



2024 REPORT

# SCALE OF SOLAR

[www.irishsolarenergy.org](http://www.irishsolarenergy.org)







*“The scale of solar generation already achieved in just two short years shows what can be delivered when society, government and industry work together. We will fully decarbonise our electricity system in the next 10-15 years, with solar being a fundamental predictable part of the electricity system. Ireland has set an ambitious target to have 8GW of solar by 2030 and the findings of this research indicates that we are making big strides towards meeting that target and demonstrates the great progress already made in a short period of time.”*

Eamon Ryan,  
Minister for the Environment, Climate and Communications





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# WELCOME

As solar energy rapidly grows in Ireland, it brings significant benefits to both society and the environment. With a target of 8GW of solar capacity by 2030, outlined in the Climate Action Plan 2023, solar power plays a crucial role in decarbonising Ireland's electricity system.

Solar photovoltaic (PV) technology now leads Ireland's decarbonisation strategy, greening our electricity supply alongside wind and energy storage.

This transition happened swiftly, with key policy decisions made in the last three years. Achieving the 8GW target would position Ireland as a global leader in solar energy per capita, a remarkable feat since our first solar farm was energised in 2022.

We have the projects, rooftops, and supportive Government policies in place. Now, focus shifts to delivering on this vision by building the necessary infrastructure and actions to remove bureaucratic obstacles outlined in the Climate Action Plans.

Collaboration between industry and the state, with special thanks to ESB Networks and Minister Ryan, is vital for success. The decisions we make today will determine our future energy landscape.

Let's seize this opportunity together.

Best regards,  
Conall Bolger  
CEO, ISEA





# INTRODUCTION TO SCALE OF SOLAR 2024



The Irish Solar Energy Association (ISEA) presents the following data on the volumes of solar energy connected to the Irish grid, demonstrating the value of solar power to Ireland and the diverse settings in which it can be utilised.

Solar PV has moved centre stage as part of Ireland's decarbonisation toolkit. It will be an important piece in the mosaic of solutions to green our electricity supply, alongside wind and storage.

This report details the rapid progress made in the solar sector, driven by policy decisions and government support over the last three years. The target of 8GW by 2030, set by the Climate Action Plan, is testament to Ireland's commitment to becoming a leader in solar energy.

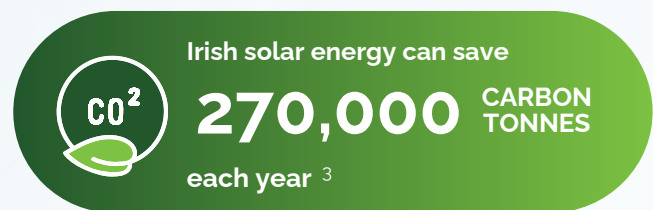
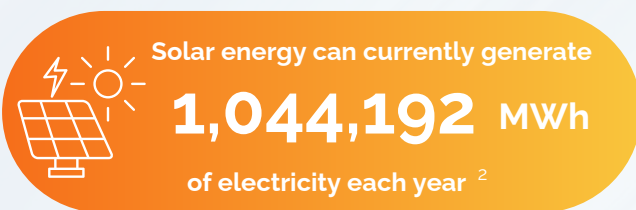
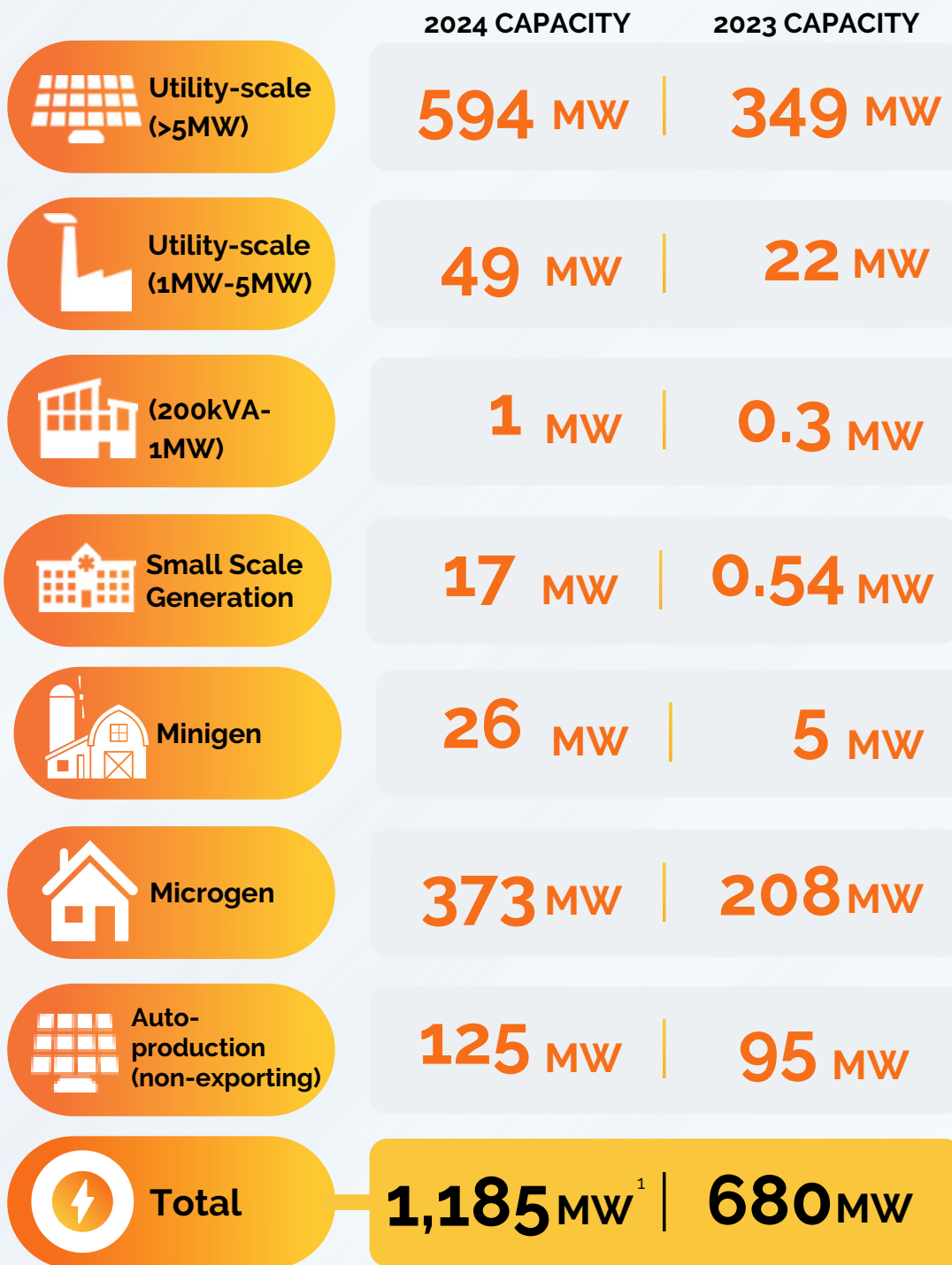
We have the projects and the rooftops to achieve this target. The government's policy framework gives a clear direction, and now it is all about delivery. Building the necessary grid and infrastructure, removing administrative barriers, and ensuring economic feasibility are key steps toward a successful transition.

The collaboration between industry and government will be crucial in reaching our goals. The data provided in this report, with the support of ESB Networks and the collaboration with Minister Ryan, highlights the progress made and the opportunities ahead.

We invite you to explore the data and insights presented in this report, which underscore the significant role solar energy will play in Ireland's sustainable future.



# OVERVIEW







*"As we approach mid summers day, ESB Networks is delighted to announce that almost 1,200 MW of solar generation has been connected to our Network. By end of 2024, ESB Networks forecast almost 1,600 MW of solar will be connected from domestic roof top to large utility scale solar projects. This makes the solar industry Ireland's fastest growing renewable power source helping Ireland deliver its Climate Action Plan targets."*

Nicholas Tarrant, Managing Director ESB Networks.



# UTILITY SCALE >5MW

Utility-scale solar developments exceeding 5MW are instrumental in achieving Ireland's solar energy targets, comprising a significant portion of the 2030 solar target.

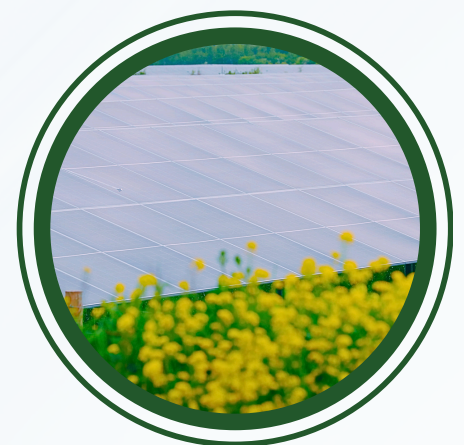
Since the first project supported under the Renewable Electricity Support Scheme (RESS) connected to the electricity network in 2022, utility-scale developers have continued to build on a years-long effort to establish approximately 11GW of solar capacity. Solar PV secured the majority of capacity in the first three RESS auctions.

The growth in this sector has been remarkable. In 2023, Ireland had 394 MW of utility-scale solar (>5 MW) across 7 projects. As of 2024, this has expanded to 594 MW across 13 projects, reflecting substantial progress in expanding solar power infrastructure.

**Ireland now has**

# 594 MW

**of utility-scale solar (>5MW)  
connected to the grid**







## Ballymacarney Solar Project, Co. Meath



Utility-scale  
(>5MW)



Capacity: 200  
MWp (40,000  
homes)

**Overview:** The Ballymacarney Solar Project, developed by Statkraft, is Ireland's largest solar farm, with a capacity of 200 MWp. It powers over 40,000 homes with clean energy, advancing the country's renewable goals.

**Project Scope:** Spanning circa 1,000 acres in Co. Meath, the farm hosts 750,000 solar panels, utilising abundant daylight to generate clean energy.

**Impact and Benefits:** Ballymacarney Farm reduces greenhouse gas emissions, creates job opportunities, and engages the local community through educational programs.

**Community Engagement:** Statkraft collaborates closely with local stakeholders, ensuring transparency and addressing concerns through educational programs like workshops and open days, promoting awareness of renewable energy and sustainability.

**Future Outlook:** With potential for expansion, the farm contributes to Ireland's renewable goals, integrating efficiently with the national grid.

# UTILITY SCALE 1MW TO 5MW



Projects falling within the 1MW to 5MW capacity range represent a diverse array of installations, including large commercial rooftop setups and smaller solar farms. These installations are vital for enhancing Ireland's renewable energy mix and supporting the nation's decarbonisation goals.

This segment has also seen significant growth. In 2023, Ireland had 22 MW of utility-scale solar (1 MW-5 MW) across 5 projects. Presently, in 2024, this has increased to 49 MW across 11 projects, further diversifying Ireland's renewable energy portfolio.

## Small-Scale Renewable Electricity Support Scheme (SRESS)

Phase Two of the Small-Scale Renewable Electricity Support Scheme (SRESS), announced in May 2024, represents an opportunity for communities, local businesses, and SMEs to contribute to Ireland's renewable energy transition. Fixed tariffs for solar projects—€150/MWh for community projects (1MW or under), and €140/MWh for projects greater than 1MW up to 6MW, €130/MWh for SME projects (1MW or under), and €120/MWh for projects greater than 1MW up to 6MW—, tailored support, flexibility within the framework, and alignment with the broader agricultural support programme are key features of this phase.<sup>4</sup>



# COMMERCIAL 200KVA TO 1MW

As of 2024, Ireland has **1MW** of solar capacity with projects between 200kVA and 1MW connected to the grid. A significant increase from 0.3MW in 2023.

These rooftop systems play a vital role in advancing renewable energy adoption, and businesses are increasingly installing solar PV systems on their building rooftops and onsite on their campuses.

Here's why:

- **Carbon Offset:** By harnessing solar energy, businesses can effectively offset their carbon emissions, contributing to a greener environment.
- **Energy Transition:** These installations actively participate in Ireland's energy transition, promoting cleaner and more sustainable practices.
- **Cost Savings:** Solar panels enable businesses to generate their own electricity, reducing reliance on the grid. Energy savings and potential revenue from excess energy sold back to the grid can offset installation costs.
- **Tax Incentives:** Ireland offers tax incentives can offset installation costs and accelerate ROI for renewable energy projects, including solar installations.





## Musgrave Distribution Centre, Kilcock



**Commercial**  
**200kVA-**  
**1MW**



**PV Generation:**  
**756,074**  
**kWh/Year**

**Overview:** The Musgrave Distribution Centre in Kilcock, Co. Kildare, exemplifies the growing trend of businesses embracing solar energy solutions. The Activ8 Project, implemented at this site, showcases the benefits of commercial solar installations in reducing carbon emissions and promoting sustainability.

**Project Details:** The Activ8 PV system at Musgrave Distribution Centre, comprises 1,800 Q.PEAK DUO ML-G11S.2+505 Wp modules and 6 Huawei SUN2000 100KTL M1 100kW inverters, with a total size of 909 kWp.

**Impact and Benefits:** This solar installation generates 756,074 kWh of clean energy annually, reducing CO<sub>2</sub> emissions by 195,067 kg. This showcases the significant environmental impact of commercial solar projects, enhanced by advanced PV modules, inverters, and a trapezoidal roof type, maximising renewable energy potential.

**Future Outlook:** As technology advances and renewable energy policies evolve, there is potential for further expansion and optimisation of commercial solar projects, reflecting a broader trend towards increased sustainability and environmental responsibility in commercial operations.



# MINI-GENERATION

Minigen projects, with capacities between 17kVA and 50kVA, are typically installed by businesses, farms, and other commercial operations to consume their self-generated electricity.

As of 2024, Ireland has connected **26MW of minigen** projects to the grid, demonstrating the growing adoption of small-scale renewable energy solutions in the commercial sector.

Key Benefits:

- **Self-Consumption:** Allows businesses, farms, and commercial operations to consume their self-generated electricity, reducing reliance on the grid.
- **Cost Savings:** By generating their own power, businesses can significantly lower their energy bills over time.
- **Environmental Impact:** Contributes to a greener environment by reducing carbon emissions.

## Non-Domestic Microgen Grant

Businesses, the agricultural sector, public sector bodies, schools, community centers, and non-profit organisations can apply to the Non-Domestic Microgen Grant (NDMG) in Ireland for financial assistance to install solar photovoltaic (PV) panels. This initiative aims to reduce electricity costs, enhance energy security, and promote sustainability. Grant amounts vary based on system size, ranging from €900 for 1 kWp to €150 per kWp for systems up to 1000 kWp.<sup>5</sup>

# AUTO-PRODUCTION

Auto-production refers to onsite solar projects that generate electricity exclusively for self-consumption by a household or business, without exporting electricity to the national grid. These systems are installed on land instead of rooftops, allowing for larger installations and greater energy production.

As of 2024, Ireland has **125MW of operational auto-production** solar projects, marking a notable increase from 95MW in 2023. This demonstrates substantial growth and adoption of this efficient and sustainable energy solution.

Key Benefits include:

- **Energy Independence and Cost Savings:** These systems enable households and businesses to generate their own electricity, reducing reliance on the grid and significantly lowering energy bills.
- **Environmental Impact:** Auto-production contribute to the reduction in carbon emissions, supporting sustainability goals and combating climate change. By utilising unused land or fields, these systems maximise space without interfering with existing structures, offering both environmental and land use benefits.





# MICRO-GENERATION

There has never been a better time to install solar PV on residential rooftops. Homeowners now benefit from zero VAT on the supply and installation of panels and no longer require planning permission.

The number of homes in Ireland equipped with solar panels in **2024 has exceeded 94,000**, a significant increase from under 60,000 in the previous year. With an average of 65 installations per day and up to 100 installations occurring daily at times in 2023, this highlights the remarkable growth of residential solar adoption across the country.

Key Benefits:


- **Residential Savings:** Installing solar panels enables homeowners to save on electricity costs.
- **VAT Exemption:** Customers no longer pay VAT on panel supply and installation.
- **Grid Interaction:** Microgen systems can sell excess electricity back to the grid, enhancing cost-effectiveness.
- **SEAI Grants:** The Sustainable Energy Authority of Ireland (SEAI) offers grants that reduce upfront costs associated with solar PV installation, making solar power even more accessible and affordable for homeowners.





**Co. Wexford home  
with heat pump**

 **Microgen -  
rooftop panels**

 **67% of  
electricity**

**Overview:** The Kents needed a cost-effective solution to offset energy costs while maintaining their commitment to sustainability, following a heat pump installation in their Co. Wexford home.

**Solution:** Partnered with Pinergy Solar Electric for ground-mounted solar panels, transforming their home into a micro-generating system, strategically angled for optimal sun exposure.

**Benefits:**

1. Their panels now supply on average 67% of electricity, effectively offsetting energy costs and reducing grid reliance.
2. The energy generated by their significantly lowers electricity bills, meeting the family's target of expense offsetting.
3. The family energy consumption habits adapted to maximise solar utilisation, optimising appliance usage during brighter periods.

**Outcome:** The installation of solar panels not only reduced electricity costs but also instilled a sense of pride and friendly competition within the family. Monitoring tools provided by Pinergy Solar Electric allow the Kents to track their energy usage and compare it with other family members, fostering a culture of sustainability and efficiency.



# POTENTIAL SOLAR ENERGY GENERATION

The growth of Ireland's solar capacity from 680 MW in 2023 to **1,185 MW in 2024** showcases the immense potential for renewable energy.

Remarkably, **505MW—42.6% of the total—was delivered in the last 12 months alone**. This rapid expansion highlights the urgent need to accelerate delivery even further, a momentum that is steadily building.

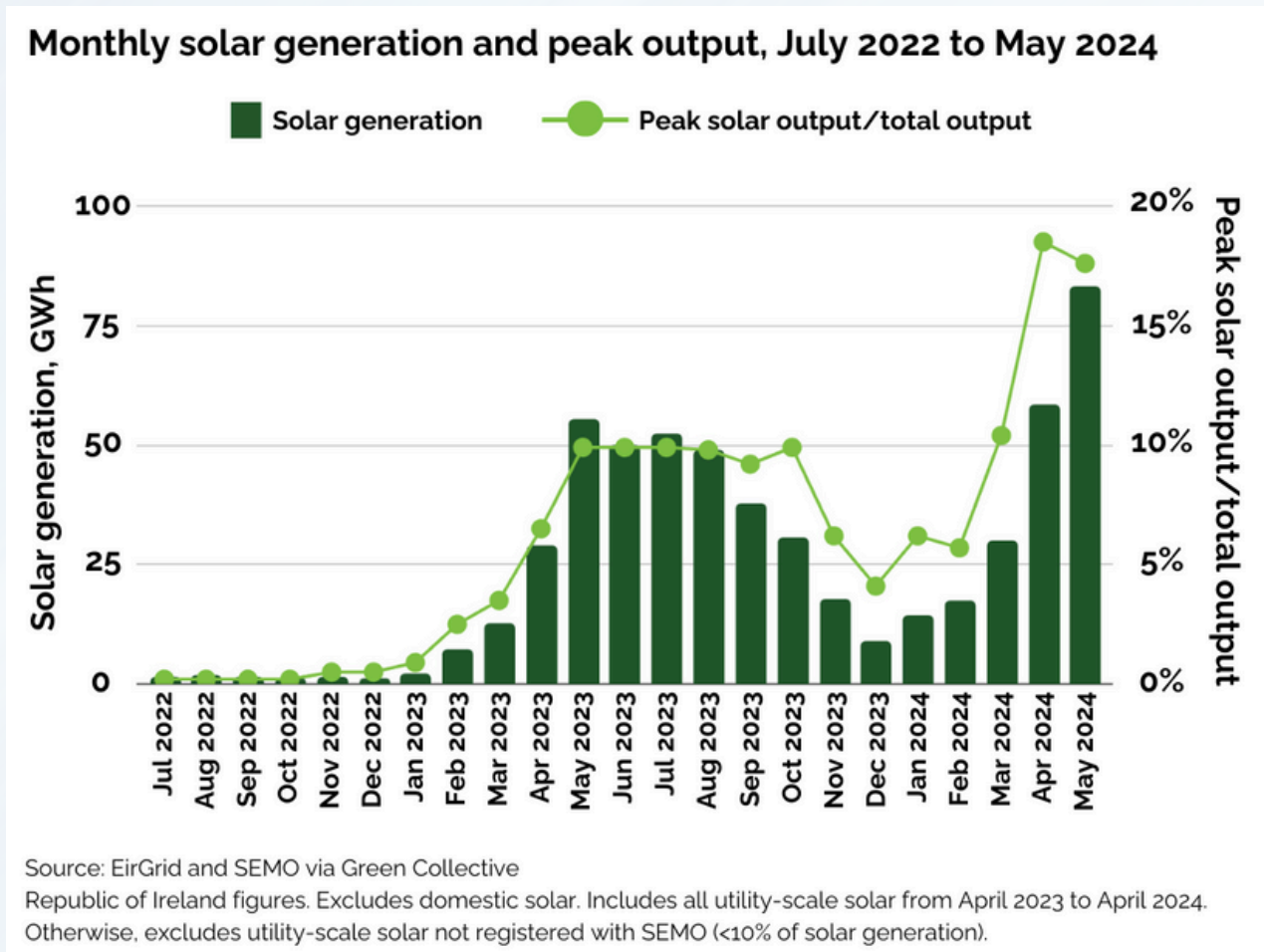
With the forecast of almost 1,600 MW of solar connected by the end of 2024, the industry aims to add 400 MW in the next six months.<sup>4</sup>

The current capacity, equivalent to powering **248,000 homes annually and generating 1,044,192 MWh** of clean, renewable electricity in 2024 (599,131MWh in 2023), is a significant advancement towards sustainability and underscores the pivotal role of solar in Ireland's energy transition.



# POTENTIAL SOLAR GENERATION

Data from the Green Collective from June 2022 to May 2024,<sup>6</sup> shows that Ireland has seen a steady increase in output. With peak generation consistently occurring during the summer months, this summer promises to break solar records.



Ireland's solar revolution is in full swing, with solar energy now a significant contributor to the nation's power grid. Rapid adoption has boosted solar to new heights, with widespread onsite installations driving enthusiasm for decentralised energy production. Supported by favourable policies and the ISEA's advocacy, solar adoption is set to accelerate, paving the way for a cleaner, greener future in Ireland.



# POLICY AND REGULATORY CHANGES

Governmental initiatives have been pivotal to the growth of the Irish solar sector. The sector nearly doubled in size over the last 12 months, reaching 1,185 MW of solar connected to the grid, a significant milestone towards achieving the 8GW target by 2030, supported by robust Government initiatives such as those shown below.

Government Solar Initiative	Date Launched
<b>Small-Scale Renewable Electricity Support Scheme (SRESS)</b> – Launched to offer solar grants to businesses and non-domestic applicants.	July 2023
<b>Third Renewable Electricity Support Scheme (RESS) Auction</b> – Awarded a fixed price to 20 solar projects to generate renewable electricity for 15 years.	October 2023
<b>Solar for Schools Programme</b> – Providing eligible schools with approximately 16 solar panels to generate their own power and reduce their electricity bills.	November 2023
<b>Expansion of SRESS</b> – Offering a fixed electricity price to Renewable Energy Communities, Small-Medium Enterprises (SMEs), farmers and those generating and using their own electricity for 15 years.	May 2024

These initiatives sent positive signals to the market, building on key Government decisions over the past three years to:

- **Provide grants aimed at reducing upfront costs** for homeowners, businesses, public organisations, and community groups, complemented by guaranteed prices for surplus electricity under the Microgeneration Support Scheme.
- **Extend the exemption** from the requirement to get planning permission to rooftop solar for homes, community buildings, schools and farms.
- **Run successive RESS auctions** to award successful applicants with a guaranteed price for the renewable energy generated.
- **Remove VAT** on solar panel supply and installation in residential properties.
- **Enhance grants under TAMS 3** for farmers investing in solar installations.

# POLICY AND REGULATORY CHANGES

## A Sunny Story

Policy decisions have had a favourable impact on solar energy adoption in Ireland. Since the launch of the Microgeneration Support Scheme in February 2022, 16,819 homes have received grants to install solar panels.<sup>7</sup> The scheme's expansion to businesses in 2022 has resulted in approximately 1,709 businesses receiving grants.<sup>8</sup>

By October 2023, 45 farmers had been awarded grants for solar installations under TAMS 3.<sup>9</sup> Additionally, last year, 20 solar projects were awarded contracts guaranteeing a fixed price for the electricity they generate over 15 years.

Each solar installation represents a local success story, enabling individuals, businesses, and communities to take direct climate action, reduce reliance on fossil fuels, decrease emissions, and save on electricity bills. Collectively, these efforts contribute to a national success story, enhancing Ireland's energy security, reducing emissions, and progressing toward the 8GW solar target for 2030.





# POLICY AND REGULATORY CHANGES



## Future Outlook: Sun!

The growth of Ireland's solar sector is driven by both top-down and bottom-up initiatives. At the European level, key policies such as the European Green Deal, the European Climate Law, the Fit for 55 package, the Solar Energy Strategy, and the Renewable Energy Directive III (RED III) are setting ambitious targets to connect up to 320 GW of solar PV by 2025 and 600 GW by 2030.

To further these goals, Europe's Solar Energy Strategy includes four key initiatives, designed to promote rapid, large-scale solar development:

- **European Solar Rooftops Initiative:** Mandates that key categories of buildings be fitted with solar panels by deadlines between 2026 and 2030.
- **EU Large-Scale Skills Partnership for Onshore Renewable Energy:** Addresses the skills shortage in the solar sector.
- **European Solar PV Industry Alliance:** Aims to establish a robust European PV manufacturing sector.
- **Permitting Package under RED III:** Requires Member States, including Ireland, to streamline and accelerate permitting procedures for renewable energy projects.

The future direction from Europe is clear and ambitious. At the Irish level, there has been steady growth in the volume of solar power connected to the grid, supported by an increasingly favourable legislative and policy framework. This framework is set to expand and evolve in alignment with European developments. While challenges and exciting developments lie ahead, the outlook for Ireland's solar sector remains sunny and promising.

# ENVIRONMENTAL AND SOCIAL IMPACT

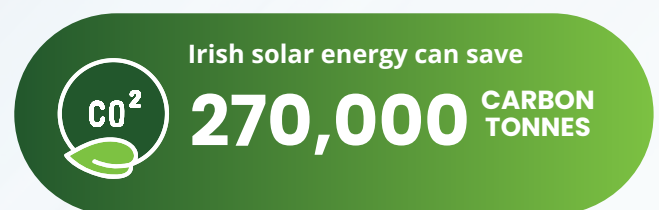
Solar will be a key part of Ireland's decarbonisation strategy. As Minister Ryan has highlighted, achieving our 2030 target of 8GW of solar PV could enable the country to be substantially powered by solar energy on sunny days.

Working in concert with wind and storage, solar forms a crucial triad of solutions capable of transitioning Ireland's electricity system to being predominantly renewable. Achieving the goal of a clean electricity system is within reach, provided we take the necessary actions.

Solar operates effectively at both large scales, contributing to the bulk supply of electricity, and at smaller scales, such as rooftop installations, meeting the demand of individual users and reducing overall demand. This dual capability of meeting both supply and demand allows solar to address energy needs locally and globally.

We have the necessary technologies across this trio of solutions. What we need now are the rules, systems, and infrastructure to integrate them seamlessly and realise the potential outlined in this report.

Decarbonising the power system means creating a future with surplus clean energy to power our society and lives. We are committed to working towards that future and call on stakeholders to support this transition.





# TRENDS IN SOLAR ENERGY

Since Heinrich Hertz built the first solar cell in 1887, the main aim of solar technology has been to maximise electrical output per square metre of panel. Today's commercial panels achieve efficiencies of about 23%, while lab records have shown potential for up to 47.6%.

Innovations in materials and structures, like Tunnel Oxide Passivated Contact (TOPCon) solar cells, perovskite solar panels, and Heterojunction (HJT) solar cells, are driving these improvements. Policy support from initiatives like the EU Green Deal and the US Inflation Reduction Act, along with increasing standardisation of module sizes, further boosts this progress.

**Combining solar power with storage solutions** can bridge the gap between increased electrification and renewable power generation. Pairing solar with storage allows for storing excess energy generated during peak sunlight hours for use when needed, providing a steady and reliable power supply. This increased controllability matches renewable output with rising demand from electrified applications such as heat pumps and electric vehicles.

**Integrating solar and wind energy** at both system and site levels optimises network use. Insights from BrightWind<sup>10</sup> reveal that wind tends to be available when solar energy production is lower, and vice versa—*wind often blows when the sun doesn't shine*—providing a complementary generation profile. This pairing allows for a more consistent energy supply throughout the day, enhancing grid utilisation and reducing reliance on fossil fuels. Policymakers and industry stakeholders are actively working on frameworks to unlock the full potential of this co-location approach globally and in Ireland, but we need to increase the pace of delivery.



# FUTURE OUTLOOK FOR SOLAR ENERGY IN IRELAND

The advancements in solar panel efficiency, storage solutions, and smart grid integration are driving substantial growth in Ireland's solar energy sector. With technological innovation, supportive policies, and market expansion, solar energy is poised to become a cornerstone of Ireland's renewable energy strategy, fostering a cleaner, greener, and more sustainable future.

## **Technological Advancements**

The global trends in solar technology are highly relevant for Ireland. Technological improvements will continue to enhance the value that solar energy delivers. For instance, bifacial solar panels, which absorb daylight from both sides, are now economically viable and in use, highlight advancements that can reshape market dynamics.

## **Market Expansion**

Solar energy is witnessing remarkable expansion across utility-scale, microgeneration, and commercial sectors in Ireland. With a pipeline which includes approximately 11GW of utility-scale projects,<sup>11</sup> 1 million suitable residential rooftops,<sup>12</sup> and around 2,700 commercial and industrial projects<sup>13</sup> either connected or in the process of connecting to the system, Ireland can meet its 2030 solar energy targets.

## **Long-term Sustainability Goals**

Ireland's long-term sustainability goals are anchored in its ambitious solar targets and supportive policies. As technology evolves and the market grows, solar energy will increasingly contribute to Ireland's sustainable energy future, especially with the potential future integration of storage and smart grid technologies enhancing system efficiency and reliability.



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  - Notes:
    - Images courtesy of Activ8 Solar Energies, Neoen Renewables, Pinergy SolarElectric, Power Capital Renewable Energy, and Statkraft.
    - The value of 680MW used in this report was rounded up from 679.84MW. ESB Networks data from 20/06/2023.

**B**EAUCHAMPS

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 **Pinergy**

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