Solar Energy in Ireland: Tax and Spending in an EU Context

Key Messages

- The European Union is aiming to achieve net zero Greenhouse Gas emissions by 2050. Recent changes in EU VAT (Value Added Tax) policy have provided EU Member States with greater flexibility over VAT rates on solar panels.
- Several countries in Europe have a 0% VAT rate on solar panels (subject to certain conditions depending on the country), while other countries VAT rates vary from just above 0% to 25%.
- The *Climate Action Plan 2023* established a strategic framework to increase the proportion of electricity generated from renewable energy sources to 80%, and a target of 5 Gigawatts (GW) of solar energy in 2025, and 8 GW by 2030.
- Solar energy accounted for just 1% of renewable energy generated in Ireland in 2018, while wind accounted for 55%.[1]
- Since 2018, the Sustainable Energy Authority of Ireland (SEAI) has supported the installation of domestic solar PV systems for more than 31,789 homes.[2]
- From the start of the year to end-August 2023, 12,887 homes have been supported at a total cost of €30.2 million.[3]
- *Budget 2024* allocated €380 million from increases in the Carbon Tax to fund a number of SEAI grant schemes and initiatives, including the Solar PV Scheme.[4]
- In April 2023, a 0% VAT rate for the supply and installation of solar panels on private dwellings was announced, down from 13.5% previously. The Department of Finance estimates that this will cost the Irish Exchequer €19 million on an annual basis.[5]
- From 1 January 2024, the 0% VAT rate for the supply and installation of solar panels will be extended to schools.[6]

[1] Sustainable Energy Authority of Ireland (SEAI), *Renewable Energy in Ireland 2020 Update* (2020).
[2] Parliamentary Questions, *Renewable Energy Generation* (September 2023).
[3] Ibid.
[4] Department of Finance; Department of Public Expenditure, NDP Delivery and Reform, *Budget 2024: The use of carbon tax funds* (2023).
[5] Department of Finance; Department of the Environment, Climate and Communications, '*Ministers McGrath and Ryan announce a zero rate of VAT for the supply and installation of solar panels for private dwellings from 1 May 2023*' (2023).
[6] Department of Finance; Department of Public Expenditure, NDP Delivery and Reform, *Budget 2024: Taxation Measures* (2023).

Glossary

- **Solar PV (photovoltaic) Technology:** Electric power generation that relies on radiation from sunlight and the photovoltaic effect of certain materials to provide electric power.
- **Kilowatt:** Unit of power or rate of consumption/generation of energy – equivalent to one thousand Watts.
- **Kilowatt peak (kWp):** Unit of measurement for the output of a photovoltaic system.
- **Kilowatt hour (kWh):** Unit of energy, equivalent to using or generating one kilowatt for one hour. The energy use of most household appliances or standard electrical machinery is measured in kWh.
- **Gigawatt:** Unit of energy that represents one million kilowatts. These units are most commonly used in referring to the total output of a type of energy production e.g., solar, wind, nuclear etc. and can also be used to measure the total energy capacity of a large project or country.
- **Terawatt hours (TWh):** Unit of energy representing one trillion watt hours. This value is large enough to express annual electricity generation for entire countries and is often used when describing major energy production or consumption.
- **Ktoe:** Kilo-tonne of oil equivalent is a unit of energy, defined as the amount of energy released by burning one tonne (1000 Kilograms) of crude oil.

Introduction

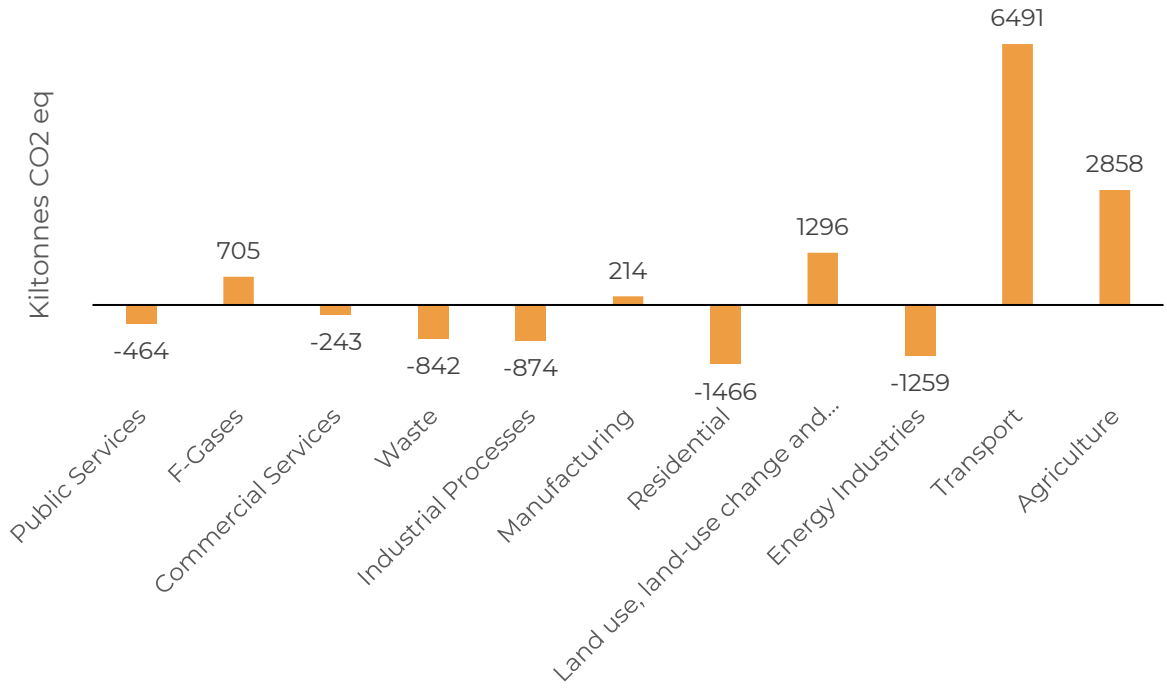
This note provides an overview of solar panel taxation and expenditure in Ireland as well as an overview of the VAT rate on solar panels across many European countries.

Greenhouse gas (GHG) emissions in Ireland

The *Programme for Government* commits Ireland to a **51% reduction in greenhouse gas emissions from 2021 to 2030 and to achieve 'net zero' emissions by 2050**.[7] Figure 1 below shows the changes in the GHG emissions by sector from 1990 to 2022, noting that:

- Emissions have been reasonably static across most sectors in the period 1990 to 2022,
- Emissions growth has primarily been driven by the Agriculture and Transport sectors,
- Net emissions have increased by 6,416 kilotonnes of CO2 equivalent from 1990 to 2022, and
- To reach the Programme for Government's target of a 51% reduction in emissions from 2021 to 2030, net annual emissions need to decline by ~32,729 kilotonnes.

Figure 1: Ireland's Provisional GHG Emissions by Sector (Change from 1990 to 2022)



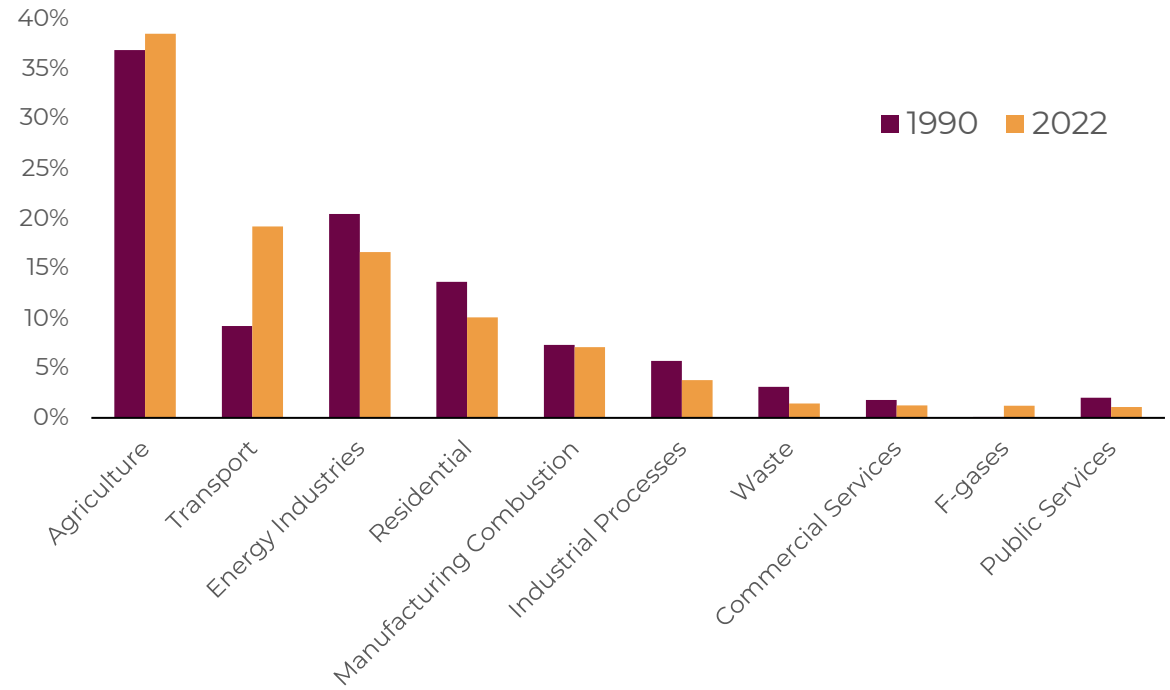
Source: PBO based on Environmental Protection Agency, *Ireland's Provisional Greenhouse Gas Emissions* (July 2023) pp.29-30, and Department of the Taoiseach, *Programme for Government: Our Shared Future* (2020) p.32.

[7] Department of the Taoiseach, *Programme for Government: Our Shared Future (2020).*

While the overall target is a 51% reduction, **the sectoral emissions reduction target for the electricity sector is 75%**, as set out by the *Climate Action Plan 2023*. This means increasing the renewable energy output from wind and solar is critical to achieving these climate targets.[8]

In 2017, the energy sector accounted for 19.3% of Ireland's greenhouse gas emissions reducing to 16.6% in 2022.[9] In 2022, the energy industries, transport and agriculture sectors accounted for 74.1% of total GHG emissions. Agriculture is the largest contributor to the overall emissions (38.4%), with transport (19.1%), energy industries (16.6%) and the residential sector (10.1%) being the three next largest contributors. **Overall, Ireland's GHG emissions have increased by 9.2% from 1990-2022.**[10]

Figure 2: Irish Greenhouse Gas Emissions Share by Sector (1990 vs 2022)



Source: PBO based on Environmental Protection Agency, *Ireland's Provisional Greenhouse Gas Emissions* (2023) pp.29-30.

[8] The two main types of solar energy technologies include – photovoltaics (PV) and concentrating solar-thermal power (CSP).
[9] The Central Statistics Office, *Greenhouse Gases and Climate Change* (2020).
[10] Ibid.

Solar Energy Targets

Under *The Climate Action Plan 2023*, the largest percentage reduction in emissions is to come from the Energy Sector. This can only be achieved through the deployment, at scale, of renewable energy generation capacity which will allow the sector to significantly decarbonise its processes. Of the 24 GW of renewable energy sources targeted to be deployed by 2030, solar infrastructure is forecast to provide up to 8 GW of renewable energy.[11] The *Climate Action Plan 2023* highlights the difficulties surrounding the targets, noting that *"The electricity sector faces an immense challenge to meet its requirements under the sectoral emissions ceilings."*[12]

Table 1: Key Targets

	2025	2030
Renewable Electricity Share	50%	80%
Onshore Wind	6 GW	9 GW
Solar	Up to 5 GW	8 GW
Offshore Wind		At least 5 GW
New Flexible Gas Plant		At least 2 GW
Demand Side Flexibility	15-20%	20-30%

Source: Department of the Environment, Climate and Communications, *Climate Action Plan 2023* (2022) p.129.

Table 2 below shows that 55% of all renewable energy in 2018 was from wind, 36% from bioenergy and just 1% from solar.[13]

Table 2: Renewable energy use, by source, 2000 to 2018

	Quantity (ktoe)			Share (%)		
	2000	**2010**	**2018**	**2000**	**2010**	**2018**
Biomass	113	196	299	52%	31%	22%
Landfill Gas	8	16	12	4%	2%	1%
Biogas	4	10	14	2%	2%	1%
Liquid Biofuels	0	93	154	0%	15%	12%
Total bioenergy	**126**	**315**	**479**	**57%**	**50%**	**36%**
Hydro	73	52	60	33%	8%	4%
Wind	21	242	743	10%	38%	55%
Solar	0	8	15	0%	1%	1%
Ambient	0	16	44	0%	2%	3%
Total	**220**	**631**	**1,341**	**100%**	**100%**	**100%**

Source: SEAI, *Renewable Energy in Ireland 2020 Update* (2020) p.11.

[11] Department of the Environment, Climate and Communications, *Climate Action Plan 2023* (2022).
[12] Ibid p.17.
[13] SEAI, *Renewable Energy in Ireland 2020 Update* (2020).

Solar Energy Initiatives

The expansion of solar energy in Ireland has been actively supported by various initiatives from both the Government and the SEAI, with the aim to enhance the growth of solar projects, advance solar technology adoption, and increase solar awareness across the country. These initiatives include:

- **Renewable Electricity Support Scheme (RESS)**, an auction-based scheme that invites renewable electricity projects to bid for capacity. RESS 1 was first opened in 2020, followed by RESS 2 in 2022 which is expected to contribute significantly towards the ambitions to connect up to 2.5GW of solar to the electricity system by 2030.[14]
- The **Micro-generation Support Scheme (MSS)** was introduced throughout 2022. Domestic applicants can apply to the SEAI for a grant towards the cost of installing Solar PV equipment. In 2023, this included capital grants of up to €2,400. Supports under the MSS will gradually reduce over time from 2024.[15]
- On a legislative level, the **Renewable Energy Directive (RED)** and its successor **REDII**, have been instrumental in promoting the growth of renewable energy. RED significantly impacted the renewable energy sector both in Ireland and the European Union by establishing obligatory renewable energy targets. REDII delineates new targets and criteria that Ireland is required to fulfil by 2030.[16]
- SEAI's **Solar Atlas** is a digital map of Ireland's solar energy resources, a tool aimed at aiding the planning process for future solar projects.[17]
- The **Solar PV Payback Calculator** is a tool provided by the SEAI to help domestic users understand the savings on return on investment they could achieve by installing solar panels.[18]
- SEAI developed a **Community Energy Resource Toolkit: Solar PV**, a comprehensive guide for community groups and governing bodies. This toolkit is designed to provide practical guidance to support project development and delivery of Solar Photovoltaics (PV).[19]
- The **Targeted Agriculture Modernisation Schemes (TAMS 3)** provide a number of grants to farmers, including the **Solar Capital Investment Scheme** at 60% grant rate and a €90,000 investment ceiling.[20]

[14] Department of the Environment, Climate and Communications, '*Minister Ryan opens first grid-scale solar project to connect to the national grid under the Renewable Electricity Support Scheme (RESS)*' (2022).
[15] Department of the Environment, Climate and Communications, *Micro-generation* (2021).
[16] SEAI, *Renewable energy targets* (Accessed 18 October 2023).
[17] SEAI, *Solar Map* (Accessed 18 October 2023).
[18] SEAI, *Solar Electricity Calculator* (Accessed 18 October 2023).
[19] SEAI, *Community Energy Resource Toolkit: Solar PV* (2021).
[20] Department of Agriculture, Food and the Marine, *Solar Capital Investment Scheme* (2023).

VAT on solar panels cut from 13.5% to 0% in Ireland

In April 2023, the Government announced a zero percent rate of VAT for the supply and installation of solar panels for private dwellings, effective 1st May 2023, down from 13.5% previously.[21] This reduction was made possible by recent changes made by the European Union, specifically changes to Annex III of the Vat Directive in 2022.[22] The Department of Finance estimate this measure will cost €19 million annually and would reduce the cost of the supply and the installation of solar panels for consumers by €1,000. It is anticipated that the reduction in VAT will result in increased installation of solar panels on private dwellings. In May 2023, there were 2,862 new solar PV applications accepted (up 55% on previous month and a 104% increase on May 2022).[23] From 1 January 2024, the VAT rate for the supply and installation of solar panels installed in schools will also be reduced to zero.[24]

Solar Panel Expenditure and Support

Budget 2024 included funding of €380 million for SEAI residential and community energy upgrades, including the Solar PV Scheme (increase of €43 million from *Budget 2023*) to build momentum in the delivery of the *National Retrofit Plan*. This allocation is fully funded from the collection of Carbon Tax.[25] The SEAI administers grant support to help households buy and install solar panels on their home to generate renewable electrical energy.

Who can apply for solar panel grants in Ireland?

All homeowners, including private property owners, whose homes were built and occupied before 2021 can apply (in 2022 eligibility was changed from 2011 to 2021).[26] Solar PV Panel support is available with a value of €900 per kWp up to 2kWp (for example €1,800 in support for 2kWp solar panels) and €300 for every additional kWp up to 4 kWp (for example €2,100 for 3kWp solar panels and €2,400 for 4kWp solar panels). Total Solar Panel grant support is capped at €2,400.

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[21] Department of Finance; Department of the Environment, Climate and Communications, '*Ministers McGrath and Ryan announce a zero rate of VAT for the supply and installation of solar panels for private dwellings from 1 May 2023*' (2023).
[22] Irish Tax Institute, *EU VAT Rules – Recent Developments* (Accessed 19 October 2023).
[23] Parliamentary Questions, *Renewable Energy Generation* (September 2023).
[24] Department of Finance; Department of Public Expenditure, NDP Delivery and Reform, *Budget 2024: Taxation Measures* (2023).
[25] Department of the Environment, Climate and Communications, '*Minister Ryan delivers record €1.159 billion investment in Budget 2024 to support families, communities, and a net-zero future*' (2023).
[26] Targeting the grant scheme at existing homes rather than new builds ensures that the solar panel grant maximizes emission reductions and delivers energy savings. New build houses must follow *Part L of the Building Regulations*, which relates to the energy performance of buildings. This requirement can be met by installing Solar PV panels.

VAT on Solar Panels in the European Union

Through the *Reduced VAT Rates Directive,* the European Union recently introduced VAT reforms which enable Member States to have more control over VAT policies across a range of products and services. As a result of this Directive, Ireland has opted to apply a zero percent VAT rate on all domestic solar panels, both supply and installation.

There remains, however, significant variation across the Member States in both the rates of VAT being applied and the criteria used to designate the applicable VAT rate.

Countries with 0% VAT rates on solar panels

Subject to certain conditions a 0% VAT rate on Solar Panels is available in the following countries:

- The **Republic of Ireland**, the **Republic of Croatia**, **Germany**, and **the Netherlands** (where the 0% rate only applies to households and sheds).
- Outside of the EU, the **United Kingdom** has also adopted a 0% rate for solar panels.

Countries where the VAT rate on solar panels varies

Spain offers a 0% VAT rate when the solar panels are donated to non-profit organisations, while a rate of 10% applies where the installation is part of a renovation or rehabilitation of a building. All other instances are charged at the standard 21% VAT rate. The rate of VAT on solar panels in **Belgium** is mostly charged at the standard VAT rate at 21%, however there is scope for a 6% VAT rate for solar panels subject to certain conditions.

Countries with non-zero VAT rates on solar panels

A 3% VAT rate applies in **Luxembourg** to the supply and installation of solar panels on and adjacent to private dwellings, housing, public buildings, and other buildings used for activities in the public interest.

Both **Austria** and the **Slovak Republic** have a VAT rate of 20%. In **Estonia** solar panels are currently taxed at the standard rate of 20%, however this will increase to a rate of 22% on 1st January 2024.[27] In the **Czech Republic** the standard VAT rate is 21% however if the solar panels are built into buildings that meet the condition of social housing then these construction works are subject to a reduced VAT rate of 15% (including solar panels).[28] In **Slovenia**, VAT on Solar Panels is taxed at the general VAT rate of 22%.[29] Among other VAT rates assessed **Finland**, **Iceland**, **Sweden**, and **Denmark** have the highest, ranging between 24% and 25%.

[27] Correspondence from the Ministry of Finance, Estonia (2023).
[28] Correspondence from the Ministry of Finance, Czech Republic (2023).
[29] Correspondence from the Ministry of Finance, Slovenia (2023).

Table 3: Solar Panel VAT Rates in Europe

Country	VAT Rate on Solar Panels
Ireland	0%
The United Kingdom	0%
Germany	0%[30]
The Netherlands	0%[31]
Republic of Croatia	0%[32]
Spain	Rate varies[33] (0%/10%/21%)
Belgium	Rate varies (6%/21%)
Czech Republic	Rate varies[34] (15%/21%)
Luxembourg	3%[35]
Romania	5%[36]
Moldova	20%[37]
The Slovak Republic	20%[38]
Austria	20%[39]
Slovenia	22%[40]
Finland	24%[41]
Iceland	24%[42](deduction available)
Sweden	25%[43] (deduction available)
Denmark	25%[44]

Source: PBO based on correspondence with relevant Government authorities.

[30] Correspondence from the Federal Ministry of Finance, Germany (2023).
[31] Correspondence from the Government of the Netherlands (2023).
[32] Correspondence from the Croatian Tax Administration (2023).
[33] The VAT rate in Spain varies. The standard rate of VAT for solar panels in Spain is 21%, however the installation of solar panels is taxed at a reduced rate of 10% if it is part of a renovation or rehabilitation of a building. There is also a 0% VAT rate where the solar panels are donated to non-profit entities.
[34] The VAT in the Czech Republic is 21% which includes solar panels, however a reduced VAT rate of 15% is available for solar panels which are used for the provision of social housing.
[35] Correspondence from the Ministry of Finance, Luxembourg (2023).
[36] Taiyang News, *Romania Lowers Value Added Tax On Solar PV Panels* (2023).
[37] Correspondence from the Government of Moldova (2023).
[38] Correspondence from the Ministry of Finance of the Slovak Republic (2023).
[39] Correspondence from the Austrian Ministry of Finance (2023).
[40] Correspondence from the Directorate for the System of Tax, Customs and Other Public Finances, Republic of Slovenia (2023).
[41] Correspondence from the Tax Department, Ministry of Finance, Finland (2023).
[42] Correspondence from the Iceland Revenue and Customs (2023).
[43] Correspondence from the Swedish Parliament (2023).
[44] Correspondence from the Danish Tax Agency (2023).

Conclusion

Ireland's renewable energy landscape has evolved over the last number of years with the *Climate Action Plan 2023* setting out an ambitious target to increase the amount of electricity generated from renewable energy sources to 80% of total generation by 2030. Overall, the Plan has targeted a 75% reduction in greenhouse gas emissions by 2030 across the energy sector.[45]

The take up of solar energy installation is gaining traction, bolstered by the increase in funding in *Budget 2024* for the Solar PV Scheme. This progress is supported by Government initiatives such as the Micro-generation Support Scheme and the Renewable Electricity Support Scheme, along with legislative frameworks (e.g., REDII) which play a pivotal role in shaping the renewable energy trajectory.

The announcement of a zero percent VAT rate on the supply and installation of solar panels means Ireland joins several other European countries in pursuing this policy. However, for Ireland to achieve its binding international commitments around GHG emissions reductions and generation of energy from renewable sources there needs to be a significant ramp up in the adoption of renewable energy technologies, including solar, at both the wholesale and domestic levels.

[45] Department of the Environment, Climate and Communications, *Climate Action Plan 2023* (2022).

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