

## Country Reports

IEA Bioenergy: 09 2018

This report was prepared from the 2018 OECD/IEA World Energy Balances, combined with data and information provided by the IEA Bioenergy Executive Committee and Task members. Reference is also made to Eurostat and national Irish statistics. All individual country reports were reviewed by the national delegates to the IEA Bioenergy Executive Committee, who have approved the content. General background on the approach and definitions can be found in the central introductory report<sup>1</sup> for all country reports.

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## NATIONAL POLICY FRAMEWORK IN IRELAND

Irish renewable energy policy is framed in the context of legal obligations specified in various EU Directives and Regulations, as well as other international and national targets. The EU Renewable Energy Directive is important legislation influencing the growth of renewables in Europe and Ireland. Ireland's overall binding target under the Renewable Energy Directive is to ensure that at least 16% of gross final energy consumption is from renewable sources by 2020 (compared with 2.8% in 2005). The Renewable Energy Directive also specifies a mandatory national target of a 10% share of energy in transport to come from renewable sources by 2020. To meet the overall 16% renewable energy target Ireland has set further national targets for 40% of gross electricity consumption and 12% of gross final heat consumption to come from renewable sources by 2020. These targets are summarised in the table below.

Table 1: Ireland's 2020 renewable energy targets.

Sector	Share in gross final consumption per sector*
<b>Overall target</b>	16%
<b>Heating and cooling</b>	12%
<b>Electricity</b>	40%
<b>Transport</b>	10%

Source: National Renewable Energy Action of Ireland (2010)<sup>2</sup>  
 \*Based on calculation methodology detailed in Directive 2009/28/EC

<sup>1</sup> Available at <https://www.ieabioenergy.com/iea-publications/country-reports/2018-country-reports/>

<sup>2</sup> <https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans>

Under the EU effort sharing decision, Ireland must reduce emissions in those sectors outside of the EU emissions trading scheme by 20% compared to 2005 levels by 2020. No other EU country has a higher emissions reduction target and bioenergy deployment has an important role to play in delivering the required reductions.

The White Paper on Energy Policy, *Ireland's Transition to a Low Carbon Energy Future 2015-2030*, published in 2015, presents a long-term strategic vision that is intended to guide the direction of Irish energy policy to 2030. It identifies the long-term strategic importance of diversifying Ireland's energy generation portfolio and largely decarbonising the energy sector by 2050. The National Mitigation Plan (2017) outlines the supports and measures in place and planned to reduce emissions. Both of these documents take account of the actions outlined in the Draft Bioenergy Plan published in 2014.

## Electricity

Up to the end of 2015, a Renewable Electricity Feed In Tariff (REFIT) provided different support levels for several types of renewable electricity generation. Table 2 shows the list of technologies and the support offered. This scheme and its predecessors were successful in stimulating the deployment of renewable electricity generation, particularly wind. Ireland supplied over 25% of electricity demand from wind in 2016 placing the Irish system 3<sup>rd</sup> in the world for the penetration of wind generation. The deployment of bioenergy has also been helped by support for renewable electricity generation. In 2016 bioenergy technologies contributed 3.3% of total electricity demand in Ireland. The scheme closed to new applications in 2015 and a proposal for a new scheme is under development called the Renewable Electricity Support Scheme (RESS). The proposed scheme was presented for public consultation in 2017. The proposal outlines a scheme that will set a support price based on an auction process where all renewable generators would compete for market share.

Table 2 – REFIT 1, 2 & 3 Reference Prices for 2018 (in €/MWh)

Technology	2018
<b>REFIT 1</b>	
Large Scale Wind (> 5 MW)	69.999
Small Scale Wind (≤ 5 MW)	72.455
Hydro	88.42
Biomass - Land Fill Gas	85.964
Biomass - Others	88.42
<b>REFIT 2</b>	
Large Scale Wind (> 5 MW)	69.999
Small Scale Wind (≤ 5 MW)	72.455
Hydro	88.42
Biomass - Land Fill Gas	85.964

REFIT 3	
Biomass Combustion	89.671
Biomass - Energy Crops	100.221
Large Biomass CHP > 1500kW	126.595
Small Biomass CHP ≤ 1500kW	147.694
Large AD non-CHP > 500kW	105.496
Small AD non-CHP ≤ 500kW	116.045
Large AD CHP > 500kW	137.144
Small AD CHP ≤ 500kW	158.244

REFIT 1 Balancing Payment in 2018 = €10.50 (subject to CPI)
REFIT 2 & 3 Balancing Payment = €9.90 (not subject to CPI)

Source: Department of Communication, Climate Action and Environment (DCCAE)

## Transport

The Irish Government introduced the Biofuels Obligation Scheme in 2010 to ensure that a proportion of the transport fuel used in the State consists of environmentally sustainable biofuels. Biofuels are typically blended with fossil fuels and made available to consumers at the pump. The existing scheme places an obligation on suppliers of mineral oil to ensure that 8.695% (by volume) of the motor fuels (generally gasoline and motor diesel) placed on the market are produced from renewable sources. This has increased from a share of 4.166% in 2010. In 2016, biofuels accounted for 1% of total energy demand and 5% of transport demand (under the EUs Renewable Energy Directive accounting rules).

Support schemes and taxation measures also support the uptake of low emissions vehicles. For instance, a purchase grant of up to €5,000 and relief from vehicle registration tax of up to €5,000 are available for electric vehicles. The excise rate for natural gas used as a transport fuel is set at the minimum rate allowable under the Energy Tax Directive up to 2023.

## Heat

In December 2017, the Irish Government approved the introduction of a new scheme, the Support Scheme for Renewable Heat (SSRH), to increase the energy generated from renewable sources in the heat sector. The government funded scheme will support the adoption of renewable heating systems by commercial, industrial, agricultural, district heating, public sector and other non-domestic heat users not covered by the emissions trading system. The scheme will support projects through one of the following support mechanisms:

- (1) An on-going operational support (paid for a period up to 15 years) based on useable heat output in renewable heating systems in new installations or installations that currently use a fossil fuel heating system and convert to using biomass heating systems or anaerobic digestion heating systems. This support consists of a multi-annual payment (for a period of up to 15 years) on the basis of eligible heat use and prescribed tariffs. The tariffs paid will reduce with increasing output. Table 3 details the tariff structure for the eligible technologies.

- (2) A grant (of up to 30%) to support investment in renewable heating systems that use eligible heat pumps technology.

Table 3: SSRH tariff details

Tier	Lower Limit (MWh/yr)	Upper Limit (MWh/yr)	Biomass Heating Systems Tariff (c/kWh)	Anaerobic Digestion Heating Systems (c/kWh)
1	0	300	5.66	2.95
2	300	1,000	3.02	2.95
3	1,000	2,400	0.5	0.5
4	2,400	10,000	0.5	0
5	10,000	50,000	0.37	0
6	50,000	N/A	0	0

Source: Department of Communications, Climate Action and Environment

Other technologies and methods of support continue to be under consideration (including biomethane grid injection) for subsequent phases of the scheme.

### Other

**Carbon Tax:** The carbon tax was introduced in 2010, and applied to oil and gas products as well as solid fuels. At the moment, this is set at €20/tCO<sub>2</sub>. The Department of Finance is commissioning further analysis to inform the policy direction of the tax, with an examination of the mitigation and distributive impacts of the carbon tax as implemented and an assessment of its possible future price evolution.

**Afforestation scheme:** This scheme aims to increase Ireland's forest cover to 18%, comprises of certain types of trees and to generally encourage use in the domestic market. It also aims to increase carbon sequestration, enhance biodiversity and to develop a long-term sustainable rural economy. The scheme provides a fixed 100% grant of total costs consisting of two payments (75%) immediately after completion of the establishment works and the second instalment (25%) will be payable 4 years after planting. On-going premiums will be paid annually for 15 years.

A detailed description of all fiscal and non-fiscal supports for bioenergy development is available at: <http://www.iea.org/policiesandmeasures/renewableenergy/?country=Ireland>

## TOTAL PRIMARY ENERGY SUPPLY (TPES) AND THE CONTRIBUTION OF BIOENERGY

According to IEA statistics, the total primary energy requirement of Ireland in 2016 was 583 petajoule (PJ)<sup>3</sup>. Ireland reduced import dependence from 88% in 2015 to 69% in 2016 on imports due to the Corrib Gas field coming on stream and increased renewable deployment. In 2016, Ireland became an exporter of electricity for the first time since 2001, exporting 2.6 PJ of Electricity. The Irish energy system is still dominated by fossil fuels (more than 90%): 272 PJ oil, 178 PJ natural gas, 56 PJ coal and 31 PJ peat. Renewable energy sources have a share of 8% or 46 PJ – 3.6% bioenergy and 4.3% other renewable energy sources.

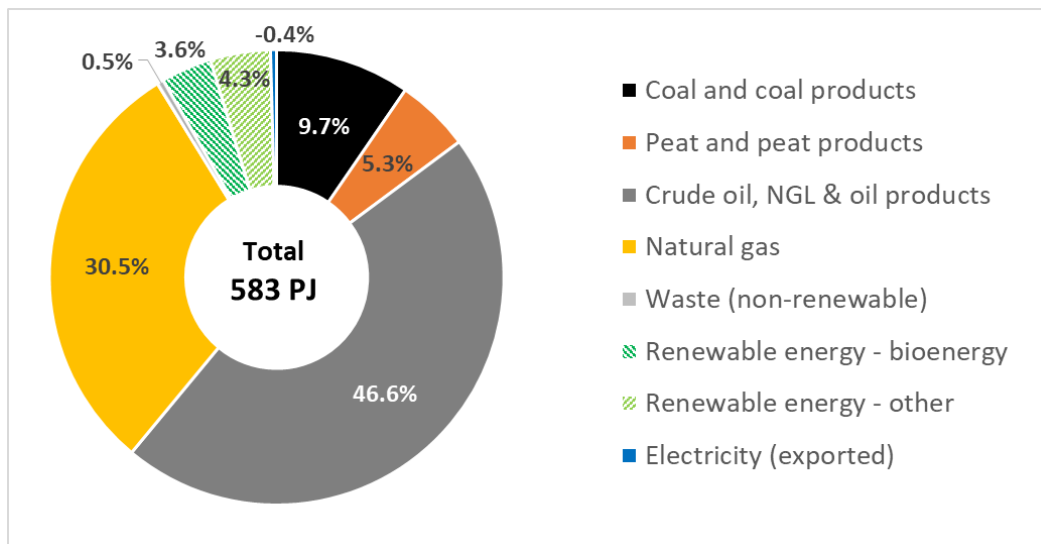


Figure 1: Total primary energy supply<sup>4</sup> in 2016 (Source: World Energy Balances © OECD/IEA 2018 Sustainable Energy Authority of Ireland (SEAI))

Compared to 5 years earlier (2011) the share of the different energy carriers remained relatively stable, with slight reductions for oil and natural gas. Renewable energy increased from 5.8% to 8%.

Wind energy (22 PJ) and bioenergy (21 PJ) are the most important renewable energy sources in Ireland. Hydropower represents 5% (2.5 PJ) of renewable energy primary energy supply and solar energy 1.3% (0.6 PJ). Irish statistics also report 2.3 PJ geothermal energy, which are not in IEA statistics. This is likely due to different definitions / methodologies (e.g. if ground energy for heat pumps are included).

Bioenergy is used to generate renewable energy for transport, heat and electricity. Bioenergy is the largest renewable source in the heat and transport sectors.

<sup>3</sup> Irish statistics report a slightly higher TPES of 603 PJ, with the main difference in oil products (289 PJ instead of 272 PJ). Source: Sustainable Energy Authority of Ireland (SEAI)

<sup>4</sup> TPES underestimates the actual role of pure electricity sources like PV, wind or hydro energy, and overestimates the role of resources producing electricity with a high share of unused waste heat.

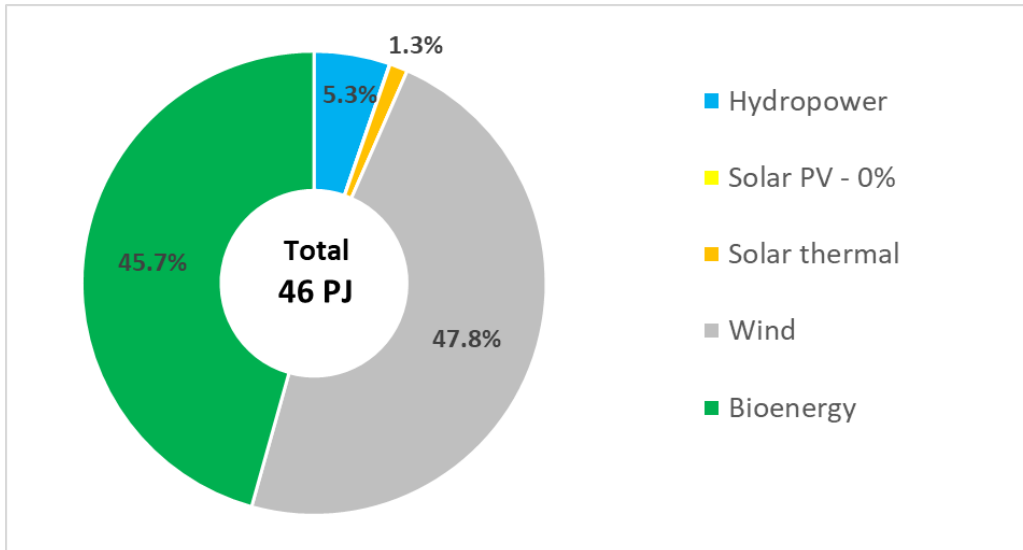


Figure 2: Total primary energy supply of Renewable Energy Sources in Ireland in 2016 (Source: World Energy Balances © OECD/IEA 2018)

Two thirds of the bioenergy consumed in Ireland comes from solid biomass (11.3 PJ) and renewable MSW (2.7 PJ). Biodiesel (3.4 PJ) and bioethanol (1.4 PJ) together represent almost a quarter of bioenergy consumption. Biogas represents another 11%, which is mostly landfill gas (1.7 PJ) and some biogas from anaerobic digesters (0.67 PJ).

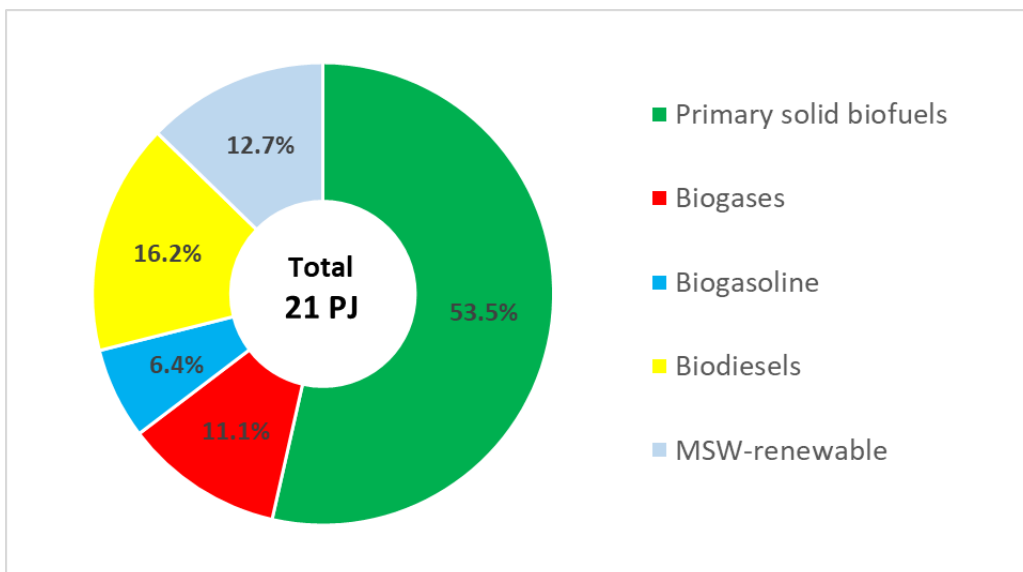


Figure 3: Total primary energy supply from bioenergy in Ireland in 2016 (Source: World Energy Balances © OECD/IEA 2018 and SEAI)

Bioenergy consumption in Ireland increased almost fourfold from 2000 to 2016, with the share of bioenergy in total primary energy supply going from 1.0% in 2000 to 3.5% in 2016. In 1990 most bioenergy came from solid biomass, which accounted for 4.4 PJ. Meanwhile, solid biofuels together with renewable MSW have increased to 14 PJ. Landfill gas was introduced after 1995 and experienced a relatively high growth up to 2010. Since 2010 levels have stabilized at 2 PJ. Biogas from anaerobic digesters is slightly growing. Liquid biofuels were introduced between 2005 and 2010 and have increased to 5 PJ in 2016.

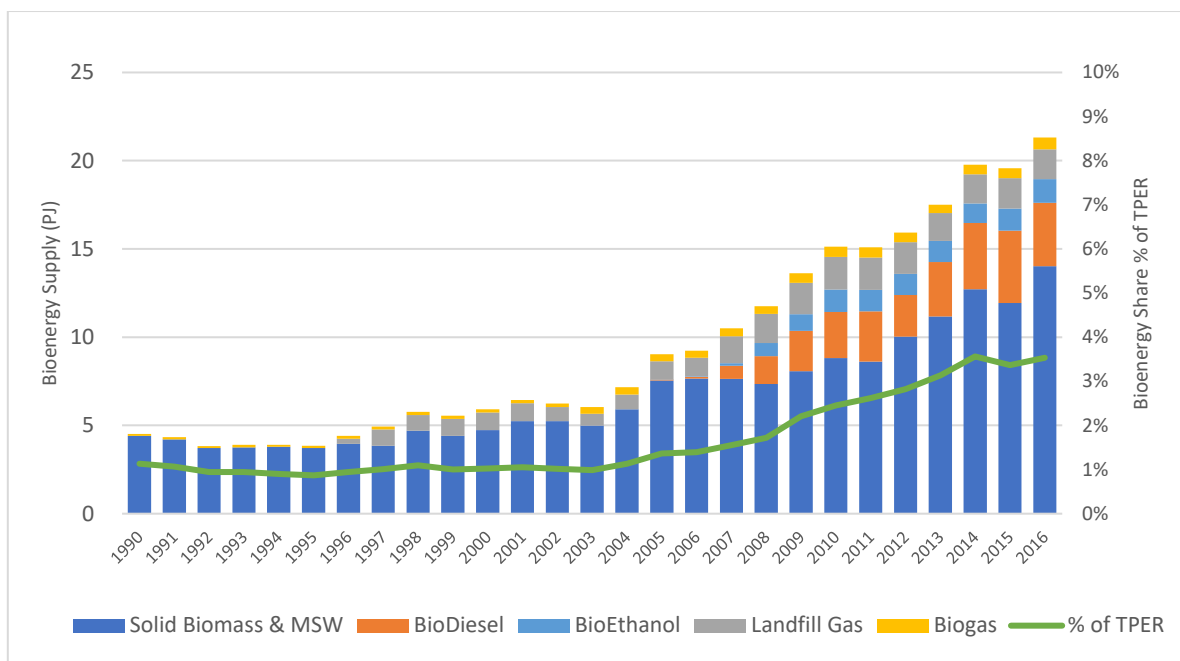


Figure 4: Development of total primary energy supply from bioenergy in Ireland 1990 – 2016 (Source: SEAI)

The following table expresses the 2016 TPES figures per capita, considering Ireland’s population of 4.75 million people. Compared to the other 22 member countries of IEA Bioenergy (expressed per capita), Ireland ranks halfway for renewable MSW, biogas and liquid biofuels, and in the lower end for solid biomass.

Table 4: Total primary energy supply per capita in 2016

	GJ/capita
<b>Total energy</b>	124.6
<b>Bioenergy</b>	4.5
<b>Solid biofuels</b>	2.4
<b>Renewable MSW</b>	0.6
<b>Biogas</b>	0.5
<b>Liquid biofuels</b>	1.0

Source: World Energy Balances © OECD/IEA 2018

### Role of bioenergy in different sectors

Ireland has a relatively important (and increasing) share of renewable electricity, which is predominantly wind energy, and a relatively small role for biomass-based electricity. The share of biofuels for transport amounts around 3%. Overall, the direct share of biomass for heating in the different sectors is around 5%.

**Table 5:** Role of bioenergy and renewable energy in electricity production, transport energy consumption and fuel/heat consumption in 2016

Sector	Share of bioenergy	Share of renewable energy	Overall production/consumption
<b>Electricity production</b>	2.3%	24.9% (20.4% wind)	30.1 TWh (108 PJ)
<b>Transport energy (final consumption)</b>	2.9%	2.9%	168 PJ
<b>Overall fuel and heat consumption<sup>5</sup></b>	5.4%	5.8%	184 PJ

Source: World Energy Balances © OECD/IEA 2018

According to Eurostat<sup>6</sup>, the following renewable energy shares in gross final energy consumption were reached in Ireland in 2016:

- Overall share: 9.5%
- In heating and cooling: 6.8%
- In electricity: 27.2%
- In transport: 5.0%

Mind that some of these figures can differ from the IEA derived data because of different accounting rules, particularly for renewable energy in transport.

## RESEARCH FOCUS RELATED TO BIOENERGY

Bioenergy research in Ireland is funded by a number of State Agencies and undertaken in research centres and universities. Some state agencies also compete for funding and carry out research.

The Sustainable Energy Authority of Ireland (SEAI) provides energy research funding to Ireland-based projects which contribute to Ireland's transition to a clean and secure energy future through its Research, Development & Demonstration (RD&D) Funding Programme. SEAI RD&D Funding is available to Companies, Research Performing Organisations (e.g. Universities, Institutes of Technology and Research Institutions), public sector bodies and semi-state bodies which are based in the Republic of Ireland. In 2018 SEAI committed €2 million to energy research. Bioenergy projects are funded through the Programme as are many different types of sustainable energy projects. SEAI supports the development and demonstration of new technologies, practises and/or supply chain innovations across the bioenergy sector. The 2018 call includes 4 themes related to bioenergy as well as an open call. Key themes included citizen participation in energy projects, the small scale aggregation of biogas for grid injection and an investigation to quantify the impact of applying circular economy principles to the Irish biomass sector.

Science Foundation Ireland (SFI) is Ireland's national foundation for investing in scientific and engineering research in academic institutions. SFI focuses most of its research investment on projects at

<sup>5</sup> This includes final consumption of fuels and heat in industry, the residential sector, commercial and public services and agriculture/forestry. Transport fuels are excluded. Energy used for transformation and for own use of energy producing industries is also excluded.

<sup>6</sup> [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg\\_ind\\_335a&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_335a&lang=en)



technologies readiness levels (TRL) 1 (basic principles observed) and 2 (technology concept formulated), but aspects of some projects can also involve higher technology readiness levels (e.g. in the ICT space where moving between TRLs can be rapid). SFI funds individual researchers in academic institutions at all career levels from Postdoctoral Research upwards as individuals as well as part of groups. Several academics engaged in the bioenergy and bioeconomy areas are funded through investigator led research. Two research centres are also funded:

- **BEACON: Bioeconomy Research Centre:** In Ireland, the agri-food and marine sectors produce high volumes of residues during food production. The conversion of these residues to higher value products will create new business opportunities. New value chains will allow these industries to diversify and add value to the sector, increase resource efficiency and complementing food production activities. 80% of agri-food companies are in rural Ireland; thus, the bioeconomy will be a key driver to stimulate rural and agricultural redevelopment. BEACON addresses multiple scientific, technological and social challenges to convert this vision into reality. The Centre is led by University College Dublin in partnership with Trinity College Dublin, University of Limerick, NUI Galway and the Irish agricultural agency Teagasc.
- **MaREI: Marine and Renewable Energy Research:** MaREI is the marine and renewable energy research and development centre supported by Science Foundation Ireland. It combines the expertise of a wide range of research groups and industry partners, with the shared mission of solving the main scientific, technical and socio-economic challenges across the marine and renewable energy sectors. MaREI has 180 researchers across six academic partner institutions, working with 46 industry partners. It is coordinated by the Environmental Research Institute (ERI) at University College Cork. MaREI has built upon the excellent track record of well-established marine and energy-based research groups across each of our academic partners, covering a range of cross-cutting topics across seven main research areas. The academic partners are University College Cork, University of Limerick, NUI Galway, Maynooth University, University College Dublin and Cork Institute of Technology.

Public funding also contributes to the test bed for bio-based innovation - tccb RESOURCE. The centre collaborates with industry and academia to support the scale up, demonstration and piloting of biobased technologies. The Irish Government also fund the International Energy Research Centre (IERC) as an industry-led collaborative research centre in the field of integrated sustainable energy systems. The IERC recently completed a project to develop the blueprint for a renewable gas certification scheme in Ireland in partnership with MaREI, DBFZ in Germany and industry partners from the gas industry in Ireland.

The Environmental Protection Agency also runs a research programme for projects which focus on research in the environmental sector. The EPA's annual research call has three pillars: Climate, Water and Sustainability and a total of €7 million was committed to projects in 2017. Several bioenergy and bioeconomy projects have been funded and topics such as air quality are addressed.

## RECENT MAJOR BIOENERGY DEVELOPMENTS

### Support Scheme for Renewable Heat (SSRH):

In December 2017, the Irish Government approved the introduction of a new scheme to support renewable heat, the Support Scheme for Renewable Heat (SSRH). This scheme's terms and conditions are currently being developed and it is expected to be operational in 2018, subject to European Commission State Aid approval (see earlier section for details).

### Renewable Electricity Support Scheme (RESS):

A new support scheme for renewable electricity is being developed. The proposed scheme seeks to set support levels through a competitive bidding processes (renewable electricity auctions) and all new RES-E schemes would provide support in the form of a premium in addition to the market price. Following on from the RESS public consultation and review, a final design proposal will be brought to Government for approval in the coming months (mid to late 2018), including the overall costs and technologies to be supported. Subsequent to a Government decision, a formal application for State Aid clearance from the European Commission will commence. The new scheme is expected to open in 2019.

### Biofuel obligation Scheme (BOS):

The Department of Communications, Climate Action and Environment recently conducted (Dec 2017/Jan 2018) a public consultation on proposed increases to the biofuel obligation rate and the future development of the scheme. In April 2018 a policy statement was published outlining increases to the biofuel obligation rate to 11.111% from 1 January 2019 and 12.360% from 1 January 2020 with further increases signalled for the period beyond 2020.

### Green Gas Certification:

An industry led project through the International Energy Research Centre has developed a blueprint for a certification scheme for biogas, biomethane and renewable gas. The project developed a methodology for calculating and accounting for, independently quantified and certified, GHG emissions savings from renewable gas.

### Bioeconomy Policy Statement:

The Government of Ireland has recently published a National Policy Statement on the Bioeconomy. Bioeconomy with the aim of capitalising on the potential to reduce Ireland's reliance on fossil fuel based resources by boosting the use of renewable biological sources. The policy statement was developed in consultation with interested parties working in the area in Ireland in the context of developments at an EU level and internationally. It aims to capitalise on the potential of the Bioeconomy by:

1. Ensuring policy coherence.
2. Establishing a Network of Stakeholders.
3. Translating Research to real Applications.
4. Identifying fundamental challenges to the commercial success and social development of the Bioeconomy.
5. Developing a framework for implementation.
6. Raising awareness of Bioeconomy and its products.

### Other Developments:

Other recent relevant climate action developments include:

- Climate Action Fund (Sept 2018): The fund will support initiatives and projects that demonstrate innovation and capacity building and contribute to the achievement of Ireland's climate and

energy targets. It has an allocation of at least €500 million over the period to 2027.

- National Adaptation Framework (Jan 2018): sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.
- National Mitigation Plan (July 2017): This plan specifies the policy measures required to progress towards Ireland's transition to a low carbon, climate resilient and environmentally sustainable economy by 2050. The plan also takes into account existing EU and international obligations on the State in relation to reducing greenhouse gas emissions. It is a whole-of-Government Plan, reflecting in particular the roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture – as well as drawing on the perspectives and responsibilities of a range of other Government Departments. The Plan has 106 distinct actions and provides for a robust governance framework which includes implementation and oversight through a High Level Steering Group, a statutory Annual Transition Statement and a commitment to more integration of climate change into government's Public Spending Code and annual estimates processes.

## LINKS TO SOURCES OF INFORMATION

National Mitigation Plan (2017): <https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/7/National%20Mitigation%20Plan%202017.pdf>

Energy White Paper (2015) "Ireland's Transition to a Low Carbon Energy Future":  
<http://www.dcenr.gov.ie/energy/en-ie/Energy-Initiatives/Pages/White-Paper-on-Energy-Policy-in-Ireland-.aspx>

Draft Bioenergy Action Plan (2014): <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/bio-energy/Pages/Bio-Energy.aspx>

Support Scheme for Renewable Heat:  
<https://www.dccae.gov.ie/documents/Scheme%20for%20Renewable%20Heat%20Scheme%20Overview.pdf>

Green Gas Certification scheme: <http://www.greengascert.ie/>

Renewable Electricity supports: <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/Pages/REFIT-Schemes-and-Supports.aspx>

Biofuels Obligation scheme: <https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/transport/Pages/Biofuels.aspx>

Afforestation scheme:  
<https://www.agriculture.gov.ie/media/migration/forestry/grantandpremiumschemes/2012/AfforestationSchemeFeb12.pdf>

Energy related RD&D in Ireland: <https://www.seai.ie/grants/research-funding/research-development-and-demonstration-fund/>

Official Energy Statistics for Ireland: <https://www.seai.ie/resources/energy-data/>



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