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**EXPRESS**



# Thematic seminar – Regional Energy Sector Analysis

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## EXPRESS

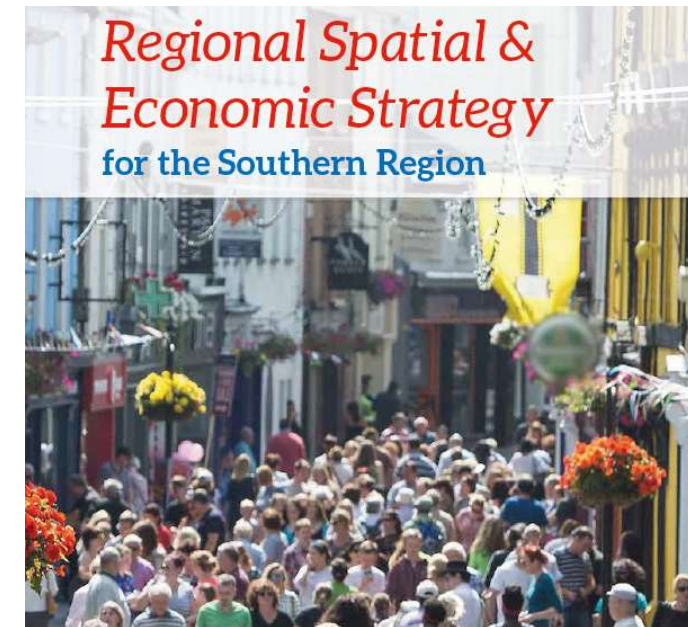
*The EXPRESS project aims to decrease the regions' dependency on energy imports and fossil energy and to increase their energy self-sufficiency and share of renewable energy by improving regional policies.*

### EXPRESS project's linkage to strategies and regional development work

Our focus will be on RPO 98 which aims **to support the development of a Regional Renewable Energy Strategy with relevant stakeholders.**

The Objective policy improvement is to improve some specific areas to assist in achieving this RPO as outlined under the RSES Project Charter for Regional Renewable Energy Strategy for the Southern Region as follows:

- Development of Renewable Energy Resources - Developing key actions that can be taken at regional level to achieve regional targets including setting out good practices for stakeholders and communities
- Awareness Raising, Engagement & Communications – Awareness raising, consciousness building, education/information – Creation of an effective way to understand outputs that will assist the communication strategy of the Regional Renewable Energy Strategy for the Southern region.



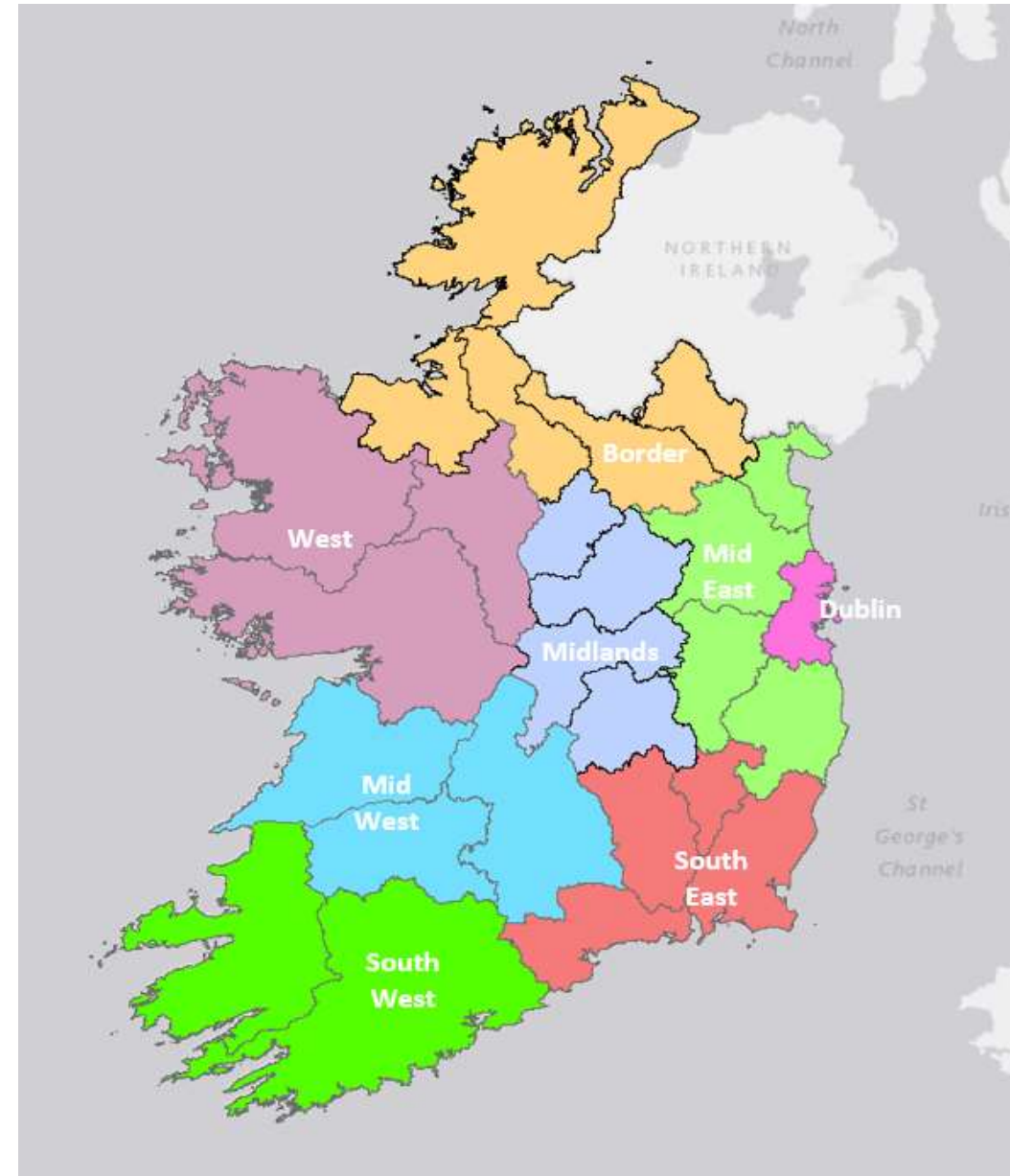
..... RPO 98 .....

**Regional Renewable Energy Strategy**

It is an objective to support the development of a Regional Renewable Energy Strategy with relevant stakeholders.

## South East Region of Ireland

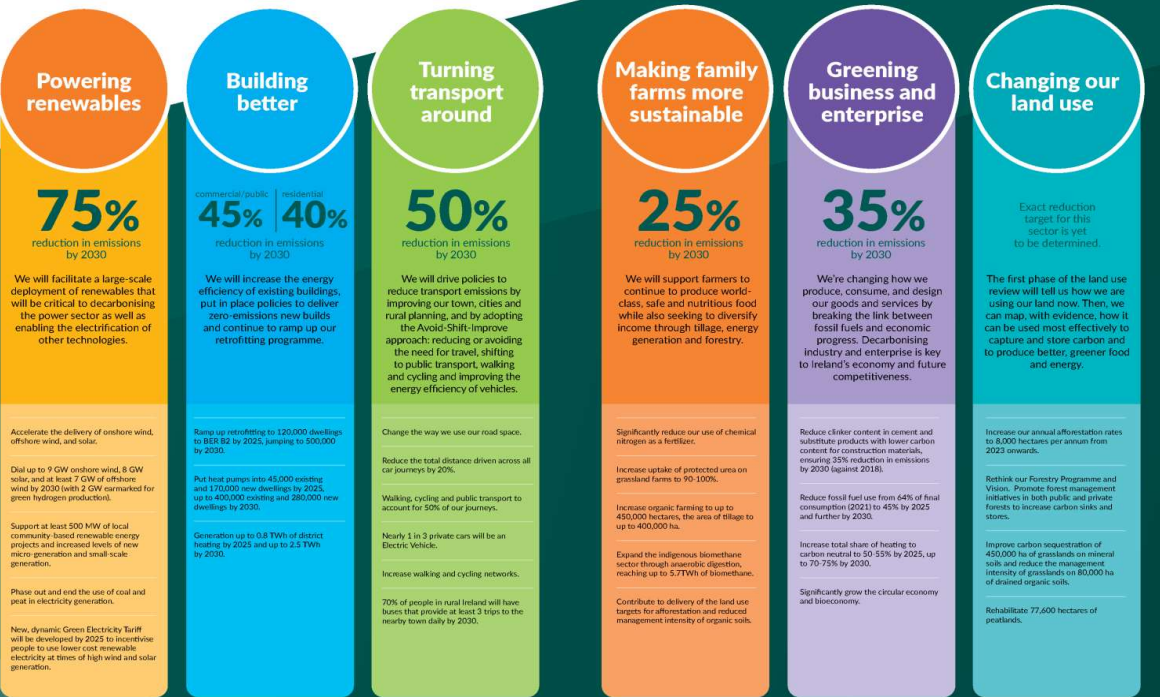
- The South East region of Southern Ireland generally includes counties such as Carlow, Kilkenny, Waterford and Wexford
- Each county has its own distinct characteristics, including natural landscapes, economic activities, and cultural heritage.



# Regional Context Assessment: Data on current situation, indicators

Ireland's Climate Action Plan 2023 focuses on six vital high impact sectors to achieve the regional energy and climate target by 2030 in the South East region. These sectors include energy, transport, agriculture, built environment, industry, and waste. Through various measures such as renewable energy promotion, sustainable agriculture practices, energy-efficient buildings, and waste management improvements, the plan aims to reduce GHG emissions and promote sustainability in the region.

## The Six Vital High Impact Sectors

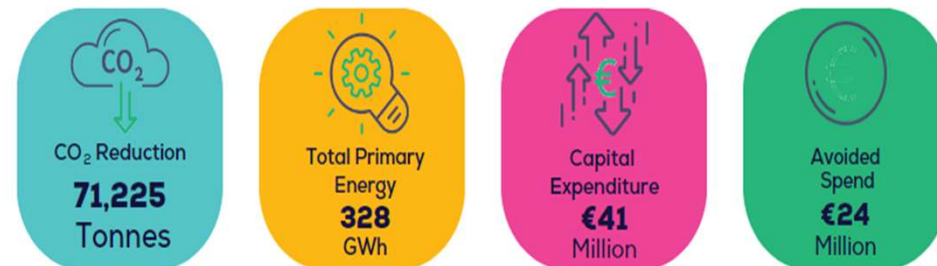


## Regional Energy and Climate Targets to 2030

Below are the Regional targets taken from the 2021 National Climate Action Plan. The South East Region represents 8.9% of the national total population. South East Energy Agency will support the region in achieving the targets set in the National Climate Action Plan.







## Progress



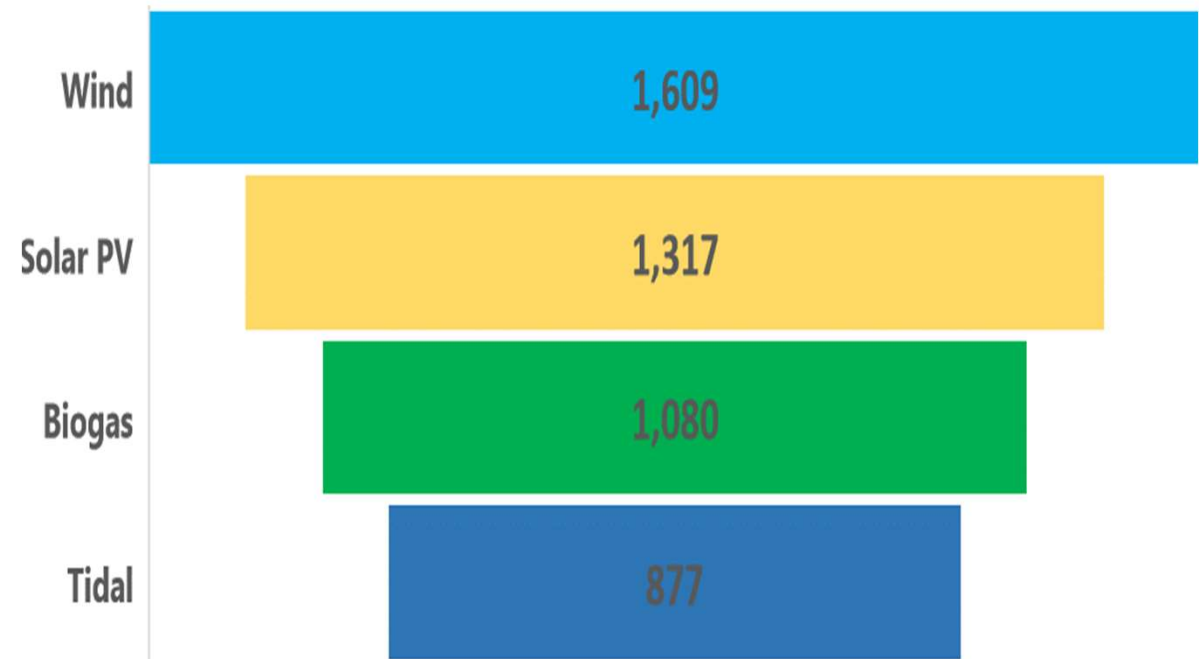
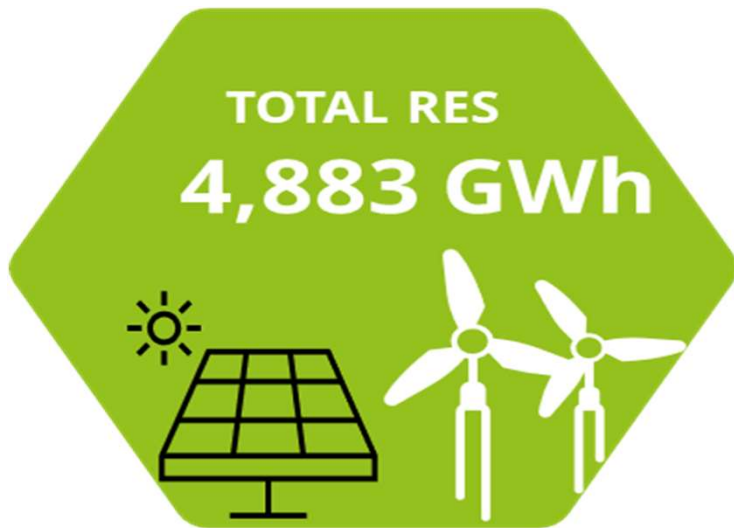
## EXPRESS in Southeast Ireland

The EXPRESS project objectives are to increase the share of **renewable energy in the participating regions**, increase the **energy self-sufficiency of the participating regions**, and improve **regional strategies to better consider the new energy sector operational environment** to enable a rapid transition to locally produced renewable energy for heating, electricity and transportation.

The South East Energy Agency (SEEA) will aim to **change the management of the policy instrument**. SEEA will intend to **influence the Regional Spatial and Economic Strategy (RSES)**. SEEA will work with the Southern Regional Assembly to:

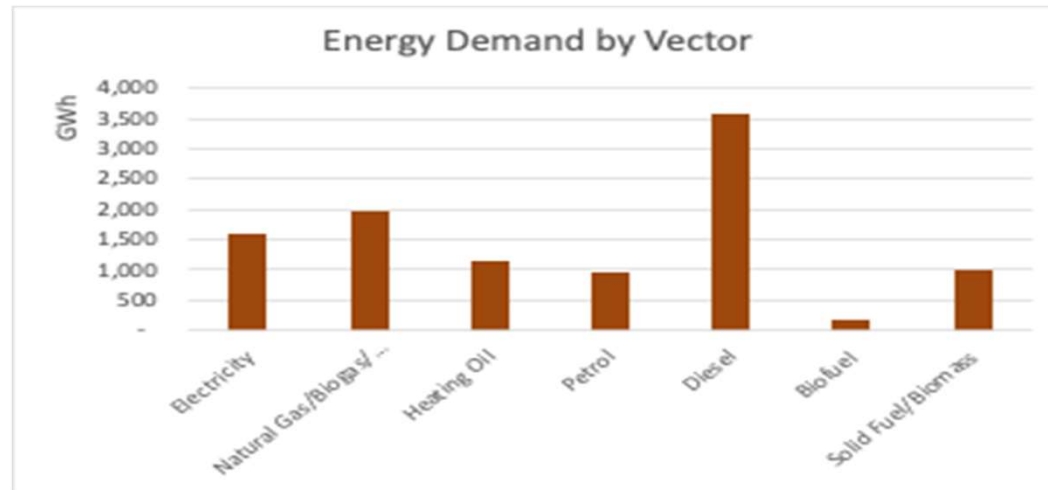
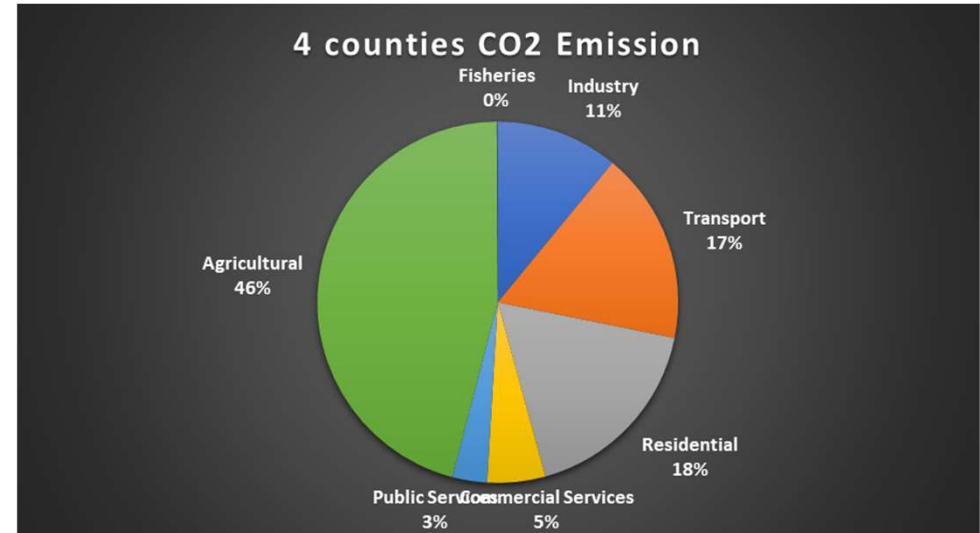
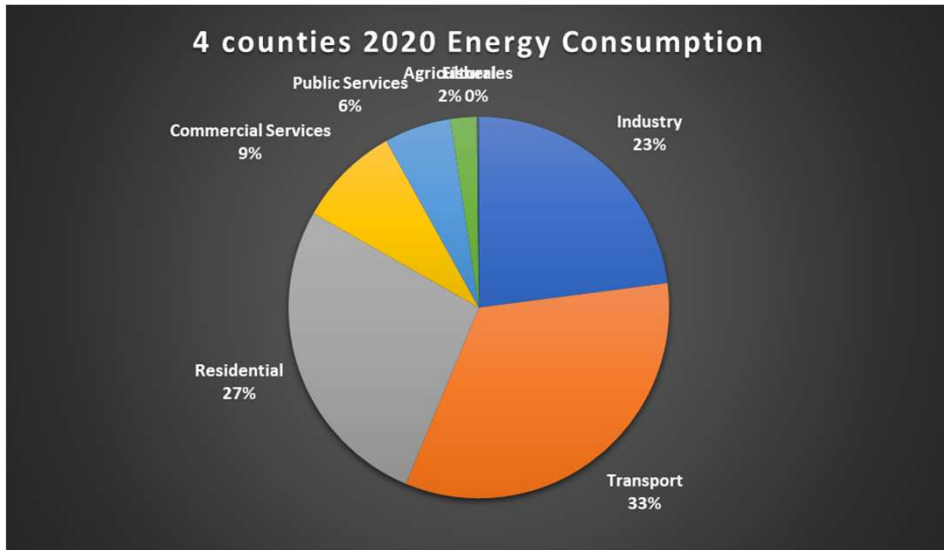
-  Revise and develop a methodology for evaluating and delivering the policy instrument.
-  Introduce new criteria for selecting the projects supported by the policy instrument.
-  Publicise/advertise proposals associated with the policy instrument.
-  Assist the managing committee, the Southern Regional Assembly, to implement the policy instrument.

## Indicative renewable energy resources in South East

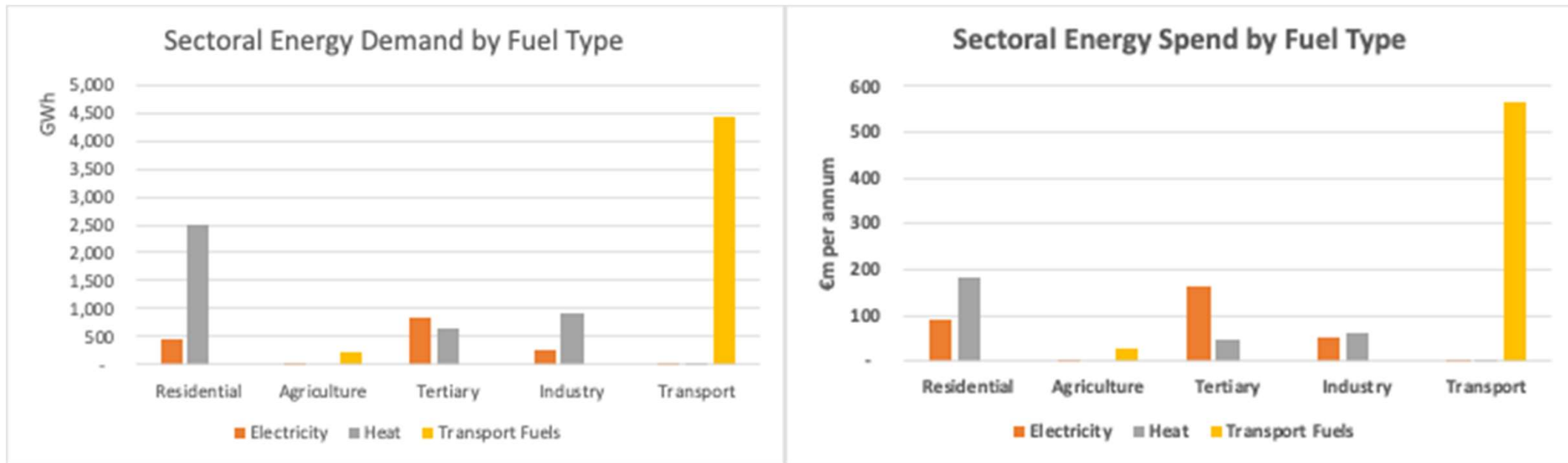


■ Potential Renewable Energy Production (GWh)

# Regional Energy Balance

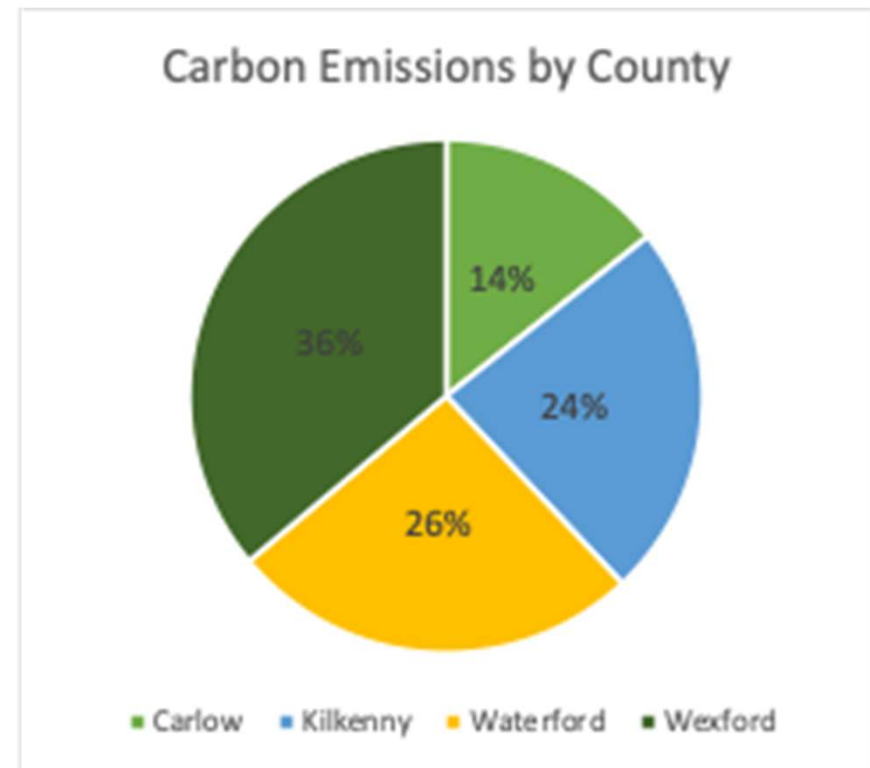
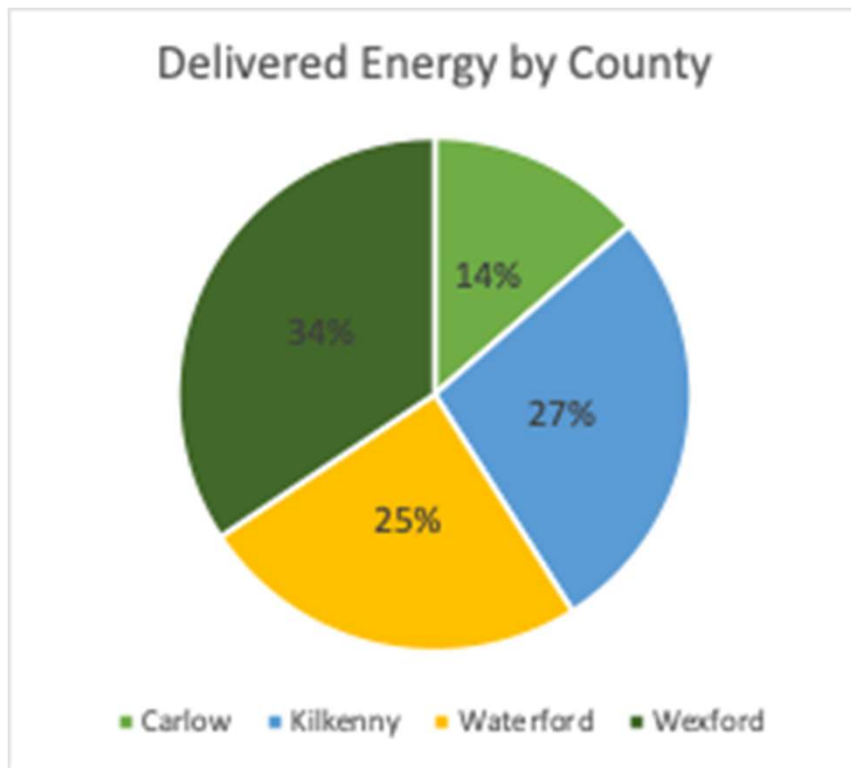


# Sectoral Demand by Energy Demand and Energy Spend





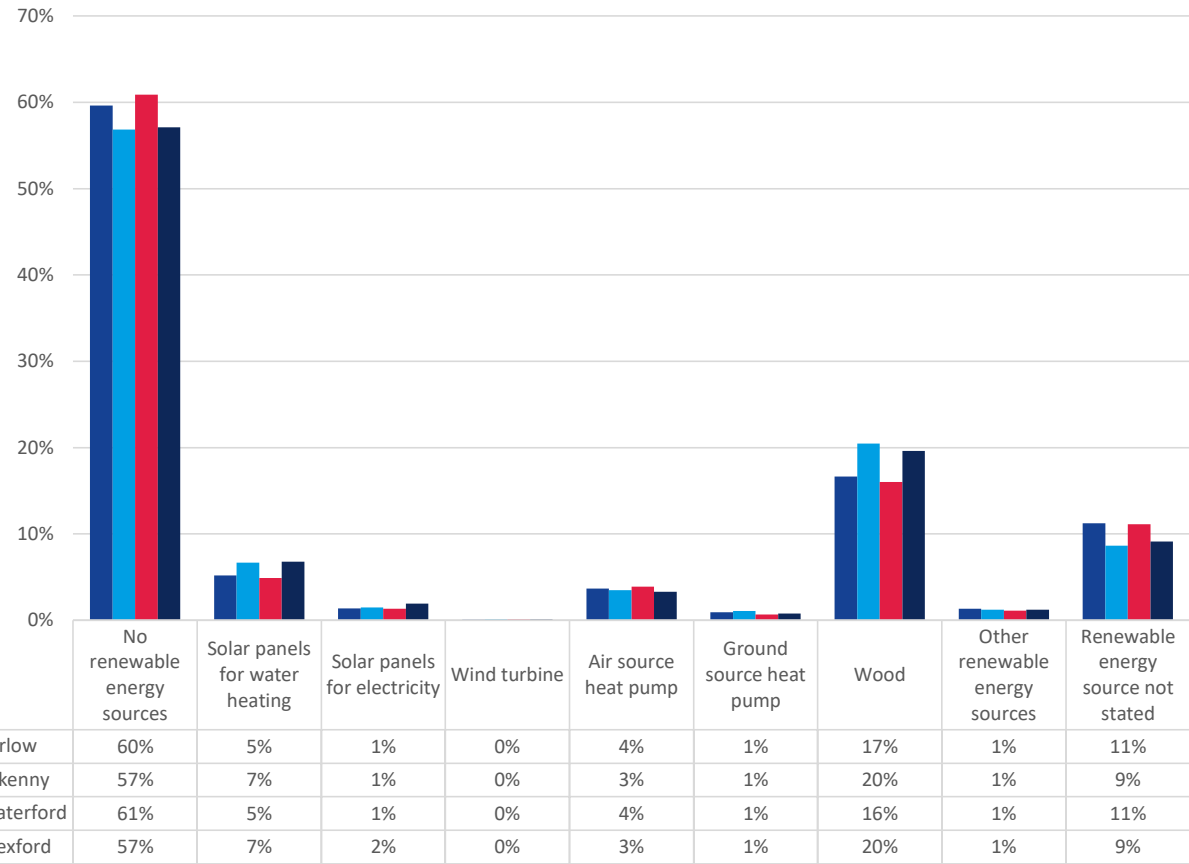
## Breakdown of energy demand and CO2 emissions by county



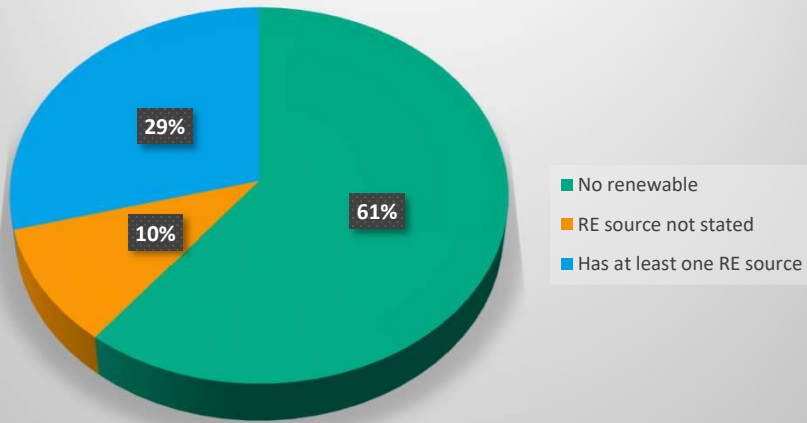
# NUTS 3 Region Renewable Energy Data

- **165,622 households in SE Ireland**
  - 100,427 – no renewable energy sources
  - 16,950 renewable energy source not stated
  - 48,245 has at least one renewable energy source of any type

Type & share of renewables utilised by households in SE region



Households with Renewable Energy Source in South East

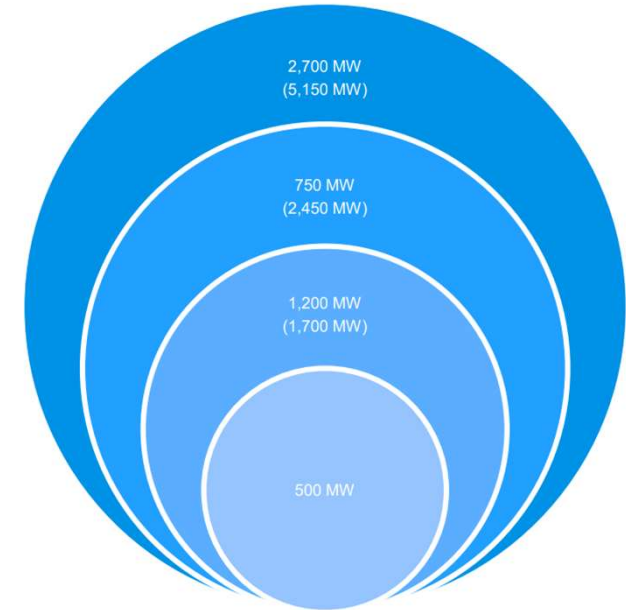


# Electricity Interconnection Policy

- Operational 500MW capacity link between ROI & NI.
- Contributes to EU's Projects of Common Interests (PCIs)
- Policy drivers are Commission for Regulation of Utilities (independent utilities regulator) and EirGrid (transmission system operator).

## Targets & policy objectives

- Increase Ireland's electrical interconnection capacity in line with evolving grid opportunities.
- Aimed to achieve 1,700 MW by 2026 & potential capacity of more than 5,000 MW by 2033.
- Connect EU member states in accordance with strategic intent and priority.
- Create the appropriate governmental, institutional, and regulatory frameworks.



**Fig. 1: Present and projected capacity for Ireland's grid interconnector**

### Upcoming projects

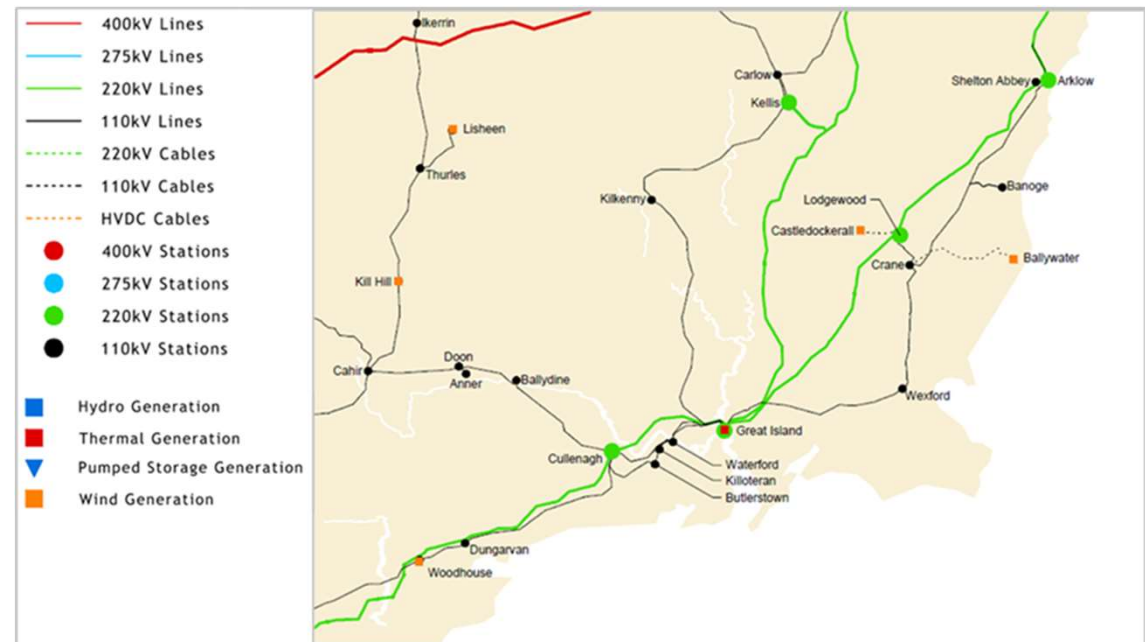
- Celtic Interconnector – 700MW subsea link between Ireland (Cork) and France.
- Greenlink Interconnector – 500 MW subsea to connect Ireland (Wexford) and Great Britain.

## Existing Transmission Infrastructure

The transmission network in the South-East region is characterised by 110kV and 220kV substations, overhead lines and cables. A number of assets could potentially be upgraded to a higher capacity.

**The South-East transmission network is characterised by 110kV and 220kV substations, overhead lines and cables.**

- South-east region has relatively strong connectivity to the greater Dublin area that accounts for c.40% of Ireland's electricity demand.
- **A number of existing 110kV circuits could be upgraded to provide additional capacity.** Typically, new 110kV overhead lines and cables have a maximum capacity rating of c.170MW.
- **Some existing 220kV circuits could be upgraded to provide additional capacity.** New 220kV circuits are typically rated to c.630MW

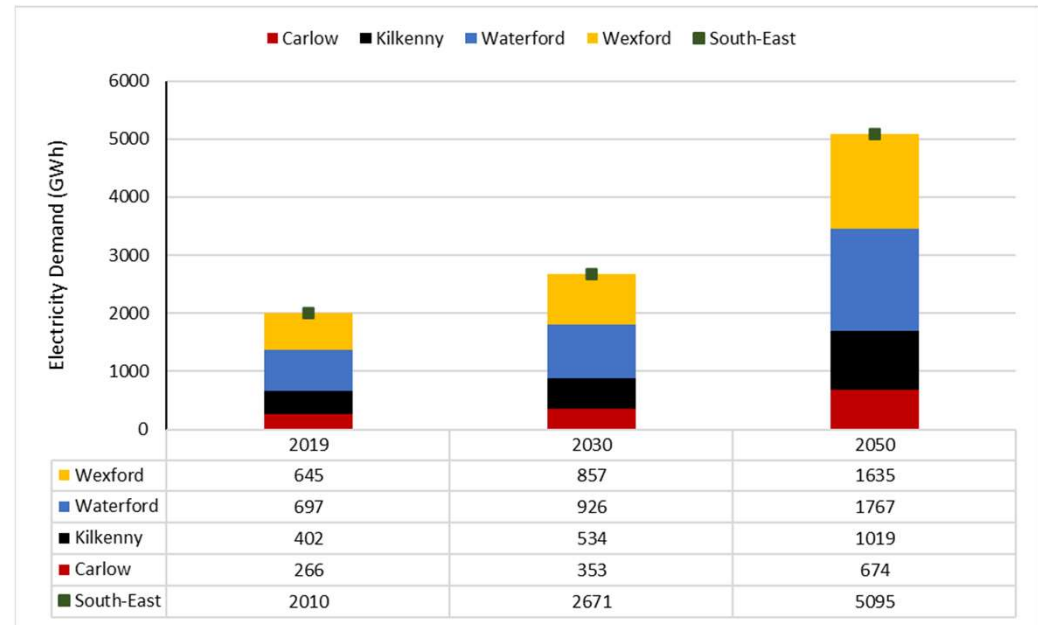


# Future Electricity Demand – Electricity Demand Projections

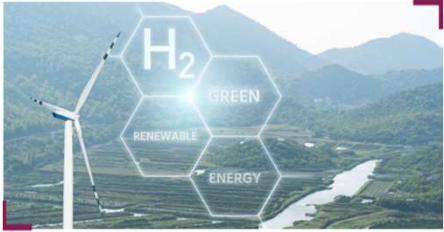
Electricity demand in the South-East region is estimated to increase by c.33% to 2030 and c.153% to 2050 based compared 2019 historical demand.

- Growth from data centres was not considered for the South-East region and therefore was excluded from the projections.
- High-level approach to projecting demand
- The actual uptake of electrified low carbon technologies is likely to vary significantly by county.

**In general, there is a lack of detailed electricity demand projections for the south east region for a net zero carbon system.**



# National Hydrogen Strategy



- Provides the long-term strategic vision of what role hydrogen will play in Irish economy.
- Hinged on 3 policy drivers.

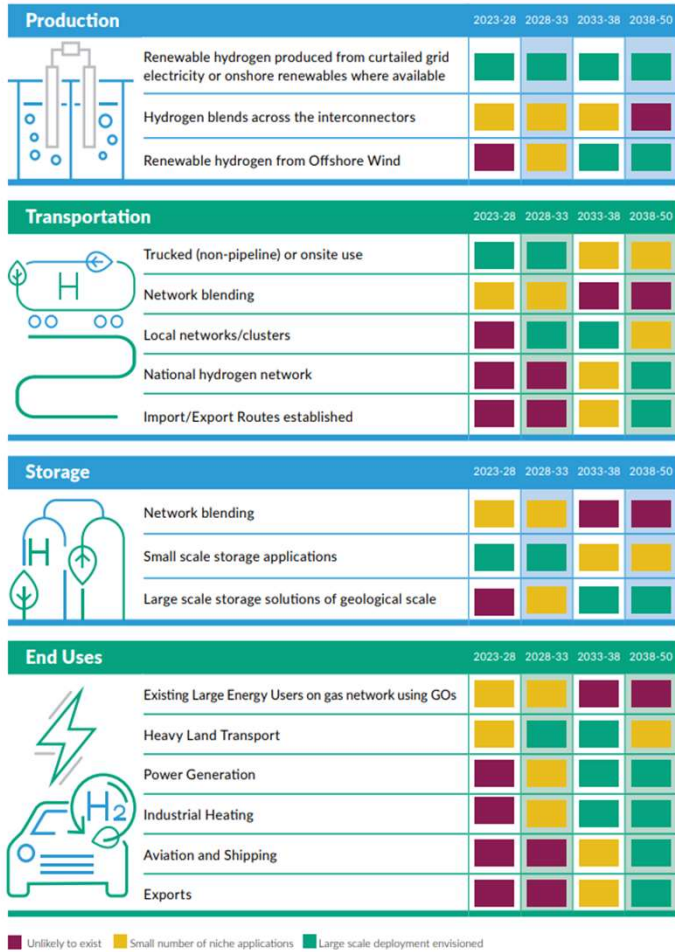
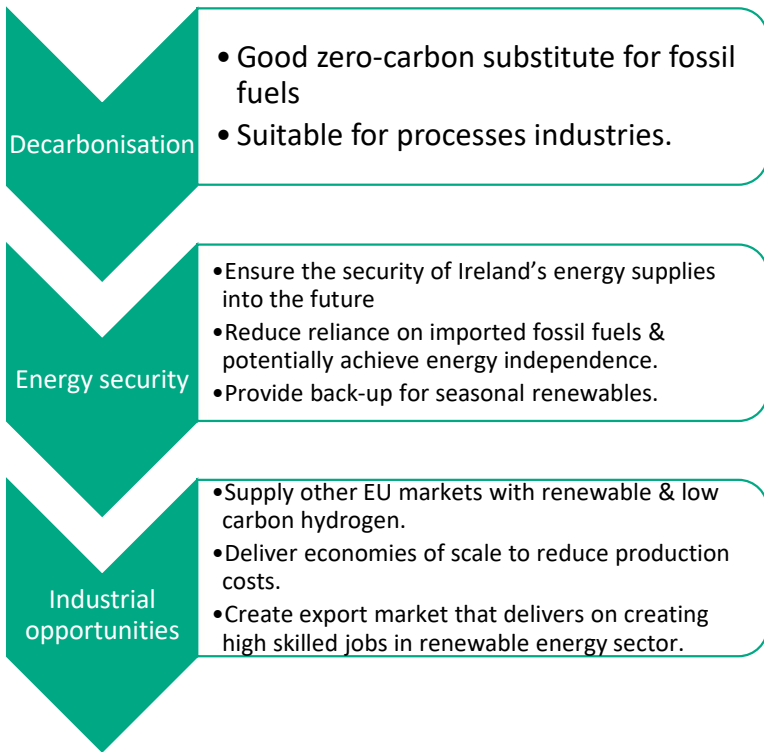


Fig. 2: Hydrogen value-chain development timeline



## Dublin Hydrogen bus

**Key facts:**

- Fleet number = 3
- 50 tonnes of CO<sub>2</sub> saved.
- 20,000 litres of diesel saved.
- 55,000 km emission-free distances covered

# Upcoming green hydrogen projects



## 2MW Mount Lucas Green Hydrogen facility

### Key facts:

- 200,000 kg of green hydrogen produced annually from wind energy
- 4 kt of CO<sub>2</sub> reduction from transport & heating sectors annually.
- Operational in 2025 & energy security along the value-chain.

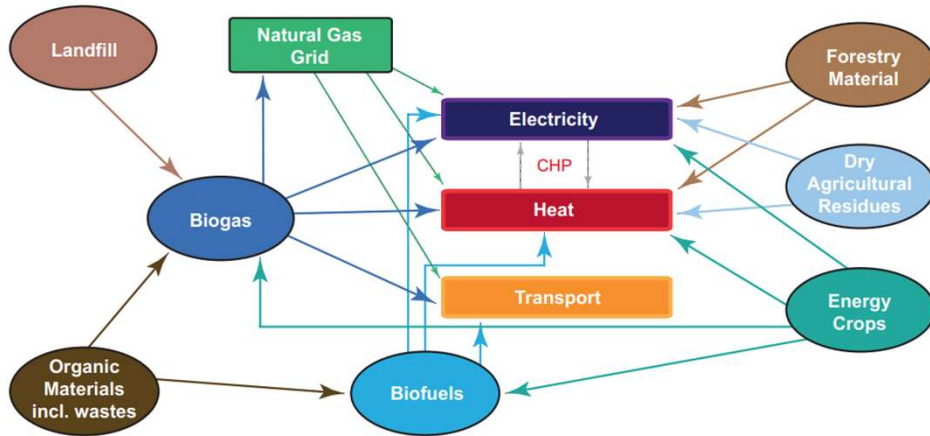


## Moneypoint Green Atlantic

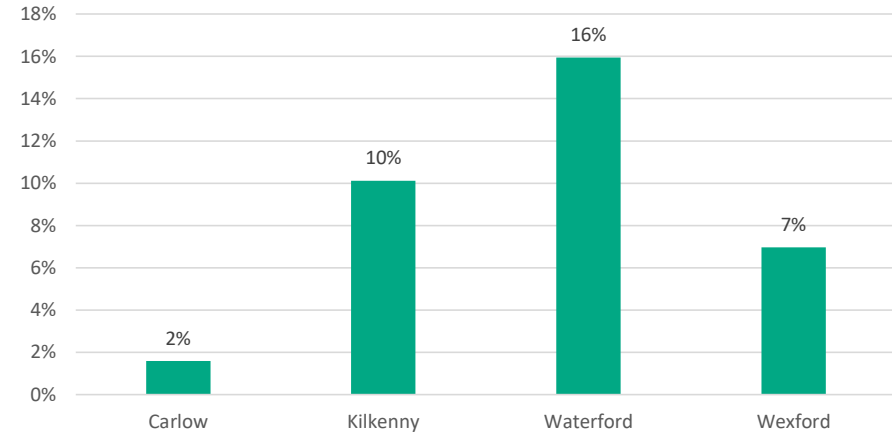
### Key facts:

- Transformation of coal plant to renewable energy hub.
- Green fuels production (renewable hydrogen & zero-carbon ammonia) from offshore wind.
- Co-location of 4 facilities – offshore wind, green fuels facility, green construction, new grid connection

# Bioenergy Plan



Land utilisation for biomass



## Area of land utilized for biomass production

- Carlow – 1,137.80 (ha)
- Kilkenny – 20,867.73 (ha)
- Waterford – 29,316.67 (ha)
- Wexford – 16, 390.55 (ha)

Scenario	Wood chips / pellets		Biomethane / biogas		Other (including bioliquids and bioLPG)	
	2030	2050	2030	2050	2030	2050
Baseline	6.3	5.3	2.2	2.2	0.3	1.1
Balanced	5.5	7.5	2.8	2.4	0.4	1.1
High Electrification	3.7	6.6	1.1	0.1	0.1	1.1
Decarbonised Gas	3.5	3.4	4.6	2.0	0.4	1.1
Rapid Progress	4.2	5.4	8.2	7.5	0.4	1.1



## What can biomass contribute to the region?

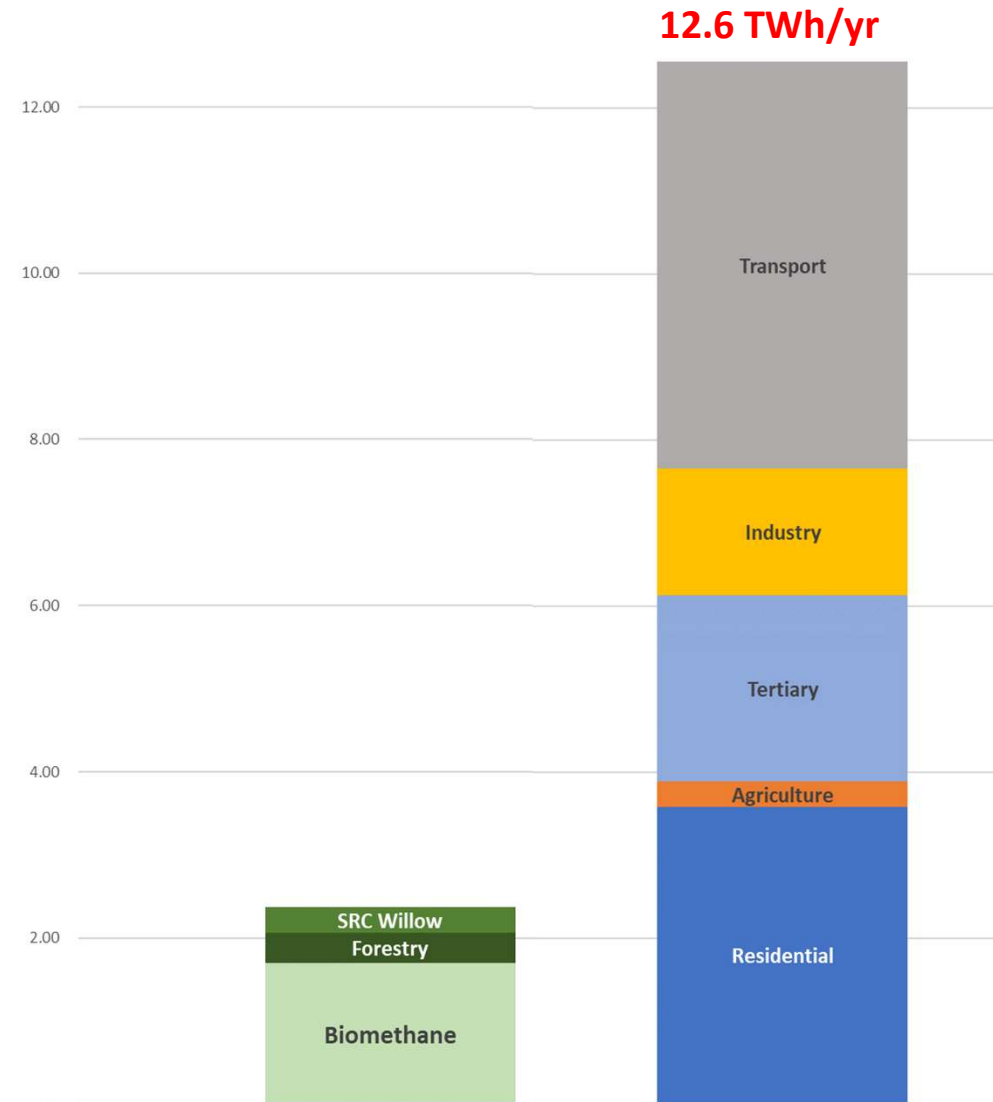
Biomethane can replace 86% of natural gas used

Solid biomass can replace 60% of heating oil used

Meet 19% of the region's energy demand

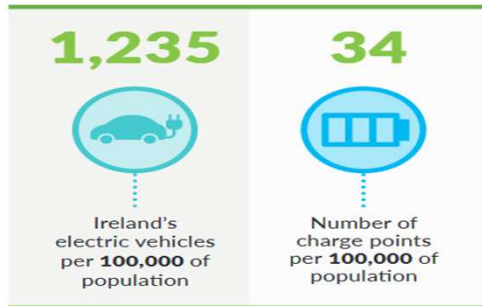
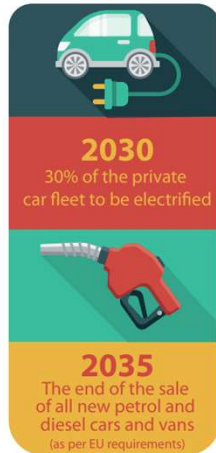
Reduce CO2 emissions by 15%

Reduce import dependency by 20%

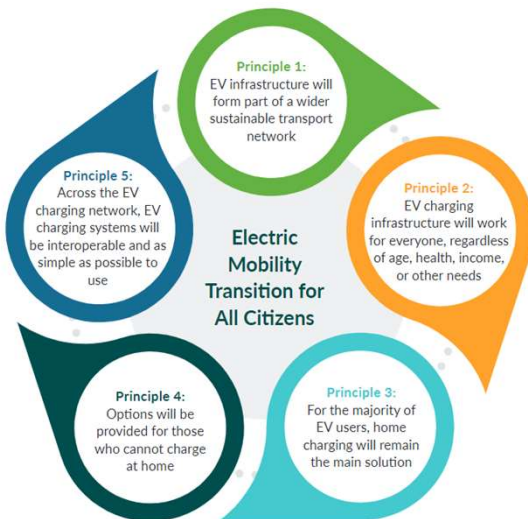


# EV charging infrastructure policy

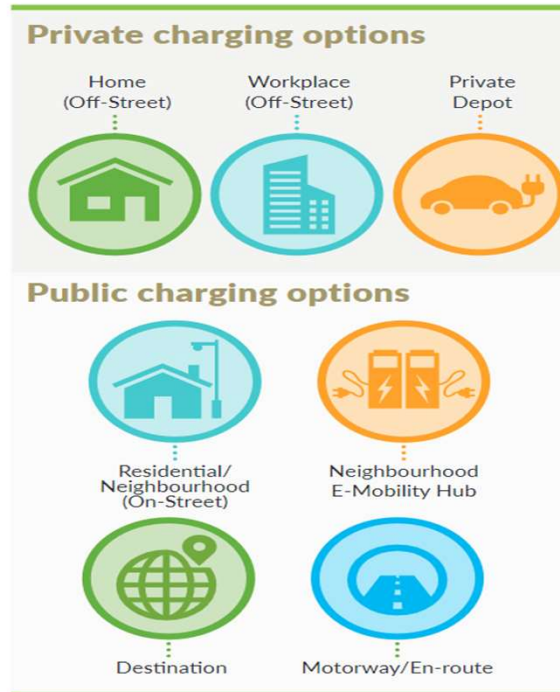
## Key facts



## Policy outlook



## Delivery options



## Current projects

- Fingal e-mobility hub: Civic site for EV car share clubs & e-bike station.
- Dingle Project: EV infrastructure across rural areas.
- En-route charging bays: Ultra-rapid charging on motorways

## Future projects

- On-street kerbside charging: suitable for residential areas e.g., lamppost charge points.
- Vehicle-to-grid charging: back-up electricity storage.
- Wireless charging bays: Futuristic approach for charging EVs

## SWOT ANALYSIS OUTCOMES

### Carlow

- Onshore wind energy is the largest contributor to total RE generation.
- Installed capacity = 6MW (planning approved for 6MW).
  - 30 MW to be generated from wind by 2030.
- Bioenergy
  - 2.5 MW renewable energy share in heat (RES-H).
  - 4 bioenergy crops.
  - 2 CHP plants, 1 solid fuels manufacturer, 7 bioheat facilities
- Solar energy
  - 4 operational solar farms (c. 30MW).
  - New planned projects to deliver 70MW.
- Micro hydropower schemes
  - 3 operational (combined output = 0.23 MW)
- 100MW battery storage facility at Kellistown East.
  - Electro-chemical storage (uses Li-ion technology).
  - Grid support services.
- 19 publicly available EV charging stations.

### Future developments

- District heating for urban areas (Carlow town & Bagenalstown).
- 18 potential sites for micro-hydropower generation.

### Kilkenny

- Onshore wind energy is the largest contributor to total RE generation.
  - 10 operational wind farms (76 MW).
- Solar energy
  - 16 operational solar farms (c. 35MW).
  - New planned projects to deliver 70MW.
- Bioenergy
  - Wood biomass on 9.6% of county (approx. 19,795 hectares)
  - 2 biomethane facilities (from anaerobic digesters)
  - 4 bioenergy crops.
  - 2 CHP plants, 1 solid fuels manufacturer, 7 bioheat facilities
- Hydroelectric power
  - 4 operational (combined output = 185kW)
- 11 publicly available EV charging stations.

### Future developments

- District heating.
- Medium & large-scale combined heat and power (CHP).
- 20 potential sites for micro-hydropower generation.

**Waterford**

- Wind energy
  - 5 operational onshore wind farms (c. 63MW)
  - 6 planned wind farm (53MW).
- Solar energy
  - 3 approved solar farms (c. 20 MW).
  - 2 new planned solar farms.
- Bioenergy
  - 235 GWh renewable heat from forest products (65% public-owned, 35% privately-owned).
- 16 publicly available EV charging stations.

**Future developments**

- District heating & CHP schemes at *off-grid* centres.
- CHP & AD at Kilbarry recycling centre.
- 3 GW marine renewables (offshore wind, tidal, wave).
- Micro renewables generation.

**Wexford**

- Wind energy
  - 17 onshore wind farms (180 MW).
  - 1 floating wind farm (1.5GW).
- Solar energy
  - 36 solar farms (c. 475 MW).
  - 12 new planned solar farms to deliver 170MW.
- Bioenergy
  - 2 biofuel manufacturing facilities
  - 2 anaerobic digesters.
- 23 publicly available EV charging stations.

**Future developments**

- 4.5GW offshore wind energy.
- 1.5 GW marine renewables (tidal, wave).
- Waste-to-energy facilities

## Waterford

Sector	Energy (GWh)				
	2010	2016	2020	2025	2030
Residential	981	831	760	700	696
Industry	604	661	671	704	797
Services	501	389	374	366	388
Agriculture	71	86	88	94	109
Transport	1,132	1,102	1,178	1,318	1,592
<b>Total</b>	<b>3,289</b>	<b>3,068</b>	<b>3,070</b>	<b>3,183</b>	<b>3,582</b>

### Renewable Energy Generated in Waterford in 2016 and projected to 2030

Energy Source	2016 Renewable Electricity Generation (MW)	% of Total Electricity (2016)	2030 Projected Renewable Electricity Generation (MW)	% of Total Electricity (2030)
<b>Electrical</b>				
On Shore Wind	62.9	21.68%	131.7	17.01%
Off Shore Wind	0.0	0.00%	33.0	5.94%
Solar PV	0.0	0.00%	84.1	2.89%
Hydroelectricity	1.0	0.39%	3.1	0.77%
Biomass CHP	0.0	0.00%	5.0	2.06%
Gas Fired CHP	0.4	0.36%	2.6	0.87%
Biogas CHP	0.0	0.00%	2.2	1.12%
Ocean	0.0	0.00%	10.0	0.96%
Micro	0.2	0.03%	56.9	3.00%
<b>Total</b>	<b>64.5</b>	<b>22.46%</b>	<b>328.6</b>	<b>34.64%</b>
Energy Source	2016 Renewable Heat Energy Generation (MW)	% of Total Heat Demand (2016)	2030 Projected Renewable Heat Energy Generation (MW)	% of Total Heat Demand (2030)
<b>Thermal (Heat)</b>				
Commercial Biomass Boilers	4.3	0.59%	12.3	3.39%
Domestic Stoves, Gassification and Woodchip boilers	40.1	5.29%	23.3	3.35%
Commercial Heat Pumps	0.1	0.02%	12.6	1.83%
Energy Crop Boilers	0.8	0.17%	5.0	1.75%
Cereals, Straw	0.5	0.07%	5.5	1.01%
Biomass CHP	0.0	0.00%	10.0	4.66%
Gas Fired CHP	0.5	0.18%	4.6	1.68%
Biogas CHP	0.0	0.00%	4.0	1.32%
Domestic Micro Thermal, including heat pumps, solar water heating, micro CHP	6.4	0.98%	124.8	19.06%
Commercial Solar Water Heating	0.0	0.01%	0.3	0.04%
<b>Total</b>	<b>52.6</b>	<b>7.30%</b>	<b>202.3</b>	<b>38.09%</b>
Renewable Energy Use in Transport in Waterford, 2016 and 2030 Projection				
Sector	% of 2016's Transport Demand		% of 2030's Projected Transport Demand	
Transport	6.36%		30.06%	

## Wexford

### Energy demand

Mode of Application	2006	2016	2017	2020	2025	2030
Transport	1,596	1,496	1,575	1,836	2,372	3,065
Electricity	680	942	951	1,245	1,754	1,775
Heat	1,607	1,988	1,970	1,692	1,263	1,389
<b>Total Final Energy Consumption GWh</b>	<b>3,884</b>	<b>4,426</b>	<b>4,495</b>	<b>4,773</b>	<b>5,390</b>	<b>6,228</b>

Wexford - Renewable Energy - Energy production by source (GWh)	2017	2021	2025	2030 based on national projections	2030 limited to 53.8% RES-E
Hydro	0.29	0.28	0.28	0.28	0.28
Biodegradable Municipal Solid Waste	0.00	0.00	0.00	0.00	0.00
Biogas	1.80	1.21	1.12	1.02	1.02
Biomass	0.00	0.00	11.23	11.23	11.23
Onshore wind	658	766	830	1,018	770
Offshore wind	0.00	0.00	42.55	140	140
Solar PV	0.00	5.09	18.34	45.10	45.1
Ocean	0.00	0.00	0.00	0.00	0.00
<b>Total Energy Generation GWh</b>	<b>660</b>	<b>773</b>	<b>903</b>	<b>1,215</b>	<b>967</b>

# Government support schemes

- **Small-scale Renewable Electricity Support Scheme (SRESS)**

- Provide a simpler route to energy market for community-led projects.
- Provide end-to-end support to create a community energy sector.

- **Support Scheme for Renewable Heat (SSRH)**

- Fully incentivise the development and supply of renewable heat.
- Supports biomass boiler & heat pump installations.

- **Offshore Renewable Electricity Support Scheme (ORESS)**

- For offshore wind energy generation to power 2.5million Irish homes.
- Sustainable environment and maritime incentives for offshore wind projects.
- Outlines a designated maritime area plan (DMAP) off Irish coast.

- **Warmer Home Scheme**

- Free energy-efficient home upgrades for welfare recipients who are also homeowners.
- Offers upgrades for the following: insulation (attic, wall), upgrades (heating, lighting), retrofitting, draught proofing.

# Biggest challenges in reaching renewable energy self-sufficiency

## Energy Security

- Ireland was the 10th most energy-dependent EU Member State
- Lack of development of indigenous sources of renewable energy

## Meeting Climate Commitment

- Ireland fails to meet climate change targets by 2030 (EPA projection report, 2023)
- all sectors of the economy deliver emission reductions in the short term and sustain this delivery into the future.

## Energy Cost & their significance

- Higher energy poverty for household and Cost competitiveness for business
- Lack of energy competitiveness

## Sectoral issues

- Transport, heat, and electricity have historically accounted for approximately 40% of final energy use each, with the remaining 20% accounted for by the electricity mode

## Physical infrastructure and employment opportunities

- Though the cost of RES is falling the cost of connecting RES is increasing and there is not enough grid capacity available.
- Lack of professional resources

# Upcoming energy policies

Policy	Summary	Progress achieved to date	Year
Electricity Storage Policy	Provide a system services to balance variable renewable electricity supply with demand.	Consultation on developing electricity storage policy framework	Nov. 2022
District heating policy	Deliver heat from a central energy source to provide space heating and hot water to the buildings connected to the network.	District Heating Steering group report	Sept. 2023
Private wires	Create a framework that allows for private undertakings installing, operating, and owning private electricity infrastructure, provides a potential off-grid solution for the generation and supply of electricity.	Public consultation concluded	Oct. 2023



# Planned Transmission Infrastructure Developments – Transmission Development Plan (TDP)

Developing transmission assets can take considerable time to bring from concept to completion. Recent experience has been over 15 years to develop 220kV circuits and more than 10 years for 110kV circuits.

## There are 13 projects with capital approval :

- 4 of these projects are new assets
- 4 involve replacing/refurbishing existing equipment
- 5 involve upgrading existing equipment to a higher capacity

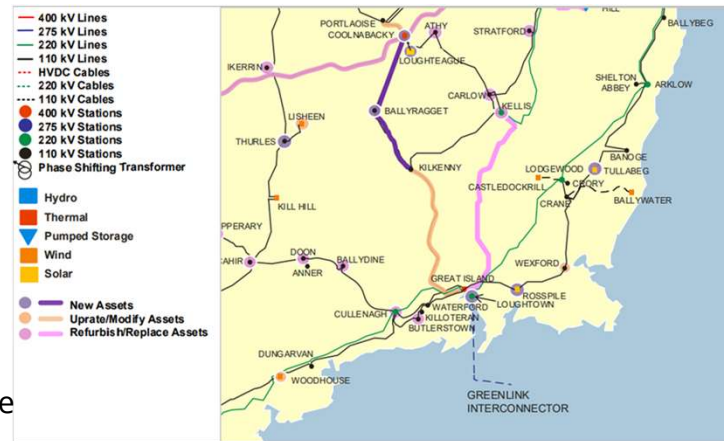
## Two new interconnectors planned:

- Greenlink interconnector: Wexford (Great Island)-Wales
- Celtic interconnector: Cork(Knockraha)-France

## Developing transmission assets can take considerable time to bring from concept to completion.

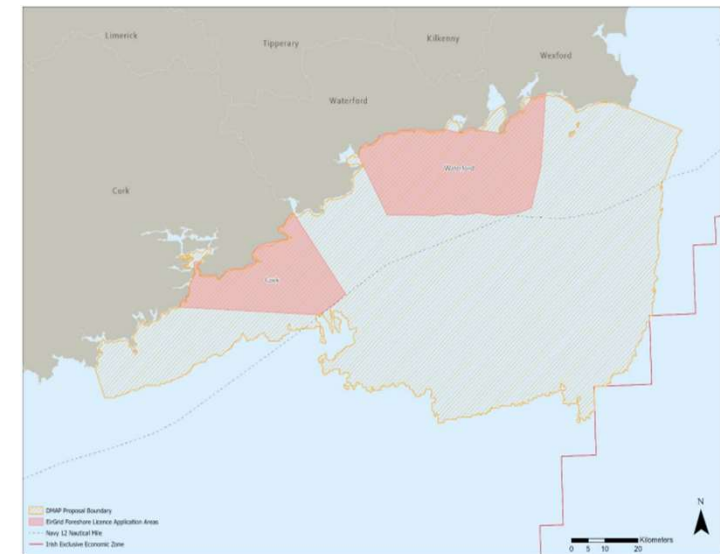
- New 220kV or 400kV circuits taking over 15 years
- New 110kV circuits often taking over 10 years

## EirGrid TDP 2021-2030



### Three categories of reinforcement:

- **New:** asset newly developed to create additional capacity due to limitations in existing infrastructure or for the connection of a new demand/generation facility.
- **Uprate/modify:** asset replaced with higher rated equipment to cater for future needs.
- **Refurbish/replace:** where the asset condition is poor, assets are refurbished or replaced on a like-for-like basis.



- 2<sup>nd</sup> phase offshore renewable energy to focus on South East.
- Deployment of 1.1GW by 2035.

# GOOD PRACTICE

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## Ireland's largest producer of biogas

- Operate an integrated Anaerobic Digestion (AD) and Compost Facility.
- Turn organic wastes into green energy (biogas, bio-methane, electricity, heat)
- Nutrient-rich soil amendment products.



THANK YOU

