



Report 2023

# Ireland

Oweninny Wind Farm - 13th Sep 2023. Source: SEAI.

**Authors** Connor Malloy, Shane Ó Húilín and John McCann, Sustainable Energy Authority of Ireland (SEAI).

**2023 marked an increase on the levels of deployment of new installed capacity relative to 2022. Dispatch-down in 2023 was equivalent to 8.9% of the total available wind energy, an increase on 2022 levels.**

2023 saw the completion of 2 renewable electricity auctions; the on-shore RESS 3 auction and Offshore Renewable Electricity Support 1 (ORESS1) auction. Judicial reviews of planning decisions, compounded by a protracted grid connection application process, continues to prolong the construction and energisation of additional wind farm capacity. The SEAI National Energy Research Development and Demonstration (RD&D) Fund provided a total value

of 5.39 million Euro to wind energy related RD&D projects. Progress was made in relation to test and demonstration facilities at the Atlantic Marine Renewable Energy Test Site (AMETS) and MegaAWE Airborne Wind Test Site.

**Table 1. Key National Statistics 2023: Ireland**

Total (net) installed wind power capacity	4.68482 GW
Total offshore capacity	0.0252 GW
New wind power capacity installed	0.2592 GW
Decommissioned capacity (in 2022)	0 GW
Total electrical energy output from wind	11.7 TWh
Wind-generated electricity as percent of national electricity demand	37.33%
Average national capacity factor	28.6%
Target	9 GW onshore, 57 GW offshore by 2030
National wind energy RD&D budget	€20 million total SEAI RD&D budget

## Highlight(s)

- Increased target of 9 GW from onshore wind by 2030 (up from 7 GW in the previous Climate Action Plan), and at least 5 GW of offshore wind by 2030.
- New record of largest wind turbine rotor and generator size set: 158 m rotor for 6.1 MW turbine.
- 259 MW of new onshore wind generation capacity commenced operation in 2023.
- Final results of (ORESS1) the first Offshore Auction in Ireland, were announced in June 2023, for more than 3 GW of offshore wind.

80% of demand by 2030. There was an increased target of 9 GW from onshore wind by 2030 (up from 7 GW in the previous Climate Action Plan), and at least 5 GW of offshore wind by 2030, plus an additional 2 GW offshore wind for green hydrogen production. Interim targets include 6 GW onshore wind by 2025. CAP23 also included an action to establish an Accelerating Renewable Energy Taskforce, to focus on the development of onshore renewable generation, by addressing planning and grid-related constraints. A work programme is expected in Q2 2024. Work continued on the Renewable Electricity Spatial Planning Framework (RESPF) for onshore renewable electricity as part of the National Planning Framework, and an updated Offshore Renewable Energy Development Plan for marine renewable energy resources, all of which are expected to come into effect in 2024.

Ireland's mapping and spatial designation obligations as a member state under the recast Renewable Energy Directive. A 3-tier approach shall translate National targets to Regional and Local targets, in terms of km<sup>2</sup> of land and MW.

- As part of the National Planning Framework, the Department of Housing, Local Government and Heritage (DHLGH), and the Department of Environment, Climate and Communications (DECC) are developing a four-tier classification system for suitability of lands for hosting renewable electricity developments.
- Action EL/23/4 of the Climate Action Plan 2023 contains a commitment to having a new draft of Wind Energy Development Guidelines prepared by the end of Q4 2023, with revised Guidelines to be published in 2024 [1].

## Market Development

### Targets and Policy

- The Climate Action Plan 2023 (CAP23) was published in December 2022 [25], the second update to Ireland's Climate Action Plan 2019. CAP23 once again saw an increased target of renewable electricity to meet

- The RESPF outlines the intended supporting policy framework and implementation strategy for delivering onshore renewable electricity targets, as well as

### Progress and Operational Details

- 259.2 MW of new onshore wind generation capacity com-

menced operation in 2023, the majority of this additional capacity comprised wind farms supported under the Renewable Energy Support Scheme, RESS 1. No wind power capacity was decommissioned in 2023. No additional offshore wind generation capacity began operation in 2023.

- 1,537 GWh was produced from wind power during the month of December 2023 [15], the highest monthly total energy generation on record to date.
- The final results of Offshore Renewable Electricity Support 1 (ORESS1), the first Offshore Auction run under the Government of Ireland's Renewable Electricity Support Scheme, were announced in June 2023. Four offshore wind projects with a total Offer Quantity of 3,074 MW were awarded a contract offer for a total Deemed Energy Quantity of 12,117 GWh/A [2]. The Deemed Energy Quantity (DEQ) GWh-weighted average Strike Price was 86.05 EUR/MWh.
- The terms and conditions of the RESS 3 auction, the third onshore renewable electricity auction run by the Irish Government, were published in May 2023 [4]. A key difference between RESS 3 and previous Renewable Electricity Support Auctions is that community owned renewable electricity projects are no longer provided with a special auction category. Another key difference is that Unrealised Available Energy Compensation (UAEC) is a new "availability" provision in RESS 3, in substitution for curtailment compensation arrangements which were provided for in RESS 1 and 2. UAEC compensates (at the Strike Price) for availability not converted to generation for reasons of either curtailment or oversupply.
- The Irish Government an-

nounced a Small-Scale Renewable Electricity Support Scheme (SRESS) [5]. The Climate Action Plan 2023 (CAP23) stated a target of at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation. The SRESS will provide a 15-year support lifetime via a Feed-in Premium tariff for successful applicants, and the scheme will be open for applications on a continuous basis for the duration of the scheme.

- The final results of the RESS 3 auction, the third onshore renewable electricity auction run by the Irish Government, were announced in September 2023. Three onshore wind projects with a total Offer Quantity of 148.40 MW were awarded a contract offer for a total Deemed Energy Quantity of 454.99 GWh/A [3]. The Deemed Energy Quantity (DEQ), a GWh-weighted average Strike Price of the Successful Applicants (Combination of wind and solar projects) was 100.47 EUR/MWh. A timeline for the RESS 4 Auction is expected in Q1 2024.
- A 'Supplementary Note in Relation to Alterations to the RESS 2 Milestone Completion Date' was published in December 2023 by the Department of the Environment, Climate and Communications (DECC). Amongst the changes to milestone dates was a change to the commercial operation date (COD) from the 31st of December 2024 to the 31st of December 2025 [14].
- DECC published a series of indicative roadmap scenarios for Ireland's next offshore wind energy auction, Offshore Renewable Electricity Support 2.1 (ORESS2.1). ORESS 2.1 will procure 900 MW of offshore wind generation capacity from a state-selected provisional designated area, known as a

Designated Maritime Area Plan (DMAP) [X2].

- Dispatch-down is the curtailment and constraint of wind energy output. In the Republic of Ireland, the dispatch-down energy from wind resources was 1,124 GWh in 2023. This is equivalent to 8.9% of the total available wind energy [23]. This is an increase on 2022 figures, when dispatch-down energy from wind resources was 988 GWh, equivalent to 8.3% of the total available wind energy [24]. However, the 2023 figure is still below the peak dispatch-down of 11.4% in 2020.
- The System Non-Synchronous Penetration (SNSP) limit remained at 75% in 2023 (11). Eir-grid's Operational Policy Roadmap 2023-2030 [13] indicates that an operational trial of up to 80% will take place in the first half of 2024. SNSP is a real-time measure of the percentage of generation that comes from non-synchronous sources, such as wind and HVDC interconnector imports, relative to the system demand.
- 2023 saw records being broken in relation to the size of wind turbine technology being installed in the Republic of Ireland. In Q2 2023, a new rotor size record for a wind turbine installed onshore in the Republic of Ireland was set. A 149 m rotor installed at Arderroo Wind Farm [8], commenced electricity export to the Irish grid in June 2023. These wind turbines also utilise 5.X MW generators, a new generator size record at the time. However, in December 2023 new records were set by the Drumlins Wind Farm, consisting of 158 m rotor GE 6.1 MW wind turbines. The GE-158-6.1 MW wind turbine installed at Drumlins Wind Farm is also the first example of segmented blade technology being used at a wind farm in the Republic of Ireland [22], consisting

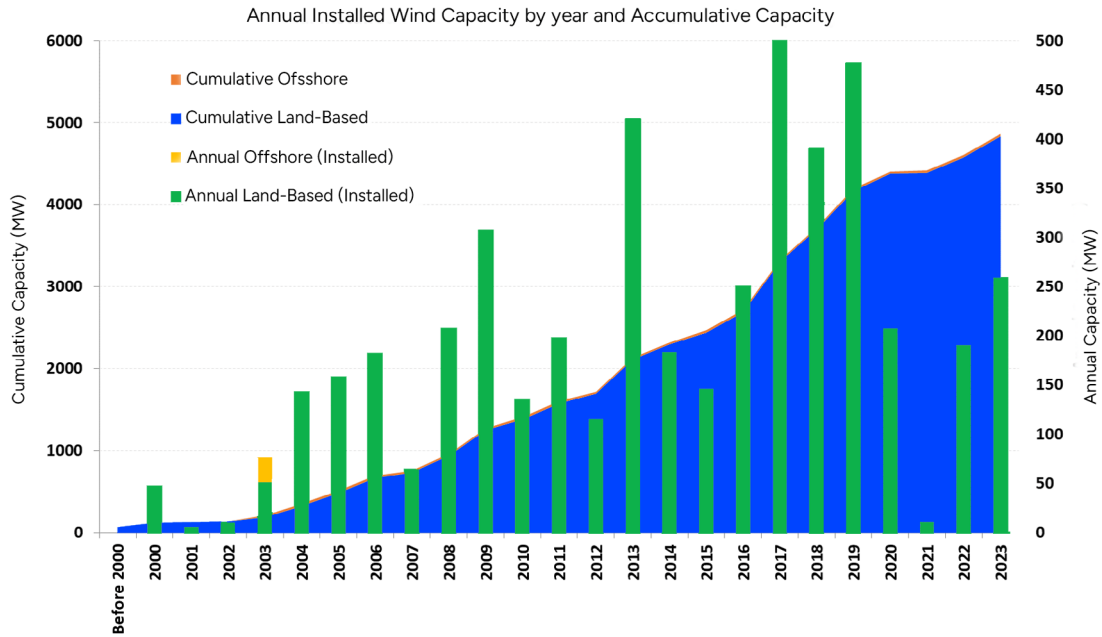


Figure 1: Annual installed wind capacity by year along with the accumulative installed wind capacity.

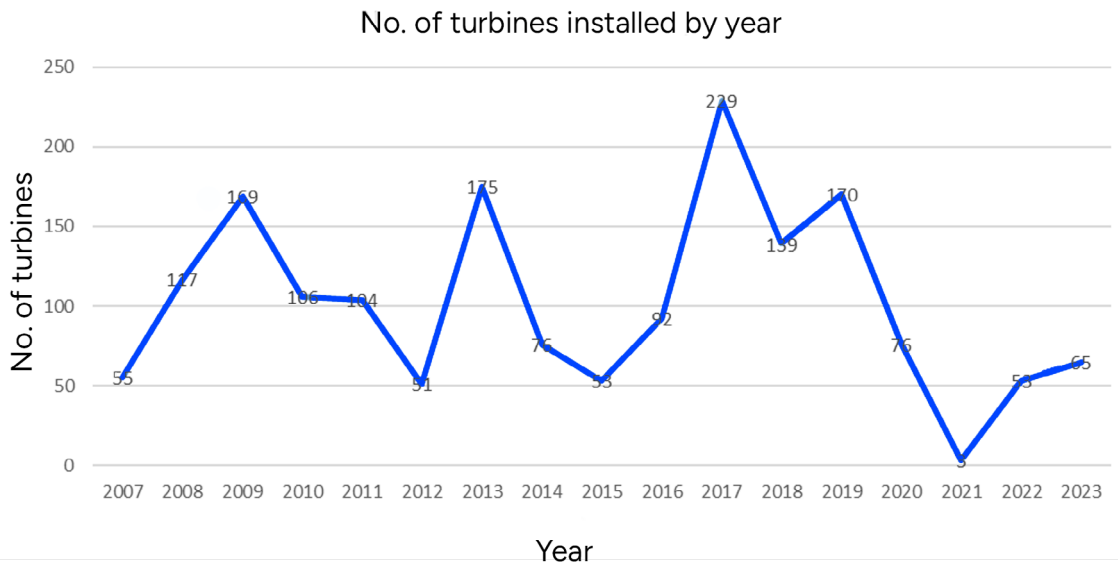


Figure 2: Number of turbines installed by year.

of a 65-metre-long main blade section and a 14-metre-long tip section.

### Matters Affecting Growth and Work to Remove Barriers

The main factor affecting growth continues to be a deficit in the pipeline of consented projects proceed-

ing to construction phase that would be necessary for Ireland to meet its 2030 target of 9 GW of onshore wind. Judicial reviews of planning decisions continue to prolong permitting times for wind farms and the grid connection application process is also protracted. The slow pace of deployment of renewable energy projects was brought to national attention at the end of 2023, as it

was revealed that only four decisions were made on wind farm planning applications by the Irish planning board, An Bord Pleanála, in 2023, with all four requiring judicial reviews. Overall, 34 wind projects were submitted for planning in 2023.

The Irish Government have assigned SEAI to the role of “Single Point of Contact” for all renewable energy

permitting processes as required by the 2nd Renewable Energy Directive (RED3), to provide developers with guidance on the permitting process.

## RD&D Activities

### National RD&D Priorities and Budget

The SEAI National Energy Research Development and Demonstration (RD&D) Funding Programme invests in innovative energy RD&D projects which contributes to Ireland's transition to a clean and secure energy future. A total of EUR 20 million in government funding was invested in the programme in 2023 [6]. The key programme objectives include the following:

- Accelerate the development and deployment in the Irish marketplace of competitive energy-related products, processes and systems.
- Support solutions that help overcome technical and other barriers to market uptake.
- Grow Ireland's national capacity to access, develop and apply international class RD&D.
- Provide guidance and support to policy makers and public bodies through results, outcomes and learning from supported energy projects [7].

### National Research Initiatives and Results

The following wind energy-related RD&D projects were funded in 2023, with a total value of EUR 5.39 million:

- Grid integration impacts of type 5 (hydrostatic transmission-based) wind turbines for the Irish power system, led by University College Dublin.
- LEProtect: Development of a

novel Leading Edge Protection system for offshore wind turbine blades, led by ÉireComposites Teo.

- SustaBlade – Development of Sustainable wind turbine blades using novel materials, led by ÉireComposites Teo.
- Sol-gel materials for fouling prevention on Wind Turbine Blades (SOLOBLADE), led by SouthEast Technological University (SETU) Carlow.
- Anchor and mooring selection for FLOW (AMS-FLOW), led by Atlantic Technological University.
- Floating Offshore Wind Technologies for the Atlantic Frontier (AtlanticFloat), led by University College Cork.
- Floating Offshore Wind Dynamic Cables (FIOWDyn), led by University College Dublin.
- De-risking Ireland's Floating Offshore Wind Targets (DIFOWT), led by Rockall Research Ltd.
- Innovation in Dynamic Cables for Offshore Renewable Energy, led by Trinity College Dublin.
- Optimising Offshore Wind Turbine Foundations Through Investigation of Pile Ageing Effects, led by Trinity College Dublin.
- **Co-Wind project:**

The Co-Wind project (Community Engagement in Wind Energy: Innovative approaches to achieving a social license) is a University College Cork project funded by the Sustainable Energy Authority of Ireland. It aims to better understand the ways in which community engagement in wind energy can be improved through combined measures focused on 1) public participation in decision-making, 2) direct investment and co-ownership in projects by the public and 3) enhancing current practice by developers in establishing commu-

nity benefits schemes. The project began in 2019 and was completed in 2023 [20].

- **SEAI's RESS Community Impacts research – Evaluating the impacts of community measures in the Renewable Electricity Support Scheme:**

An SEAI funded difference-in-difference study of people who live near 50 new commercial solar or wind farm projects in Ireland. The survey of 1,764 households - 1,116 of which were within 5 km of a new project – is the most comprehensive study of public attitudes towards onshore wind and solar in Ireland. This work was commissioned by SEAI and completed by Indecon Economic Consultants and Ipsos MRBI with technical support from the MIS-TRAL-ITN programme, with a total Project Cost to Date of 155,240 Euro [26].

Key findings from the research include:

\*Most households close to new wind or solar power projects have positive attitudes to the project close to them.

\*Across rural Ireland, general levels of support for wind and solar projects remain very high, as well as support for government policies that secure financial benefits for households and communities, such as 'Community Benefit Funds'.

\*A follow up study shall be commissioned in 2024/2025 to assess the impacts of the RESS policy.

**DG REFORM – Accelerating permitting for renewable energy – Improving incentives, spatial planning and acceptance for renewable energy development in Ireland.**

- DECC secured a technical support instrument from the Directorate-General for Structural Reform Support of the Europe-

an Commission for the project “Accelerating permitting for renewable energy – Improving incentives, spatial planning and acceptance for renewable energy developments in Ireland. The project kicked off in Q4 2023, with outputs expected in Q3 and Q4 of 2024. Highlights include: A review and evaluation of the Renewable Electricity Support Scheme (RESS).

- Specifications for a common online GIS mapping platform supporting consistent onshore renewable energy spatial planning.
- Recommendations for facilitating public engagement and acceptance for onshore and offshore renewable energy development.

### Test Facilities and Demonstration Projects

#### Ocean Test Sites In Ireland | Ocean Energy | SEAI

- Atlantic Marine Renewable Energy Test Site (AMETS).

The Atlantic Marine Energy Test site (AMETS) in Belmullet Co. Mayo is being developed by SEAI to test full scale pre-commercial offshore energy technologies with TRL ranging from 7 to 9. The development of the AMETS has progressed steadily over the last decade. SEAI has expanded the scope of the test site to include floating offshore wind technology testing where the test site is currently consented to test wave energy converters [8]. In 2023, the SEAI issued a notification via eTenders seeking companies and consortia with the expertise and skills capable of installing, operating and maintaining a Floating LiDAR System (FLS) at AMETS [21]. The construction of an onshore substation is scheduled for completion in 2025.

- MegaAWE Airborne Wind Test Site:

The MegaAWE Airborne Wind Test Site is led by Mayo County Council in partnership with Ampyx Power, RWE, Airborne Wind Europe and other organisations across Ireland, Europe and the UK. The project has also received funding from Interreg North West Europe. The test site is based in Bangor Erris, County Mayo on land leased from Bord Na Móna. The overall objective of the project is to bring large-scale multi megawatt Airborne Wind Energy. Testing commenced on the site in 2023 [19].

### Collaborative Research

- Ireland participates in 17 IEA Wind Tasks. In 2023, Ireland participated in IEA Wind Tasks 11, 25, 28, 30, 34, 39, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51 and 53. Meetings relating to Task 11, Task 25 (Wind Energy penetration within electricity power systems) and Task 53 (Wind Energy Economics) were hosted by the Sustainable Energy Authority of Ireland in March 2024.
- The Sustainable Energy Authority of Ireland, in collaboration with the International Energy Agency (IEA) Technology Collaboration Program (TCP), also hosted the Topical Expert Meeting (TEM) 113: Net Zero Electricity System Studies in Dublin in March 2024.
- An IEA TCP Task Appointment Call was issued by the SEAI in 2023 [12]. Following that process, there were successful applications to join two Tasks and Ireland is due to be added to IEA Wind Task 56 and 58 in 2024.

### Impact of Wind Energy

#### Environmental Impact

- In 2023, Ireland generated 3.3 TWh less electricity from fossil

fuels than in 2022, balanced by 3.0 TWh more electricity imported through international interconnectors and 1.0 TWh more renewable generation in Ireland [18]. In 2023, Ireland produced more wind energy than it extracted from its natural gas reserves (10.9 TWh) for the first time. Wind accounted for 50.8% of Ireland’s renewable energy.

### Economic Benefits and Industry Development

- The Minister for Enterprise, Trade and Employment announced plans to develop a National Industrial Strategy for Offshore Wind in May 2023 [16]. The National Industrial Strategy for Offshore Wind will be developed in consultation with the relevant government departments, agencies, and industry, with the objective of ensuring that Ireland fully captures the value of both the supply chain to deliver an OWE sector at scale, and the routes to market for this renewable energy.
- A draft version of the [17] SEAI Offshore Renewable Energy Technology Roadmap was formulated in December 2023, with a plan to publish in March 2024. The report assesses technology trajectories through techno-economic modelling scenarios where metrics such as annual deployment rates, technology performance and costs are utilised to produce projections of technology performance in the Irish market up to 2050. Techno-economic projections provide a basis for comparing the impact of different deployment pathways which vary the mixture of technologies utilised and the volumes of offshore renewable energy being delivered.

## Next Term

It is anticipated that wind farm projects with a total installed capacity exceeding 400 MW will be in various stages of development during the year 2024. These projects are expected to have completed construction phase or the final commissioning stage by year end. A timeline for the RESS 4 Auction is expected in Q1 2024. Eirgrid's Operational Policy Roadmap 2023-2030 [13] indicates that an operational trial of up to 80% SNSP will take place in the first half of 2024. It is hoped that the introduction of the Renewable Electricity Spatial Planning Framework for onshore renewable electricity in 2024 shall accelerate planning decisions and increase deployment. It is expected that the National Industrial Strategy for Offshore Wind will be published in Q1 2024 and complement a suite of government policies led by the Department of Environment, Climate and Communications through the Offshore Wind Delivery Taskforce. The Offshore Renewable Energy Technology Roadmap is due to publication in March 2024 [17].

## References

- [1] Oireachtas (2023). <https://www.oireachtas.ie/en/debates/question/2023-11-07/651/>
- [2] Eirgrid Group (2023). [https://www.eirgrid.ie/site-files/library/EirGrid/ORESS-1-Final-Auction-Results-\(OR1FAR\).pdf](https://www.eirgrid.ie/site-files/library/EirGrid/ORESS-1-Final-Auction-Results-(OR1FAR).pdf)
- [3] Eirgrid Group (2023). [https://www.eirgrid.ie/site-files/library/EirGrid/RESS-3-Final-Auction-Results-\(R3FAR\).pdf](https://www.eirgrid.ie/site-files/library/EirGrid/RESS-3-Final-Auction-Results-(R3FAR).pdf)
- [4] Government of Ireland (2023). <https://assets.gov.ie/255955/e7728c6a-0a48-4c20-b1ab-41b26d-f7f029.pdf>
- [5] Government of Ireland (2023). <https://www.gov.ie/en/publication/96110-small-scale-generation/>
- [6] Sustainable Energy Authority of Ireland, Research, Development and Demonstration Programme (2023). <https://www.seai.ie/news-and-media/energy-research-funding-1/>
- [7] Sustainable Energy Authority of Ireland, Research, Development and Demonstration Programme. <https://www.seai.ie/grants/research-funding/research-development-and-demonstration-fund/>
- [8] Nordex (2023). <https://www.nordex-online.com/en/2021/11/nordex-se-nordex-group-receives-order-for-101-mw-from-ireland/>
- [9] Sustainable Energy Authority of Ireland, National Energy Balance (2023). [https://www.seai.ie/data-and-insights/seai-statistics/key-publications/national-energy-balance/#:~:text=The%20provisional%20RES%20values1,RES%2DT\)%20was%205.5%25](https://www.seai.ie/data-and-insights/seai-statistics/key-publications/national-energy-balance/#:~:text=The%20provisional%20RES%20values1,RES%2DT)%20was%205.5%25)
- [10] Sustainable Energy Authority of Ireland, Energy in Ireland (2023). <https://www.seai.ie/publications/Energy-in-Ireland-2022.pdf>
- [11] Eirgrid (2023), Wind Dispatch Down - 2011 to Date (Table). <https://www.eirgridgroup.com/site-files/library/EirGrid/Wind-DD-Historical.png>
- [12] Sustainable Energy Authority of Ireland. <https://www.seai.ie/data-and-insights/international-energy-agency/seai-iea-tcp-appointment/>
- [13] Eirgrid (2023). <https://www.eirgrid.ie/site-files/library/EirGrid/Operational-Policy-Roadmap-2023-to-2030.pdf>
- [14] Government of Ireland (2023). <https://www.gov.ie/pdf/?file=https://assets.gov.ie/278167/faec4f1b-314a-4fbf-b72a-3fa0cccbe8fb.pdf>
- [15] Sustainable Energy Authority of Ireland (2023). <https://www.seai.ie/data-and-insights/seai-statistics/monthly-energy-data/electricity-monthly/#co>
- [16] Government of Ireland (2023). <https://www.gov.ie/en/press-release/4bd0b-minister-coveney-announces-plans-to-develop-a-national-industrial-strategy-for-offshore-wind/>
- [17] Sustainable Energy Authority of Ireland (2023). <https://assets.gov.ie/281532/c83f991a-da89-4b40-93bc-5f4118cc4363.pdf>
- [18] Sustainable Energy Authority of Ireland (2024). <https://www.seai.ie/data-and-insights/seai-statistics/key-publications/national-energy-balance/>
- [19] RTÉ. <https://www.rte.ie/news/business/2023/0925/1407170-rwe-and-kitepower-test-new-wind-technology/>
- [20] University College Cork. <https://www.seai.ie/documents/research-projects/RDD-000281.pdf>
- [21] eTenders. [https://irl.eu-supply.com/ctm/Supplier/PublicPurchase/232876/0/0?returnUrl=&b=E-TENDERS\\_SIMPLE](https://irl.eu-supply.com/ctm/Supplier/PublicPurchase/232876/0/0?returnUrl=&b=E-TENDERS_SIMPLE)
- [22] Energia. <https://energiagroup.com/renewables/onshore-wind-development/drumlins-park-windfarm/drumlins-park-construction-imagery/>
- [23] Eirgrid. <https://cms-prd.eirgrid.dept.ie/sites/default/files/publications/Annual-Renewable-Constraint-and-Curtailment-Report-2023-V1.0.pdf>
- [24] Eirgrid. <https://cms.eirgrid.ie/sites/default/files/publications/Annual-Renewable-Constraint-and-Curtailment-Report-2022-V1.0.pdf>

[25] Government of Ireland (2022),  
<https://www.gov.ie/en/publication/67104-climate-action-plan/#climate-action-plan-2023>

[26] Sustainable Energy Authority of Ireland (2023).  
<https://www.seai.ie/plan-your-energy-journey/for-your-community/enabling-framework/impacts-research/>