



# Emerging Energy Scenarios and Implications for Development Plans

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# Agenda

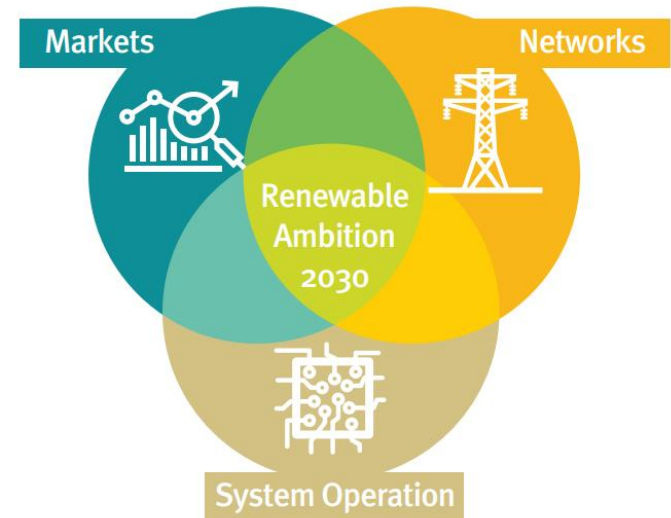
Emerging Landscape

Our Approach

Local Implications

# Who are EirGrid?

EirGrid operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical, and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, in all cases with a view to ensuring that all reasonable demands for electricity are met having due regard for the environment.



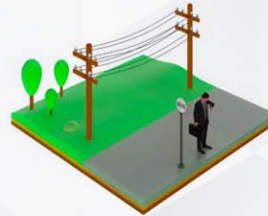
# How does the grid work?



Generation companies create electricity and compete to supply it at the best price.



EirGrid ensures there is enough electricity, then safely delivers this directly to large energy users and all around the grid.



ESB Networks take electricity from the grid and send to everyone who needs it.

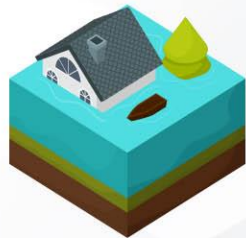


Consumers choose an electricity supplier, confident that they'll have a reliable and secure supply – now and in future.

# Why is electricity a solution to climate change?



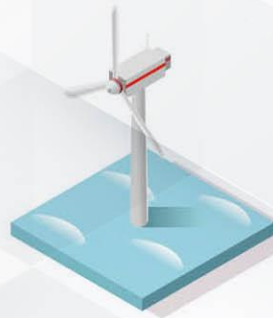
Burning fossil fuels  
creates carbon  
emissions



Carbon emissions  
create climate  
change



Electricity can be generated from  
clean and renewable sources  
with no carbon emissions



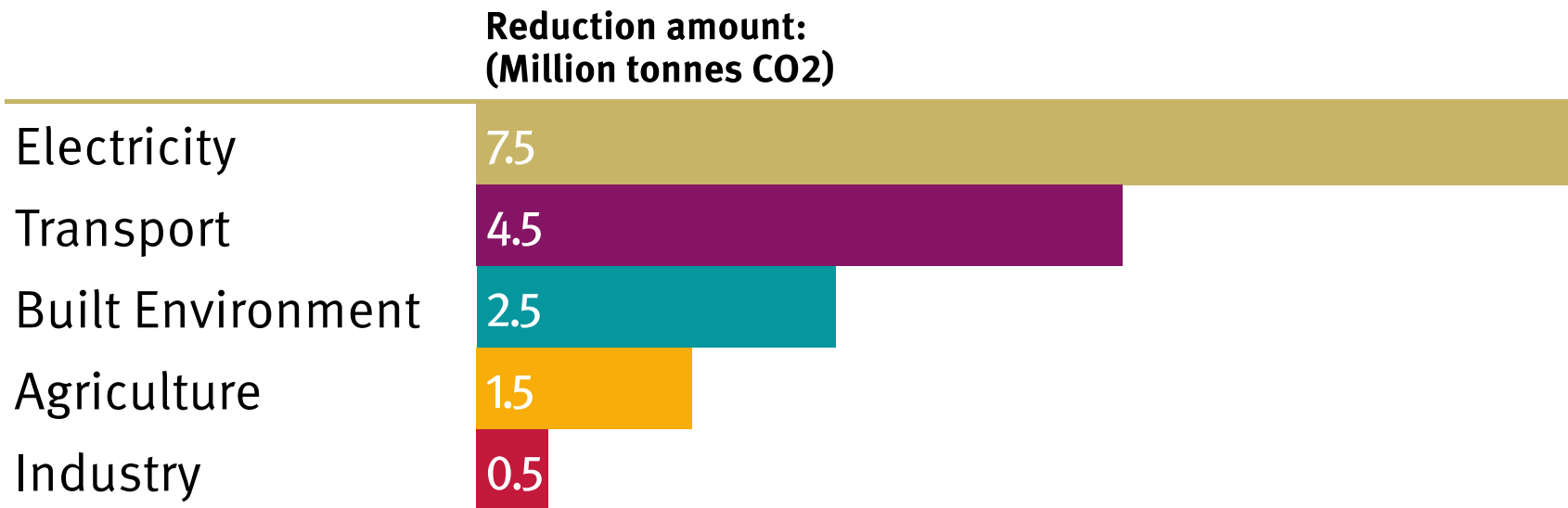
Clean electricity from  
renewable sources will  
replace fossil fuels



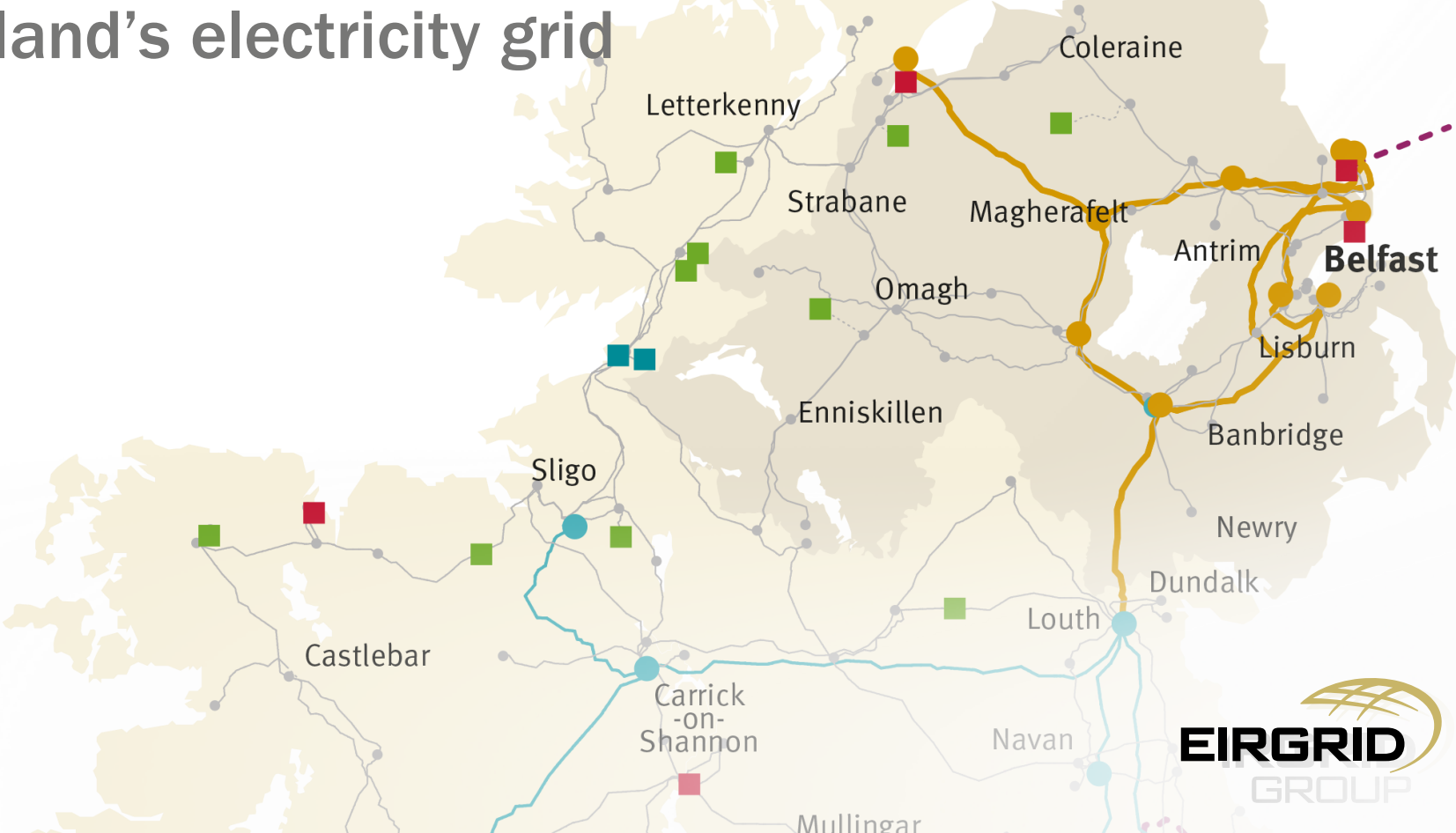
An aerial photograph of a wind farm in a rural landscape. The wind turbines are white and are scattered across a green field. The sky is a mix of orange and blue, suggesting sunset or sunrise. The foreground shows a green field with a stone wall and a road.

**In response, the Government has asked us to prepare the grid so at least 70% of Ireland's electricity can come from renewable sources by 2030.**

# Clean electricity drives the Climate Action Plan

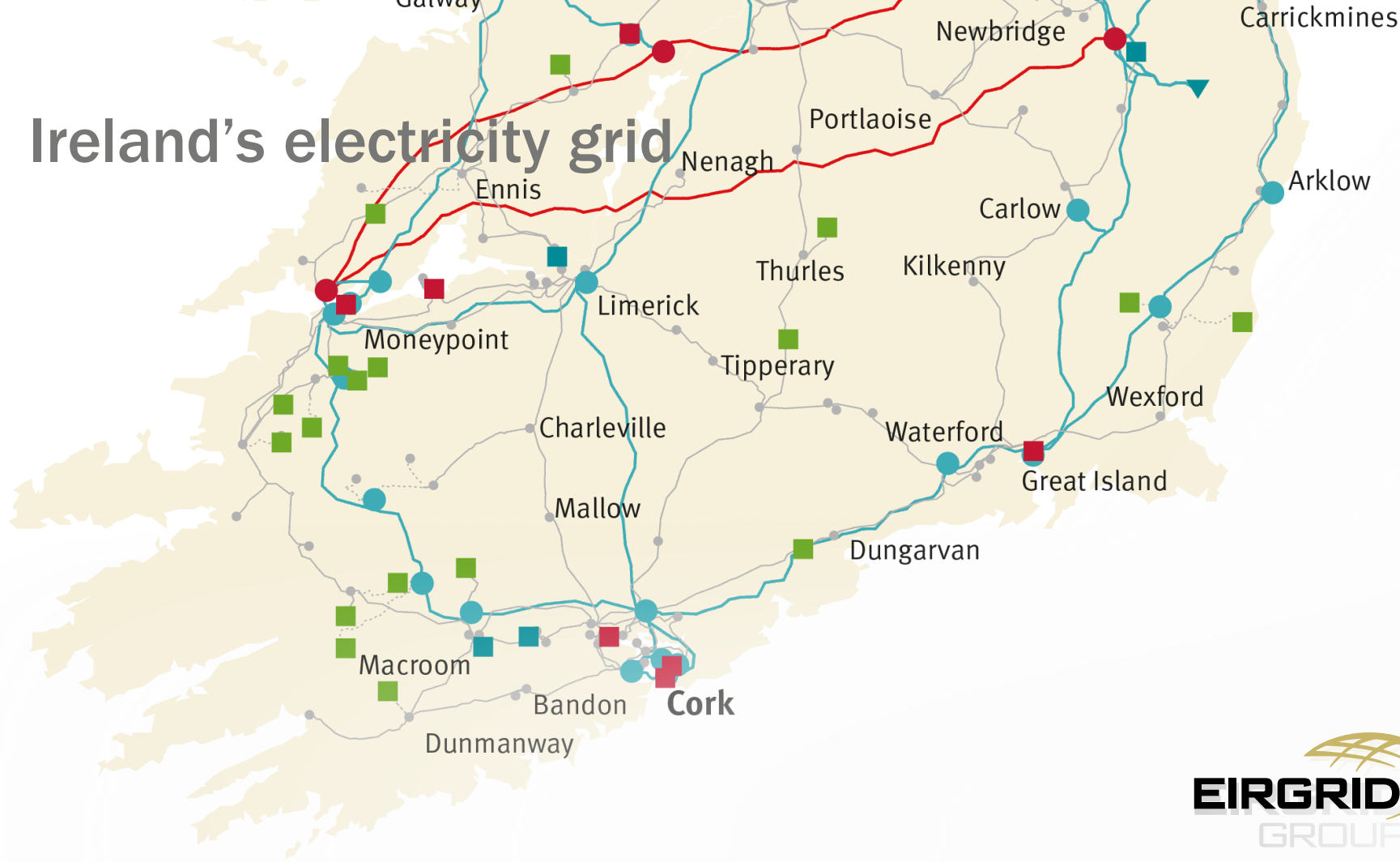


# Ireland's electricity grid

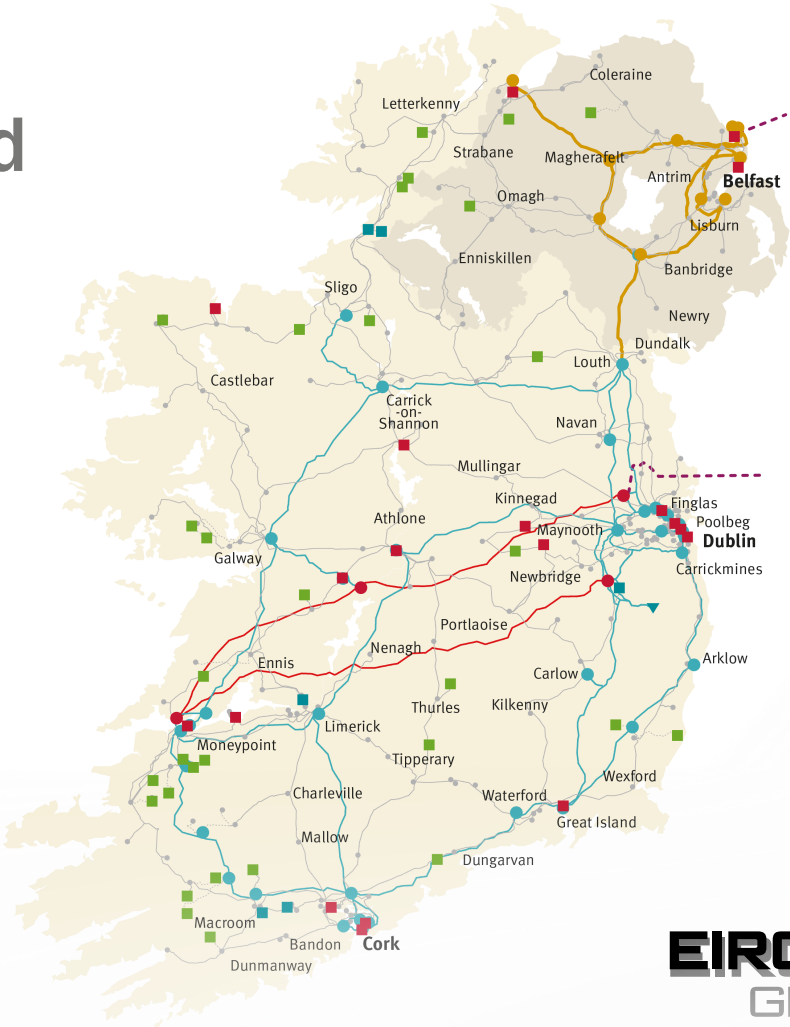




# Ireland's electricity grid

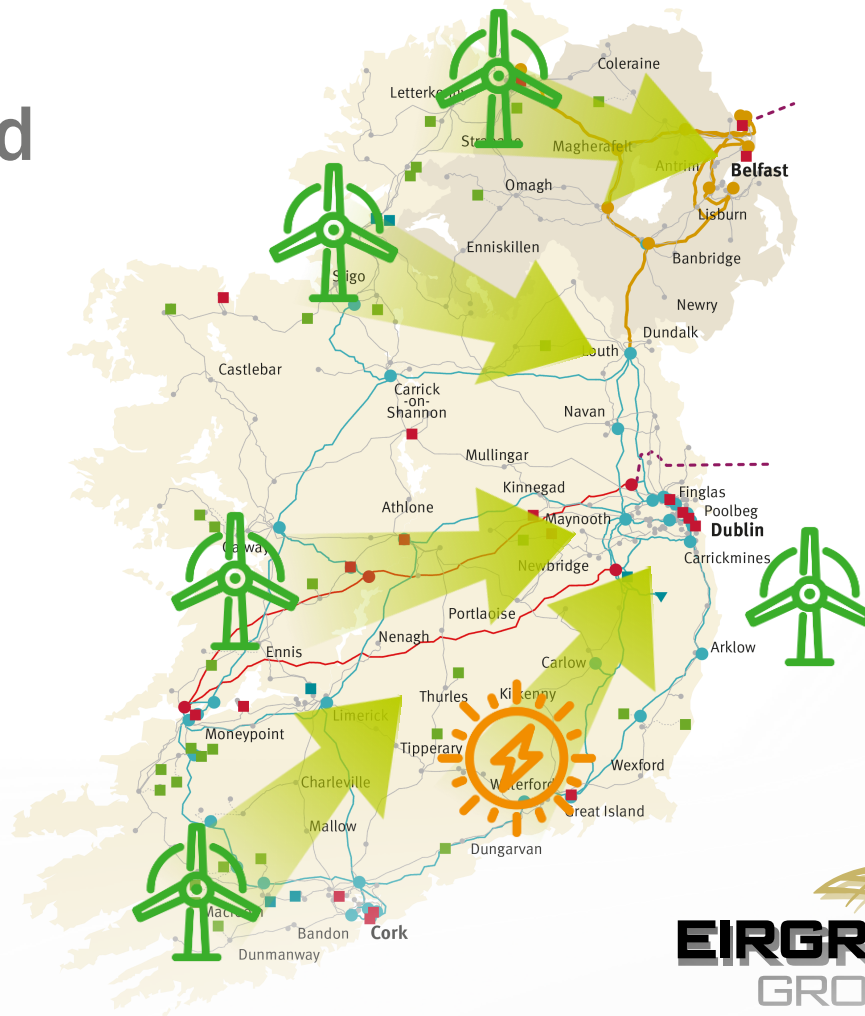


# Ireland's electricity grid



# Ireland's electricity grid

- More electricity will be carried across this grid than ever before, and most of this power will come from renewable sources.
- The grid needs to carry at least 10 GW more renewable electricity by 2030 – double 2020 levels.
- Power output from renewable sources depends on the weather.
- Renewable electricity is typically generated far away from where most electricity is used.



# Emerging Energy Scenarios

## Today's Power System

40% Renewables Gen.  
70% SNSP\*  
30 TWh Demand  
5 GW Renewables  
Ageing infrastructure  
Security of Supply  
~ 12M tonnes of CO<sub>2</sub>



Shaping Our  
Electricity Future

## Future Power System 2030

70% Renewables Gen.  
95% SNSP  
41- 45 TWh Demand  
15 GW Renewables  
Modernised Grid  
System is secure  
~ 4.5M tonnes of CO<sub>2</sub>



Vision  
2050

## Future Power System 2050

Net. Zero Carbon  
100% SNSP  
>> 50 TWh Demand  
~ 45 GW Renewables  
Modernised Grid  
System is secure  
~ 0M tonnes of CO<sub>2</sub>

Social Acceptance

\*70% SNSP - up to 70% of our instantaneous demand is met by Non Synchronous sources – such as wind, solar or interconnectors

# Why are so many renewables needed?

18<sup>th</sup> December 2019:

*“A new wind record was set on the island of Ireland yesterday.*

*For the first time in the history of the electricity system, all-island wind generation exceeded 4,000 MW, accounting for 72% of demand.”*



Date	Wind Generation	System Demand	% Wind	EWIC
17/12/2019 @11.45am	158	5700	3%	530
18/12/2019 @11.45am	3786	5621	67%	-500

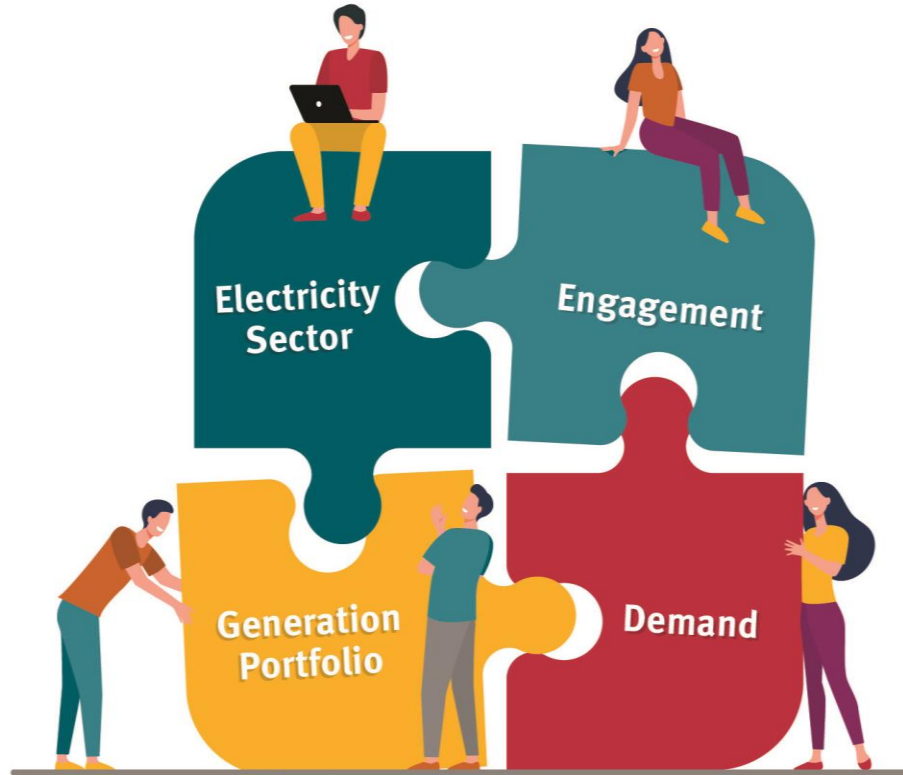


Emerging Landscape

Our Approach to the Challenges

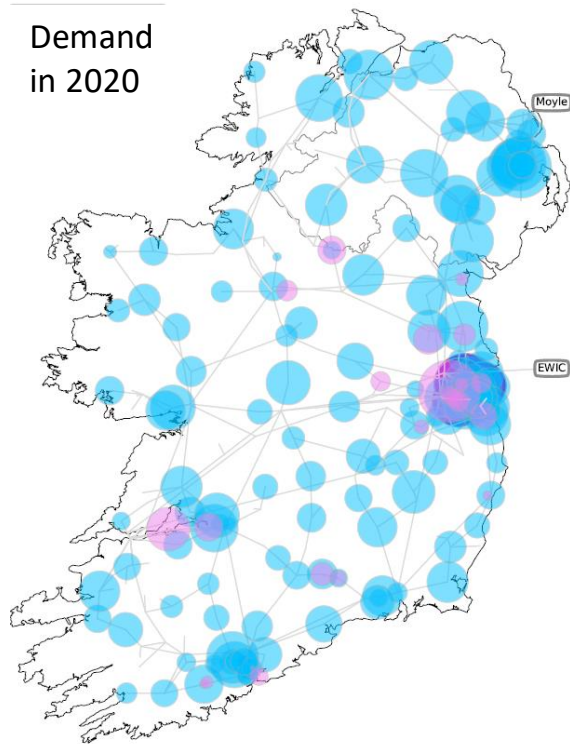
Local Authorities

# What are the Challenges?

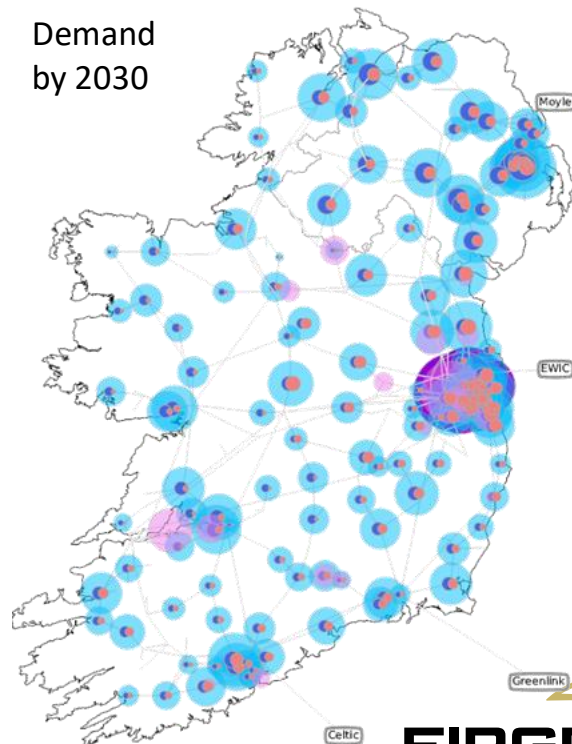


# Increasing Demand on the Network

Demand  
in 2020



Demand  
by 2030

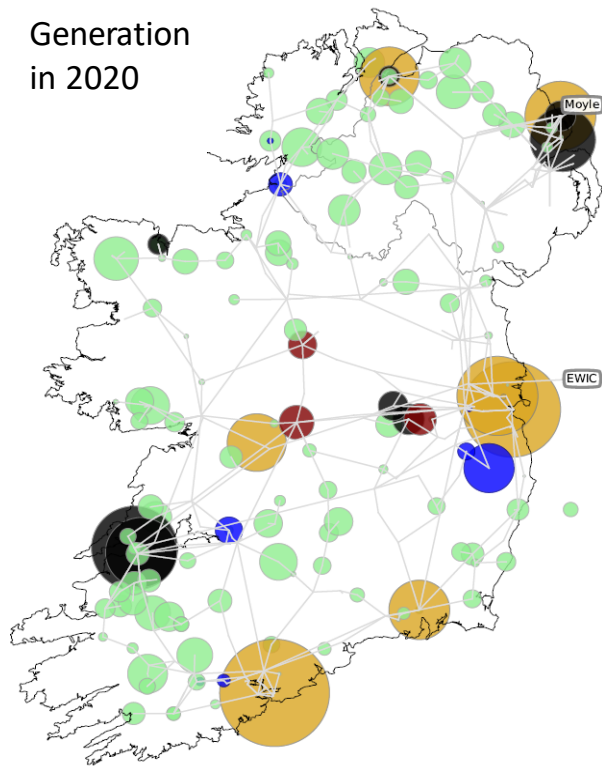


- Main demand types -
- Distribution load
- Data center load
- Large industrial load
- Electric vehicles
- Heat pumps

Up to 49% (IE) and 26% (NI) in some scenarios; 27% of demand in IE consumed by large energy users; Mainly based on east coast. (Source: Tomorrow's Energy Scenarios System Needs Assessment [TESSNA] 2019)

# Increasing Generation on the Network

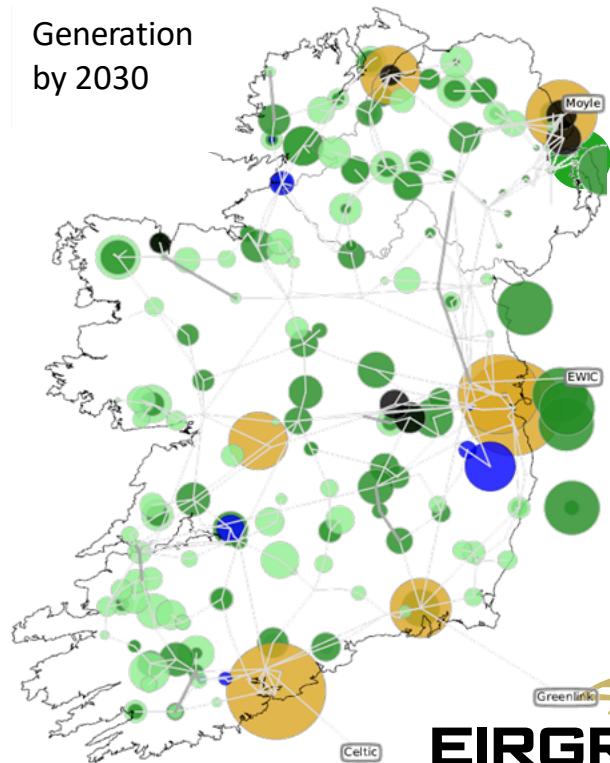
Generation  
in 2020



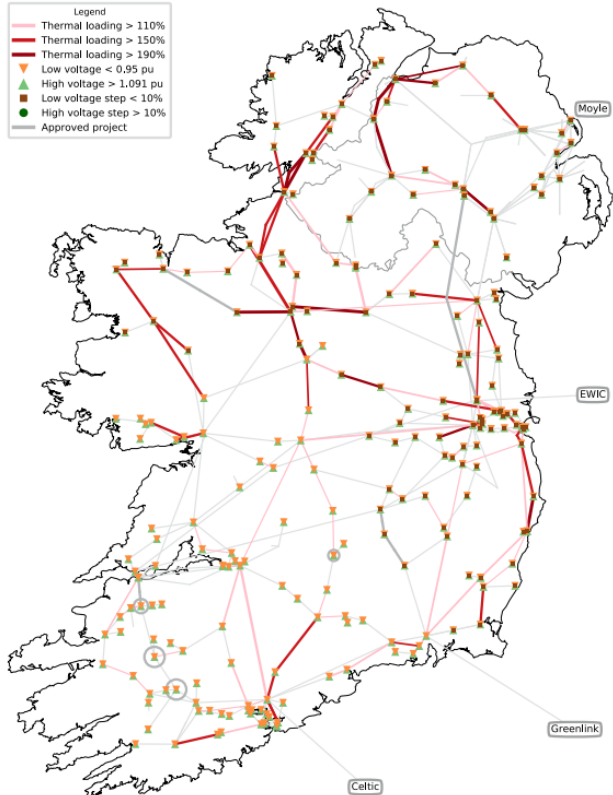
- Main fuel types -

- Existing wind
- Future wind
- Hydro/pumped storage
- Coal/DO/HFO
- Peat
- Gas

Generation  
by 2030



# What this means for the Transmission Network



The “existing” network does not have sufficient capacity to integrate the levels of RES needed to achieve a 70% RES-E ambition.

Lack of transmission network investment will also create challenges for future power system operational planning and operations, for example outage scheduling and voltage control.



# Potential Renewable Generation Sources

Source	Jurisdiction	2020 [GW]	2030 [GW]	Delta [GW]
Onshore Wind	IE	4.3	4.40 – 8.20	0.10 – 3.90
	NI	1.24	1.40 – 2.00	0.16 – 0.76
Offshore Wind	IE	0.03	1.80 – 4.50	1.77 – 4.47
	NI	0	0.35 – 0.70	0.35 – 0.70
Solar	IE	0.05	0.60 – 2.00	0.55 – 1.95
	NI	0.25	0.6	0.35
<b>Total</b>	<b>IE</b>	<b>4.4</b>	<b>9.5 – 12.0</b>	<b>5.1 – 7.6</b>
	<b>NI</b>	<b>1.5</b>	<b>2.7 – 3.0</b>	<b>1.2 – 1.5</b>

# How should we achieve this goal?

Proposed four approaches to reach 70% by 2030



## Generation-Led

Put clean electricity generation close to where most power is used



## Developer-Led

Let developers decide where to locate clean electricity generation



## Technology-Led

Try new ways to move clean electricity across the country



## Demand-Led

Put large electricity users close to sources of clean electricity generation



Our final plan will include elements of all approaches, strongly led by one of them.

# 1

## Generation-Led

Put clean electricity generation close to where most power is used

- Government policies would determine the best location of new renewable generation.
- Preferred locations will consider the strength of the existing grid and the local demand.
- Likely to lead to more offshore wind generation close to major cities, with less need for new onshore renewable generation.
- Requires around 38 Projects / €0.7bn  
4.5 GW offshore wind (east coast)  
1 GW solar energy and inland wind farms
- **Highly likely to succeed**



# 2

## Developer-Led

Let developers decide where to locate clean electricity generation

- Continue to connect new sources of renewable electricity in any location that developers request.
- This will create a need for a very large number of grid development projects – that cannot be delivered for many years after 2030.
- This approach would also see more power being generated than can be used.
- Requires over 77 Projects / €1.9bn
  - 4 GW from inland wind farms
  - 2 GW each from solar and offshore wind
- **Highly unlikely to succeed.**

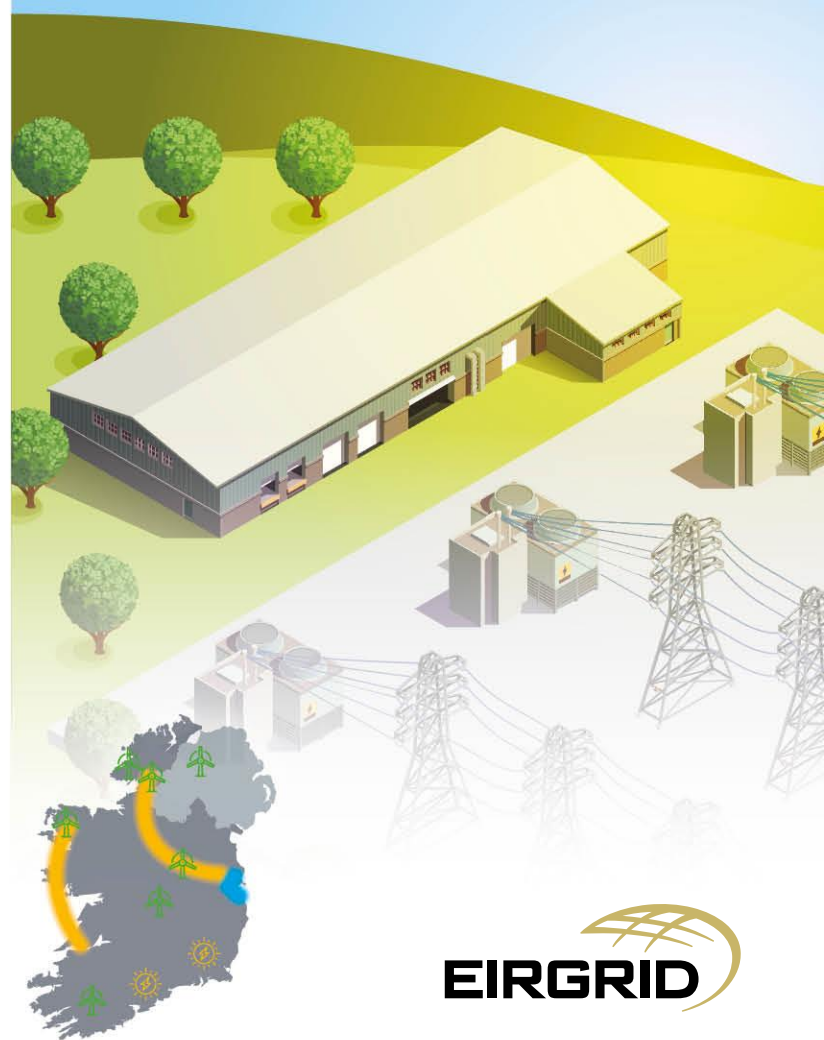


# 3

## Technology-Led

Try new ways to move clean electricity across the country

- Use innovative ways to move clean electricity from the west coast to the east coast.
- This will involve isolated underground cables carrying high voltage direct current – directly from renewable sources to east coast cities.
- These cables would not integrate with the rest of the grid. They need large, expensive and complex converter stations at both ends of each cable.
- Requires over 46 Projects / €1.5bn  
4 GW from inland wind farms  
2 GW each from solar and offshore wind
- **Very challenging to complete in time.**





# 4

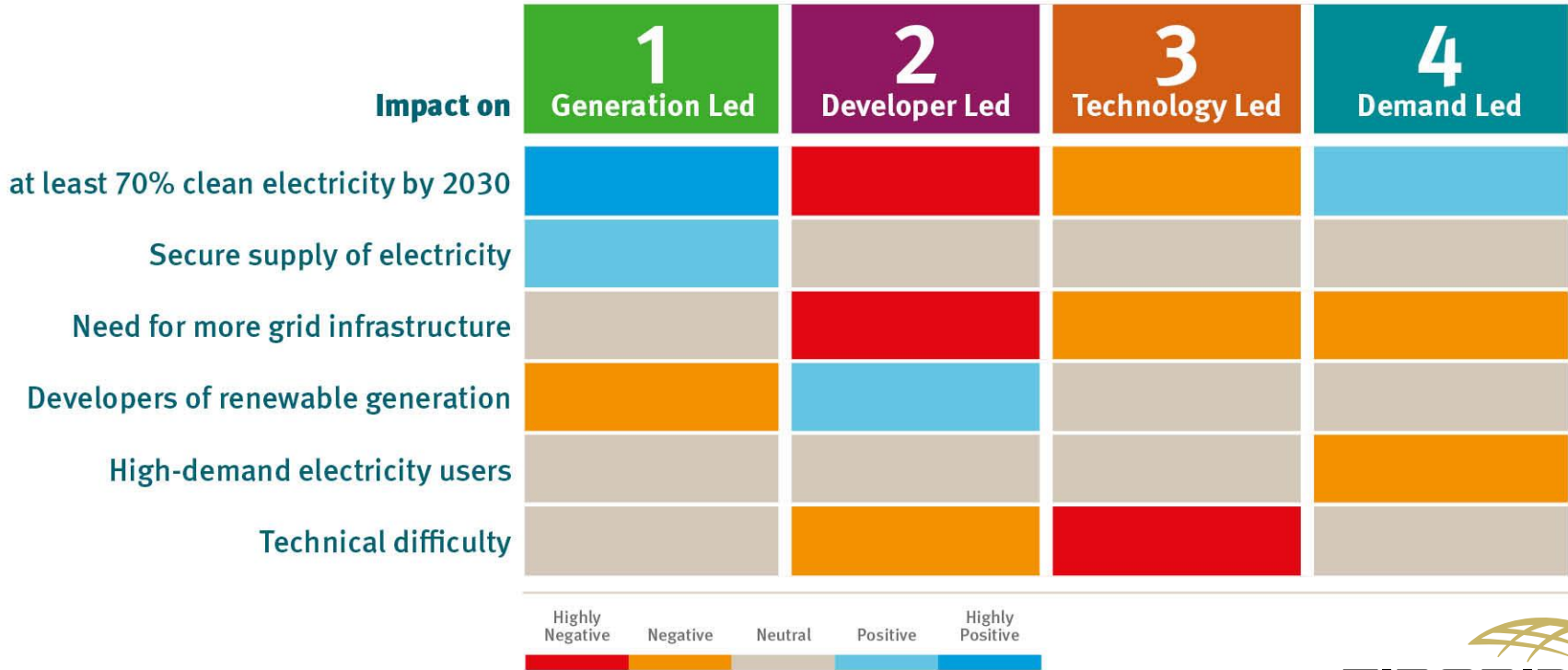
## Demand-Led

Put large electricity users close to sources of clean electricity generation

- Government policies would determine the best location for large-scale electricity users. These users, such as data centers, could use 27% of all the electricity on the grid by 2030.
- This means new high-demand customers would locate closer to sources of renewable electricity, and where the grid is already strong.
- Requires over 41 Projects / €0.5bn  
4 GW from inland wind farms  
2 GW each from solar and offshore wind
- **Requires large electricity users to locate in preferred locations to succeed.**



# How do these different approaches compare?

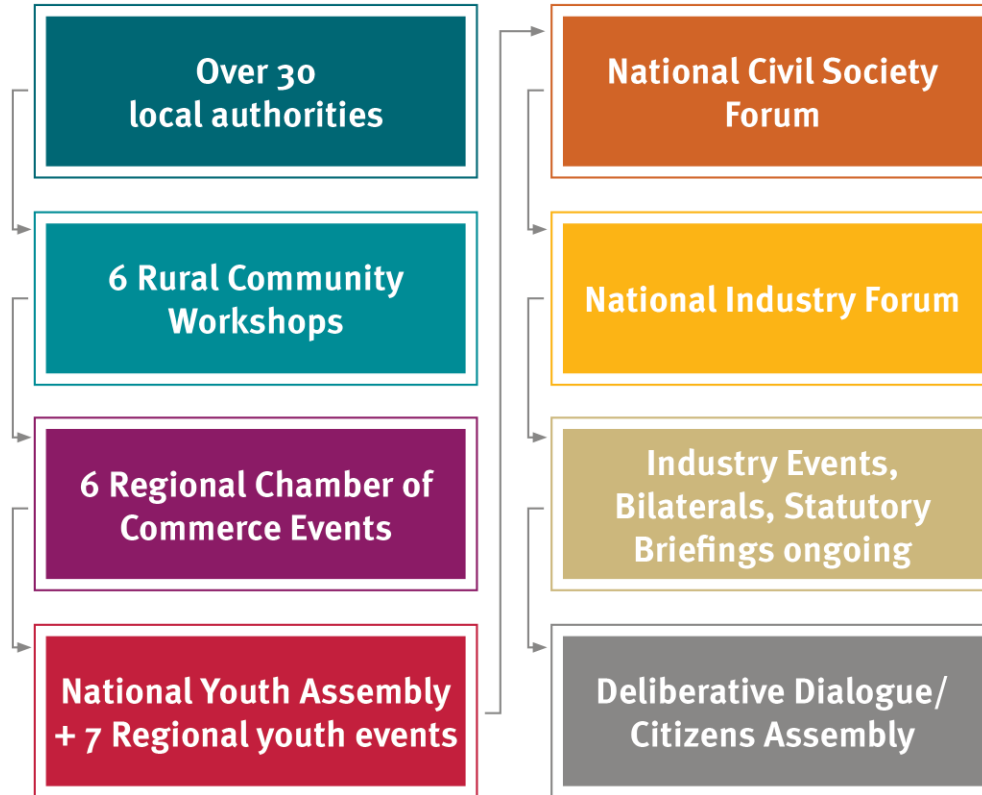




*The involvement and commitment of the public and of all stakeholders is crucial to the success of the European Green Deal. Recent political events show that game-changing policies only work if citizens are fully involved in designing them. People are concerned about jobs, heating their homes and making ends meet, and EU institutions should engage with them if the Green Deal is to succeed and deliver lasting change. Citizens are and should remain a driving force of the transition.*

EU Green Deal

# How are we engaging on it?



Emerging Landscape

Our Approach to the Challenges

Local Authorities





We're here to help.

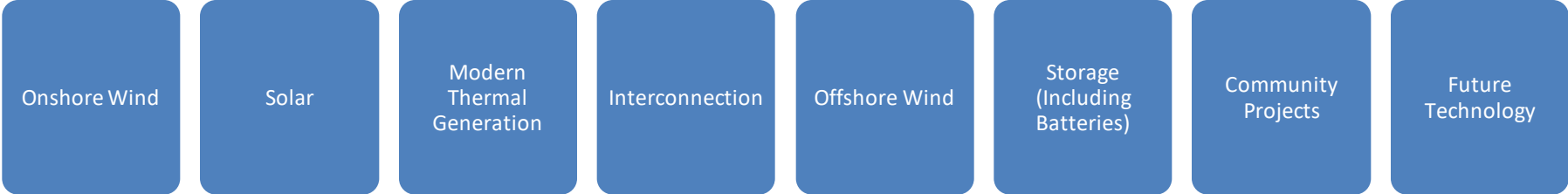
Info  
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Working with you for a  
safe, secure and reliable  
supply of electricity.

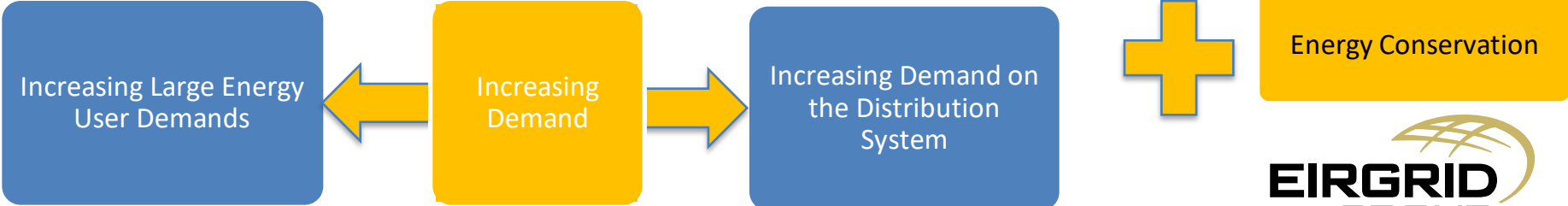
Making sure you  
have electricity  
when you need it.

Elected Members are critical gate keepers in realising emerging energy scenarios through decisions made in the development plan for that area.

# Pathway to 2030



## Power System Transformation





# What does it mean for local areas?



# What can you do in the development plan?

support and facilitate newer and existing energy technologies and their integration into the national grid (grid connections).

support and facilitate upgrading and reinforcements of electricity networks into and through the region.

support and facilitate the safeguarding of strategic energy corridors/areas.

support and facilitate the sustainable development of Ireland's onshore and offshore renewable energy resource.

# What benefits are you facilitating?



## Competition

Apply downward pressure on the cost of electricity to consumers



## Sustainability

Help facilitate Ireland's transition to a low carbon energy future



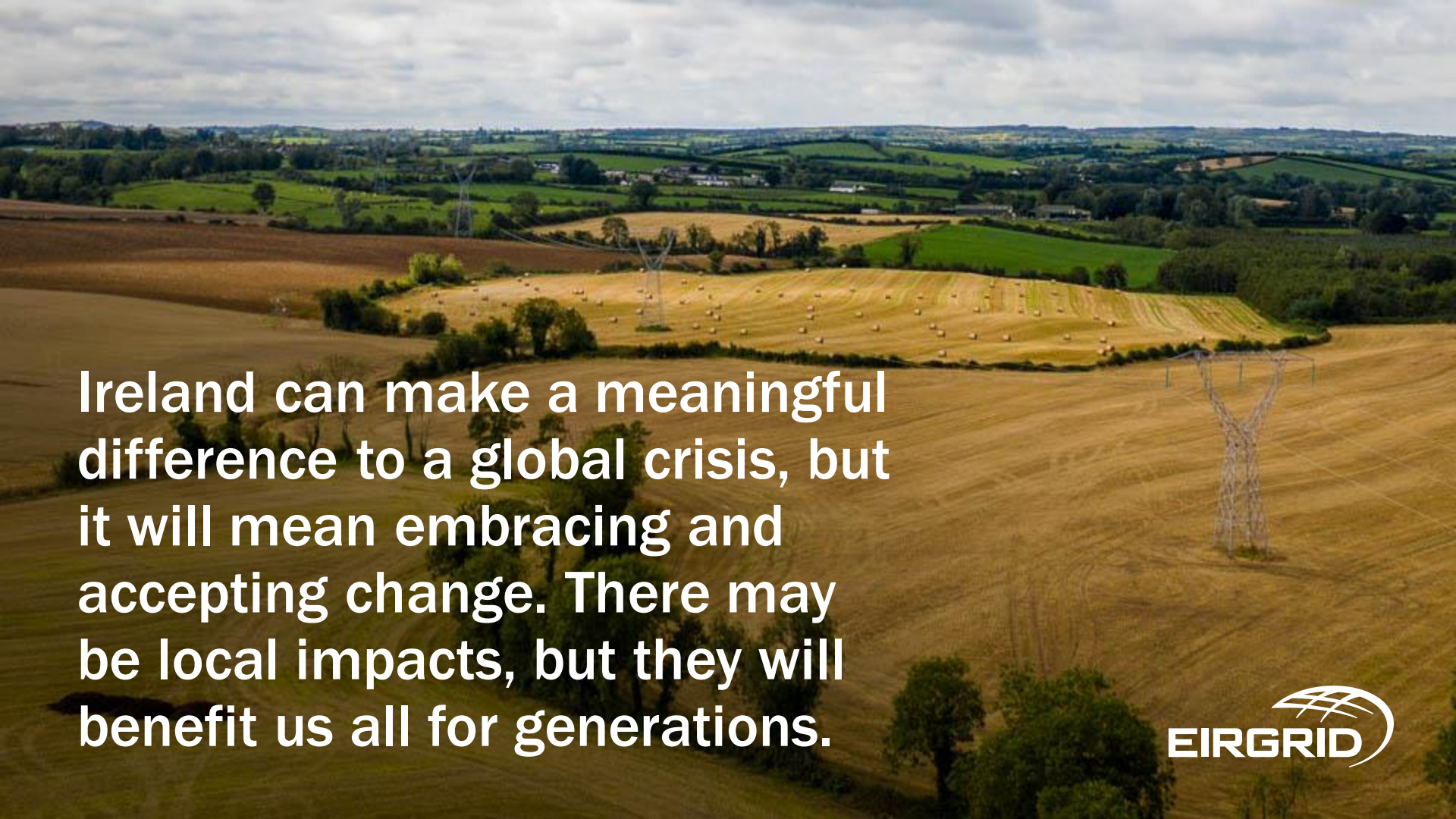
## Security of Supply

Enhanced security of supply for Irish electricity consumers



## Economic Benefits

Help support the growth of regional industry



**Ireland can make a meaningful difference to a global crisis, but it will mean embracing and accepting change. There may be local impacts, but they will benefit us all for generations.**





Thank You  
Questions?

