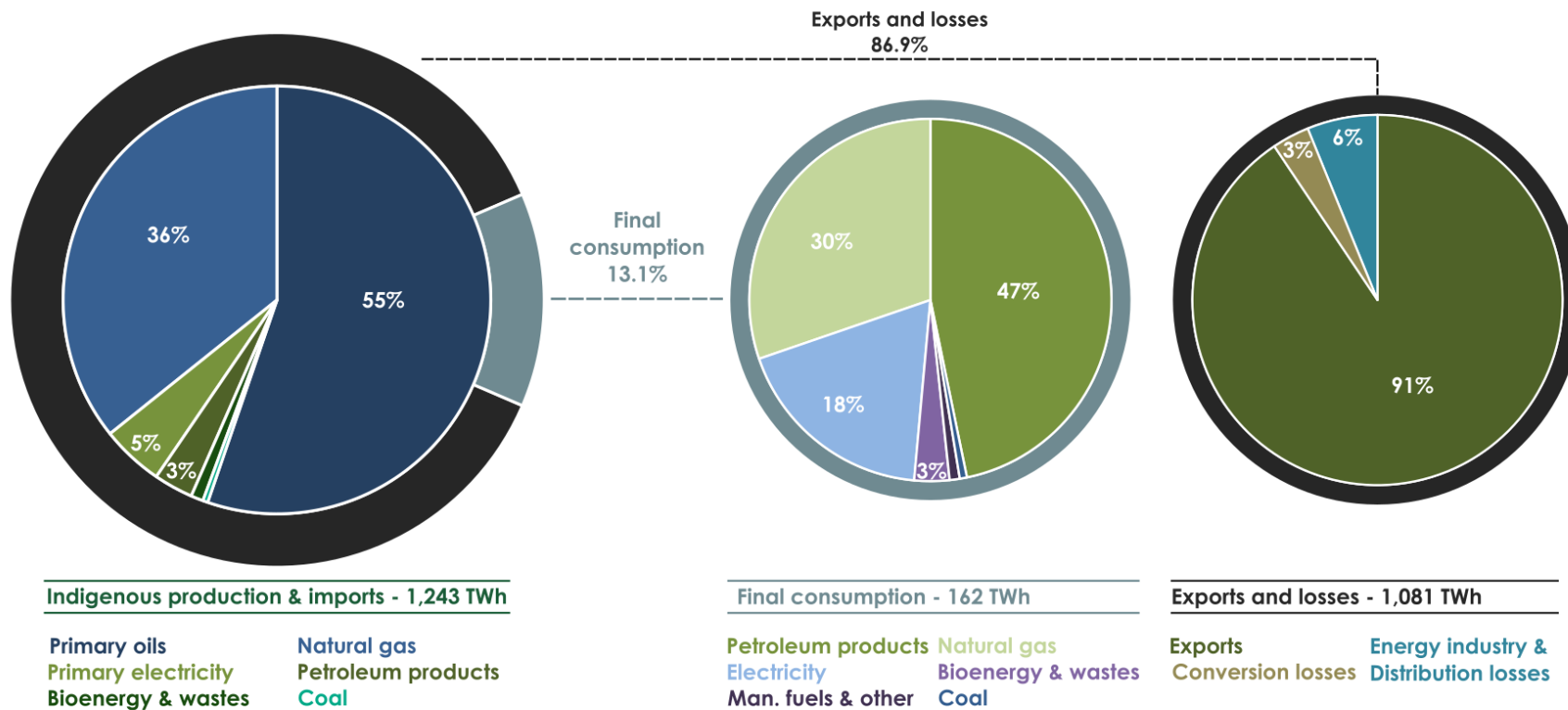
An interactive version of the energy balance can be found in the [Energy Statistics Hub](#)

What does Scotland's energy balance tell us?

In **2018**, Scotland's total input to the energy system, or primary energy, was **1,243 TWh**, rising for the fourth successive year. **Indigenous production makes up 77.9%** of this and **22.1%** from **imports**. The vast majority (**93.9%**) of primary energy is from **oil and gas**, 1,167 TWh, up 4.6% on 2017.

Simplified energy flow

Scotland, 2018



Source: BEIS, SG, HMRC

In terms of **outputs**, **78.8%** of all primary energy was **exported in 2018**, **8.2%** was lost in **transformation** and **13.1%** is accounted for by end use **consumption** in Scotland.



How important is energy to Scotland's economy?

Scotland's **energy** (including renewables) **sector** was identified in [Scotland's Economic Strategy](#) as one of the growth sectors in which Scotland can build on existing comparative advantage and increase productivity and growth. The sector is defined using the **Standard Industrialisation Classification (SIC) 2007** codes which can be found [here](#). Due to the sector definitions, the figures are not directly comparable with those on the low carbon and renewable sector or the oil and gas sector later in this document.

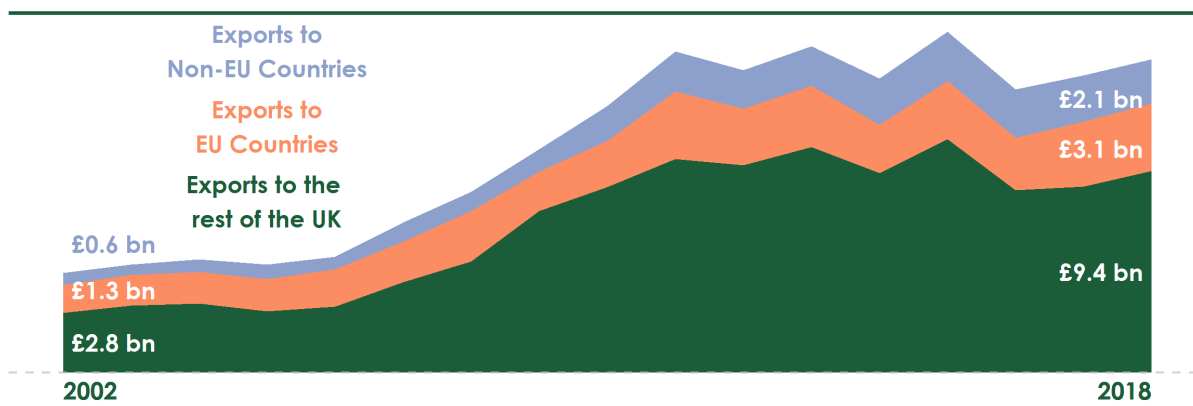
Gross value added (GVA) for the Energy growth sector totalled **£20.8 billion** in **2018**, up **11.1%** on **2017** to its highest level since 2013. This increase is driven by a 32.6% rise in GVA associated with extraction of **oil and gas**.

Total **turnover** in the Scottish energy sector was **£40.8 billion** in **2018**, down **7.8%** in nominal terms on **2017**. This is largely attributable to some companies adopting new accounting standards in Annual Business Survey returns in 2018, therefore care should be taken when making comparisons over time to 2018.

Total **exports** from the Energy growth sector stood at **£14.6 billion** in **2018**, accounting for **17.2%** of **Scotland's total exports**. Exports from this sector **increased** by **5.4%** over the latest year.

Exports associated with the energy sector

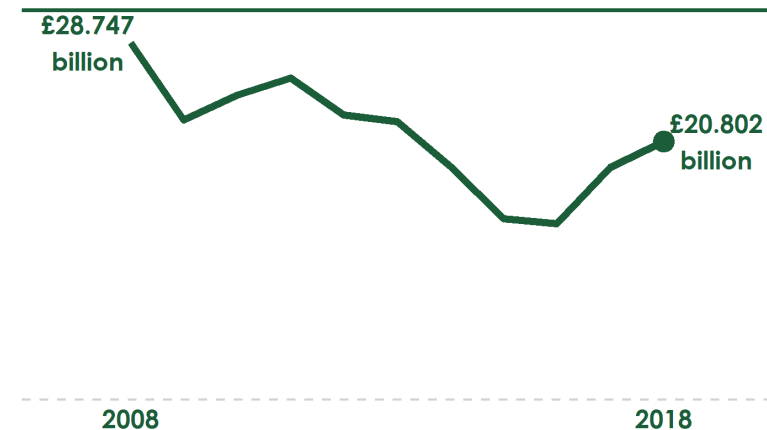
Scotland, 2002 - 2018



Source: SG

GVA associated with the energy sector

Scotland, 2008 - 2018



Source: SG

Employment in the energy sector stood at **67,000** in **2018**, down from **69,000** in **2017**. **Scotland** accounted for **20.2%** of employment in Energy across **Great Britain** as a whole. Employment in the energy sector is highly **concentrated** in the **North-East** with **38.8%** of all jobs in **Aberdeen City** and **13.4%** in **Aberdeenshire**.





Renewable and Low Carbon Solutions

“We will continue to champion and explore the potential of Scotland’s huge renewable energy resource, and its ability to meet our local and national heat, transport and electricity needs – helping to achieve our ambitious emissions reduction targets”



What are **low carbon** solutions?



Low carbon solutions come from the need to **limit** Scotland's **emissions** given the increasing threat of **climate change**. By adopting low carbon means to generate power rather than relying on fossil fuels (i.e. coal, oil and gas), we can produce power with fewer greenhouse gas emissions. This will be critical for Scotland's target of **net-zero emissions** by **2045** as outlined in the [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Act 2019](#).

Low carbon solutions include **renewables** which are naturally occurring and inexhaustible, for example, wind, hydro, solar, tidal, biomass, energy from waste and geothermal. Low carbon solutions may also include nuclear electricity generation and **electricity** and green **hydrogen** solutions for **heating** and **transport**.

In this section, we look at how Scotland has performed in terms of utilising low carbon and renewable sources across electricity, heat and transport, and what this means for emissions and Scotland's economy.



How is Scotland performing in terms of renewable electricity?

The Scottish Government has a target to generate the equivalent of **100%** of Scotland's own electricity demand from renewable sources by **2020**. This does not mean that Scotland will be fully dependent on renewables generation, but rather that renewables will form the key part of a wider, balanced electricity mix.

In **2019**, the equivalent of **90.1%** of gross electricity consumption* was from renewable sources, rising from **76.7%** in **2018**. Much of this increase is due to **wind**; in the last year there was an almost **1.0 GW increase** in wind **capacity**, which contributed to approximately **3 TWh** increase in electricity **generation** via wind.

Scotland's ability to meet the 100% target by 2020 will depend on how much renewable electricity generation increases and gross consumption decreases in the next year. As of **March 2020**, Scotland has **11.9 GW** of installed **capacity** operational with **13.5 GW** in the **pipeline**. How quickly these projects become operational, how favourable the climate is for renewable electricity generation and the extent to which gross consumption falls in the next year could determine if the target is reached.

Share of renewable electricity in gross electricity consumption

Scotland, 2000 - 2019



Source: BEIS

* Gross electricity consumption refers to total electricity generation minus net exports



How much renewable electricity does Scotland generate?



2019 was a **record year** for **renewable electricity generation** in Scotland with **30.5 TWh** generated, **13.6% up** on **2018**. This is the equivalent of powering all households in Scotland for over three years, or charging almost 6.7 billion mobile phones for a year.

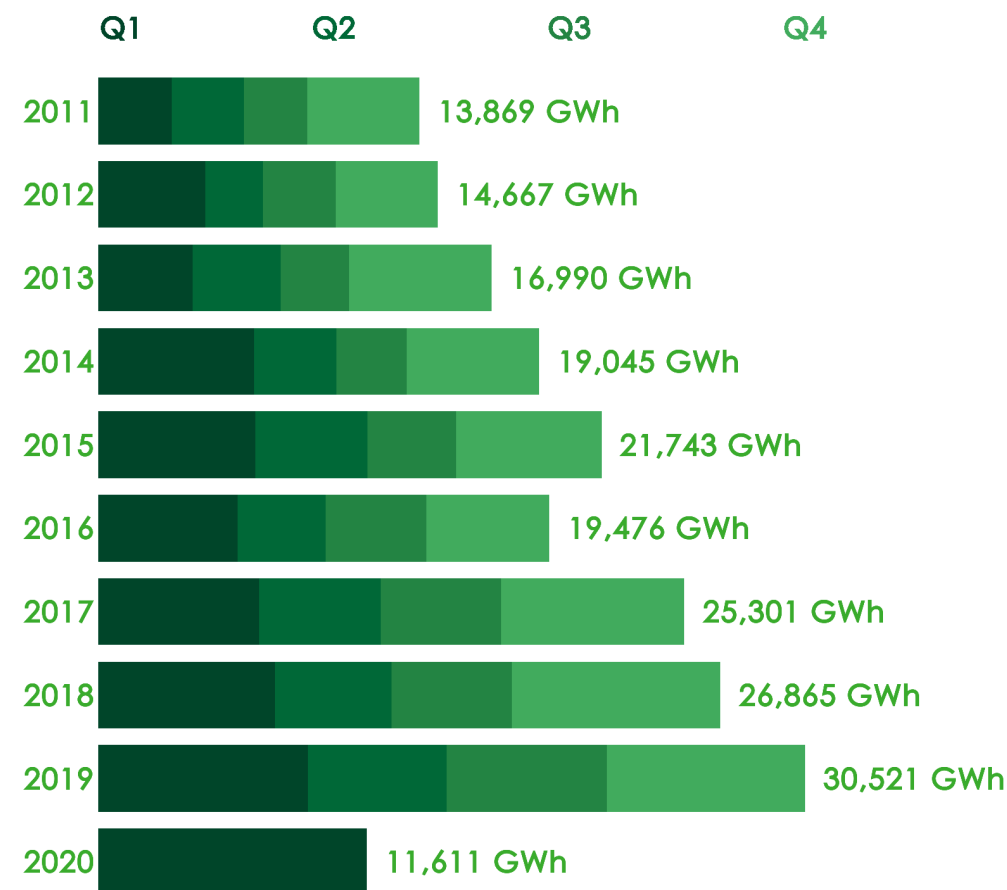
Scotland made up over a quarter (**25.3%**) of the **UK's** renewable electricity generation in 2019.

Scotland hit a new record high for quarterly renewable electricity generation in **Q1 2020**, with **11.6 TWh** generated between January and March 2020. This is **up 28%** on the same period last year, and is equivalent to about half of Scotland's total electricity consumption. **Increases** in **rainfall** and **wind speed** contributed to this - compared to Q1 2019, **onshore wind** generation is **up 25%**, **hydro** generation is **up 38%** and **offshore wind** generation **increased** by **54%**

The majority of Scotland's renewable electricity generation continues to come from **wind (22.3 TWh in 2019)**. **Offshore wind** grew substantially in **2019**; **3.2 TWh** was generated last year via offshore wind, up from **1.4 TWh** in **2018**. This is due to the Beatrice wind farm off the Caithness coast becoming fully operational in May 2019.

Quarterly electricity generated from renewable sources

Scotland, 2011 - 2020



Source: BEIS

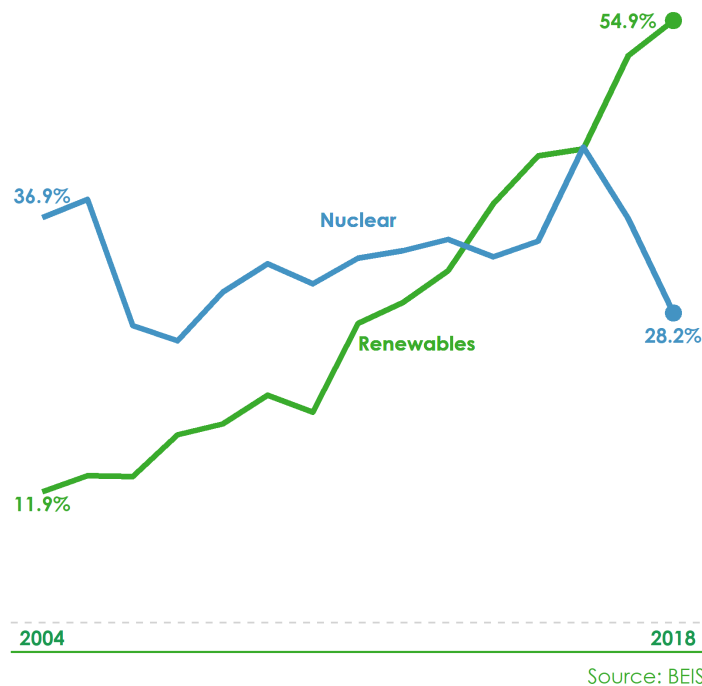


How much does **renewable** and **low carbon electricity generation** make up of all of Scotland's electricity generation?

The electricity generation mix in Scotland has significantly changed in recent years driven by privatisation and subsidy schemes introduced to encourage the development of low carbon and renewable technologies.

This has meant that the vast majority of the electricity that Scotland generates is from **low carbon** sources, **83.1%** in **2018**, compared to **15.7%** generated from **fossil fuels**. However, electricity generation from fossil fuels increased in the most recent year, up from **10.3%** in **2017**. Generation from natural **gas** reached its **highest point** since **2011**. Gas electricity generation may be making up for

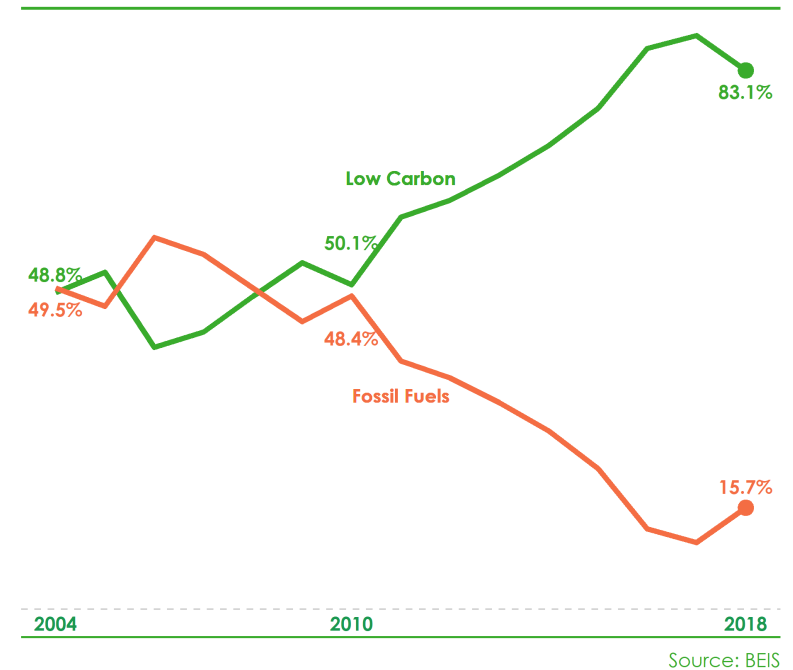
Electricity generation - nuclear versus renewables
Scotland, 2004 - 2018



a **drop** in **nuclear** electricity generation (**36.8%** to **2017** to **28.2%** in **2018**) stemming from long-term outages at Hunterston B towards the end of 2018. As such, **nuclear** generation is at its **lowest** level since **2007**.

The sources of electricity generation in Scotland have changed rapidly since **2010** when approximately half of Scotland's generation came from each of **low carbon** sources and **fossil fuels**. The **growth of renewables drove the increase in low carbon generation**, rising from **19.2%** of all generation in **2010** to **54.9%** in **2018**. National and international incentives, including the [Renewables Obligation](#) and the [EU Renewable Energy Directive](#), contributed towards the increase.

Electricity generation - low carbon versus fossil fuels
Scotland, 2004 - 2018



What comprises Scotland's electricity generation?

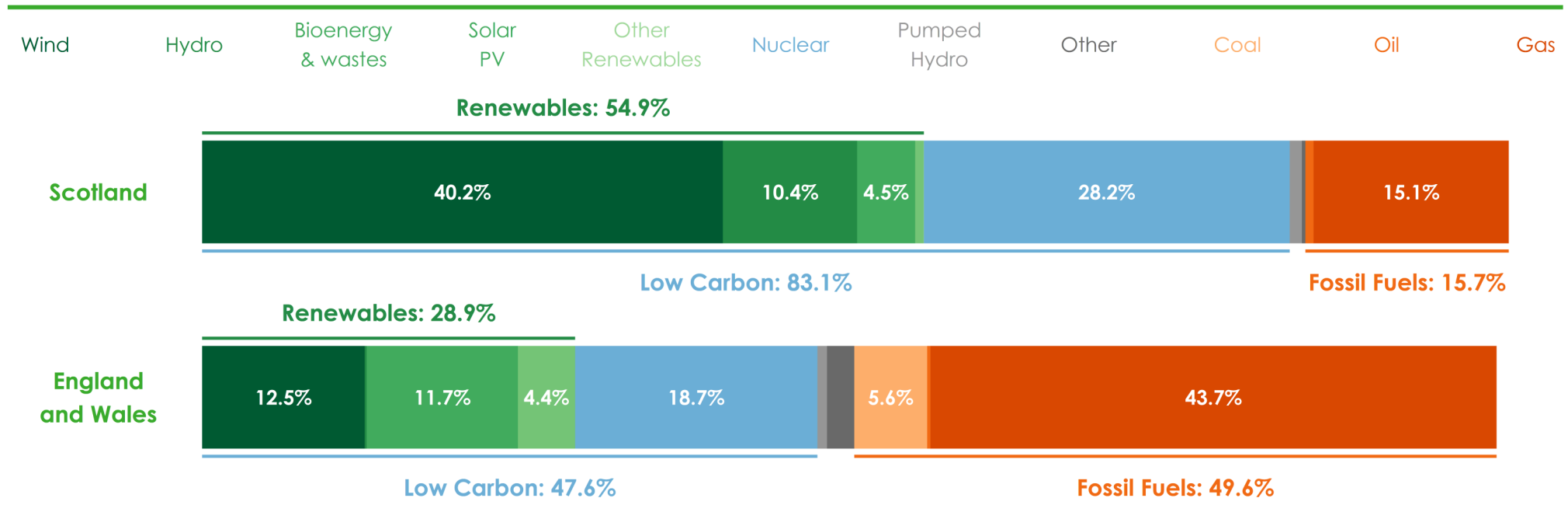


Looking at the individual technologies for electricity generation in Scotland, **wind (40.2%)** contributes more than any other source to Scotland's domestic generation, followed by **nuclear (28.2%)**.

By contrast, **England and Wales** use a significantly **smaller proportion of low carbon (47.6%)** and **renewable (28.9%)** sources for electricity generation than Scotland. **Fossil fuels** comprise half (**49.6%**) of England and Wales' electricity generation, with **gas** making up most of this (**43.7% of all generation**).

Proportion of electricity generation by fuel

2018



Source: BEIS



What is Scotland's future for renewable electricity generation?



Scotland had **11.9 GW** of installed renewable electricity generation **capacity operational in March 2020**. This has steadily risen over time, however, has levelled off since June 2019. Most of Scotland's operational capacity comes from **onshore wind (8.4 GW)**, with **offshore wind** capacity growing rapidly (**1.0 GW**).

As of March 2020, 289 renewable electricity projects with a capacity of **13.5 GW** are in the **pipeline**. **1.3 GW** of these are **under construction**, most of which are **offshore wind** farms off the Moray Firth. **7.7 GW** are awaiting **construction** and **4.5 GW in planning**.

Were all capacity in the pipeline to be delivered it would more than double the level currently deployed, and could generate an estimated **31.9 TWh** of renewable electricity. It is worth noting, however, that there are a number of factors that mean that projects consented in the pipeline may not progress to commissioning.

Pipeline renewable capacity by planning stage

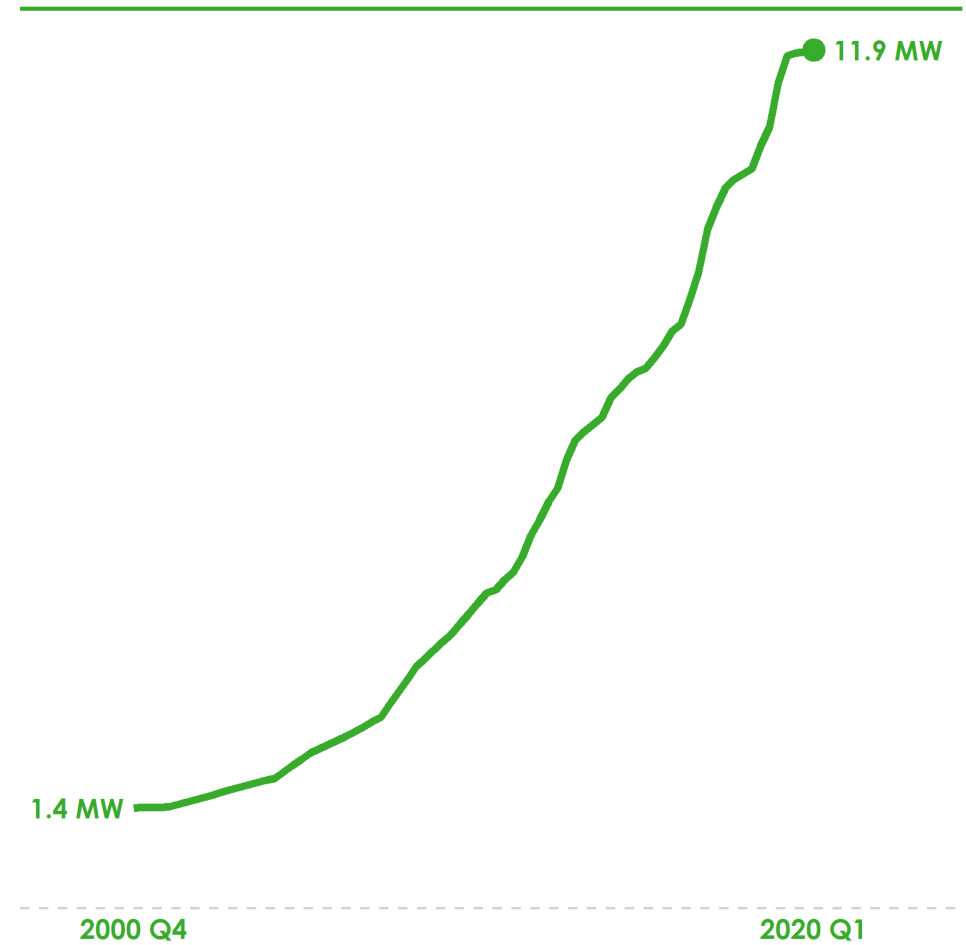
Scotland, March 2020

Under Construction	Awaiting Construction	In Planning	Total
1.3 GW	7.7 GW	4.5 GW	13.5 GW

Source: BEIS

Operational renewable capacity

Scotland, 2000 Q4 - 2020 Q1



Source: BEIS

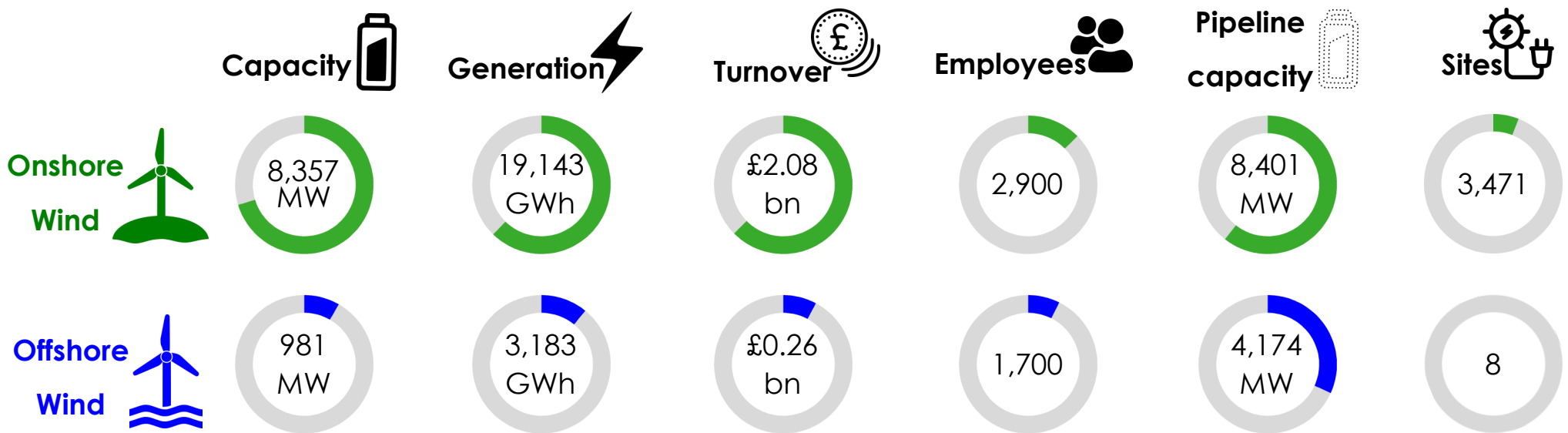


What forms of renewable electricity does Scotland generate?



Most renewable electricity generated in Scotland is from **onshore wind**. In **2019**, Scotland generated over **19,000 GWh** via onshore wind, **62.7%** of Scotland's renewable electricity. This is the equivalent of powering all of Scotland's homes for approximately two years. Onshore wind capacity is **8.4 GW** as of **March 2020**. Growth has been rapid; between **2009** and **2019**, **capacity** and **generation** of onshore wind in Scotland more than **quadrupled**, with approximately **3,500 sites** operational. It directly supported approximately **2,900** full-time equivalent **jobs** in Scotland and generated **£2.08 billion** in **turnover** in **2018**. Onshore wind will continue to play a major role with **8.4 GW** of projects in **development** in Scotland.

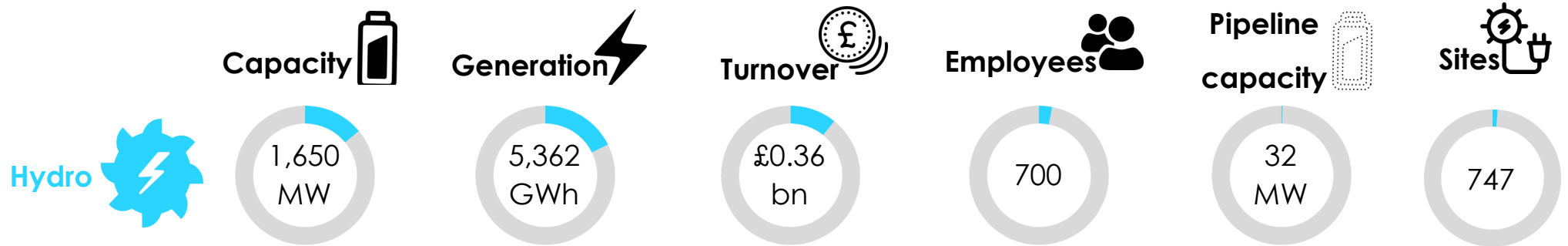
Offshore wind is rapidly growing in Scotland - **capacity** saw a five-fold increase from **0.2 GW** in **June 2018** to **1.0 GW** in **March 2020** with the Beatrice wind farm in the Moray Firth becoming operational in 2019. This led to **3,2 TWh** of electricity generated via offshore wind in **2019**, up from **1.4 TWh** in **2018**. Offshore wind is likely to play more of a role in the future; **eleven** offshore wind projects totalling **4.2 GW** are in **development**. **Five** of these (totalling **1.0 GW**) are currently **under construction**. Electricity generation via offshore wind may have generated **£0.26 billion** in turnover in **2018**, but has directly supported approximately **1,700** full-time equivalent **jobs** in Scotland.



Generation figures relate to 2019, turnover and employees figures are 2018, current and pipeline capacity figures are from March 2020.

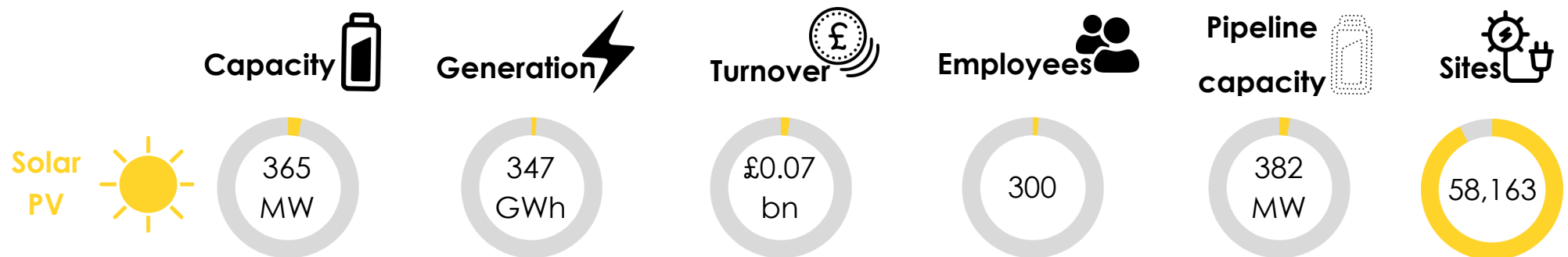


What forms of renewable electricity does Scotland generate?



Scotland has a long established base of **hydro** capacity; in **2000**, installed **capacity** was **1,320 MW**. By **March 2020**, this grew by 25% to **1,650 MW**, the growth coming from small scale installations of less than 5 MW. The number of **sites** generating electricity via hydro rose from **163** in **2003** to **747** in **2018**. In 2019, Scotland generated almost **5.4 TWh** via hydro, the equivalent of powering more than **half** of **Scotland's homes** for a year. This is **up** by **7.4%** on **2018**, possibly as a result of greater rainfall in 2019. **Scotland** accounts for **90.3%** of all hydro generation in the **UK**.

While **solar photovoltaics (PV) capacity** in Scotland increased rapidly in the first half of this decade (**2 MW** in **2010** to **326 MW** in **2016**), **progress** has **slowed** in recent years, rising slightly to **365 MW** by **March 2020**. This is likely to be due to the closure of the Renewables Obligation accreditation to all solar in March 2017. As of **2018**, there were over **58,000** solar PV installations in Scotland. Solar PV generated **347 GWh** of electricity in **2019**, enough to power almost **89,000 Scottish homes** for a year. There is a further **382 MW** of solar projects in the pipeline as of March 2020.



Generation figures relate to 2019, turnover and employees figures are 2018, current and pipeline capacity figures are from March 2020.

What forms of renewable electricity does Scotland generate?

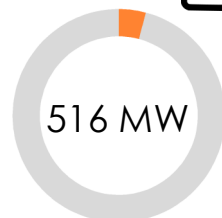
Renewable Electricity Sources



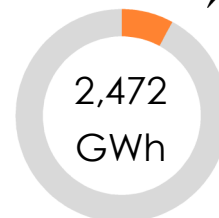
Bioenergy /
energy from
waste



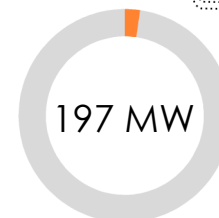
Capacity 



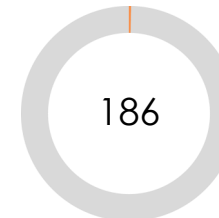
Generation 



Pipeline
capacity 



Sites 



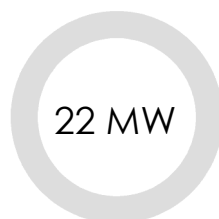
Bioenergy and **energy from waste** accounts for **8.1%** of all renewable electricity generated in Scotland in **2019 (2,472 GWh)**. There is almost **200 MW** of bioenergy projects in the **pipeline**, the vast majority of which are energy from waste projects.

Current capacity of **wave** and **tidal** in Scotland is relatively small (**22 MW** in **March 2020**), but Scotland is leading the way in the UK in this area - in **2018, 16** out of the 19 wave and tidal **sites** in the UK were in Scotland. It is also a developing technology; projects totalling **350 MW** are in the **pipeline**, including Brims Tidal Array in the Orkney Islands with 200 MW capacity alone.

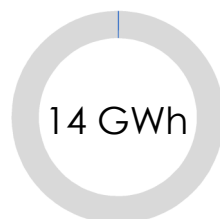
Wave/
Tidal



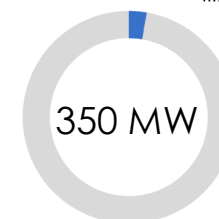
Capacity 



Generation 



Pipeline
capacity 



Sites 



Generation figures relate to 2019, current and pipeline capacity figures are from March 2020.



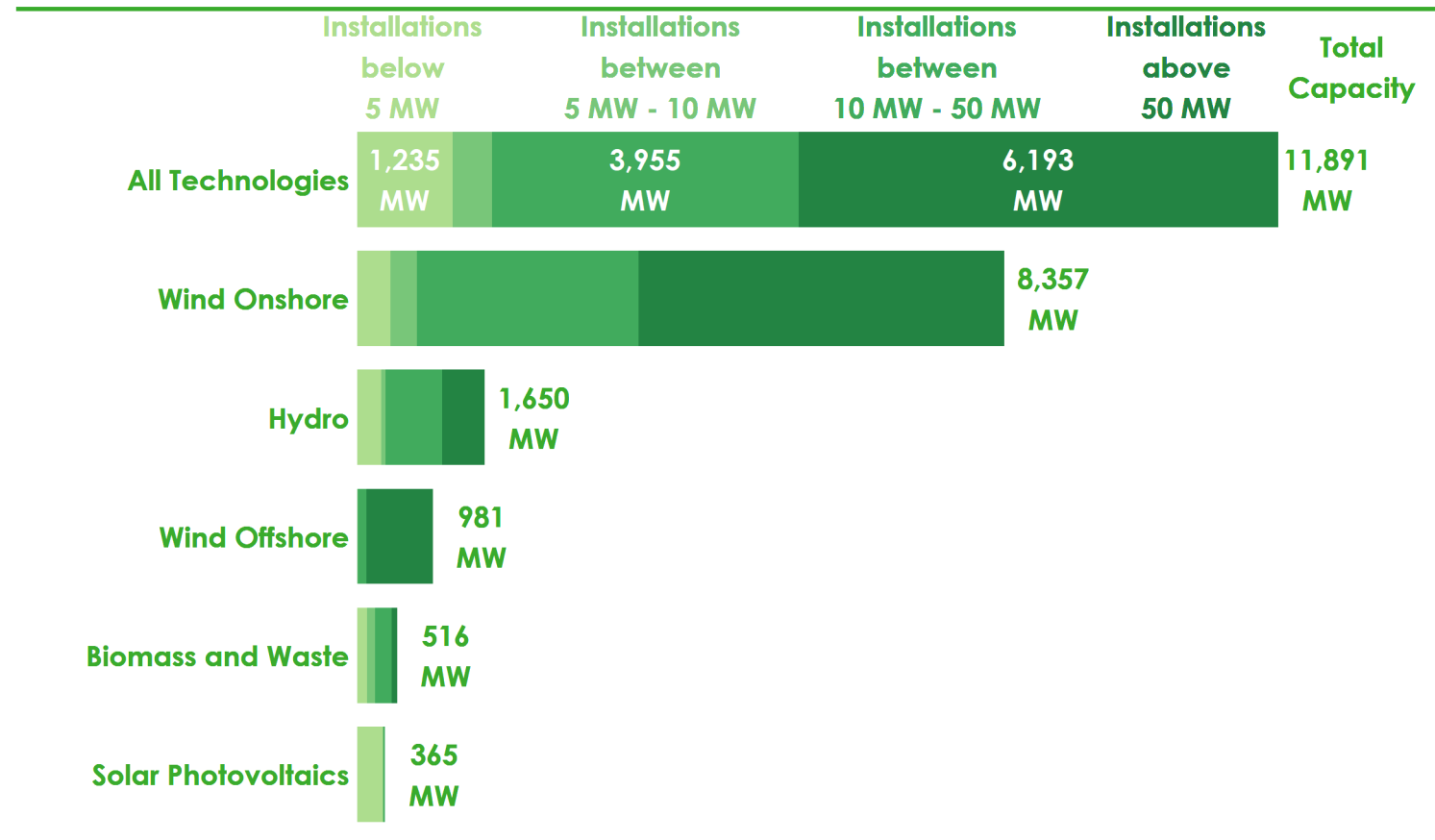
What about the size of renewable electricity installations?



Half of the renewable capacity in Scotland comes from **large installations** of over 50 MW (**6.2 GW** in total).

However, a total of **1.2 GW** comes from **small-scale installations** of less than 5 MW. These projects are important as they are likely to contribute to the development of smart, decentralised and local energy markets in Scotland. This is made up of **433 MW** of **onshore wind**, **338 MW** of **solar PV**, **315 MW** of **hydro** and **133 MW** of **bioenergy and waste**.

Operational renewable capacity by installation size Scotland, March 2020



Source: BEIS



How does Scotland's electricity generation impact grid emissions?

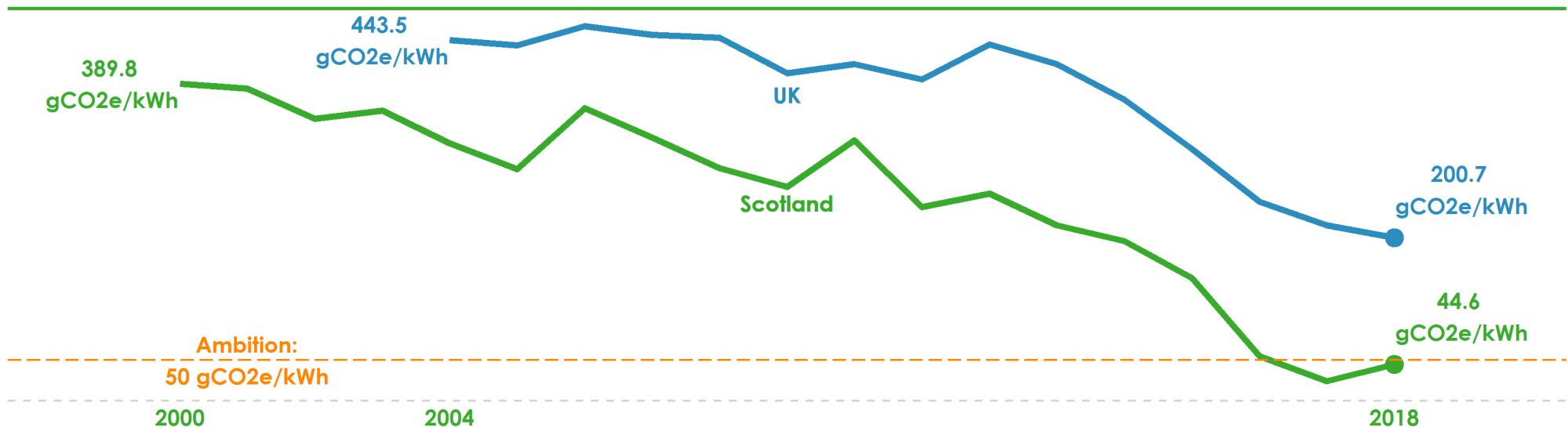
The shift towards **low carbon** electricity generation had a profound impact on **emissions**. Each kilowatt hour of electricity generated in Scotland in **2018** added an estimated **44.6** grams of carbon dioxide into the atmosphere (gCO₂e/kWh), a sizeable drop from **320.1 gCO₂e/kWh** in **2010**. This was driven by both the **increase** in **low carbon renewable generation** and the **closure** of Scotland's last **coal power stations** Cogenzie and Longannet in the last decade.

For the second year running, grid intensity is **below** the **50 gCO₂e/kWh ambition** for 2020 outlined in the [Climate Change Plan](#). It is also substantially lower than grid intensity in the **UK** as a whole (**200.7 gCO₂e/kWh**). This is due to the greater low carbon electricity generation in Scotland compared to the rest of the UK.

However, grid intensity in 2018 almost doubled from **24.0 gCO₂e/kWh** in **2017**. This is due to a **rise** in **gas** used to **generate electricity** in **2018**, compensating for a fall in nuclear generation due to long-term outages at Hunterston B.

Average greenhouse gas emissions per kilowatt hour of electricity

Scotland, 2000 - 2018



Source: BEIS, SG

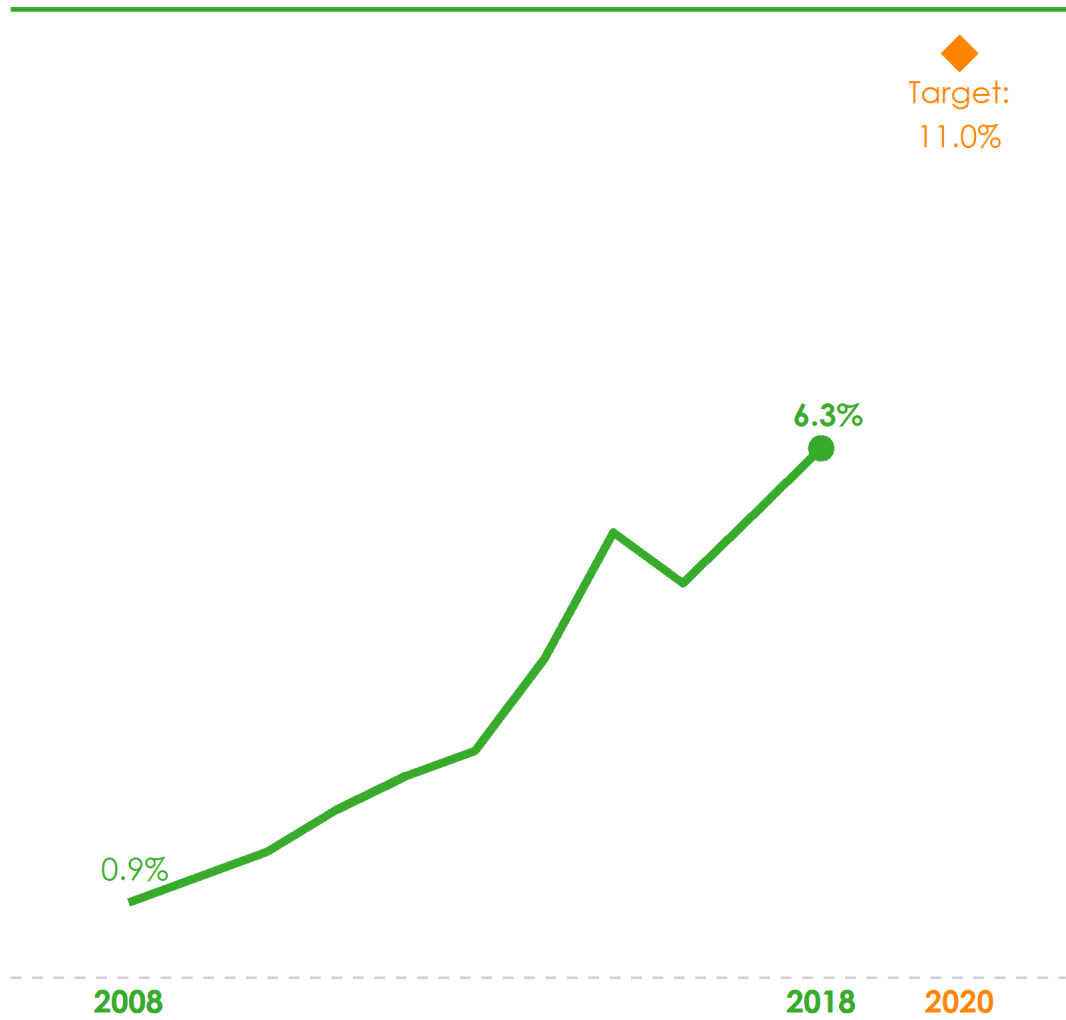




Share of renewable heat in non-electrical heat demand

Scotland, 2008 - 2018

Target:
11.0%



Source: BEIS, EST

Scotland generated **5,230 GWh** of renewable heat across approximately **25,550 sites** in 2018, a record year for renewable heat. This is the equivalent of supplying almost **387,000 Scottish homes** with gas for the year.

The 2009 Renewable Heat Action Plan set a target of delivering **11%** of Scotland's non-electrical heat demand from renewable sources by **2020**. In **2018**, the equivalent of **6.3%** of non-electrical heat demand was met from renewable sources, up from **5.5%** in **2017**. The majority of the rise this year is due to newly operational biomass and energy from waste sites as well as an increased heat output from over half of the existing biomass sites.

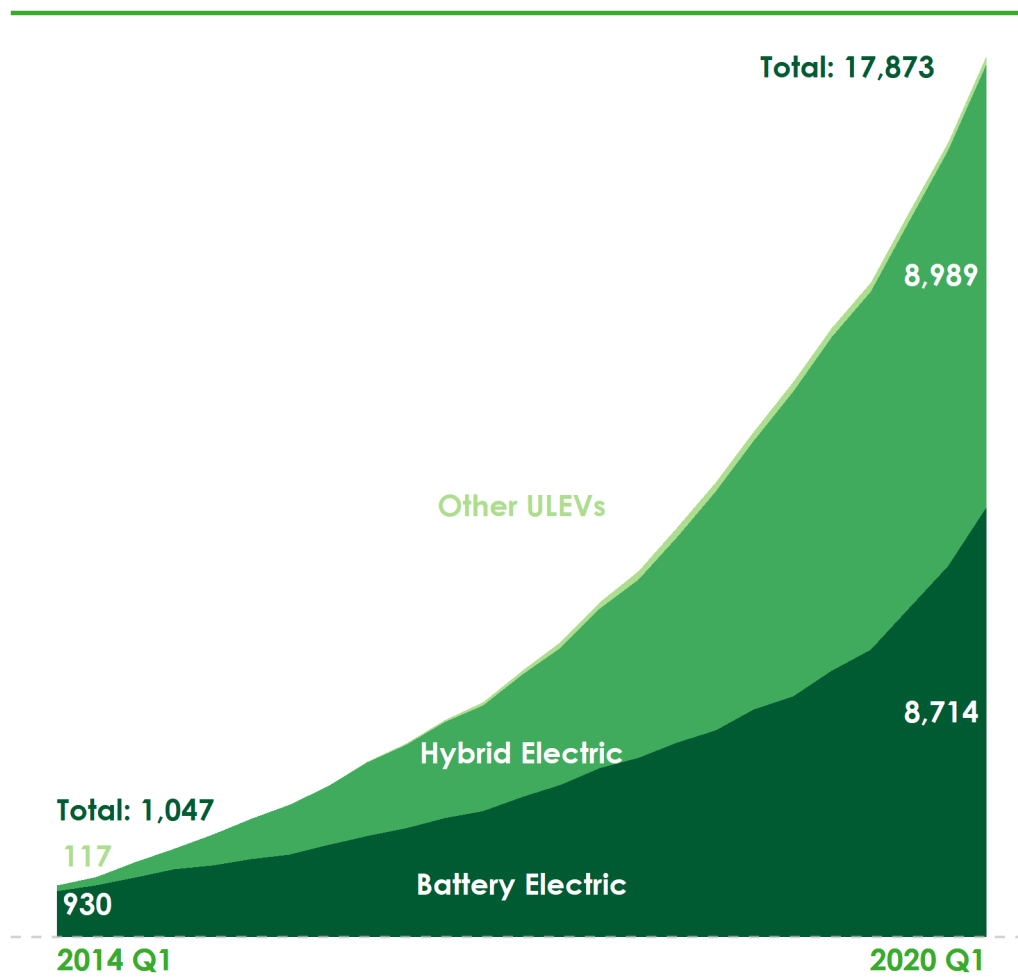
As in 2017, the majority of both **capacity** and **output** of renewable heat in **2018** came from **biomass** primary combustion and biomass combined heat and power (CHP). Together, these technologies account for **1.66 GW** of **capacity** and **3,845 GWh** of **output**. **Energy from waste** makes up **19.6%** of output and **heat pumps 6.5%**.

Almost half (**46.8%, 2,450 GWh**) of renewable heat output comes from 100 large **installations** of **over 1 MW**. There are **seven** installations that **generated more than 100 GWh** in 2018; together these sites provided 30% (**1,571 GWh**) of the total renewable heat output in Scotland in **2018**.



Number of ultra low emission vehicles licenced

Scotland, 2014 Q1 - 2020 Q1



Source: DfT

The Scottish Government has announced [its intention](#) to phase out the need for new petrol and diesel cars and vans by 2032, and has supported adoption of **ultra-low emission vehicles** (ULEVs). This term refers to electric, plug-in hybrid, hydrogen fuel-cell vehicles and all vehicles with tail-pipe emissions below 75 g/km of CO₂.

As of **March 2020**, there were **17,873** ULEVs licenced in Scotland, more than half of which are plug-in hybrid vehicles. Even though ULEVs only make up **0.6%** of all vehicles licenced in Scotland, **growth** has been **rapid**; compared to twelve months prior, ULEVs licenced **rose** by **44.8%**.

The growth of ULEVs can be further illustrated by looking at the proportion of ULEVs **registered for the first time**. This increased from **0.2%** of all newly registered vehicles in the **first quarter** of **2014** to **4.0%** in **Q1 2020**.

In **2019**, there were **1,226** public EV **charge points** on the ChargePlace Scotland network (CPS), **up** from **702** in **2017**. There were almost **647,000** separate **charging events** using the CPS network in **2019**, with **7.68 GWh** provided.

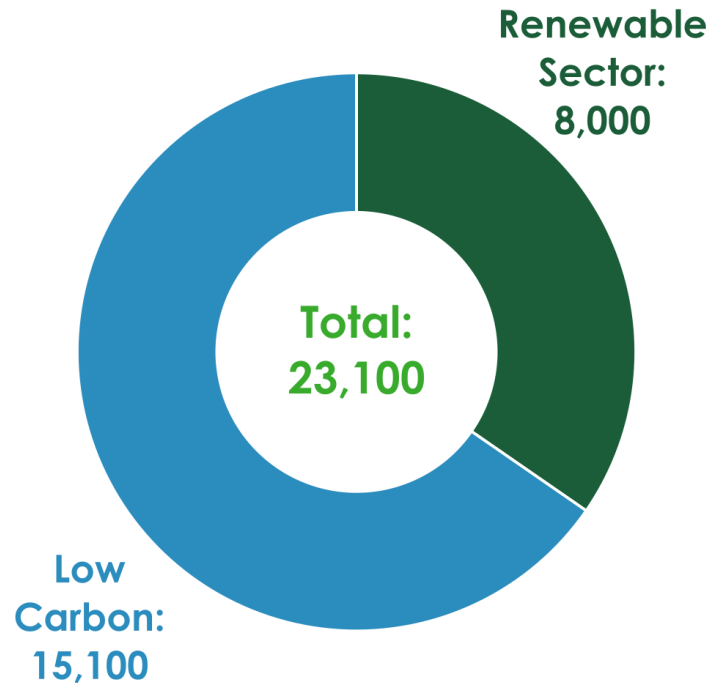
How does the **low carbon** and **renewable energy** sector **benefit** the Scottish **economy**?

In 2018, the low carbon and renewable energy (LCRE)* sector **directly** supported **23,100** full-time equivalent **jobs** in Scotland. This represents around **10%** of employment in the **UK** LCRE sector. Most of this is made up of staff employed in **energy efficiency** (12,100 full-time equivalent staff) and **low carbon electricity** (6,800).

In 2018, the Scottish low carbon and renewable energy economy directly generated **£6.4 billion**. The **renewable energy** part of the LCRE sector is particularly important in Scotland where it accounts for more than half of **Scotland's low-carbon turnover**. In contrast, renewable energy accounts for around **35%** of LCRE turnover in the **UK** as a whole.

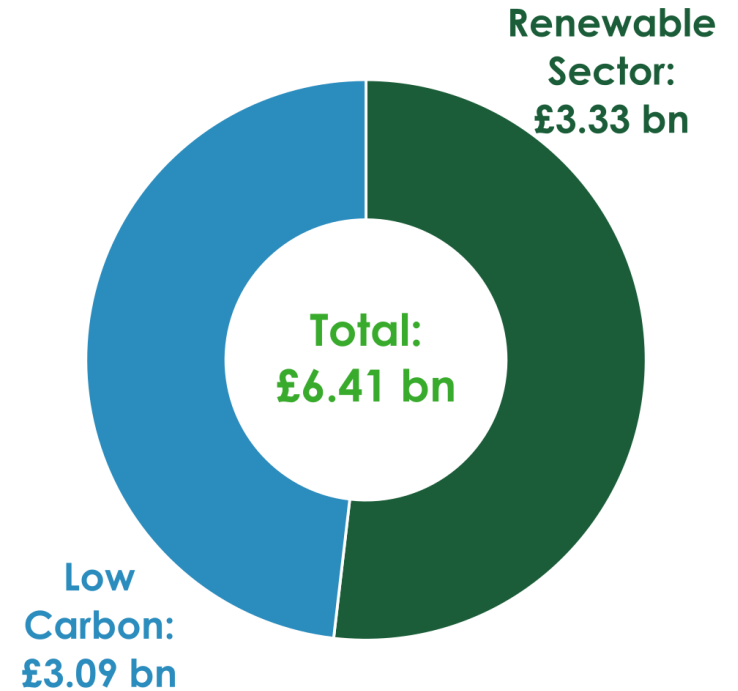
There has been strong growth in **exports** by low-carbon businesses in Scotland; rising from **£225.5 million** in **2015** to **£377.5 million** in **2018**.

Full time equivalent jobs directly supported by the LCRE sector
Scotland, 2018



Source: BEIS

Turnover directly supported by the LCRE sector
Scotland, 2018



Source: BEIS

* The 'renewable' sector includes renewable electricity, heat and energy from waste and biomass. The 'low carbon' sector includes nuclear electricity, energy efficient products, low carbon financial and advisory services, low emissions vehicles, infrastructure, fuel cells and energy storage





Local Energy Systems

“We will empower our communities, supporting the development of innovative and integrated local energy systems and networks”

What are local energy systems?

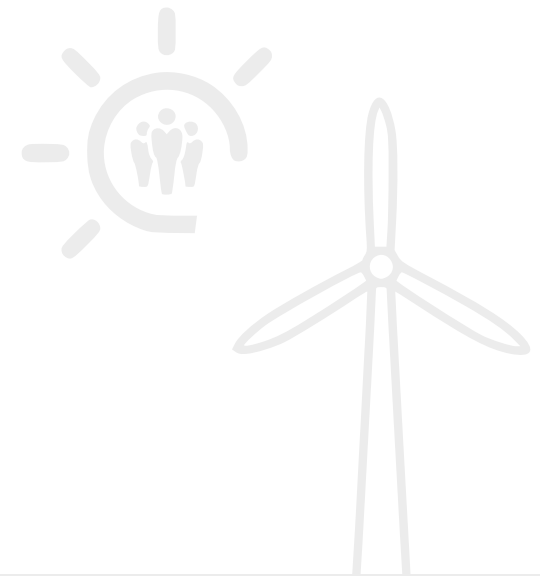


Scotland has a history of developing local energy systems, especially in rural communities and the islands. An advantage of this is that it moves away from centralised generation, which can be problematic for more remote locations. It also has benefits for the communities themselves in terms of skills and financial benefits.

The Scottish Government has a number of [initiatives](#) designed to encourage businesses and communities to invest in local and small scale renewables, for example, the Community and Renewable Energy Scheme (CARES), Resource Efficient Scotland and the Home Energy Scotland Loan.

This section looks at Scotland's progress to date on three specific initiatives:

- **Community and locally owned renewables:** this refers to installed electrical and heat capacity owned by community groups, local authorities, housing associations and other Scottish public bodies, charities, further and higher education establishments, local businesses and Scottish farms and estates.
- **Combined heat and power (CHP):** schemes that capture heat from the electricity generation process that would otherwise have been wasted and use the heat for productive purposes
- **District and communal heating:** refers to a distribution system of insulated pipes that takes heat from a central source and delivers it to a number of domestic or non-domestic buildings



How is Scotland performing in terms of **community** and **locally-owned renewables**?



Targets were set for [community and locally-owned renewables](#) with the aim of having **1 GW** of capacity by **2020** and **2 GW** by **2030**.

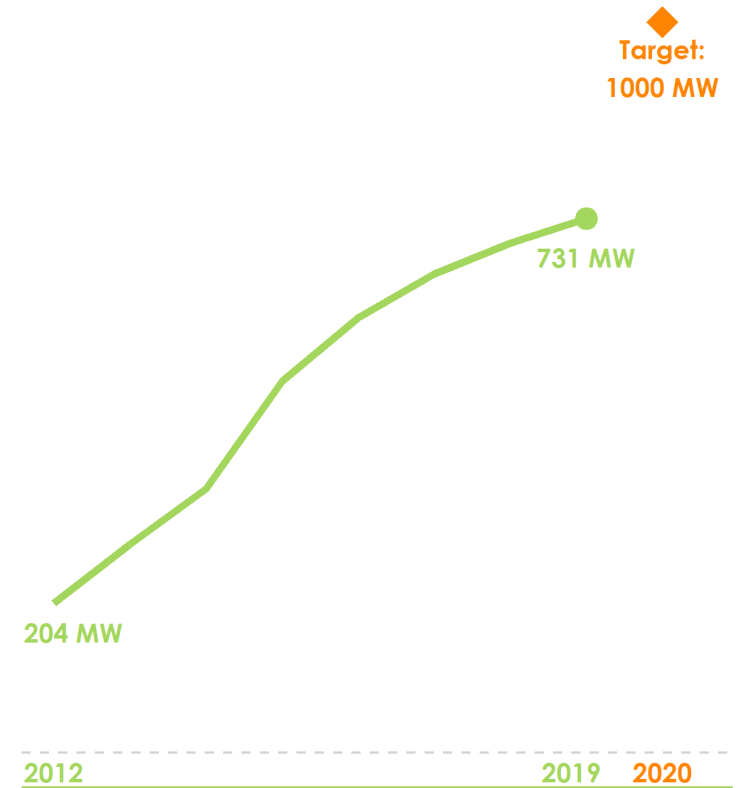
As of June **2019**, **731 MW** of community and locally owned capacity is operational. This is a small increase on 2018, and has more than tripled from June **2012** when capacity was **204 MW**.

The majority of operational community and locally-owned renewable capacity in Scotland in June **2019** was from **wind** turbines (**325 MW**), followed by **biomass** (**193 MW**). These two technologies account for approximately 70% of overall operational capacity in June 2019.

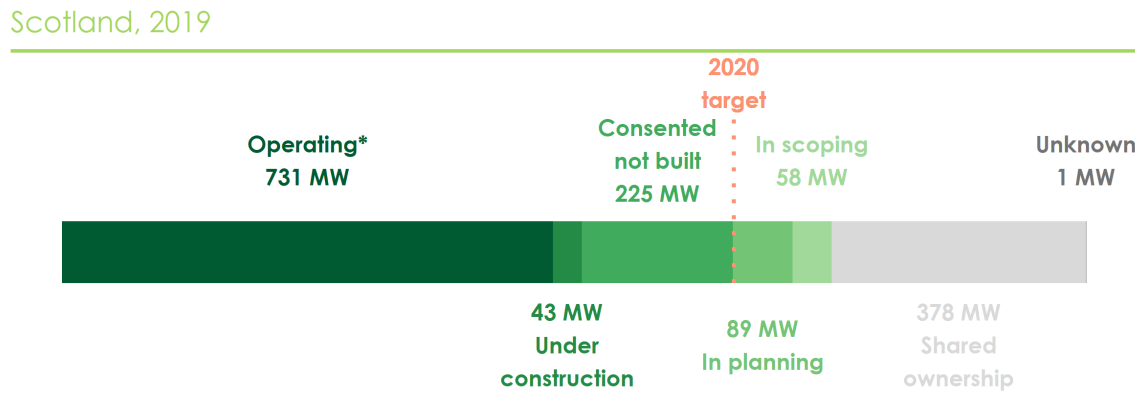
The **731 MW** of total operational capacity is split between **428 MW** (58.5%) of **electrical capacity** and **256 MW** (36.1%) of **thermal** (heat) **capacity**.

Projects totalling more than **794 MW** are in development, including **43 MW under construction** and a further **225 MW consented** but not built. If all consented projects were operational (and there is no guarantee they will), capacity would be just shy of the 2020 target.

Capacity of operating locally owned renewable energy initiatives Scotland, 2012 - 2019



Community and locally owned renewable energy capacity in different stages of development Scotland, 2019



Source: EST



How is Scotland performing in terms of **combined heat and power** and power?

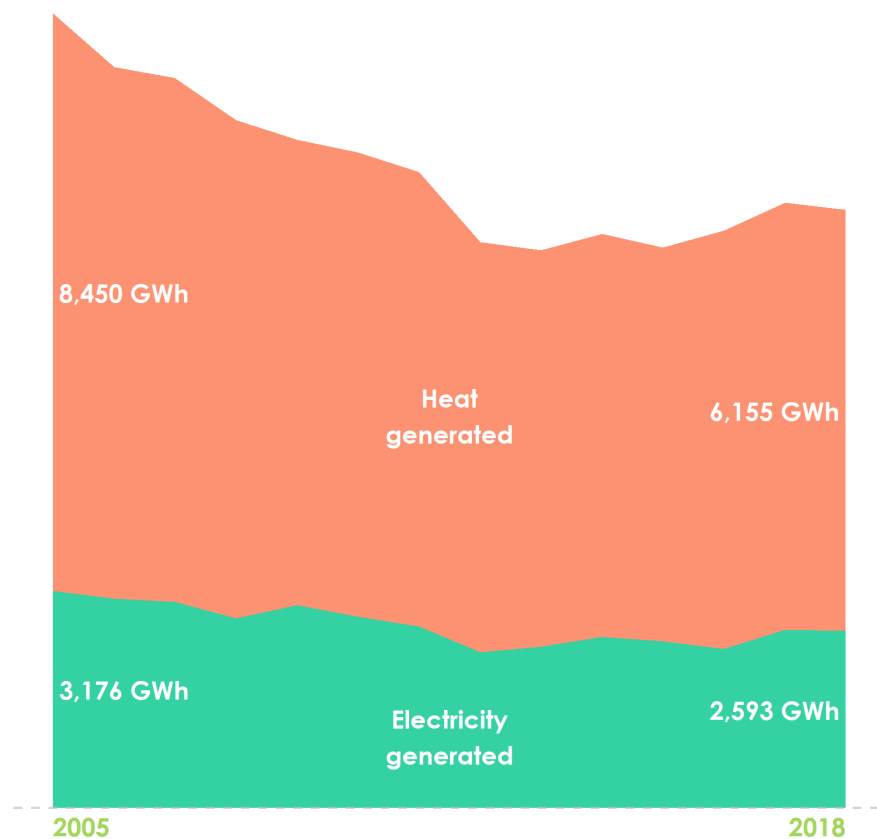
Combined heat and power



In **2018**, Scotland had **178** separate **combined heat and power schemes** in domestic and non-domestic buildings, steadily **rising** from **70** in **2005**. In total, Scotland's combined heat and power schemes generated **6,155 GWh** of **heat** in 2018 which would have been wasted otherwise, a small decrease on last year.

Electricity and heat generated via CHP

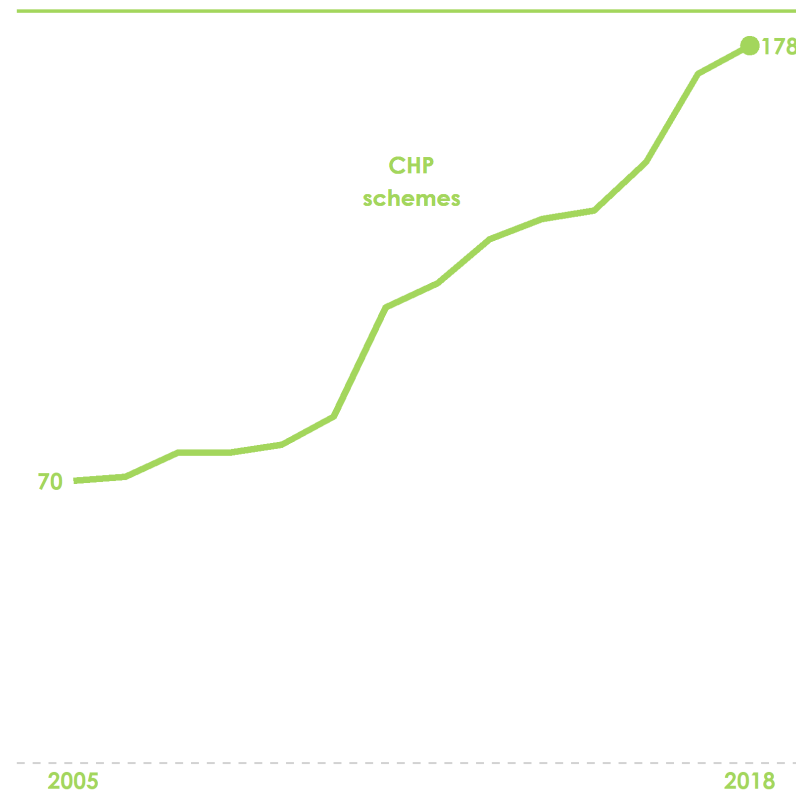
Scotland, 2005 - 2018



Source: BEIS

Number of CHP schemes

Scotland, 2005 - 2018



Source: BEIS

While the number of CHP **schemes** in Scotland have **increased**, the amount of **heat generated** has **dropped** by almost **2,300 GWh** from its peak in **2005**. This mirrors the UK wide trend of the cessation of larger industrial based schemes that generate high amounts of heat and the growth of smaller non-industrial schemes.



Annual Compendium of Scottish Energy Statistics 2020

How is Scotland performing in terms of district and communal heat networks?

The [Heat Policy Statement](#) published in 2015 set out two **ambitions** relating to district and communal heating in Scotland:

- To achieve **1.5 TWh** of Scotland's heat demand to be delivered by district or communal heating by **2020**
- To have **40,000** homes connected by **2020**.

Estimates suggest that there were **almost 30,000** homes connected to **district or communal heating networks** in Scotland at the end of **2018** meaning that Scotland is approximately three quarters of the way towards reaching 40,000 homes connected to heat networks. In terms of new connections, the data up to end of December 2018 included 35 additional networks compared to December 2017. Together these 'new' networks supplied approximately **1,250 more homes** than **2017**.

An estimated **1.18 TWh** of heat and cooling demand is supplied via **heat networks**, equivalent to 79% of the 1.5 TWh ambition.

It is worth noting that these data are experimental statistics, and will continue to improve in quality in time. There are issues with some networks not providing supply figures and others giving figures which appear to be unreasonable. While efforts have been made to correct these figures, the data should be treated as broad estimates at this stage.

District heat networks Scotland, 2018

Domestic
customers
connected to a
network

29,647

2020 Ambition:
40,000

Total heat
and cooling
supplied
through
networks (GWh)

1,178

2020 Ambition:
1,500

Source: BEIS





Energy Efficiency

“We will continue to take direct and supporting actions to improve the use and management of energy in Scotland’s homes, buildings, industrial processes and manufacturing”

What do we mean by **energy efficiency**?



Energy use underpins activity across all sectors in Scotland - business, domestic and public. It is also responsible for the major share of Scotland's greenhouse gas emissions, which contribute to climate change. By maximising the output from Scotland's energy inputs, energy efficiency offers a way to curb energy consumption without limiting growth and hence to reduce emissions whilst still growing the Scottish economy.

The following section looks at two key metrics for energy efficiency:

- **Demand reduction**, and this is in terms of electricity, heat and transport, and across the domestic and non-domestic sectors.
- Specific **energy efficiency measures** designed to **retain heat** in buildings, for example insulation and boiler improvements.



How much **energy** does Scotland **consume** and how has it changed?



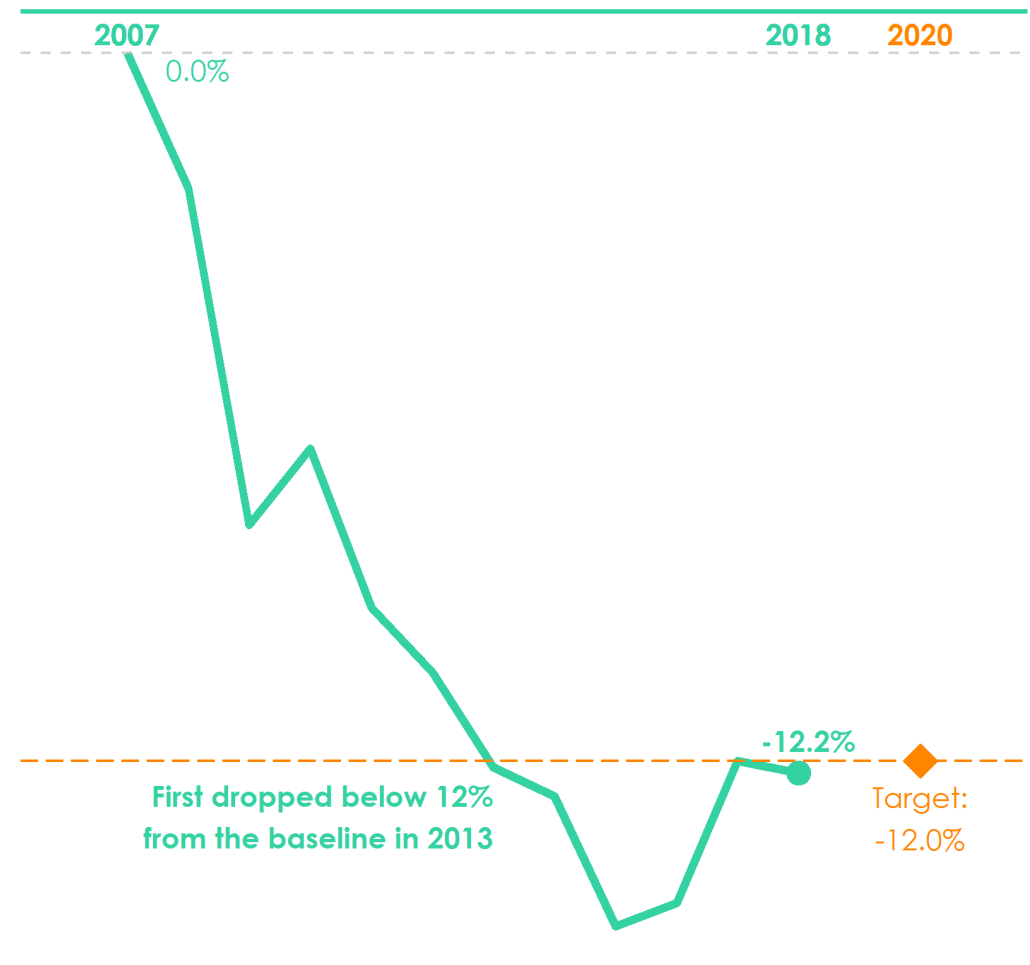
The previous **energy consumption target** published in the [Conserve and Save: Energy Efficiency Action Plan](#) in October 2010 was to reduce Scottish final energy consumption by **12%** by **2020** from a 2005 to 2007 baseline (169,588 GWh). Scotland met the target in **2013**, seven years early, and reached a record low of energy consumption in **2015**, **14.8%** below the 2005-07 baseline. Energy efficiency, the impact of the economic cycles, prevalent energy price rises and weather patterns have all played a role in reducing overall energy consumption by over **25,000 GWh** from **2005** to **2015**.

However, in recent years, 2017 in particular, Scotland's energy consumption **increased** – in **2018 up** by **3.1%** on **2015**. This mirrors trends witnessed across Europe, where energy consumption increased between 2016 and 2017 in most countries. In **2018**, total final energy consumption was **12.2% lower** than the **2005-07 baseline**. Scotland remains within the target to reduce consumption by 12% by 2020.

This section takes a closer look at consumption patterns over time in different sectors.

Final energy consumption against 2005-07 baseline

Scotland, 2005-07 - 2018



Source: BEIS



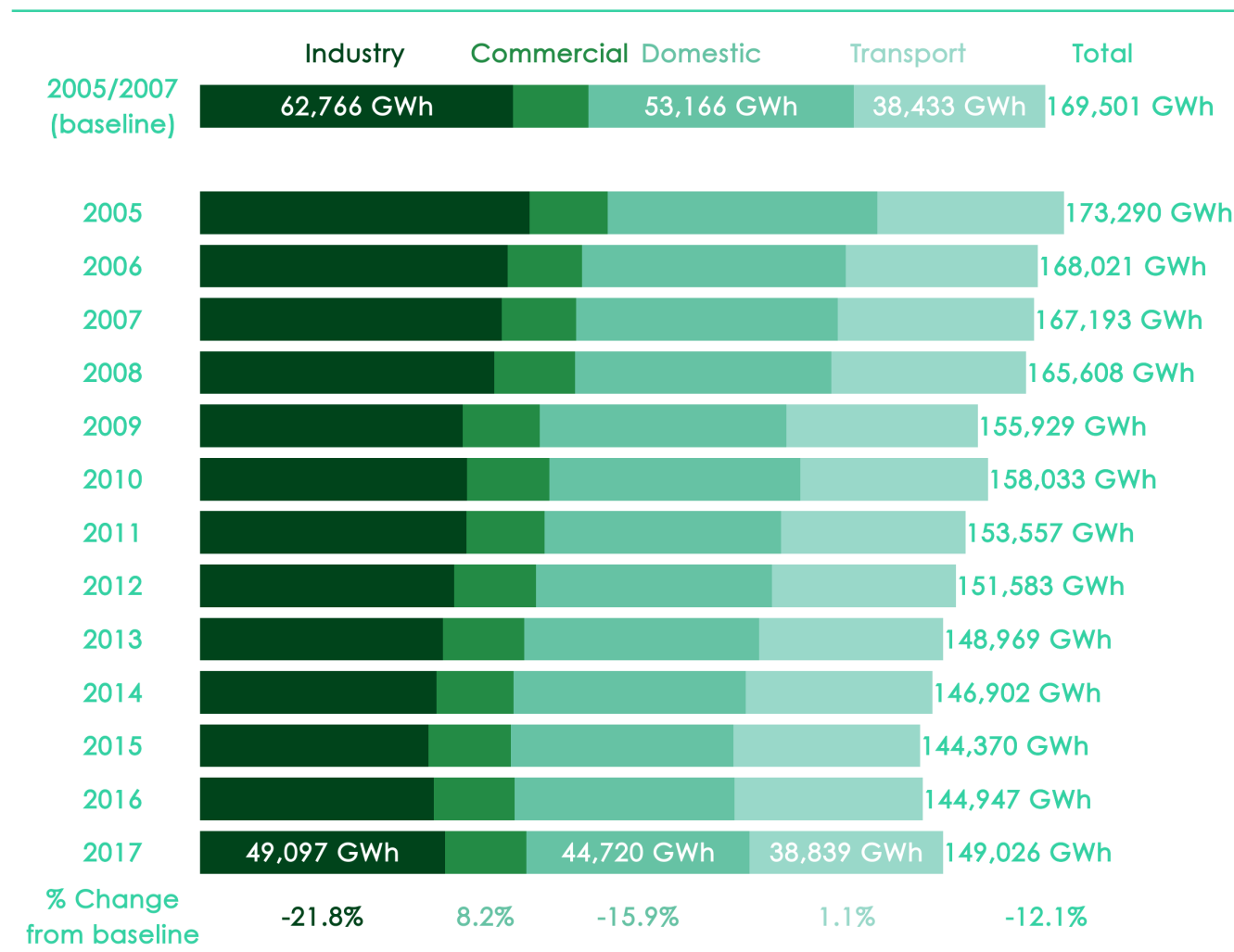
How has Scotland's energy consumption changed by sector?



It is possible to break down the reduction of Scotland's total energy consumption by **sector**, although the most recent data for this refers to **2017** when consumption was **12.1%** lower than the 2005-07 baseline.

- Energy consumption in **industry** makes up approximately a third of all Scottish consumption (**49.1 TWh**). This is a **21.8% reduction** from the 2005-07 baseline, but is a rise of **4.9%** on **2016**.
- Energy consumption in the **domestic sector** is next largest at **44.7 TWh**. This is a **decrease** of **15.9%** from **2005-07**, which may reflect improvements in energy efficiency in the domestic building stock in this time.
- Consumption in the **commercial sector** **rose** by **8.2%** from the baseline to **16.4 TWh** in **2017**. Energy consumption in **transport** also **rose** in this period, up **1.1%**.

Total final energy consumption by consuming sector Scotland, 2005 - 2017



Source: BEIS



How has Scotland's electricity consumption changed?



Electricity consumption declined steadily in Scotland compared to the 2005-07 baseline, down by **17.4%**. The difference in electricity used in 2005-07 and 2017 (5,103 GWh) the equivalent of more than half of the electricity used by Scottish households in 2017. This drop in electricity consumption is more pronounced in the **domestic** sector (**20.4%**) than the **non-domestic** sector (**15.3%**).

In recent years, electricity consumption in Scotland has **stabilised**, registering a small **increase** of **0.2%** from **2017** to **2018**. This increase is concentrated in the **non-domestic sector**, where consumption **increased** by **2.6%**, whereas it **decreased** by **3.2%** in the **domestic** sector.

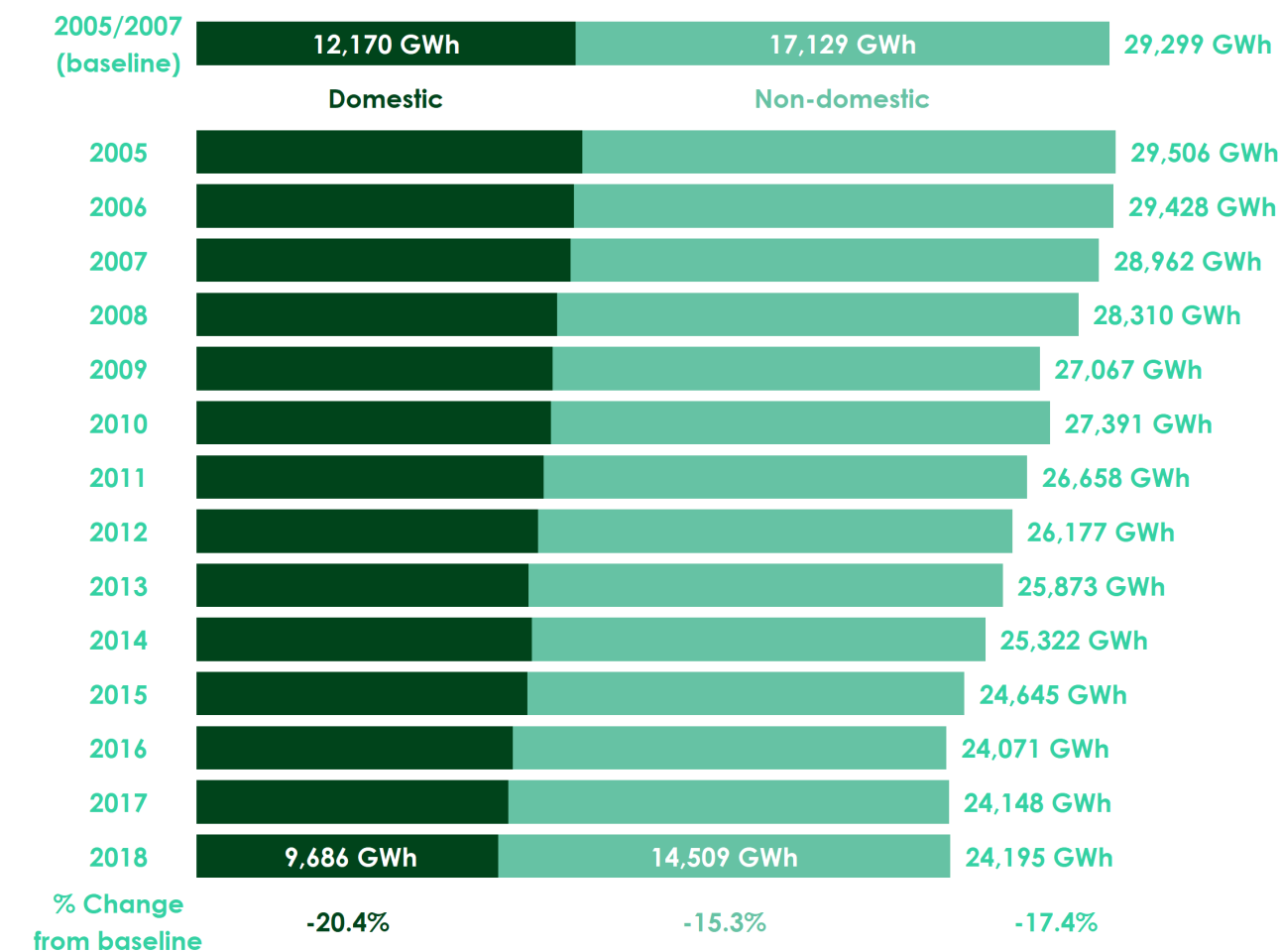
Average electricity

consumption per household in Scotland is **3,910 kWh**, **down** by **26.2%** on **2005-07**.

Average electricity consumption by household is significantly higher in the islands, because households are predominantly off the gas grid and therefore more likely to use electricity to heat their homes.

Total electricity consumption by sector

Scotland, 2005 - 2018



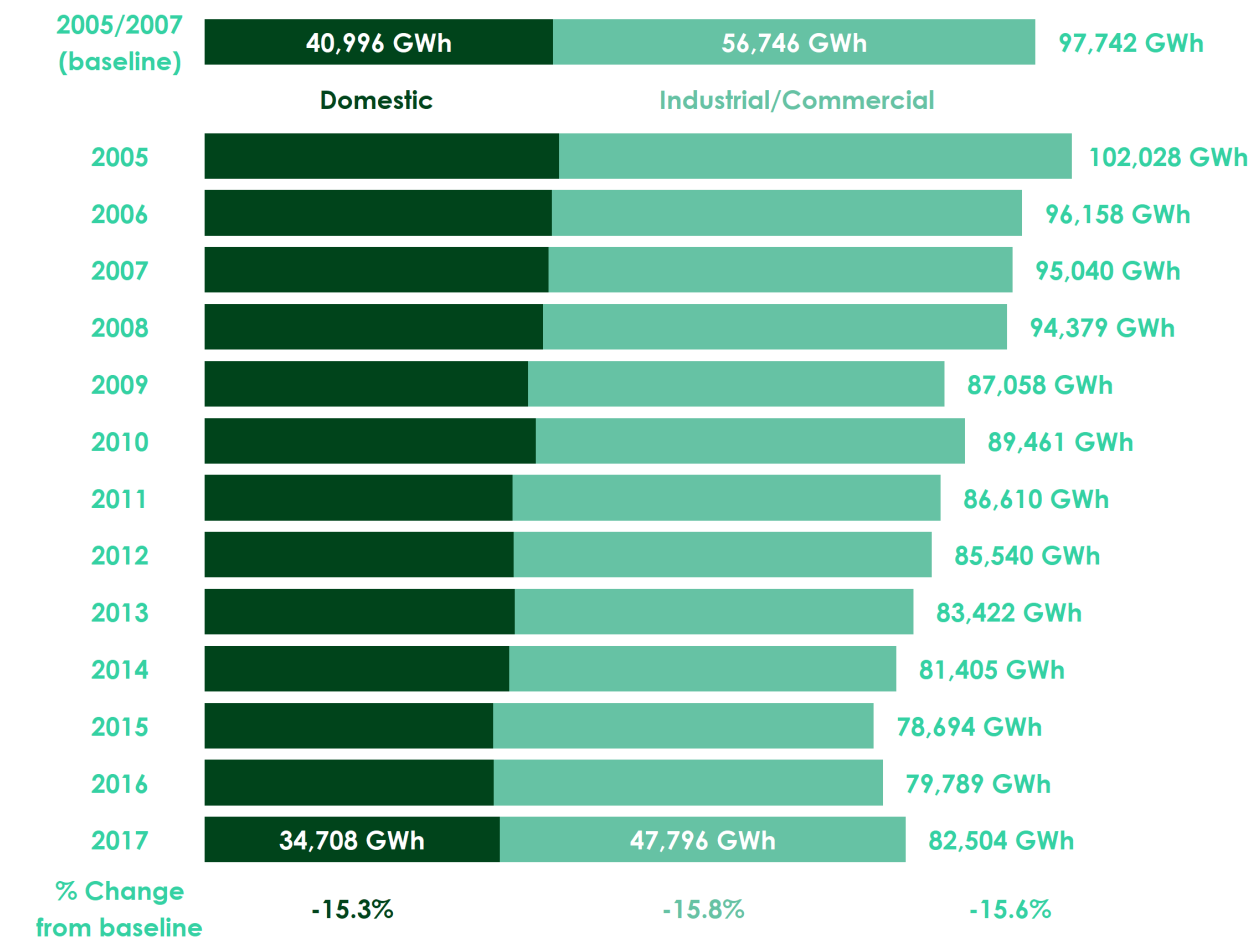
Source: BEIS



How has Scotland's heat consumption changed?

Non-electrical heat demand by sector

Scotland, 2005 - 2017



Source: BEIS

Reducing heat demand is a key priority identified in the [Scottish Government Heat Policy Statement](#) published in 2015.

Non-electrical **heat demand** follows a similar pattern to electricity; consumption steadily **declined, dropping** by **15.6%** from **2005 -07** to **2017**. This decline may be a result of improved energy efficiency, improvements in the building stock, rising gas prices and rising temperatures.

There is an aim published in the [Climate Change Plan](#) to **reduce domestic** heat demand by **15%** and **non-domestic** heat demand by **20%** between **2015** and **2032**. However, non-electrical heat demand **increased** from **2015**, up by **4.8%**, more so in the **non-domestic** (**6.7%** increase) than the **domestic** sector (**2.3%** increase). This may be explained by lower gas and oil prices and unseasonal weather conditions.



How has Scotland's gas consumption changed?

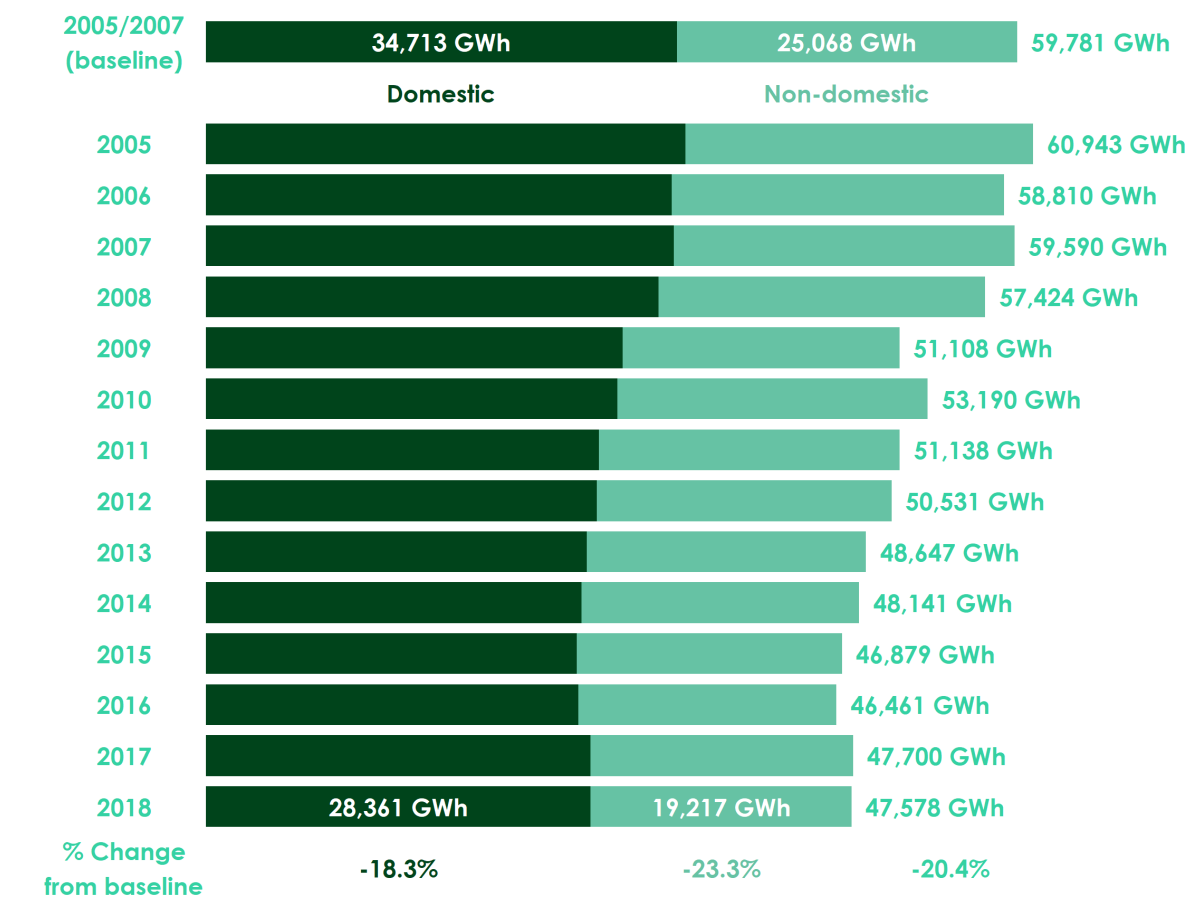
For **gas** specifically, consumption dropped by **20.4%** overall from **2005-07** to **2018**. The saving in gas consumption between 2005 and 2018 is the equivalent of almost half of the annual gas use in Scottish homes. Reduction in gas demand compared to 2005 is greater in the **non-domestic** sector (**23.3%** reduction) than the **domestic** sector (**18.3%** reduction).

The **average gas consumption per household** dropped by **30.2%** from **2005-07** to **2018**. In this period, the number of households increased by 8.9%, which illustrates the role that energy efficiency measures and improvements in the building stock made in reducing gas demand.

Despite the longer term decrease in gas consumption, it has **stabilised** in **recent years**. In **2018**, gas use is **2.4% greater** than its **lowest point** in **2016**. Falling gas prices may have played a role in this.

Average domestic gas consumption per household in **2018** is **13,522 kWh**, **down** by **30.2%** on **2005-07**, and **down** by **1.5%** on **2017**. Average gas consumption by household differs by **local authority**, ranging from **10,803 kWh** in the **Western Isles** to **18,074 kWh** in **East Renfrewshire**.

Total gas consumption by sector Scotland, 2005 - 2018



Source: BEIS

How has Scotland's **consumption** in the **transport** sector **changed**?



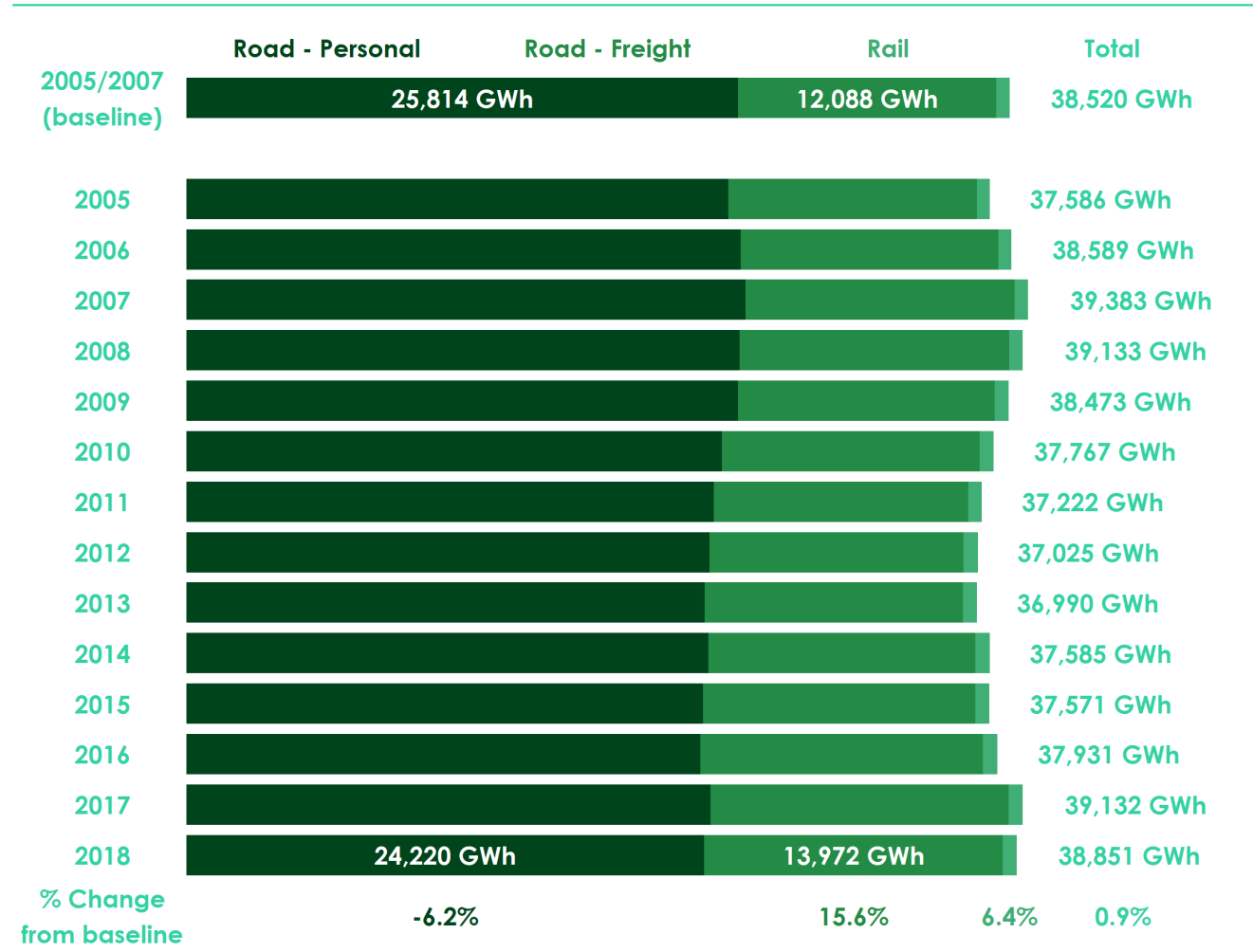
While consumption in all other sectors declined since the 2005-07 baseline, it has **increased** slightly in the **transport** sector, up by **0.9%** to **38,851 GWh** in **2018**.

The **composition** of Scottish transport energy consumption has changed over time:

- Consumption of fuel for **personal road transport** (buses, cars, motorcycles) has **decreased** by **6.2%**. Conversely **freight** has **increased** by **15.6%**.
- Consumption from **diesel** cars has **increased** by **64.7%**, whereas consumption from **petrol** vehicles **dropped** by **34.4%**
- Energy consumption from **buses** **decreased** by **23.8%** including a **14.2% drop** on **2017**. Fuel consumption in **rail** **rose** by **6.4%** from the baseline.

Road and rail energy consumption

Scotland, 2005 - 2018



Source: BEIS



How energy efficient are dwellings in Scotland?

Energy efficiency levels in the Scottish housing stock are monitored using the Standard Assessment Procedure (SAP) and expressed as an Energy Efficiency Rating (EER). These ratings are banded from A to G, where A is a very efficient dwelling and G denotes a low energy efficiency dwelling.

The Scottish Government's [Energy Efficient Scotland: Routemap](#) sets an ambition for 'every Scottish home to achieve **at least a band C** in its Energy Performance Certificate (EPC) by **2040** (where technically feasible and cost effective).

The methodology to assess of the energy performance of a dwelling changed:

- SAP 2012 based on RdSAP (v9.93): This is based on the latest methodology introduced in November 2017 and only data for **2018** is available. Under this measure, more than four in ten (**43%**) Scottish homes were rated at least **EPC band C**.
- SAP 2012 based on RdSAP (v9.92): This allows for comparisons over a longer period. Under this measure **44%** of Scottish homes were rated as **EPC band C** or better in **2018**, similar to the previous year. However, it is up from **35%** in **2014**.

By way of comparison, **34%** of dwellings in **England** have an **EPC** rating of **C** or better according to the **2018 English Housing Survey** (RdSAP changed to version 9.93 halfway through data collection).

Distribution of housing stock by EPC band (based on SAP 2012 RdSAP v9.93)

Scotland, 2018



Source: SG

Proportion of domestic properties rated EPC band C or above

Scotland, 2014 - 2018



SAP 2012
RdSAP v9.92

2014

2018

Source: SG



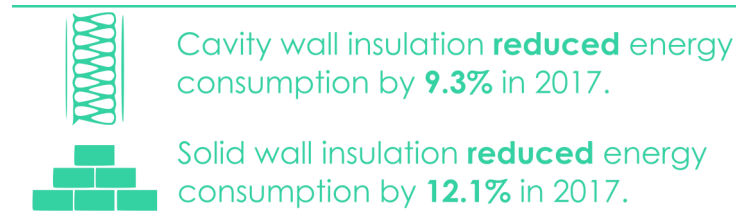
What impact does wall insulation have on energy efficiency?

Proportion of eligible homes with wall insulation

Scotland, 2007 - 2018



Source: SG



In **2018**, almost six out of every ten dwellings (**59%**) had some form of **wall insulation**. This comes close to meeting the aim in Scottish Government's [Climate Change Plan](#) that **60%** of walls will be insulated by **2020**. The proportion of dwelling with wall insulation is similar to 2017, but the longer term trend shows an increase (**42%** in **2007**). Levels of wall insulation remain higher in the **social** sector at **70%** compared with **55%** in the **private** sector.

There is a big difference between cavity and solid wall dwellings, however; **73%** of cavity wall dwellings have **cavity wall insulation** whereas just **19%** of solid wall dwellings have **solid wall insulation** in **2018**. Both types of insulation have seen longer term improvements but are unchanged on last year.

Between the **CERT** and **ECO** schemes, there were around **387,000 wall insulation measures** installed by the end of **2018** - approximately **318,000 cavity wall** insulation measures and **69,000 solid wall** measures.

We can look at the **impact** of wall insulation in terms of energy consumption and cost savings using BEIS' impact of measures analysis. It looks at savings between the years 2016 and 2018 where wall insulation has been installed in 2017. **Cavity wall insulation** saved Scottish homes an average of **1,300 kWh** or **9.3%** of **energy consumption** and **solid wall insulation** saved **1,900 kWh** or **12.1%** of **energy consumption**.



What impact does loft insulation have on energy efficiency?

Loft insulation improved rapidly over the last few years. In **2018**, **94%** of Scottish homes were **insulated to 100mm or more**. This is unchanged from 2017, but up from **73%** in **2007**. This can largely be attributed to the installation of top-up insulation in the early 2010s.

More than three-fifths (**62%**) of dwellings have loft **insulation of 200mm or more** in **2018**, a substantial rise from **18%** in **2007**. This is still short of the aim in Scottish Government's [Climate Change Plan](#) that **70%** of lofts in the residential sector will have at least **200 mm** of insulation by **2020**.

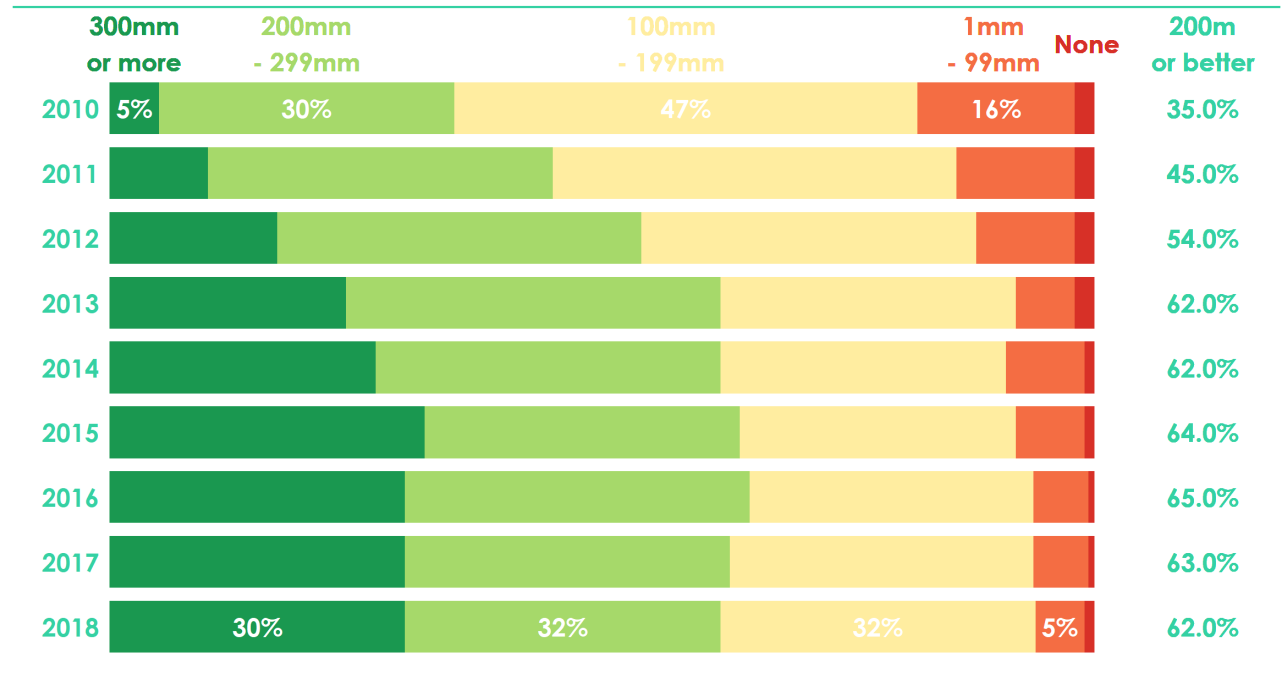
30% of lofts were insulated to a high standard of insulation (**300 mm** or more), outlining scope for improvement to the highest level. This proportion has remained about this level since 2015, following year on year increases from **5%** in **2010**.

By **2018**, **government schemes** (CERT and ECO) delivered around **480,000** loft insulation measures in Scotland.

The **impact** of loft insulation in terms of energy saving is not as great as wall insulation; the average **saving** in 2017 for Scottish homes was **200 kWh**, or **1.7%** of energy consumption.

Proportion of homes with loft insulation, by thickness

Scotland, 2010 - 2018



Source: SG



Loft insulation **reduced** energy consumption by **1.7%** in 2017.



What impact do **boilers** have on energy efficiency?

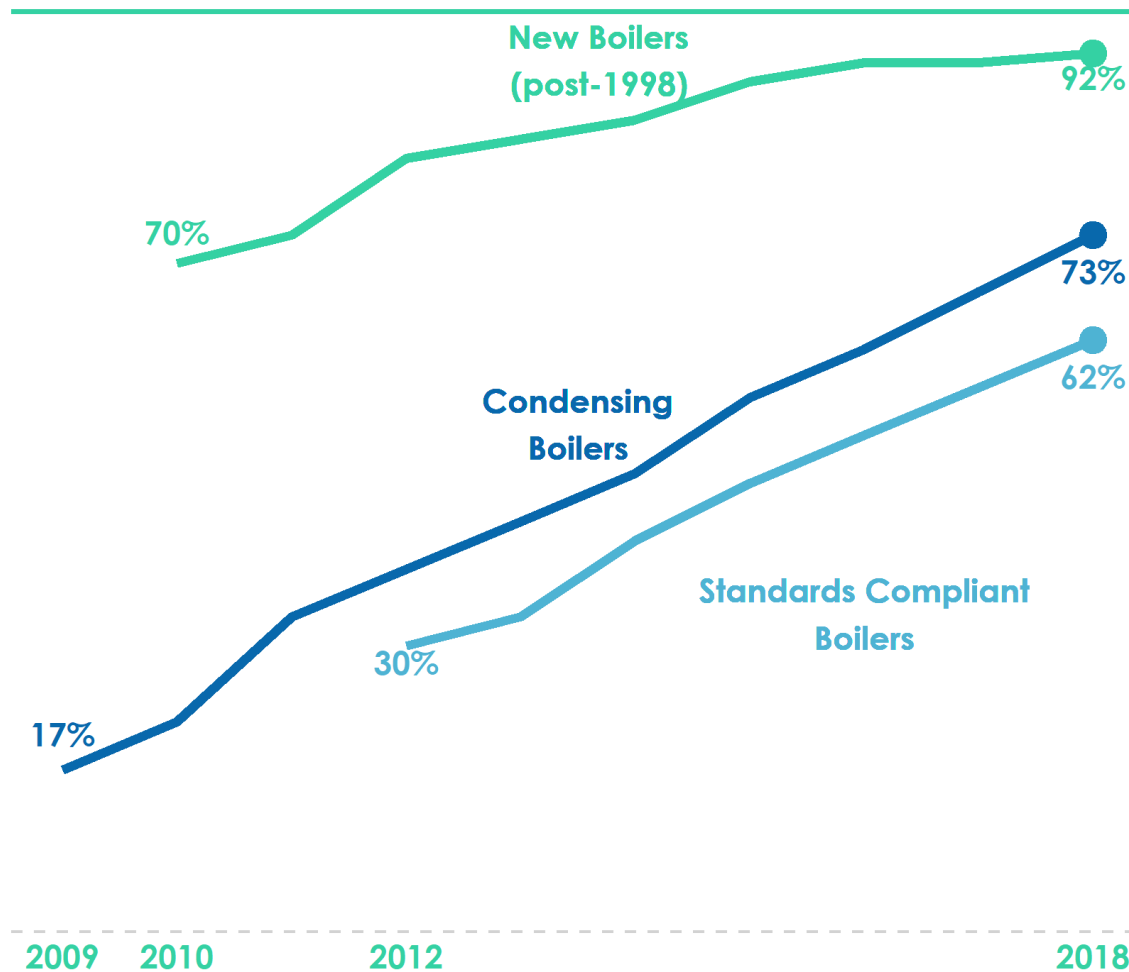


Boilers in Scottish homes have been improving rapidly as well. In **2018**, more than seven in ten (**73%**) dwellings had a **condensing boiler** and more than six in ten (**62%**) had a boiler that met the minimum efficiencies specified by the current **Building Standards**. The proportion of homes with these boiler types increased on **2017** (**67%** and **57%** respectively).

Average **savings** for installation of condensing boilers in Scottish homes are **1,000 kWh** or **7.4%** of energy consumption.

It is worth noting that all of these energy efficiency savings do not take into consideration the “**rebound effect**”. This is where savings achieved through energy efficiency may be minimised by resulting changes in behaviour. For example, as a consequence of getting a new boiler, people may use it more often, and may increase their heat demand.

Proportion of homes with boiler improvements Scotland, 2009 - 2018



Source: SG



Boiler improvements **reduced** energy consumption by **7.4%** in 2017.



Annual Compendium of Scottish Energy Statistics 2020



Consumer Engagement and Protection

“We will work hard to protect consumers from excessive or avoidable costs, and promote the benefits of smarter domestic energy applications and systems”



Consumer engagement and protection is about placing the **emphasis** on the Scottish **consumer** and ensuring that they have a **fair deal**. To this end, it is important that consumers are informed, engaged and empowered, and that all consumers have equal access to make changes to the way they consume energy if they so desire. This will be increasingly important as the energy sector continues to evolve. To this end, in May 2019, Scottish Government issued its [Energy Consumer Action Plan](#), which sets out a commitment to ensure consumers are at the heart of Scotland's energy transition.

This section focuses on the following areas:

- **Energy prices** and **fuel poverty**
- **Consumer choice** and **switching**
- **Monitoring energy usage** and **smart metering**

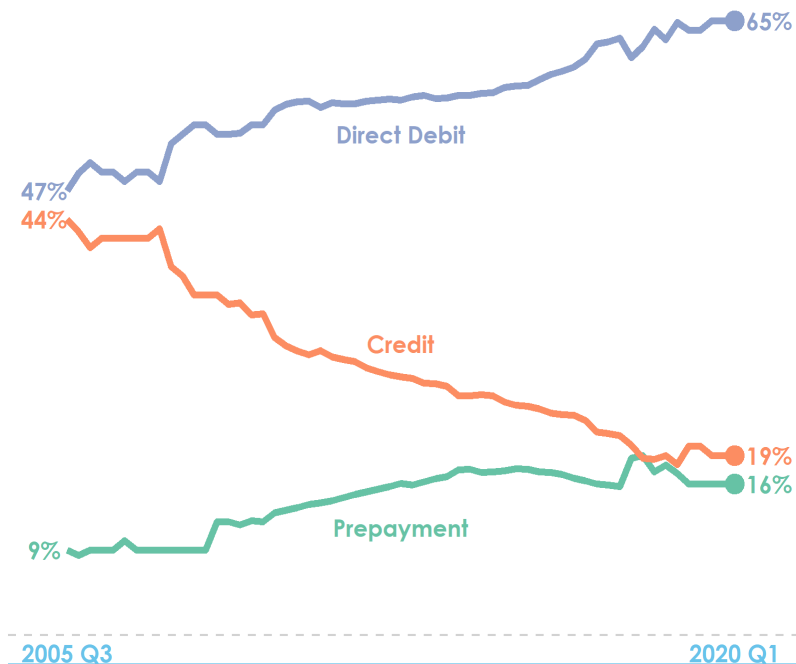


How do Scottish consumers pay their energy bills?

The way in which customers **pay** their energy bills may be able to tell us something about engagement and vulnerability of customers. The **majority** of customers in Scotland pay by **direct debit** for electricity and gas, and this has gradually risen from **44%** in **September 2005** to **64%** in **March 2020** for standard **electricity**, and from **47%** to **65%** for **gas**. Customers paying by **credit**, that is paying on receipt of their bill, has declined in the same period, from **36%** to **18%** for **electricity** and **44%** to **19%** for **gas**.

Proportion of payment methods used for gas bills

Scotland, 2005 Q3 - 2020 Q1



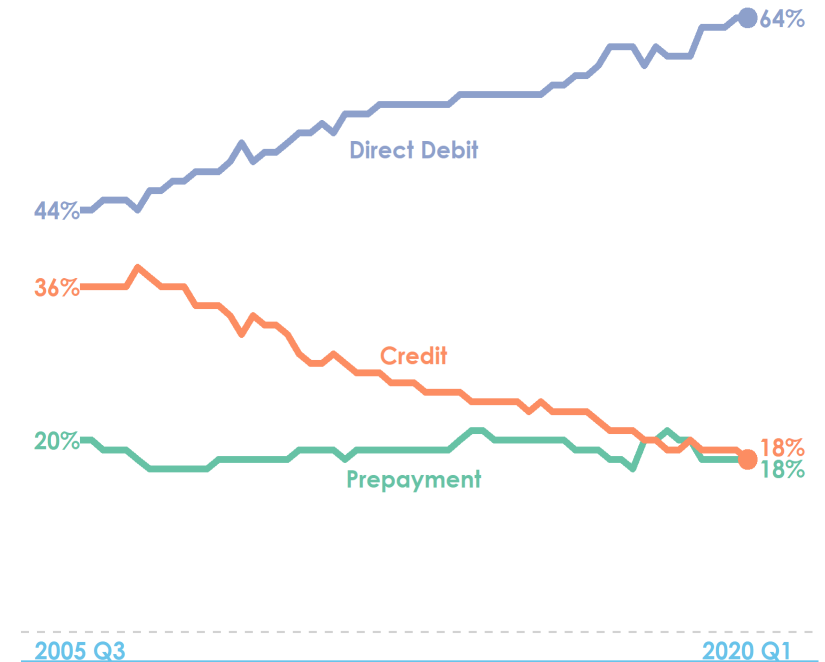
Source: BEIS

Prepayment requires the customer to make an advance payment before the fuel can be used. Prepayment customers tend to be more likely to be in **vulnerable**

circumstances than customers who pay for their energy through other means. The proportion of Scottish **prepayment** customers for electricity **stabilised** at approximately **20%** since 2005, suggesting that prepayment customers do not tend to move to other payment methods. For **gas** it rose from **9%** in **September 2005** to **16%** in **March 2020**. The overall trend for gas indicates that credit customers have been moving to direct debit and prepayment.

Proportion of payment methods used for electricity bills

Scotland, 2005 Q3 - 2020 Q1



Source: BEIS



How have electricity prices for Scottish consumers changed?

Electricity prices have **risen** substantially in real terms for all Scottish consumers compared to the **early 2000s**, with direct debit customer prices increasing by over 75% from its lowest point in 2003. This is even though electricity demand decreased substantially from this point to the present day.

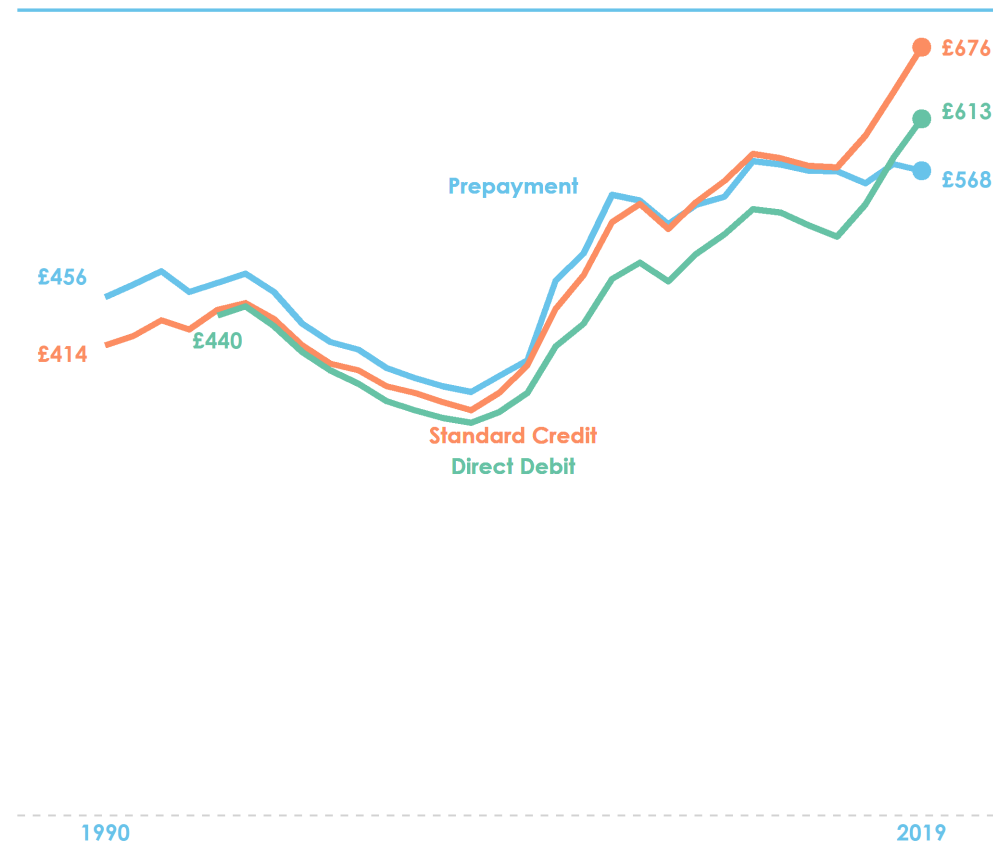
Prices had **stabilised**, however, in **2019** they **increased** each year for the last three years for **direct debit** (up **20.3%** in real terms from **2016**) and **standard credit** consumers (up **18.6%** from **2016**). Prices for **prepayment** customers remained **steady** in this period; this may be a result of [Ofgem's prepayment price cap](#) that came into force in April 2017. As such, **prepayment** customers now pay on average the **lowest electricity bills** in Scotland, **16.1% lower** (based on 2010 prices) less than **standard credit** customers who pay the most.

There are substantial differences in electricity prices between North and South Scotland* – overall, **North Scotland** residents are paying on average **6.0%** a year **more** than **South Scotland** residents, and pay the highest electricity bills of all regions in the UK. This is likely to be a result of greater costs distributing electricity to remote parts of Northern Scotland. Electricity bills for **South Scotland** residents tend to be **similar** to the **UK** as a whole.

*North and South Scotland refer to the Public Electricity Suppliers (PES) regions. South Scotland includes the central belt

Average annual domestic standard electricity bills in Scotland (based on 2010 prices)

Scotland, 1990 - 2019



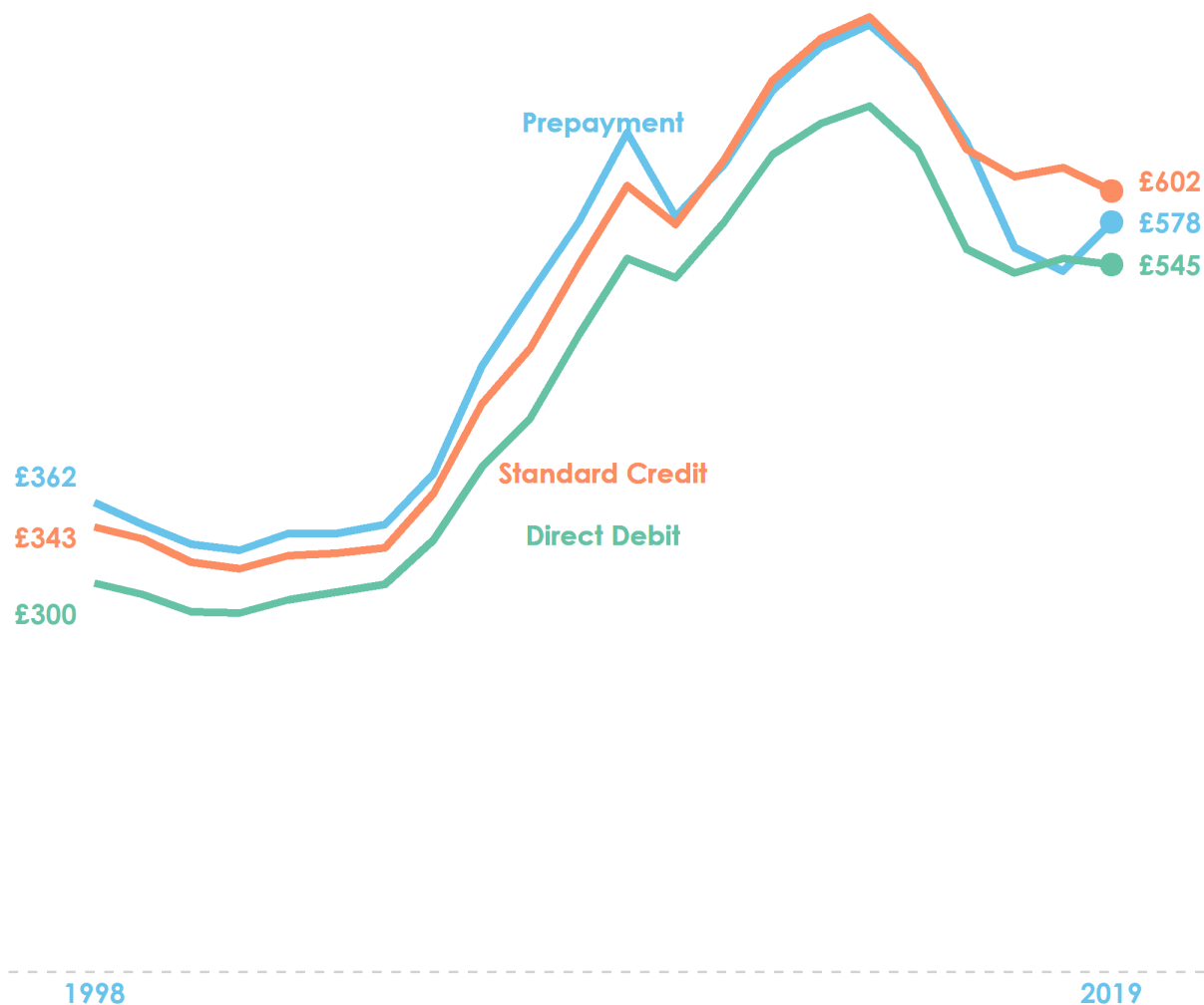
Source: BEIS



How have gas prices for Scottish consumers changed?

Average annual domestic standard gas bills in Scotland (based on 2010 prices)

Scotland, 1998 - 2019



Like with electricity, average domestic gas prices **increased** in real terms compared to their **lowest point in 2001**; **direct debit** and **standard credit** customers' bills almost **doubled**, and **prepayment** customers increased by **78.4%**. The cost of gas rose at a faster rate than electricity. Scottish gas prices **peaked in 2014**, and by **2019 dropped** by approximately **20%** on this peak.

Direct debit customers have the **lowest** bills in **2019** and **standard credit** the **highest, 10.4% more**. Even though **standard credit** customers have the highest bills, they **dropped by 2.4%** from **2018** and **2019**. In the same period, **prepayment** customers **increased by 7.9%**.

Differences between bills in North and South Scotland are negligible, and both regions are marginally lower than the British total.

Source: BEIS

How many households in Scotland are in fuel poverty?

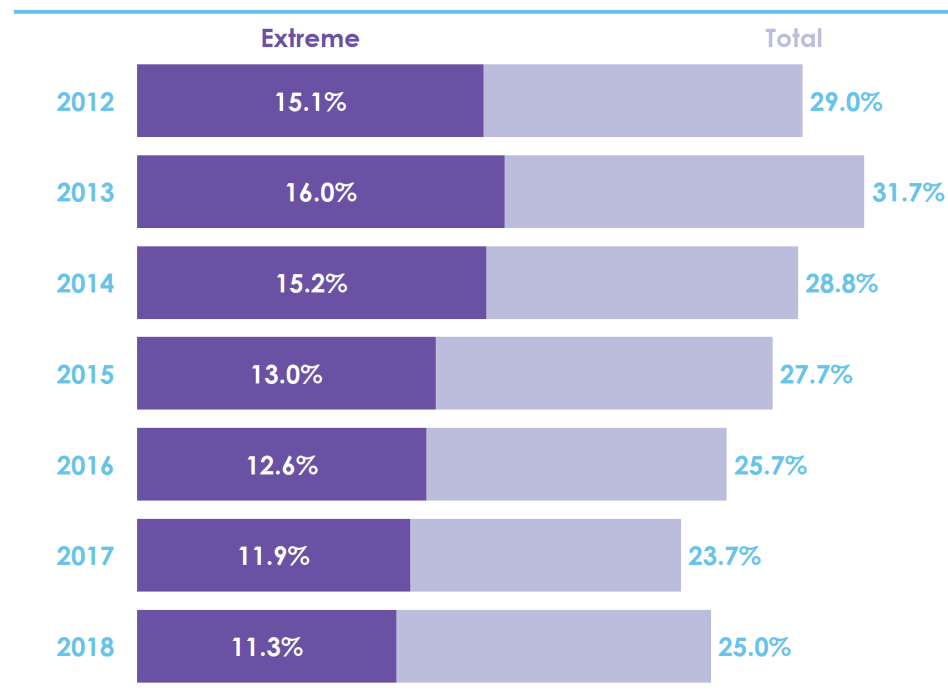
In July 2019 the [Fuel Poverty \(Targets, Definition and Strategy\) \(Scotland\) Act](#) received Royal Assent. This Act contains a new definition of **fuel poverty**: a household is in fuel poverty if, in order to maintain a satisfactory heating regime, total fuel costs necessary for the home are more than **10%** of the household's adjusted net **income** (after housing costs), and if after deducting fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living. **Extreme fuel poverty** follows the same definition except that a household would have to spend more than 20% of its adjusted net income (after housing costs) on total fuel costs and maintain a satisfactory heating regime.

In **2018, 25.0%** of households were estimated to be in fuel poverty, a similar level to **2017**. The 2018 fuel poverty rate is likely to reflect changes in fuel prices, income and energy efficiency. **11.3%** were living in **extreme fuel poverty** in **2018**. The rate of extreme fuel poverty has been **decreasing** since **2013 (16.0%)** and is the lowest rate recorded by the survey since 2012.

Households who have **gas** as their primary fuel type are significantly less likely to be in fuel poverty. Just **23%** of gas households are in fuel poverty, whereas **43%** of households that use **electric** heating are fuel poor.

Energy efficiency of homes is closely linked with fuel poverty; just **19%** of households with an **EPC band** of **B or C** are fuel poor, compared to **29%** at **band D**, **31%** at **band E** and **35%** at **bands F or G**. The Energy Efficient Scotland Routemap sets the aim for all homes with households in fuel poverty to reach EPC C by 2030 and EPC B by 2040 (where technically feasible and cost effective). A third (**34%**) of **fuel poor households** currently have **at least EPC band C**.

Rates of fuel poverty and extreme fuel poverty Scotland, 2012 - 2018



Source: SG

Are Scottish consumers switching energy suppliers?



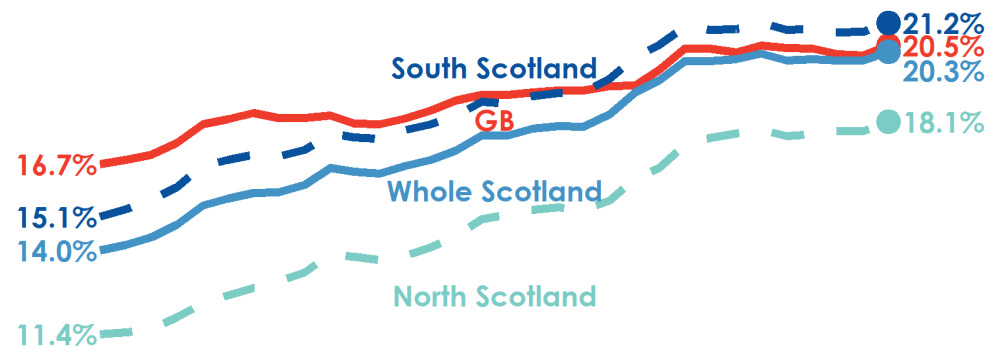
In the last ten years, the number of electricity and gas suppliers in the Scottish market increased substantially, meaning that consumers have greater choice of supplier. However, the **largest six suppliers** – Scottish Power, SSE, British Gas, E.ON, npower and EDF – still collectively dominate the market. They supply electricity and gas to **80.1% in North Scotland** and **74.6% in South Scotland**. Based on market shares, Ofgem classify other suppliers into medium and small – South Scotland have a higher share of both than North Scotland.

However, switching of energy suppliers is growing in Scotland. Between January and **December 2019**, switching rate for electricity and gas in Scotland was **20.3%**, a steady increase from **14.0%** in the twelve months ending **May 2017**. The switching rate is now on par with **Britain** as a whole (**20.5%**), whereas back in **May 2017**, switching was **2.7 percentage points higher** in GB. Switching is consistently higher in **South Scotland** (**21.2%** in the twelve months ending December 2019) than **North Scotland** (**18.1%**).

Even though the proportion of Scottish consumers switching is matching GB levels, there remains a third (**33%**) of consumers in Scotland who have **never switched electricity** or **gas** supplier according to [Ofgem's 2019 Consumer Engagement Survey](#). This is higher than **27%** in **Britain** as a whole.

Proportion of customers who have switched energy supplier (gas and electricity combined, rolling 12 months)

Scotland, May 2017 - Dec 2019



May 2017

December 2019

Source: Xoserve, Ofgem



How much do Scottish consumers **monitor** their **energy use**?

Scottish consumers have been **increasingly monitoring** their **energy usage** in the last ten years. According to the [Scottish House Condition Survey](#), the proportion that say they **closely monitor** their **energy usage** has **increased** from **44%** in **2008** to **58%** in **2018**.

The UK Government required supply companies to offer **smart meters** to their customers to enable them to monitor their energy usage. Data from Electralink suggests that as of **June 2020**, **1.1 million** smart meters were installed in Scotland, representing **39.2%** of all meters in Scotland. This is up from **9.7%** in **November 2016**. Smart meter installations slowed since March 2020 as a result of the covid-19 lockdown, but showed signs of picking up in June as a result of easing of lockdown restrictions.

Greater progress has been made in the smart meter rollout in South Scotland compared to North Scotland – **43.3%** of all **South Scotland** meters have been installed compared to **28.3%** in **North Scotland**. This may be a consequence of the fact that North Scotland is more sparsely populated than South Scotland, meaning that installing a large number of meters in North Scotland is more challenging.

There is evidence to suggest that having a smart meter can make consumers **more aware** of their **energy use** and make energy saving changes as a consequence. According to [Ofgem's Consumer Engagement Survey](#), of Scottish consumers that have a smart meter, almost six in ten (**58%**) say they **monitor their energy use more closely** and they encourage others in the household to **use less energy**.

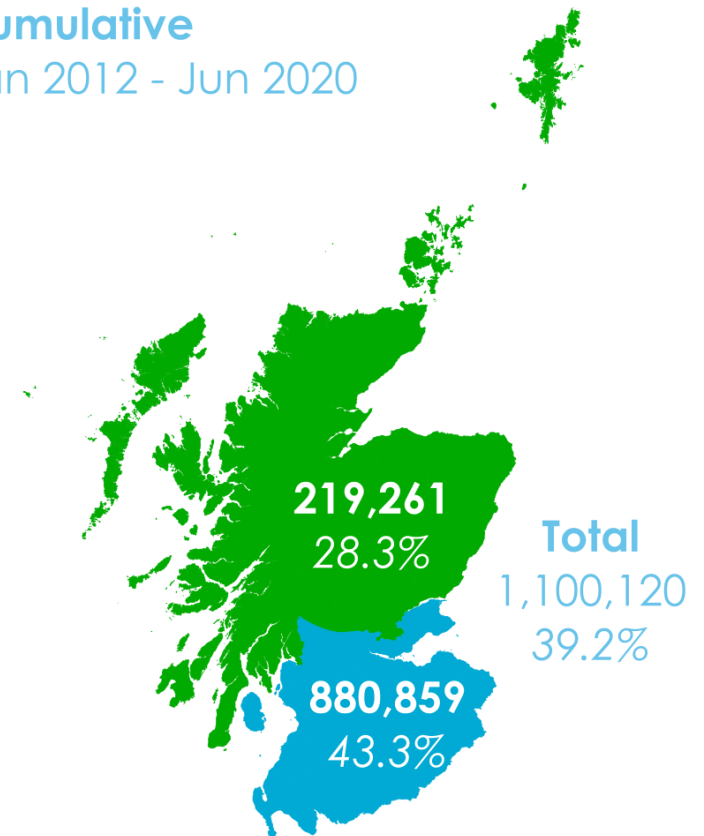
Smart Meter Installations



Smart meter installations Scotland

Cumulative

Jan 2012 - Jun 2020



Source: BEIS





System Security and Flexibility

“Scotland should have the capacity, the connections, the flexibility and resilience necessary to maintain secure and reliable supplies of energy to all of our homes and businesses as our energy transition takes place”

What does **system security** and **flexibility** mean?



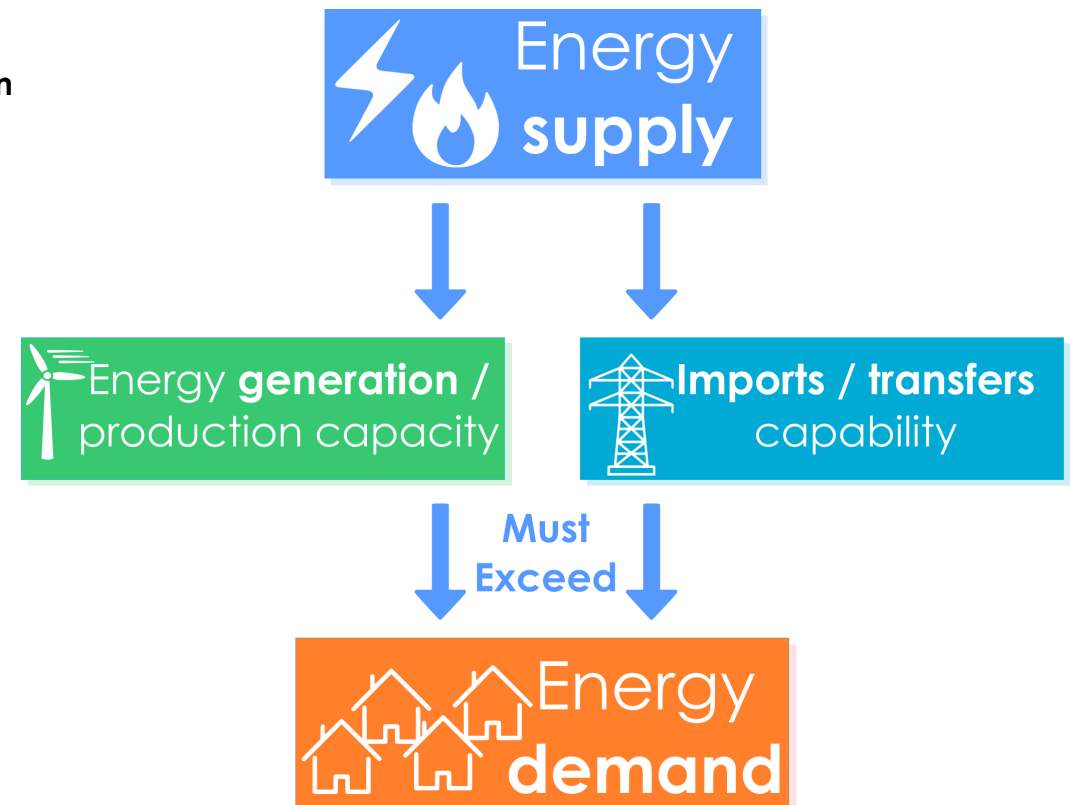
System **security** is having confidence in being able to **meet energy demand at all times** for both electricity and gas. Supply capability is a combination of domestic generation capability or production capacity and the capability of the networks to securely transfer energy into Scotland. In order for the system to remain secure, supply capability must be greater than demand.

Flexibility is about having **resources** which can be called on quickly in **response** to **changing conditions** by either an increase or decrease in their generation, production, demand or storage of energy.

The Energy Strategy looks at system security and flexibility **within Scotland** itself. For Scotland to be fully secure, **domestic generation** and energy **transferred** to and from the rest of Britain must **exceed** Scotland's **demand**.

This section focuses on the following areas:

- Scotland's **energy demand**
- Scotland's **total electricity capacity**
- How **supply** and **demand compare**
- The extent to which Scotland can **meet demand** via its **own generation**
- **Imports** and **exports**
- Scotland's **security** of supply for **gas**

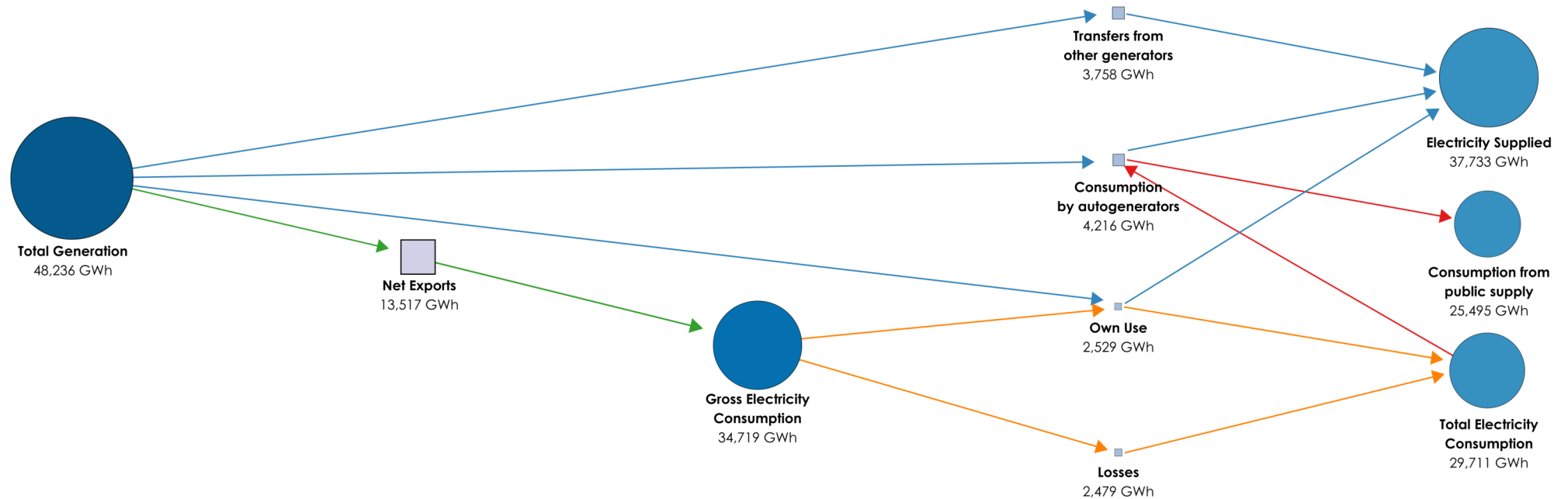


What does Scotland's electricity system look like?

Before looking at how Scotland's electricity system remains secure it's worth considering how it is comprised.

Electricity generation and supply

Scotland, 2018



Source: BEIS

In **2018**, Scotland **generated 48.2 TWh** of **electricity**. After electricity use for generators and transfers to the public supply, **37.7 TWh** of electricity was **supplied** by major power producers, the highest amount since 2015.

Consumption from public supply is **25.5 TWh** in Scotland in **2018**, which is the equivalent of just over half (**52.9%**) of the electricity Scotland **generated**. **6.7 TWh** of domestic generation is **consumed to generate electricity**, and **2.5 TWh** is lost through **transmission** and **distribution** networks. The remainder makes up Scotland's **net exports** to consumers elsewhere in the UK.



What does Scotland's energy demand look like?



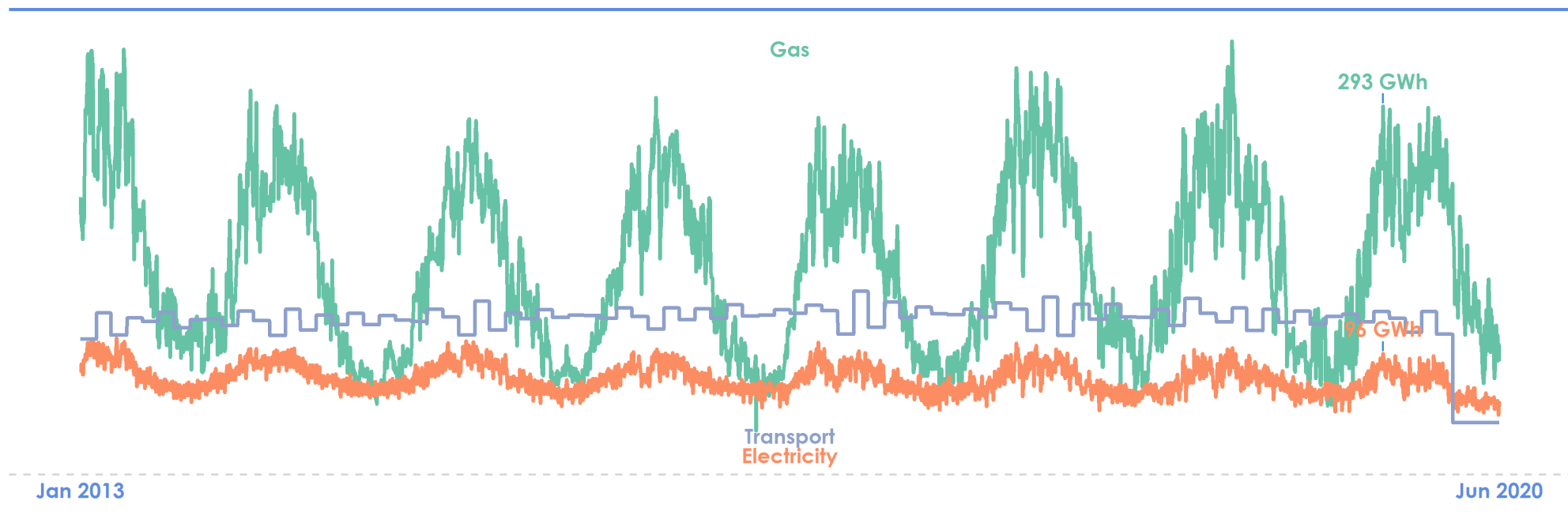
For energy supplies to remain secure, the system must be able to meet **demand** at **peak times**. Hence **seasonality** is key as demand is **higher** in the **winter** than the **summer**. The chart illustrates this, showing Scotland's energy use on a daily basis from 2013. It shows that **seasonal variations** in the demand for **electricity** are much **smaller** than they are for **gas**.

During the winter of 2019/20 **the peak daily demand** for gas was **293 GWh** (on 18th November 2019). This was more than **five times greater** than the minimum gas demand in summer 2019 (**55 GWh** on 3rd August 2019).

In 2019/20, **peak electricity daily demand** (**96 GWh**, also on the 18th November 2019) was **double** that of **minimum** demand (**50 GWh** on the 18th August 2019).

Energy use in Scotland per day

Scotland, Jan 2013 - Jun 2020



Source: Sheffield, National Grid, BEIS



What electricity **capacity** does Scotland have available?

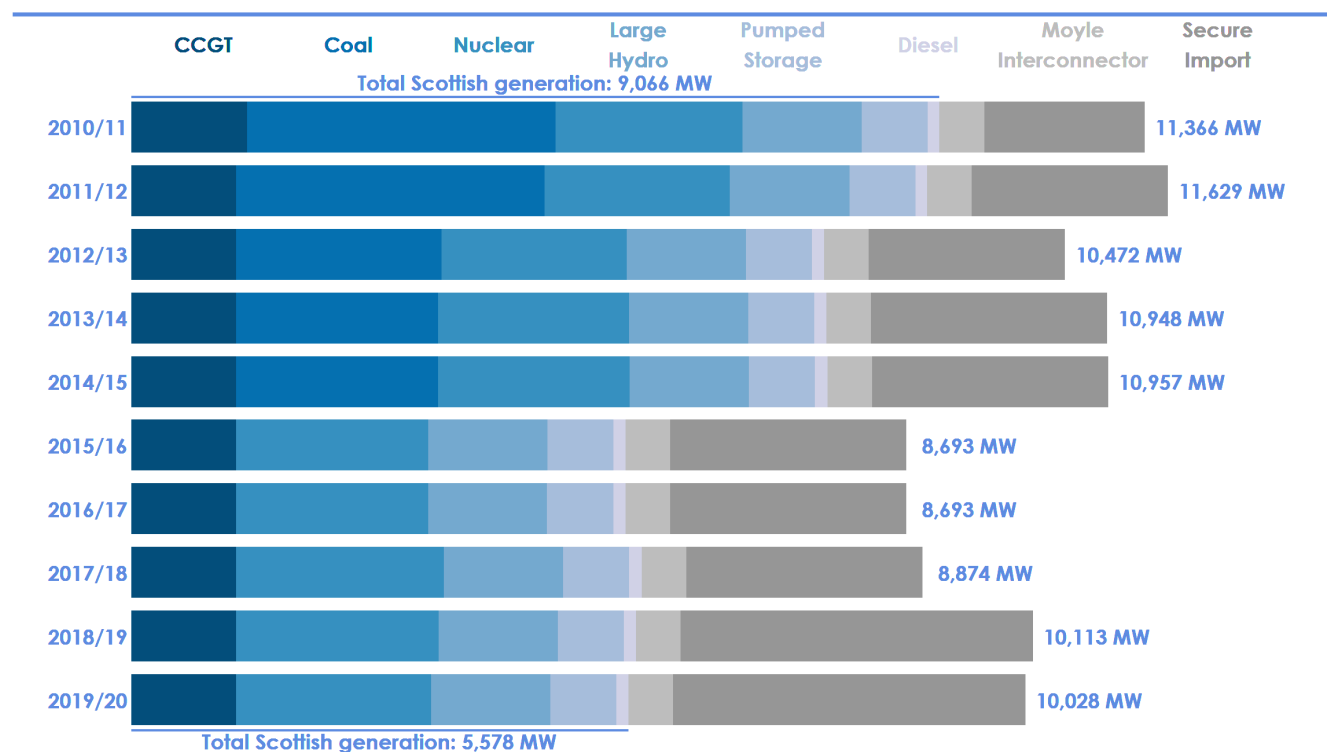


From a security of supply perspective, it is important to look at the supply capability of the system which can be relied on at times of high demand. As such, the analysis here excludes intermittent renewable generators including **wind** and **solar**.

Discounting these, Scotland had a maximum supply capacity of **10.0 GW** available in **2019/20**. This breaks down as **5.5 GW** of non-intermittent generation in Scotland and **4.5 GW** of import capability. The main sources of domestic generation capacity are: more than **2.2 GW** from **nuclear** (from Hunterston B and Torness), **1.3 GW** of **large hydro** plants, almost **1.2 GW** from **gas** (Peterhead) and **0.7 GW** of **pumped hydro** (Cruachan and Foyers). The **secure import capability** consists of **0.5 GW** of capacity available on the **Moyle interconnector** from Northern Ireland and **3.9 GW** of on transmission networks from **England and Wales**. This import capacity refers to what *could* still be safely imported following major faults on the electricity system.

Total maximum non-intermittent supply capacity by source

2010/11 - 2019/20



Source: BEIS, National Grid

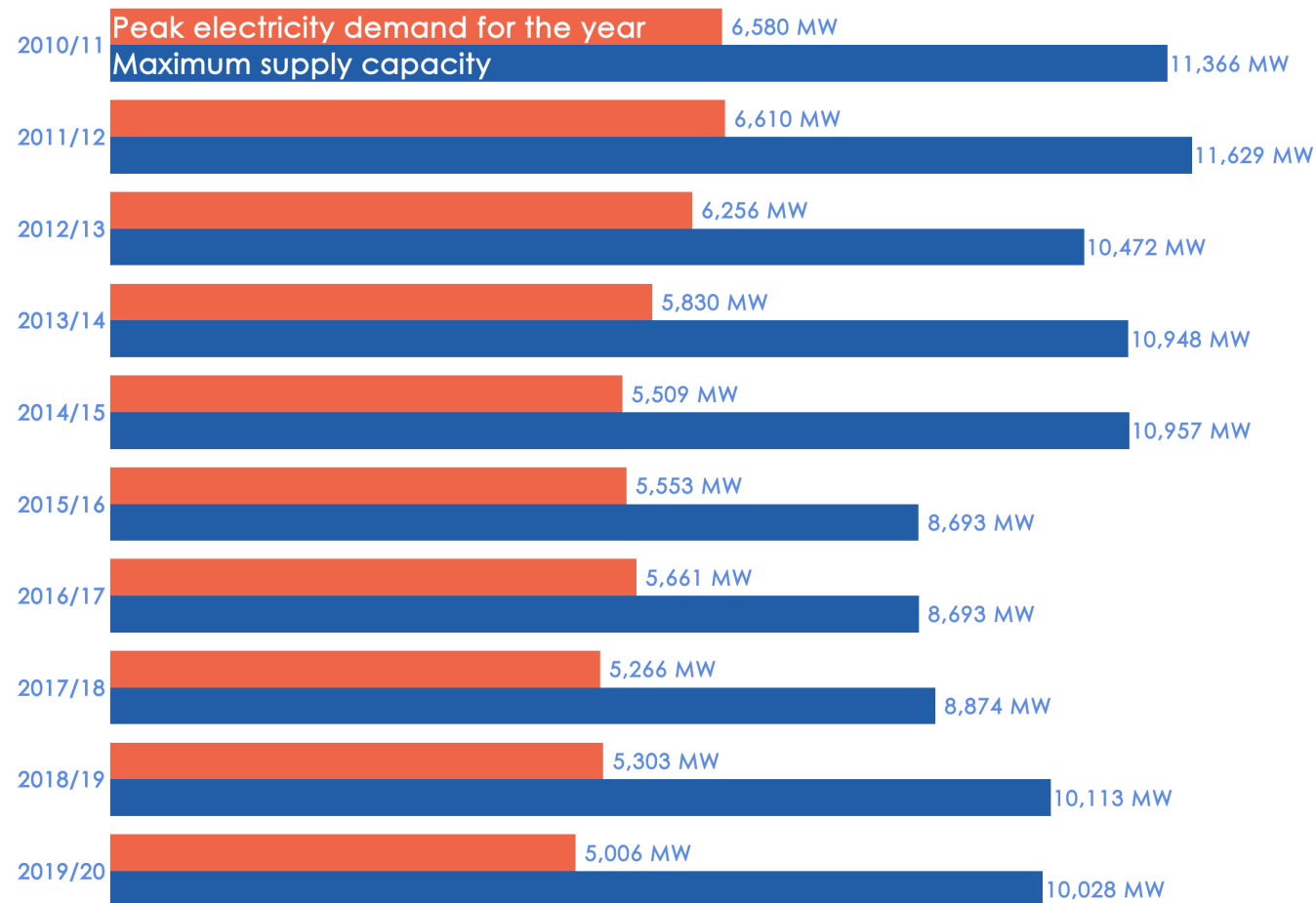




Maximum supply capacity and peak electricity demand

2010/11 - 2019/20

From a security of supply perspective the important comparison is maximum capacity with the level of **peak demand**. In the chart, the **maximum supply capacity** is plotted against the **peak demand** for each year. Scotland's electricity system remained **secure** in each year in terms of having confidence that we can meet peak demand. Scotland's peak demand in winter **2019/20** was **5.0 GW**, comfortably within **maximum supply capacity** of **10.0 GW**.



Source: BEIS, National Grid



What about Scotland's energy demand during the Covid-19 lockdown?

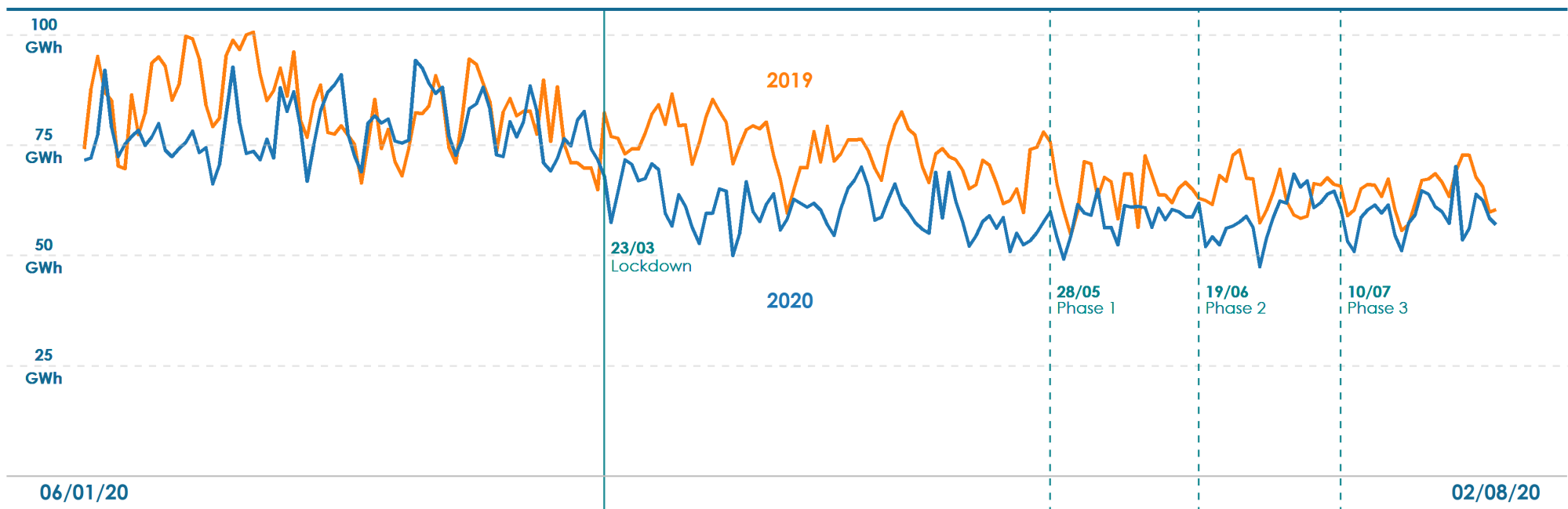


As a result of the **covid-19 lockdown, electricity use** in Scotland **declined** significantly. Since lockdown, average daily electricity demand in Scotland in **2020** is **16% lower** than the equivalent period in **2019**. In **2020**, average daily demand is **23%** lower after lockdown than before. Even though more people are working from home, the presumed increase in domestic* consumption is more than offset by the inactivity from non-essential commercial and industrial premises.

The **profile** of **electricity use** changed during lockdown too. The typical morning electricity “peak” flattened out, as electrical showers, kettles, lights and heating were spread over a slightly longer period. Half hourly **peak demand** was lower than normal - **3.8 GW post lockdown** compared to **4.6 GW** in the same period in **2019**.

Daily electricity demand - 2020 vs 2019

Scotland



Source: National Grid

*Note that it is not possible to disaggregate domestic and non-domestic consumption from this analysis.



Can we meet Scotland's electricity demand via our own generation?



Another way we can understand how Scottish and GB-wide security of supply interact is to consider what proportion of the time **Scotland** is able to meet its **electrical demand** from its **own generation**. The chart shows the proportion of time (based on half hour settlement periods) across the year where **Scottish generation exceeds** estimated **demand**. It shows that for the last ten years, Scotland has almost always met its own electricity demand via its own generation; in **2019**, this was **98.4%** of the time. During the remaining 1.6% of the year - approximately **140 hours** - we had the ability to **import** electricity into Scotland. This is an important role for the electricity transmission network.

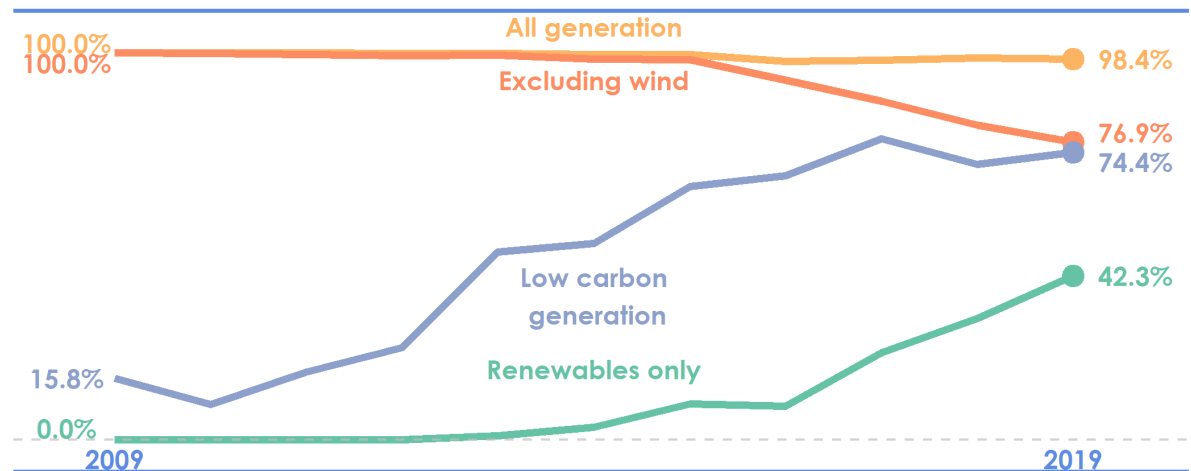
Excluding wind, Scottish generation met demand an estimated **76.9%** of the time in 2019. This has fallen from **98.4%** in **2015** after which Longannet closed. These figures suggest that there is at least **some wind** generation for the **vast majority** of the time. Analysis suggests that in **2019**, there was sufficient **wind** across Scotland to generate **at least 200 MW** per half hour for **98.7%** of the time.

For almost three quarters (**74.4%**) of the time in **2019**, Scotland **met its own demand** with its **domestic low carbon generation only** (renewables and nuclear), **down** from its peak of **77.8%** in **2017**. This is likely to be related to outages in Hunterston nuclear power station in 2018 and 2019.

Scotland's rapid rise in renewable electricity generation means that **renewables** alone **met electricity demand** for an estimated **42.3%** of the time in **2019**, rising from **0.0%** as recently as **2012**.

Proportion of time Scotland is capable of meeting demand from Scottish generation

Scotland, 2009 - 2019

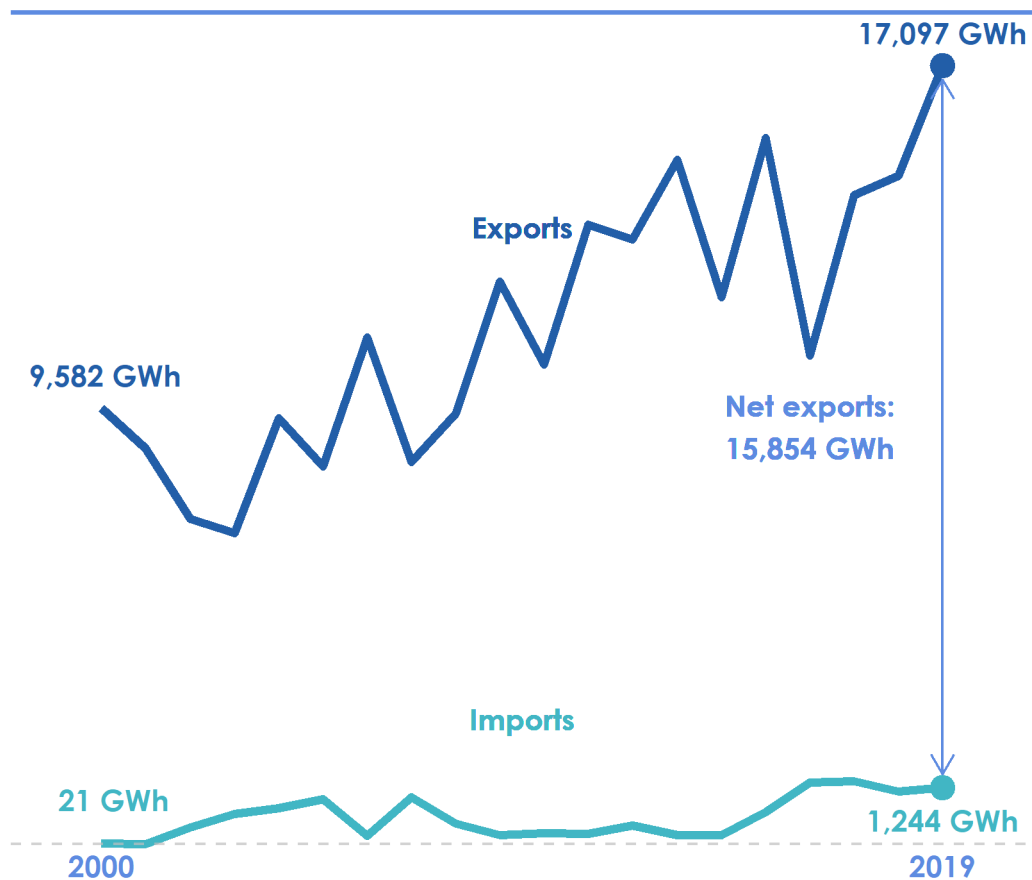


Source: Elexon, National Grid



Electricity imports and exports

Scotland, 2000 - 2019



Source: BEIS

The electricity transmission network links Scotland to England and Wales and the Moyle undersea cable links Scotland to Northern Ireland. Throughout the year when **Scottish electricity generation exceeds Scottish demand** electricity is **exported**. Likewise when **demand exceeds generation** electricity is **imported**.

The fact that Scotland's own supply is secure, and its abundant generation of electricity via wind means that Scotland has long been a **net exporter** of electricity. In **2019**, Scotland **exported** almost **17.1 TWh**, equivalent to powering every household in Scotland for 21 months. This had an estimated [wholesale value](#) of almost **£745 million**.

In recent years, **imports** have **increased** as well, rising from approximately **200 GWh** in **2014** to **more than 1 TWh** for every year since **2016**. This is possibly a consequence of the closure of the coal-fired power station at Longannet in 2016, which has meant that there has been a potential need for Scotland to have non-intermittent electricity generation available.

This all means that Scotland's **net exports** of electricity (exports minus imports) in **2019** was **15.9 TWh**, its highest to date.

In **Q1 2020**, Scotland had **record quarterly net electricity exports** of **6.7 TWh**, thanks to [record renewable generation](#) that quarter.

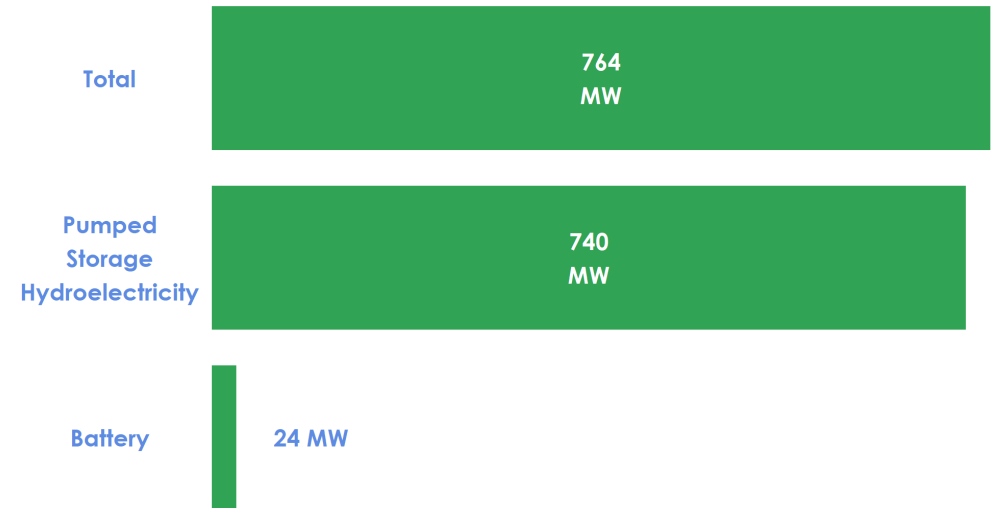


Electricity storage is another important source of flexibility as it will allow us to maximise the amount of renewable electricity we generate and deploy it when it is most needed.

By **March 2020**, Scotland has **764 MW** of **storage available**, the vast **majority** of this from the **pumped hydro** plants at Cruachan and Foyers. At least **24 MW** of **battery** storage is currently operational.

Electricity storage capacity

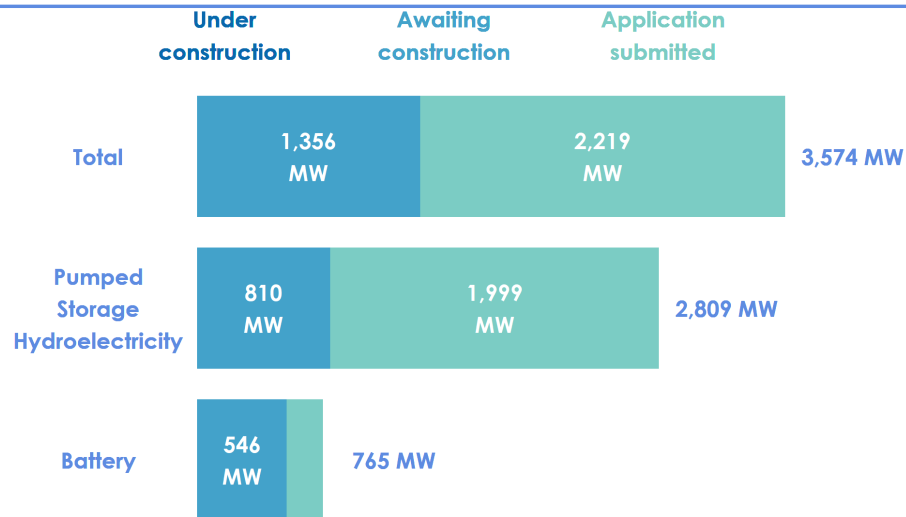
Scotland, March 2020



Source: BEIS

Pipeline storage capacity by planning stage

Scotland, March 2020



Source: BEIS

There is almost **3.6 GW** of storage projects **in planning** or **awaiting construction**. Most of this comes from four separate **pumped hydro** projects with a combined capacity of **2.8 GW**. There are a number of **battery** storage projects in the pipeline also, totalling **765 MW** if all eventually became operational.

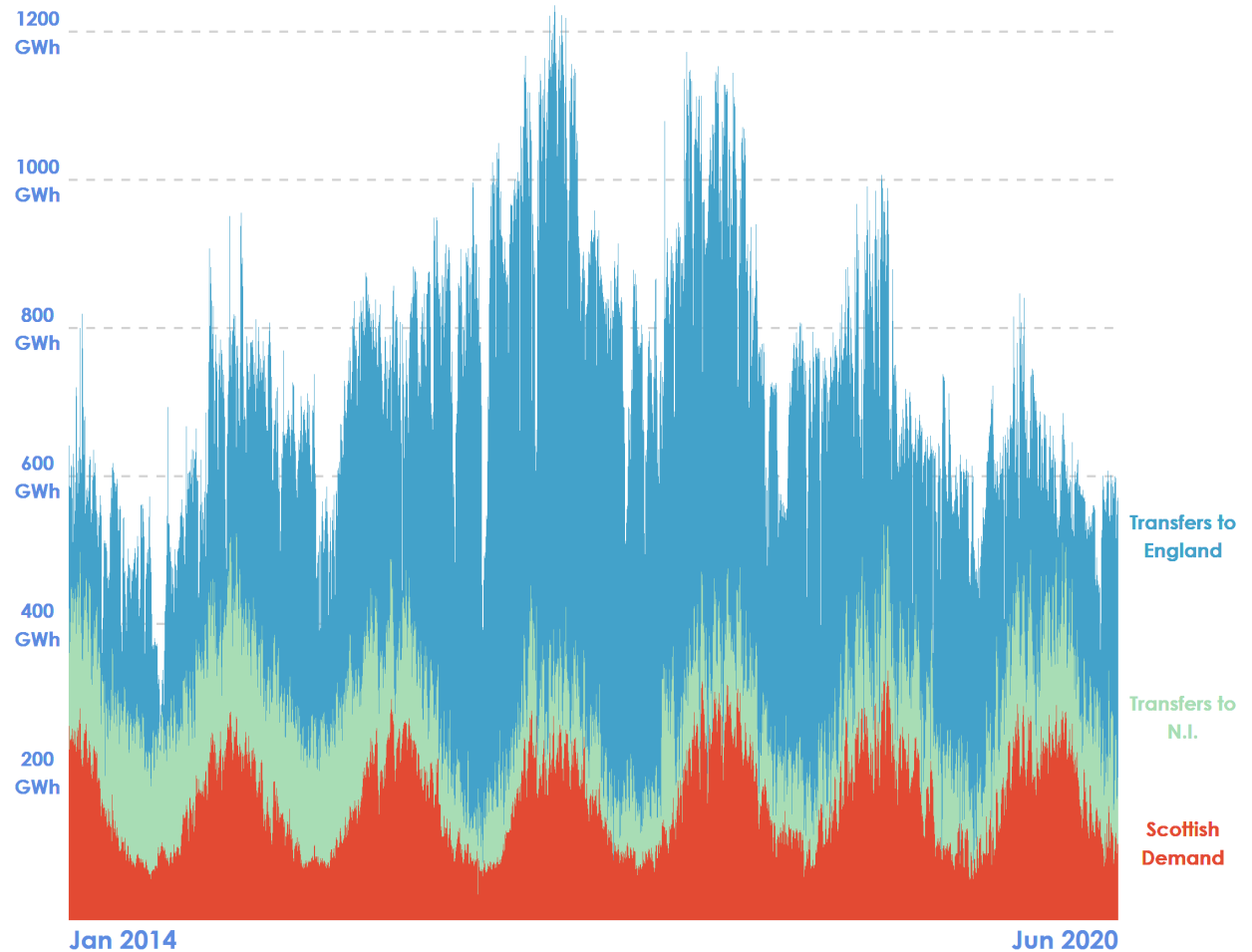
For **gas**, demand is **secured** at a **GB level**. GB supplies come from a mixture of North Sea gas fields and imported supplies from pipelines within continental Europe, or from liquefied natural gas from international markets.

Gas physically **consumed** in **Scotland** currently comes entirely from gas that flows into the **St Fergus gas terminal** in Aberdeenshire - approximately **238 TWh** in **2019**. This is down from **292 TWh** in **2018**. Gas from St Fergus is more than ample to account for Scotland's gas demand, which comprises a quarter (**26.2%**) of all of St Fergus' gas.

Imports and domestic supply that are distributed from **St Fergus** accounts for **26.3%** of all of **UK's gas** in **2019**, down from **33.5%** in **2018**.

Gas distribution from St Fergus gas terminal

Scotland, Jan 2014 - Jun 2020



Source: National Grid

Oil and Gas Strengths

“We will support investment, innovation and diversification across our oil and gas sector, working with industry to advance key priorities such as maximising the recovery of remaining resources”



Why are **oil** and **gas** still **important** to Scotland?



While there is increasingly a move to renewable and low carbon alternatives for energy supply in Scotland, fossil fuels still play a role. North Sea oil and gas production are highly regulated, with some of the most advanced and comparatively least-polluting production methods in the world. Maintaining domestic oil and gas production can lead to lower net global emissions than under a scenario where Scotland depends more on imports.

Oil and gas is likely to have continued importance in Scotland's energy mix. The National Grid Future Energy Scenarios suggest that oil and gas will still be a factor in the UK's energy supply in the short-term, albeit with reduced importance. According to the estimates by the Oil & Gas Authority (OGA), the industry regulator, up to 20 billion barrels of oil and gas could still be recovered from the UK continental shelf (UKCS), which could sustain production for at least another 20 years.

This section looks at statistics that show the significance of oil and gas to Scotland in terms of:

- **Production**
- **Consumption**
- **Exports** and **value** to the **Scottish economy**.



How important is oil and gas in Scotland's energy system?

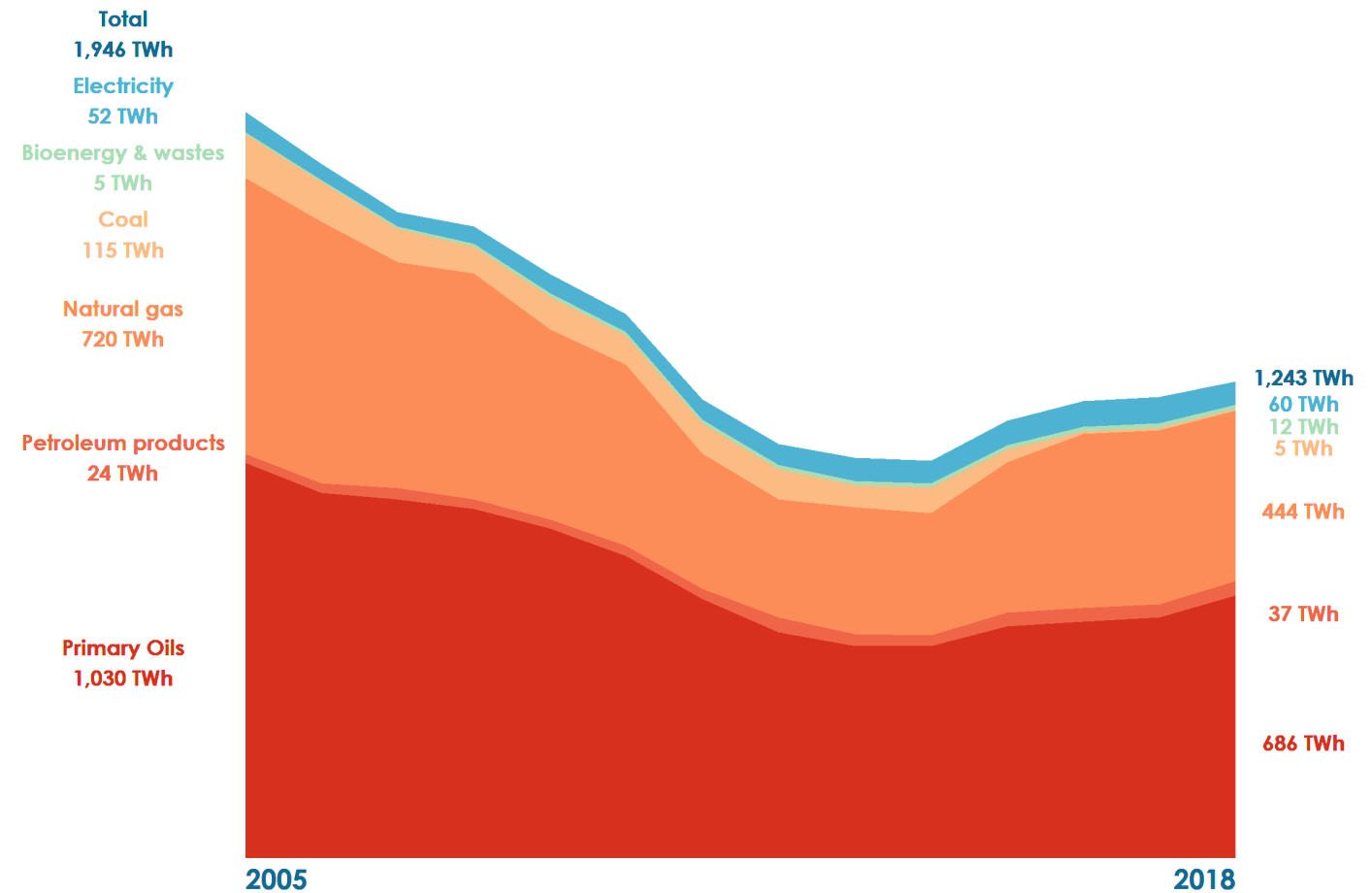


Oil and gas remains an integral part of Scotland's energy system. The chart looks at the **primary energy**, in other words, fuels as they enter the Scottish energy system. This refers to the all the energy produced within Scotland plus all the energy imported into Scotland.

Oil accounts for more than half of primary energy (**55.2%**), with **gas** making up **35.7%** and **petroleum products** making up **3.0%** in **2018**. This makes up a total of **93.9%** of Scotland's primary energy (encompassing all of Scotland's indigenous production and imports). This is the highest percentage of oil and gas as a proportion of Scotland's primary energy, which may be explained by the increase in production of oil and the fall in coal as a source of primary energy in recent years.

Distribution of primary energy (indigenous production and imports)

Scotland, 2005 - 2018



Source: BEIS, SG, HMRC



How much oil and gas does Scotland produce?

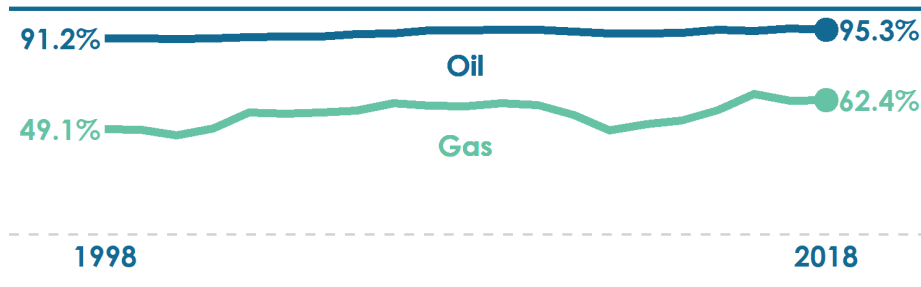


In **2018**, Scotland (including Scottish adjacent waters) **produced** an estimated **53.1** million tonnes of oil equivalent (**mtoe**) of crude **oil** and natural gas liquids (NGLs) (equivalent to **617 TWh**). While this is approximately 40% of its peak 1999, it is an **increase** of **8.5%** on **2017**. Production across the UK Continental Shelf (UKCS) has increased steadily since 2014 following several years of substantial investment in the development of new and existing fields. **Scotland** accounts for **95.3%** of total **UK** crude oil and NGLs **production**.

Scotland produced **24.1 mtoe** of natural **gas** in **2018** (equivalent to **280 TWh**), although this has dropped for each of the last two years. It accounts for **62.4%** of total **UK** gas production. This is the equivalent of almost **six times Scotland's gas consumption**.

Oil and gas production as a proportion of the UK

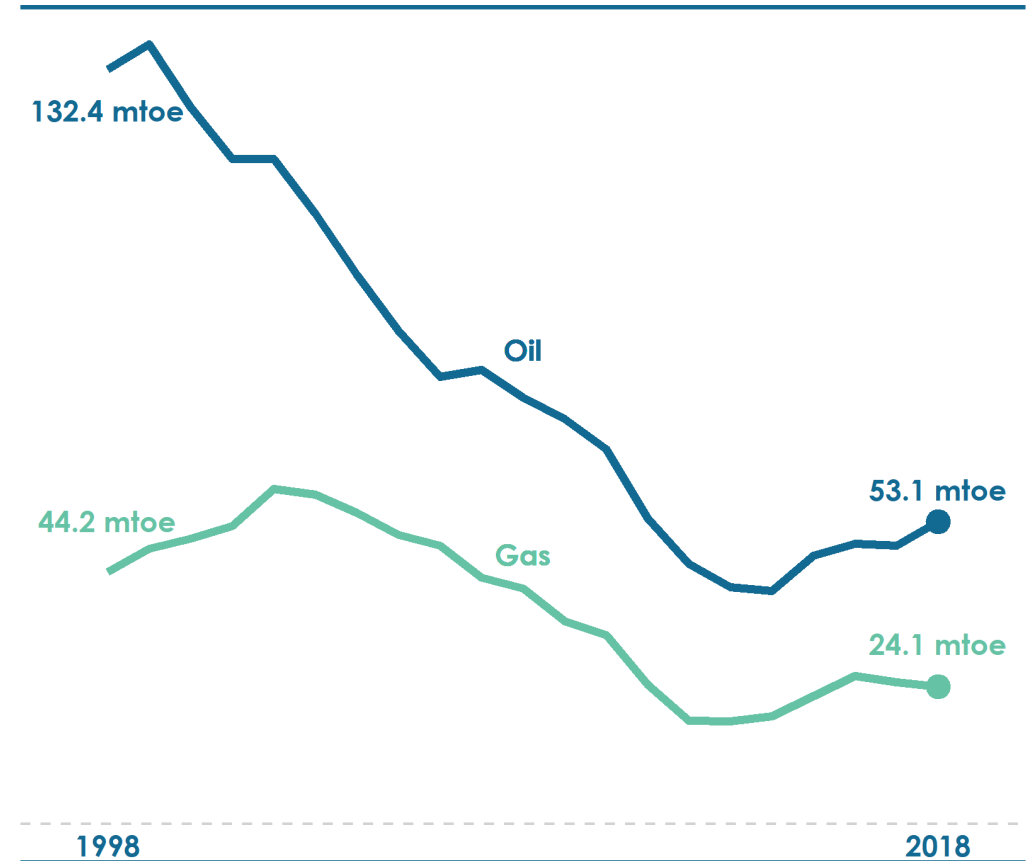
Scotland, 1998 - 2018



Source: Scottish Government

Oil and gas production

Scotland, 1998 - 2018



Source: Scottish Government



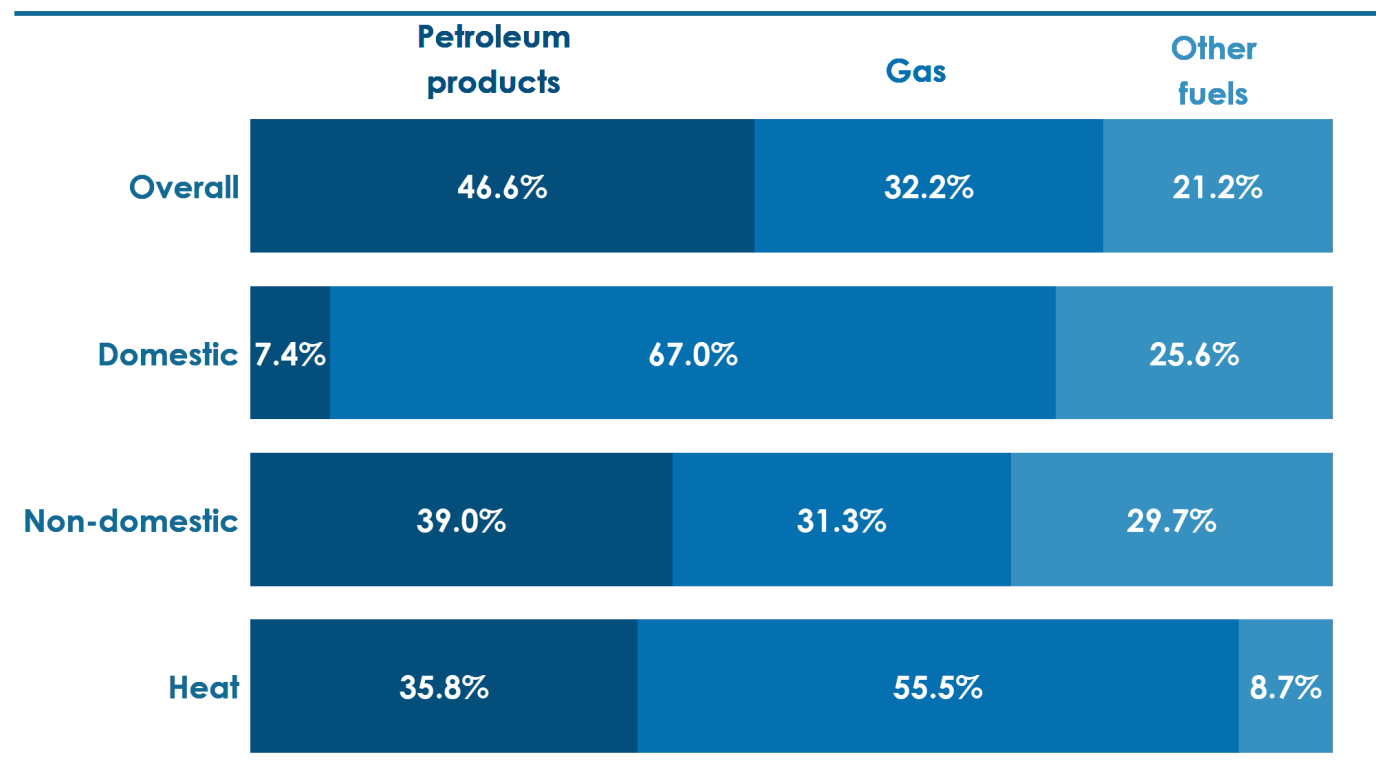


Of the contribution oil and gas makes to primary energy in Scotland, only about a tenth (**10.7%**) is domestically **consumed**. This is down from **13.3%** in **2012**.

Even with the growth of renewables in recent years, oil and gas continue to make up the majority of Scotland's energy consumption. In 2017:

- **Oil and petroleum** make up almost half (**46.6%**) of all Scottish consumption and **gas** makes up a third (**32.2%**). Just **21.2%** of all Scottish consumption comes from **other fuels**. This means that **oil and gas** make up **78.8%** of **all Scottish consumption**, slightly higher than **75.3%** for the **UK** as a whole.
- In the **domestic** sector in Scotland, **gas** makes up two-thirds of all consumption (**67.0%**).
- Oil and gas make up **almost all** of Scotland's **transport** consumption, and **91.3%** of its **heat** demand.

Oil and gas consumption Scotland, 2017



Source: BEIS



How much does Scotland make from oil and gas exports?

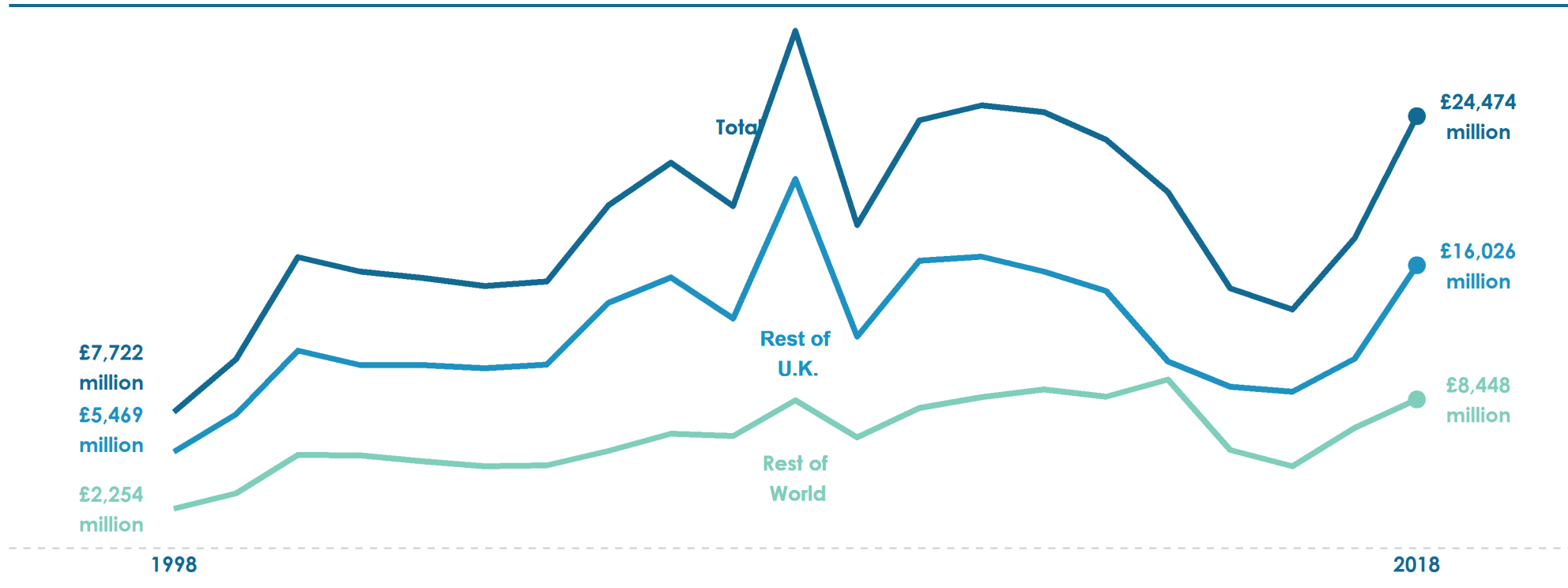


In 2018, 82.3% of all primary oil and gas energy in Scotland was exported.

Turnover of Scottish offshore oil and gas exports stands at **£24.5 billion** in 2018, of which **£16.0 billion** is exported to the **rest of the UK** and **£8.4 billion** exported to the **rest of the world**. The value of exports **increased** by **39.3%** from 2017. This is the second year in a row exports have increased, and it stands at its highest point since 2012. This is likely to be a consequence of **production stabilising** and **prices rising**.

International sales of oil and gas produced in Scotland

Scotland, 1998 - 2018



Source: Scottish Government

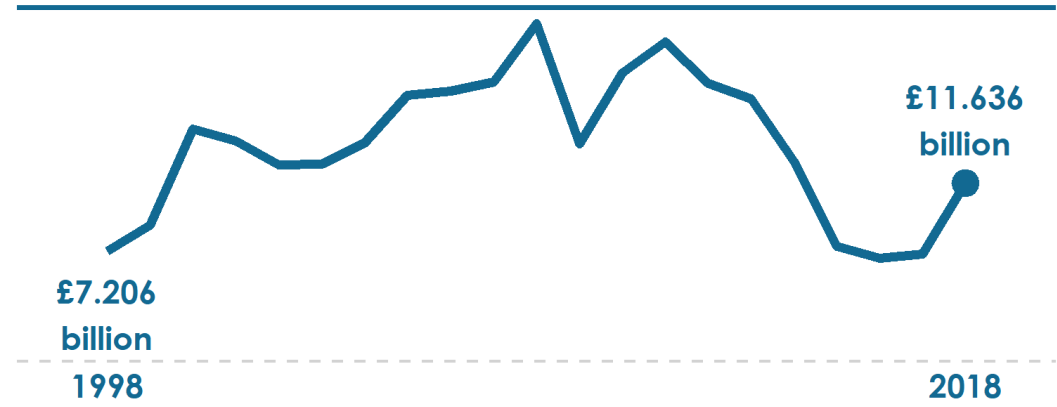


What is the oil and gas industry worth to Scotland's economy?

The chart shows the **gross value added (GVA)** associated with the offshore **oil and gas production** which is estimated to occur in the Scottish portion of the UKCS. In **2018**, the extraction of oil and gas is worth an estimated **£11.6 billion** in **GVA** to the **Scottish economy**. The contribution of oil and gas to the Scottish economy has increased for the second consecutive year, **up by £4.6 billion** on **2017** to its highest level since 2014. This is likely a consequence of **increased prices**.

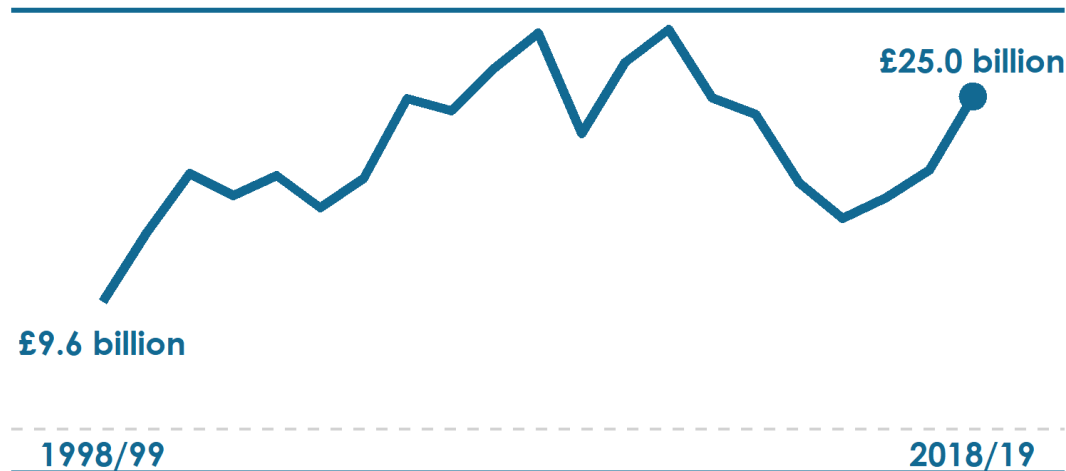
Oil and gas production is equivalent to **6.6%** of total **Scottish GDP** (including a geographical share of UK Extra Regio activity) in 2018.

Gross value added (GVA) associated with oil and gas production Scotland, 1998 - 2018



Source: SG

Oil and gas sales revenue Scotland, 1998/99 - 2018/19



Source: Scottish Government

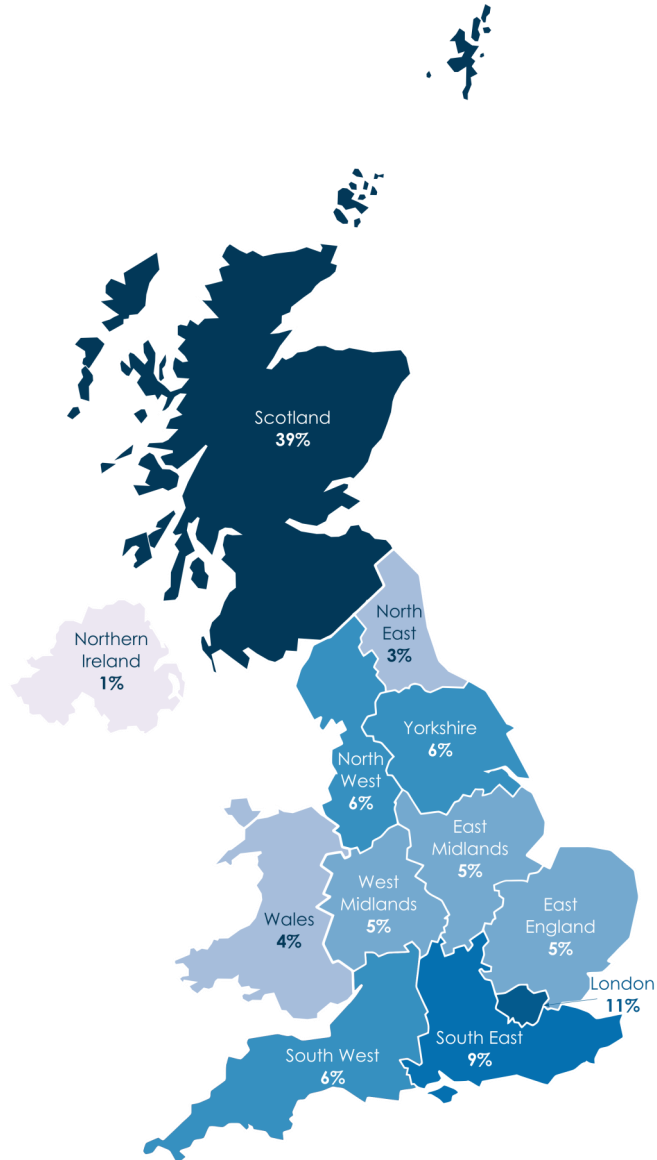
Estimated **sales** of oil and gas produced in Scotland are **£25.0 billion** in the **2018/19** financial year. Sales income **rose** for the third year in a row, up from **£19.5 billion** on the previous financial year. The increased sales revenue is mostly due to the recovery in oil prices.

How many jobs does the oil and gas sector support?



UK Oil and gas employment by region

2018



Source: Oil and Gas UK

The oil and gas sector still has an important role to play in Scotland in terms of employment. In **2018**, the **offshore oil and gas** industry supports an estimated **101,400 jobs in Scotland, similar to 2017**. It still is the main sector in Scotland for employment relating to energy, and makes up **39%** of all oil and gas employment in the **UK**.

Oil and gas employment

Scotland, 2015 - 2018



Source: Oil and Gas UK





Contact: energystatistics@gov.scot

Picture Credits

- Whole System - AR1500 turbine, used in the world's flagship tidal stream project, MeyGen, in Scotland's Pentland Firth (Credit: Highlands and Islands Enterprise).
- Renewables and Low Carbon - Whitelee wind farm Energy Stats 2014
- Energy Efficiency - Isle of Eigg Straw Bale Build – isleofeigg - <https://www.flickr.com/photos/isleofeigg/4031432667/>
- Consumer Engagement and Protection – Iain Scherr
- Local Energy - [https://commons.wikimedia.org/wiki/File:Hydro-electric_Dam_\(3288329922\).jpg](https://commons.wikimedia.org/wiki/File:Hydro-electric_Dam_(3288329922).jpg)
- System Security and Flexibility - EMEC hydrogen electrolyser, Orkney (Credit: Colin Keldie)
- Oil and Gas - Decommissioning of Buchan Alpha oil production vessel at Dales Voe, Lerwick Harbour



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