





IWEA Webinar Thursday 11th of June 4.00 pm – 5.30 pm

Welcome!

This webinar will begin shortly

You can submit your questions via the Q&A box at the bottom of the screen once the webinar commences

David Connolly, CEO IWEA



Noel Cunniffe, Head of Policy IWEA









Ask Me Anything Webinar

11 June 2020

IWEA Represents ~90% of Wind Energy in Ireland

Members across existing assets, development & supply chain for onshore & offshore:

- Wind farm developers
- Asset owners
- Supply Chain:
 - Turbine manufacturers
 - Construction companies
 - Supply companies
 - Accountants
 - Insurance
 - Consultancy
 - Legal firms
 - Banks





WIND ENERGY IN IRELAND REPORT ANNUAL REPORT





New wind farms built in 2019.

463 MW of new wind capacity installed.

Wind **outperformed** gas in February and December. New record set with 4,039 MW of wind on the all-island system



Wind Generation in Ireland May 2020

FIGURE 8

Percentage of the electricity demand covered by wind in 2019¹¹





Source: WindEurope

Speakers



David Connolly

CEO



Noel Cunniffe

Head of Policy



10 Committees within IWEA: https://www.iwea.com/committees



Irish Wind Energy Association

51 Working Groups in 10 Committees

Markata	Working Group	Chair	Working Group	Chair	
Narkets	RESS	David O'Sullivan	DCCAE Code of Practice	Karina Dennigan	Community Engagement
IWEA: Noel Cunniffe	I-SEM	John MacNamara	Communications	Andy Fox	IWEA: Justin Moran
Chair: John MacNamara	СРРА	Derek Scully	Environmental Stakeholders	TBC	Chair: Emmet Egan
	Clean Energy Package	William Carr	Working Group	Chair	
	Northern Ireland Route to Market	Richard Murphy	Offshore Safety	Michelle Ruane	Health & Safety
	Future Market Design	Stacy Feldman	Emergency Response	Stephen Lyons	IWEA: Ross McNally
	Working Group	Chair	Decommissioning	Greg Bohan	Chair: Ronan O'Meara
Grid	Enduring Connection Policy	Donal Smith	Wind Harmony	Ross McNally	
IWEA: Bobby Smith	Price Review 5	Paul Blount	Wind Turbine Safety Rules	Stephen Kelly	
Chair: Margaret Nee	Grid Capacity	Ciaran McNamara	Construction Safety Awareness	Brendan Heneghan	
	Grid Delivery - ESBN/EirGrid Project Delivery	Donal Smith	olographing	Jamia Corcoran	
	Grid Code Compliance Testing	ТВС	eceanning		
	FlexTech	ТВС	HSA	Ronan O'Meara	
Offshore	Working Group	Chair Tine Poloich	Working Group	Chair	Asset Management
IMFA: Ross McNally	Consenting Route to Market	Working Group Chair Working Group Chair Tina Raleigh Rates Shelia Layden It Peter Lefroy Life Extensions Michael Sutton Marc Lamphiere Dispetch Down Down Mullion			
Chair: Peter Lefroy	Offshore Grid	Marc Lamphiere	Life Extensions	Michael Sutton	IWEA: Johanna Cafferkey
chairrecter zerroy		Paul Doherty	Dispatch Down	Rory Mullan	Chair: Sheila Layden
	Fishing	Paul Kelly	Nature+ Energy	Johanna Cafferkey	
	Offshore 70by30 Implementation	John Young	Repowering	Greg Bohan	
	Offshore Communications & Engagement	Jeannine Dunne	SEAI Roadmap	Ross McNally	
	Transitional Protocol	Liam Murphy	Working Group	Chair	
70hv30	Working Group	Chair	DS3 Market Design	ТВС	Energy Storage Ireland
705930	70by30 Implementation	Paul Blount	FlexTech/Storage Workstream	ТВС	IWEA: Bobby Smith
IWEA: David Connolly	70by30 Promotion	David Connolly	Network Charging	Bernice Doyle	Chair: Samuel Harden
Chair: Paul Blount	Zero Carbon by 2050	Rory Mullan & Paul Blount	Working Group	Chair	Northorn Iroland
	Constraints/Curtailment	Peter Harte	NIRIG	Rachel Anderson	Northern Ireland
	Working Group	Chair	Markets	David O'Sullivan	NIRIG: Steven Agnew
Planning	WEGs / Noise	Brian Keville	Grid	Rory Mullan	Chair: Rachel Anderson
IWEA: Denis Devane	Regional Planning	Sinead O'Malley	Planning	ТВС	
Chair: Brian Keville	Planning Systems	Claire Walsh			

Wind Energy will Save the Most Carbon in the Climate Action Plan

2030 Electricity Key Statistics

- 70% RES-E
- 3.5 GW Offshore
- 8.2 GW Onshore (vs 4.2 GW in 2020)
- 0.4 1.5 GW Solar
- 600,000 Heat Pumps
- 1 million Electric Vehicles

Carbon Emission Savings

- Climate Action Plan aiming to save ~16 Mt by 2030
- 70by30 will save ~8 Mt of carbon by 2030 i.e. 50% of all!
- Wind will save the most CO2 in the Climate Action Plan

Figure 4.3 Indicative Sectoral Targets for Ireland to 2030¹⁴



1 Non-ETS emissions are made up of all emissions from Transport, Built Environment, and Agriculture, these summed up to 42 Mt in 2017. In addition, non-ETS includes 0.5 Mt from electricity, 1.2 Mt from industry, 0.5 Mt from waste, 0.2 Mt IPPU (industrial processes), and 0.8 Mt of F-Gases. NDP includes emission reduction of 0.8 MtCO₂ by 2030 from these segments

2 ETS emissions are made up of emissions from Electricity and Industry (which summed up to 17 Mt in 2017) minus the Non-ETS components of these sectors listed above

3 Based on provisional estimates from the EPA

4 NDP figures assume implementation of all measures in the National Development Plan 2018-20275 Reduction is based on MACC results, it excludes abatement from biofuels usage in energy/heat production



Life-cycle of an Onshore Wind Farm March 2019



Today it takes ten years to build a wind farm from preplanning to energisation

Key message: It is not possible to hit our onshore or offshore targets without planning reform and the right policies



Impact of Measures which Could Reduce Costs – Wind <€40/MWh



Planning and environmental constraints

Grid development and reform



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Impact of Measures which Could Increase Costs – Wind >€100/MWh



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€10/MWh Change in LCOE has ~€1.5 billion Change on Consumers

Figure 3 – Sensitivity of Net Consumer Value to different auction strike prices (€M, real 2017 money)









70by30 for Electricity: Cost Neutral @€60/MWh



Figure 1 Summary of total Renewable Energy scenario costs and benefits relative to the Fossil Fuel scenario (2020-2030)



Electrofuel, Synthetic Fuel



• Electro/syn-methanol/DME: To supply fuel for energy dense applications such as trucks, aviation, and ships, we recommend the use of synthetic fuels.







Ireland's Future Smart Energy System





Net Zero - UK Future Energy Scenarios example

Our Net Zero sensitivity modelling examines how we could stretch the ambition of our core scenarios to reach net zero emissions.

Our conclusion that net zero emissions is achievable is based on consideration of a number of key areas. These include improved energy efficiency, consumer behaviour and new technologies.



CCUS⁹ is essential

across several sectors including hydrogen production, power generation and industry.

Irish Wind Energy Association

Almost half of homes

Electricity demand could be heated almost doubles from today, all met by by hydrogen. low-carbon sources.

Carbon emissions - tracking the journey to Net Zero

(Mt CO ₂ equivalent)	2017	Net Zero 2050
Heat for buildings	85	0
Electricity before BECCS	73	0.35
BECCS in power sector	0	-37
Industry	105	10
Road transport	117	0
Hydrogen production	0	3
Other (non energy related)	123	59
Total	503	35
Relative to 1990 Emissions (% reduction)	39%	96%

Figure 6.3

Installed electricity generation capacity: Community Renewables, Two Degrees and Net Zero in 2050



Overall renewable energy by source



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Bellacorrick & Oweninny: New turbines are 3.2 MW vs. the original 0.3 MW, so x10 times the Power for x3.6 times the height (~180 m high).

22 original turbines (~50 m high) could be replaced by 2 new turbines





Onshore Theoretical Potential >10 GW?

Three capacity scenarios developed based on different conversion factors.

	Low	Medium	High				
Theoretical Area		2,705km ²					
Conversion Factor	5%	10%	15%				
Realistic Area	135km ²	270km ²	405km ²				
MW/km ²	WEGs Dependant						
Total MW	Ambition Dependant						



Presentation:



https://www.youtube.com/watch?v=w7F1tXi3kMg&list=PLDsqLyqa3iQ RqmwUGJjBkx-nOyuLiabPy&index=18

An excessive setback distance could prevent future onshore wind development

500 METRES SETBACK = 23% LAND

(CURRENT GUIDELINES)

1500 METRES SETBACK = 5% LAND (10 X MIN TIP OF 150 M)



Source: https://irelandafternama.wordpress.com/2012/11/26/wind-turbines-bill/

20% Increase in Height = 180% Increase in Power





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Ireland's PSO vs. EU: - 2nd Lowest in 2014

- 4th Lowest in 2015

Source: CEER: Status Review of Renewable Energy Support Schemes in Europe



Chart 5: Weighted average support level in 2014 and 2015, by country, in [€/MWh]



Wind for a Euro

Costs Total - €3.3bn

- €1.9bn renewable support costs (IE one of lowest PSOs in EU)
- €0.4bn DS3 costs
- €0.5bn network upgrade costs
- €0.5bn constraint costs

Savings Total - €3.2bn

- €2.3bn wholesale energy cost savings
- €0.2bn CRM savings
- €0.7bn avoided EU non-compliance with 2020 target savings







Impact of wind on wholesale prices

- Wind energy reduces the price on the electricity market
- By **5-20%** depending on the specific year
- More wind typically means more savings, so the biggest savings are occurring now i.e. as wind is growing each year







PSO = 4% of Bill; Grid Connections for RE = 1% of DSO Charges on Bill



Attitudes to Wind Power

Q.1 All adults 18+ - 2078



Ranked Benefits of Wind Power

Q.6 All adults 18+ - 2078



Irish Wind Energy Association

IWEA Research October 2017

- •84% of public favour Wind Energy
 - 47% "strongly favour"; 38% "tend to favour"
- Just 3% "strongly oppose" Wind

• High level of understanding of benefits of wind energy

Independent research commissioned by IWEA. Survey of 2000 adults throughout Ireland, conducted in October 2017 by *Interactions*.

Supporting Rural Ireland





MILLION IN FUNDING IN 2018 in the Republic of Ireland

SCHOOL SHEEP SHEARING RESIDENTS SINGERS CIRCLE PLAYGROUND SEWING GROUP

What about Corporate PPAs?



Source: BloombergNEF. Note: Data in this report is through 2018. Onsite PPAs not included. Australia sleeved PPAs are not included. APAC number is an estimate. Pre-market reform Mexico PPAs are not included. These figures are subject to change and may be updated as more information is made available.

Action 29: Ensure that 15% of electricity demand is met by renewable sources contracted under Corporate PPAs

Steps Necessary for Delivery	Timeline by Quarter	Lead	Other Key Stakeholders
Initial scoping work on Corporate PPAs including identification of barriers and policy options	Q2 2019	SEAI	CPPA Advisory Group, DCCAE, CRU
Consultation workshop(s) with industry and relevant government or state agencies (CRU, DFin, Revenue, IDA etc.)	Q3 2019	SEAI	DCCAE, CRU
Complete consultancy report on Renewable Electricity Corporate PPAs including set of policy recommendations	Q4 2019	SEAI	CPPA Advisory Group, DCCAE
Follow-up workshop with relevant entities (CRU, EirGrid, revenue etc.) to discuss and analyse in detail the proposed recommendation(s)	Q2 2020	DCCAE	SEAI, CRU
CPPAs Policy Paper based on consultancy study and Advisory Group Recommendations Paper	Q3 2020	DCCAE (with input from relevant Government Departments and Agencies	
Implementation of approved recommendation(s)	Q4 2020	DCCAE	CRU, SEAI, Other relevant State Entities

Large increase in Global CPPA Volumes

Climate Action Plan 2019 target of 15% CPPAs



Watch this space!

RESS Timelines & Development Timelines

RESS T&Cs:

5.1.3 The Letter of Offer will, subject to the terms of the Implementation Agreement and these Terms and Conditions, entitle the Supplier that enters into a PPA with a Successful Applicant to receive RESS 1 Support for a period extending no longer than 31 December 2037 (and potentially 31 December 2038 solely in the event of Force Majeure having been successfully claimed prior to achieving Commercial Operation).

RESS 1 Support will be eligible to commence upon the Commercial Operation of the RESS 1 Project or on 1 July 2021 (whichever is later), subject always to the RESS 1 Project having been listed in the PSO Order. For the avoidance of doubt, it will not be possible for a Supplier to submit a claim ex ante to the Regulatory Authority for PSO payments associated with the RESS 1 Support prior to the 2021/22 PSO Levy Year. However, if applicable, an ex-post payment claim can be made by an eligible Supplier in the 2022/23 PSO Levy Year for Commercial Operation in the period between 1 July 2021 to 30 September 2021.

Life-cycle of an Onshore Wind Farm

-IONIC-





IWEA

Cost of onshore wind is decreasing





Cost of offshore wind also decreasing



Wind '

February 2020

New June 2020 report by IRENA showing costs dropping globally

RECORD LOW PRICES IN 2019

Recent auctions results and record low auction prices underpin the downward trend in costs





Historical Market Prices in Ireland

Figure 1 – Historical average wholesale electricity prices in the SEM (€/MWh, nominal money)



Note: The baseload price gives equal weight to all hours in a year and reflects the System Marginal Price in 2008 to September 2018 and the Day Ahead price from October 2018 onwards; the wind capture price weights each hour by the amount of wind generation available that hour.



Source: Wholesale prices - SEMO; wind capture prices - SEMO and EirGrid; onshore wind LCOE - IRENA.

Impact of wind on wholesale prices

- Wind energy reduces the price on the electricity market
- By **5-20%** depending on the specific year
- More wind typically means more savings, so the biggest savings are occurring now i.e. as wind is growing each year







FIGURE 25 Ordered onshore wind turbine power ratings in Europe



27. 4 MW and above onshore turbines currently available in Europe (size of the bubble represents the rotor diameter)

Source: WindEurope



■1.5 to 2 MW ■2 to 2.5 MW ■2.5 to 3 MW ■3 to 3.5 MW ■ 3.5 to 4 MW ■ 4 to 4.5 MW ■ 4.5 to 5 MW ■ Average turbine rating

Source: WindEurope

Onshore Turbines > 4 MW



FIGURE 27

FIGURE 29

6 MW+ offshore turbines currently available in Europe (size of the bubble represents the rotor diameter)



FIGURE 26

Ordered offshore wind turbine power ratings in Europe





Source: WindEurope

Offshore Turbines now >8 MW



Demand Availability Capacity Available



https://www. esbnetworks. ie/demandavailabilitycapacitymap





Generation Availability Capacity Map

No Capacity

Supply Voltage

38 kV

MV

https://www.e sbnetworks.ie/ <u>new-</u> connections/g <u>enerator-</u> connections/g <u>eneration-</u> <u>availability-</u> capacity-map



Station Capacity

Significant Capacity

Mixed

Limited Capacity



Transmission Forecast Statement - Available Generation Capacity





Figure 7-1: Generation opportunity at 220 kV, 275 kV and 400 kV stations in 2027

Draft ECP-2 Decision Timelines - The actual outcome published yesterday evening is better!

Table 4 ECP-2 batches proposed timeline - for illustrative purposes only

		2020			20	21		2022			2023						
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ECP-1	Batch processing																
		_	_			_	_	_		_	_	_			_		
ECP - 2.1	Batch application & confirmation																
	Batch processing																
	Batch application & confirmation																
ECP - 2.2	Batch processing																
ECP - 2.3	Batch application & confirmation																
	Batch processing																



Ireland is a World Leader in Wind Power Integration

Figure 1 • Annual VRE generation shares in selected countries and correspondence to different VRE phases, 2015



Source: Adapted from IEA (2016d), Medium-Term Renewable Energy Market Report 2016

Key point • Each phase can span a wide range in terms of VRE share of electricity: there is no single point at which a new phase is entered.





Three Types of 'Dispatch Down' in Ireland



Maintained Levels of Dispatch Down





System Services Categories & Zero Carbon Technologies

Zero Carbon Technologies to provide System Services

Reserve	 Batteries, Demand Side Response, Renewable Generation (Wind, Solar, Hydro)
Inertia	• Synchronous Condensers
Reactive power	 STATCOMS, SVCs, Synchronous Condensers, Renewable Generation (Wind, Solar, Hydro)
Ramping	 Long-duration batteries (4-8 hours), Pumped Hydro Generation, Demand Side Response, Flexible Hydrogen Gas Power Plants





Store, Respond & Save & Our Energy Storage Future

energy storage 🚺 IRELAND

- Analysis carried out by Baringa Partners investigating the benefits of zero carbon reserves & System Services
- Builds off Baringa's 70by30 Study and shows large savings in operational costs and CO2 and a reduction in curtailment





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Our Energy Storage Future

Recommendations for an All-Island Energy Storage Roadmap

December 2019

- Roadmap for breaking down policy, regulatory and technical standard barriers to deliver more Energy Storage in Ireland and Northern Ireland by 2030
- Developed by Energy Storage Ireland members



