

Diversifying the Business Model Past Fossil Fuels Peat to Renewables

Bord na Móna,
Ireland

November 2018



An aerial photograph of a bog landscape. The foreground and middle ground are dominated by a grid of dark, parallel lines representing drainage channels, creating a pattern of rectangular plots. The background shows a flatter, less structured landscape under a cloudy sky. The text is overlaid on the image in white.

Undrained Raised Bog

Peatlands cover 16% of Ireland

Bord na Móna was established in 1946 to develop Ireland's peat resources for the economic benefit of Ireland

Drainage of Noggus Bog



Coal



Increasing energy & carbon content



Increasing moisture content

Partially decayed plant material

In 1946 two out of every three Irish homes did not have electricity and a programme of rural electrification began



ESB Archives

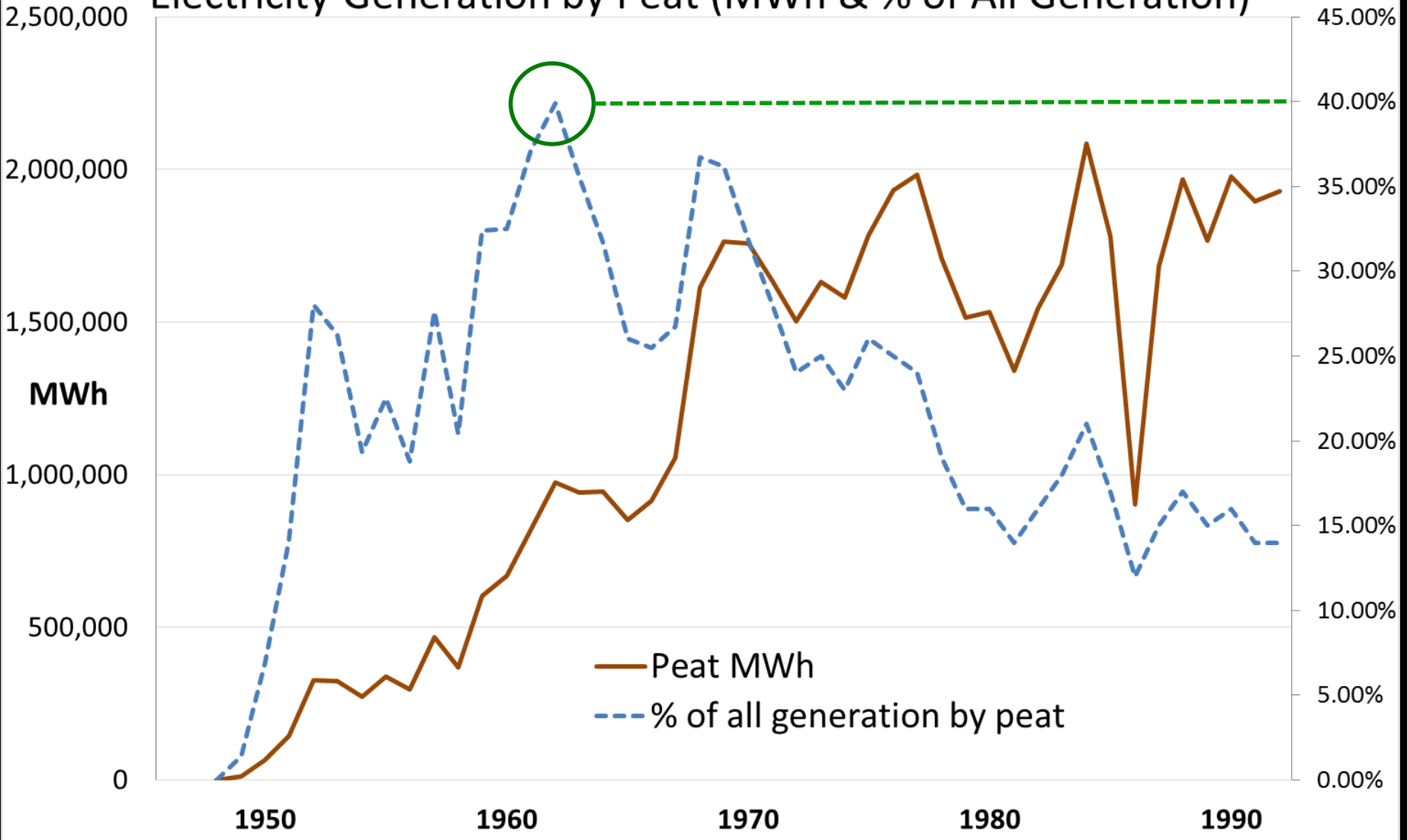
Bord na Móna focused on the production of energy peat for electricity generation



Peat production fields

Ferbane power station

Electricity Generation by Peat (MWh & % of All Generation)



Bord na Móna also built factories to produce peat briquettes for home heating



Derrinlough briquette factory under construction

Peat production fields



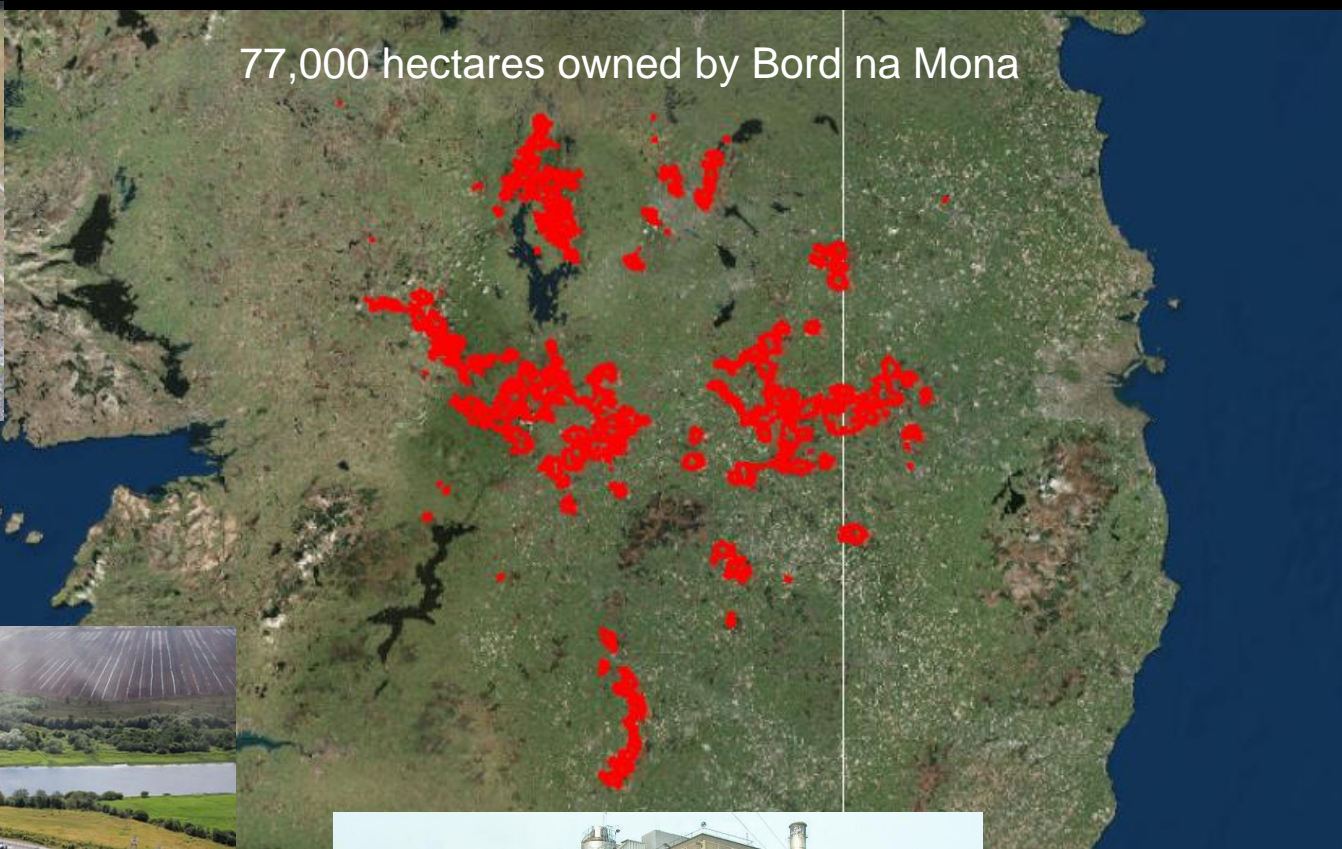
Bord na Móna built houses for it's workers and the company became deeply imbedded in the Irish midlands



The scale of Bord na Móna energy peat today



700 km of industrial railway line
200 railway locomotives
1,700 railway wagons

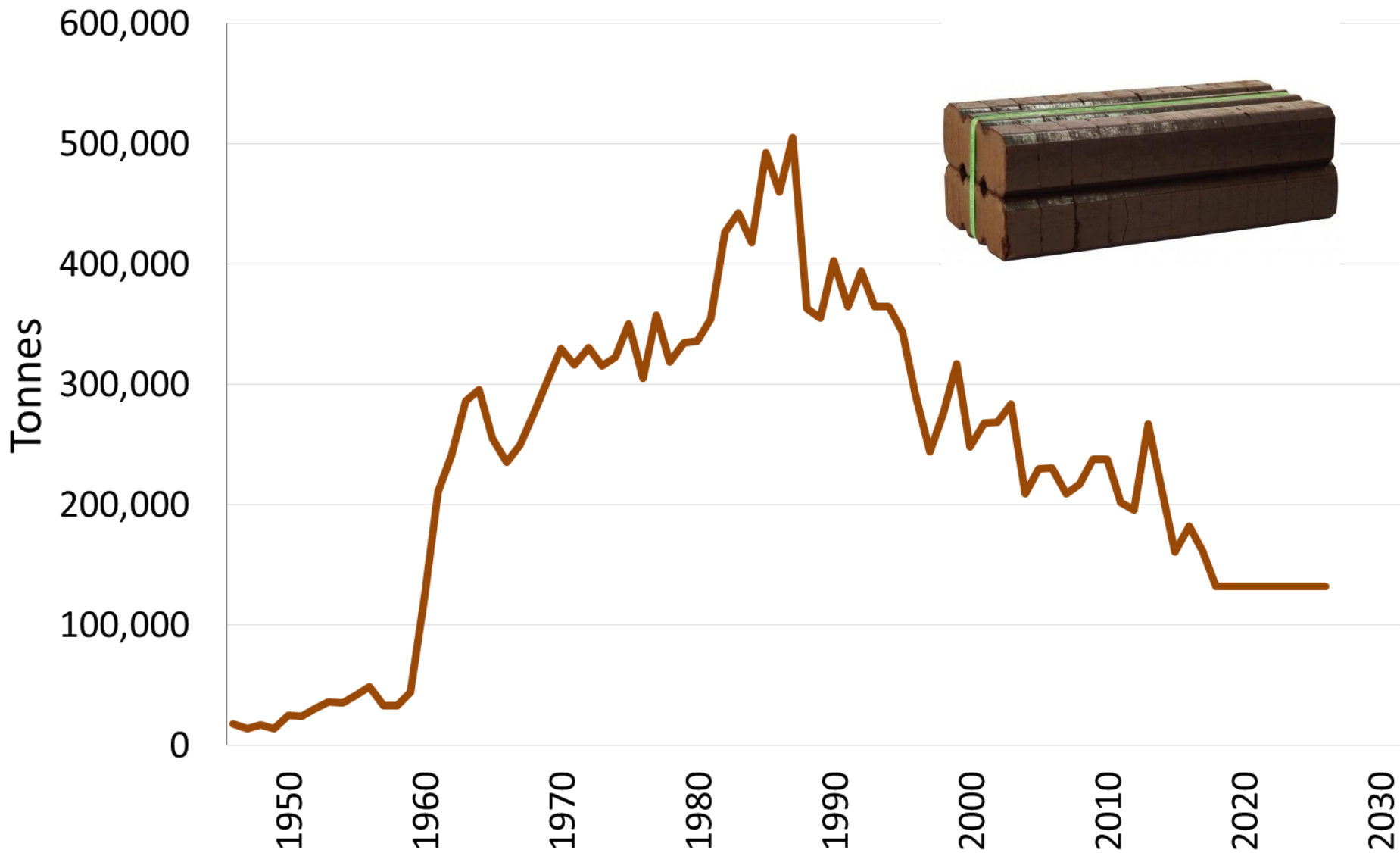


Peat accounted for 7.7 % of electricity generated in Ireland in 2016



Bord na Mona continues to produce peat briquettes

Annual Production of Peat Briquettes by Bord na Mona



An aerial photograph of a bog restoration site. The bog is characterized by a grid of parallel drainage lines, creating a pattern of small, rectangular plots. A winding path or road runs through the bog, starting from the bottom right and curving towards the center. The surrounding landscape is a mix of green and brown vegetation, with a forested area visible in the background. The sun is low on the horizon, creating a warm, golden light.

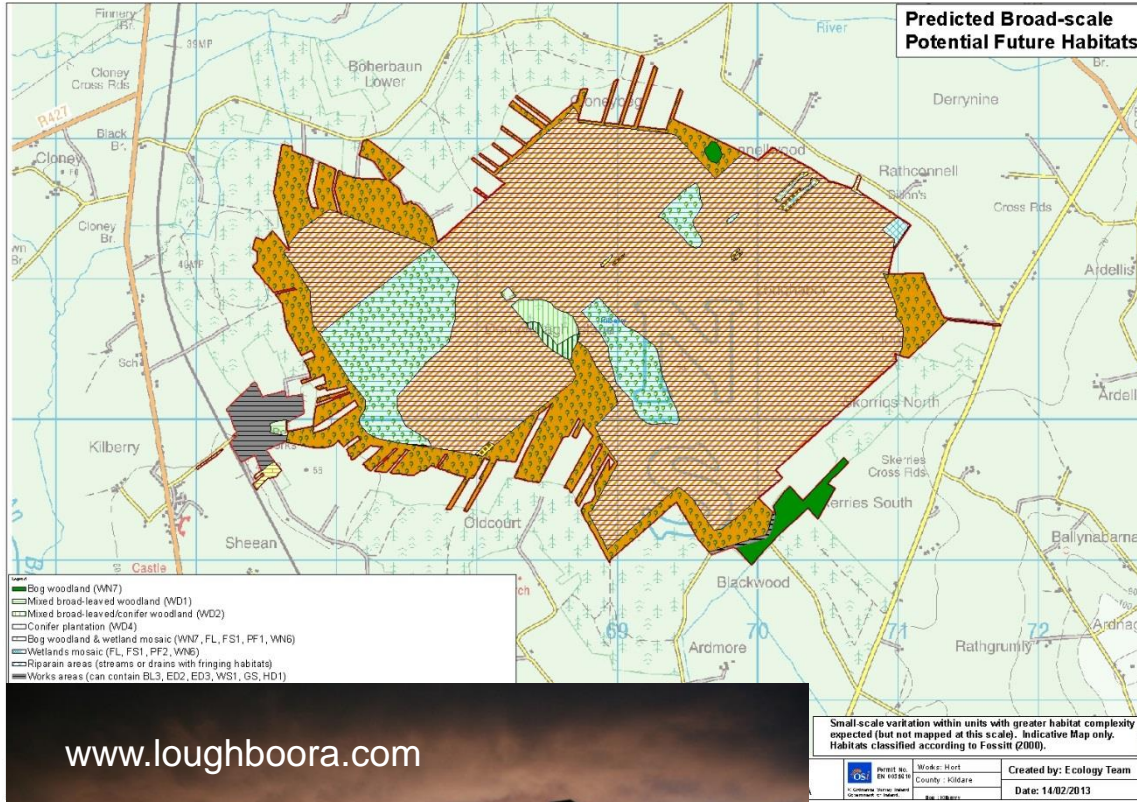
In 2010 Bord na Móna announced it would not develop any additional bogs and began restoration of bogs not yet brought into production

In the past 2 years over 800 hectares of high bog have been restored

Restoration of Abbeyleix Bog

Land Use Change

Grey Partridge

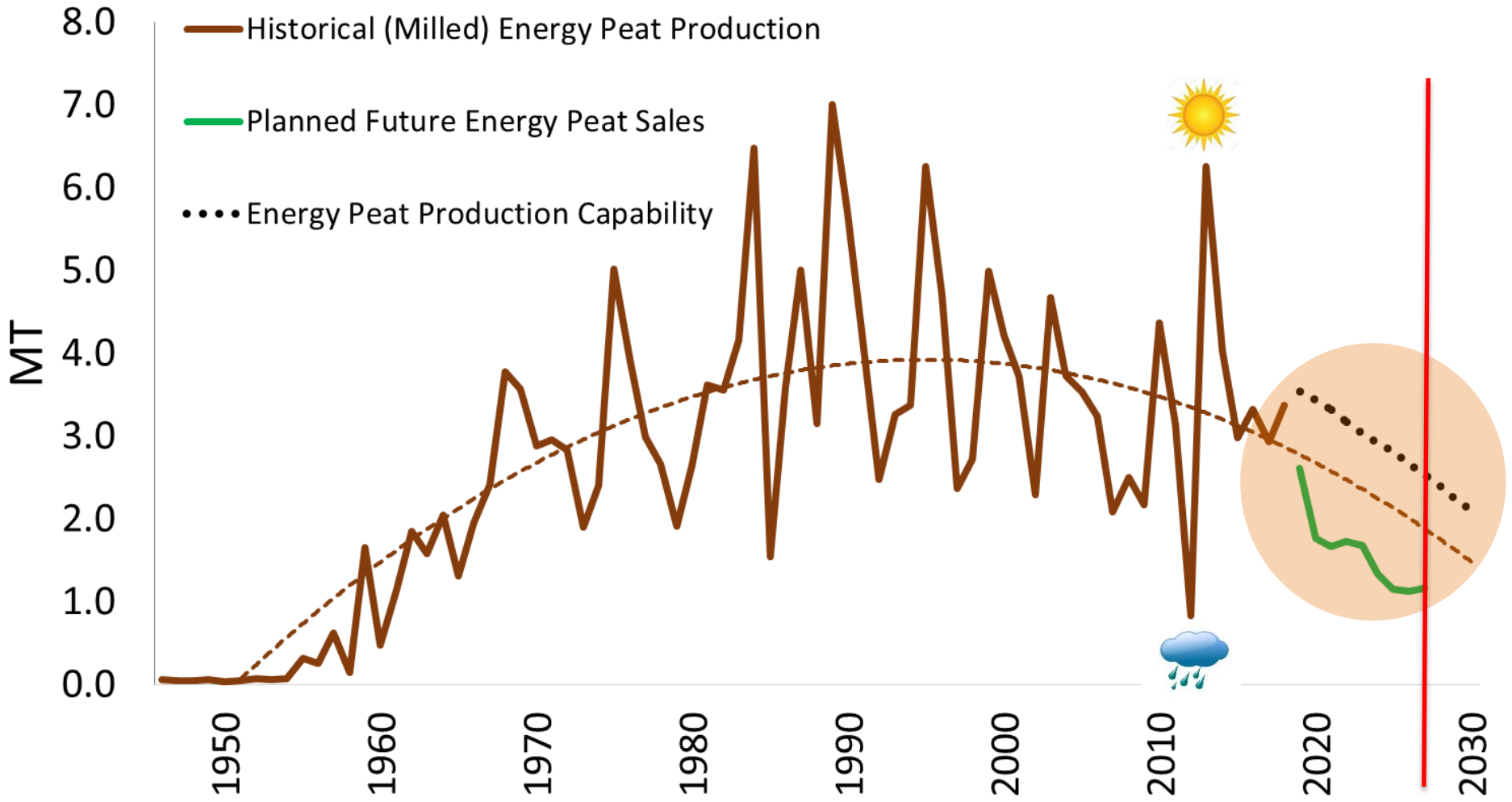


www.loughboora.com



Naturally Driven

Historical Production & Planned Future Sales of Energy Peat by Bord na Mona



Peat Power in Ireland - Today



Peat Power in Ireland - Today

- Edenderry Power (EPL), a 128 MW power station using a bubbling fluidised bed boiler, commissioned in December 2000 for IVO and is now owned by Bord na Móna;
- Currently co-firing @ 40%

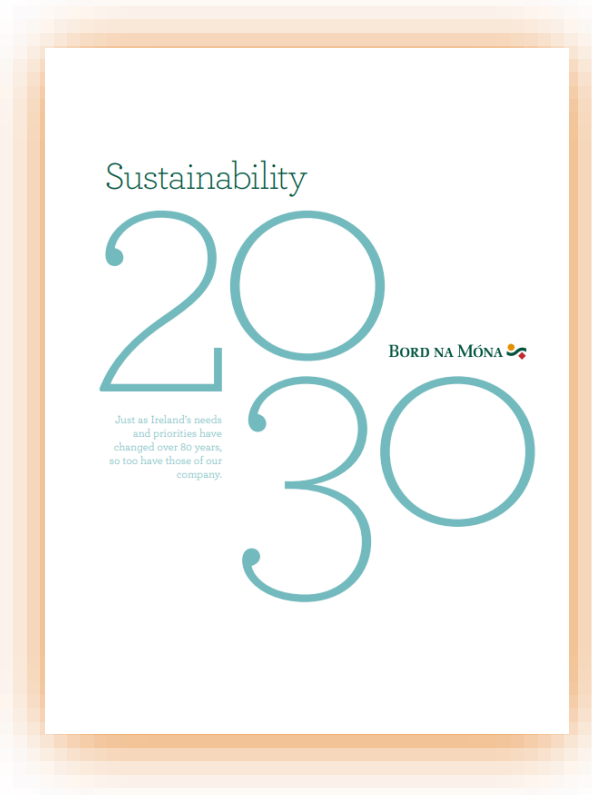
- Lough Ree Power (LRP), a 100 MW power station using a circulating fluidised bed boiler, commissioned in December 2004 for ESB; not yet co-firing biomass

- West Offaly Power (WOP), a 150 MW power station using a circulating fluidised bed boiler, which was commissioned in January 2005 for ESB; not yet co-firing biomass.

Peat Power in Ireland – The Future

In October 2015, Bord na Móna launched its *Sustainability 2030* policy, which set out the company's ambition for a sustainable future. This policy included the cessation of harvesting of energy peat for electricity generation by 2030.

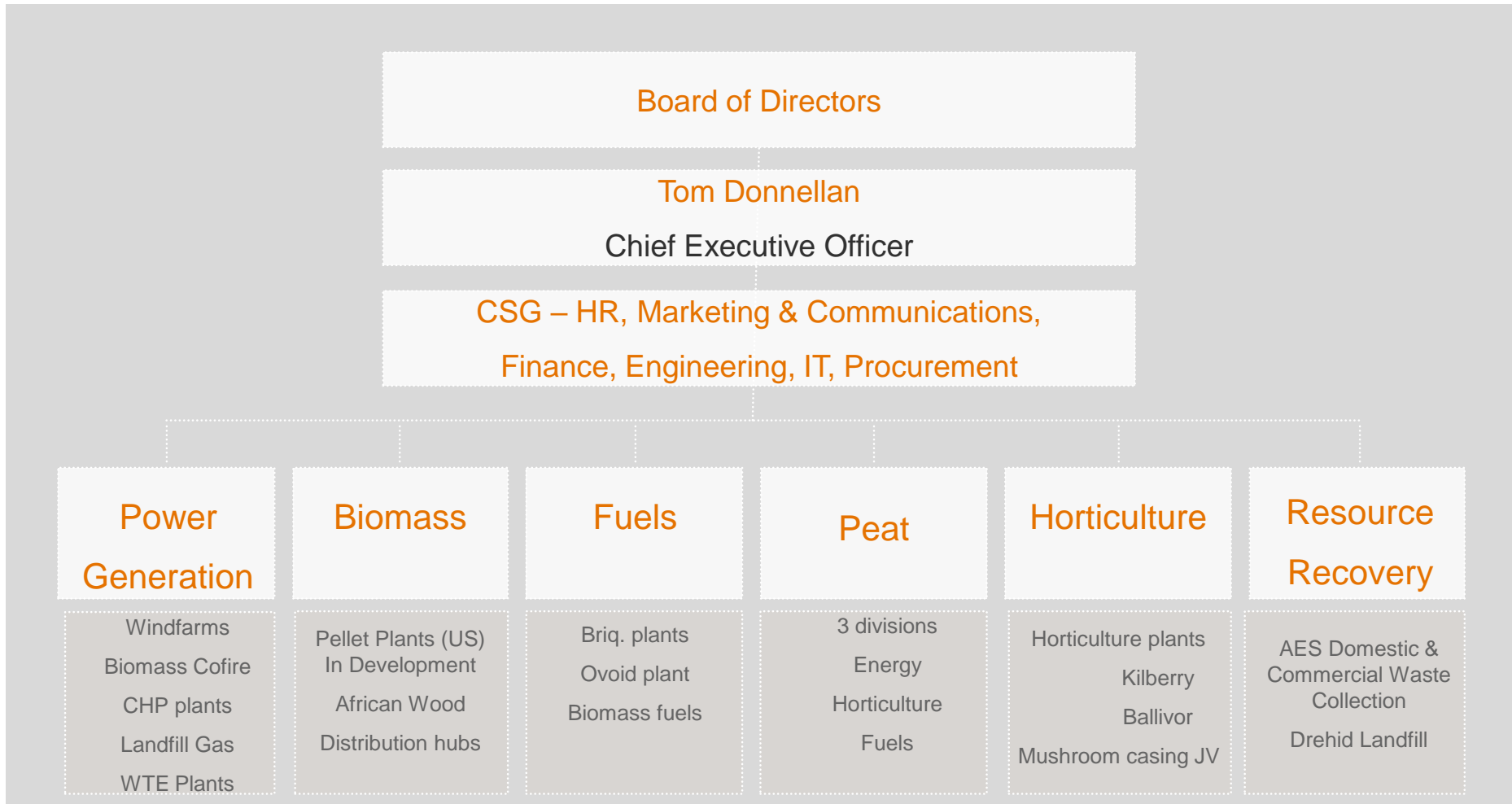
“By 2030 we will cease harvesting energy peat but we will be making sure those 125,000 acres continue to deliver benefits for the company, local communities and the country at large.”



The Transition – What's Needed?

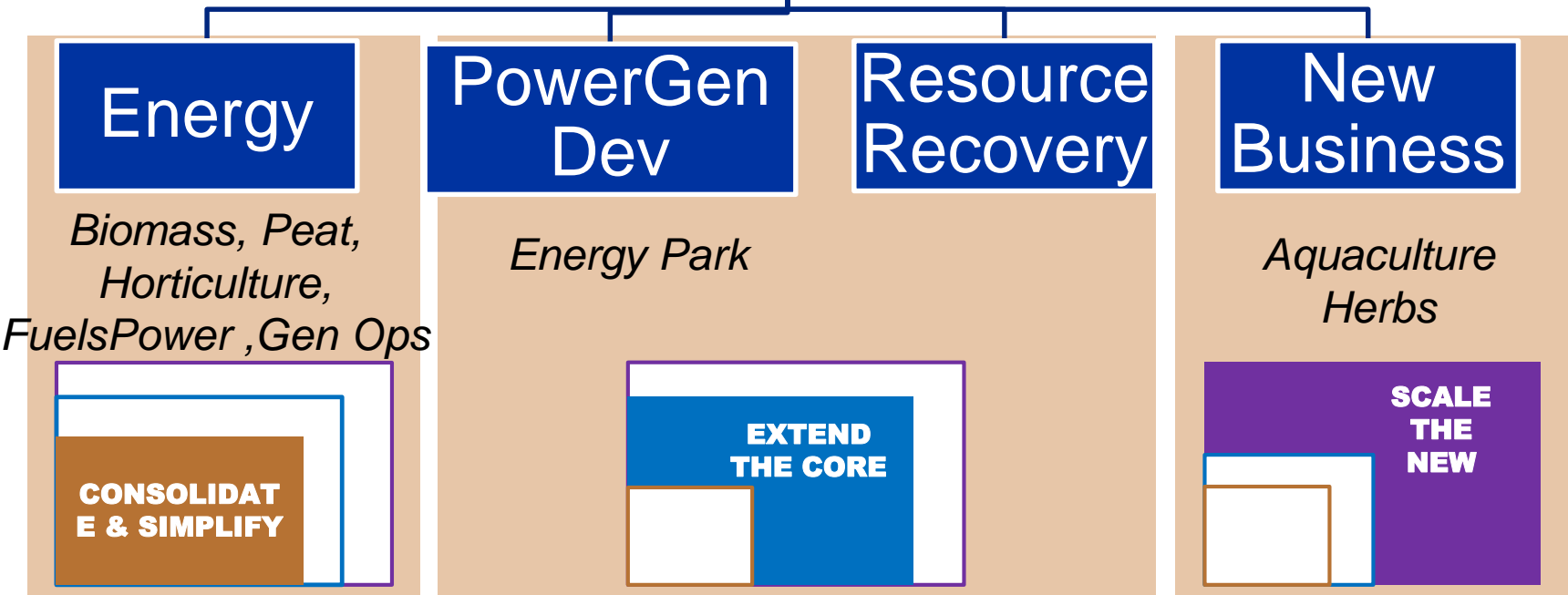
- Business reorganisation
- The existing non-peat related activities must continue to grow
- Support for the structural transformation of the peat harvesting region(s)
 - Mobilisation of private forestry and biomass supply chains;
 - Establishment of new energy crops
- Development of new enterprises on the existing peatlands:-
 - Innovative uses for the peatland assets
 - Rehabilitation of peat lands including beneficial contributions to LULUCF

Current Structure



New Business Unit Structure

BORD^{NA}MÓNA Naturally Driven



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Bord na Móna's Mount Lucas Windfarm



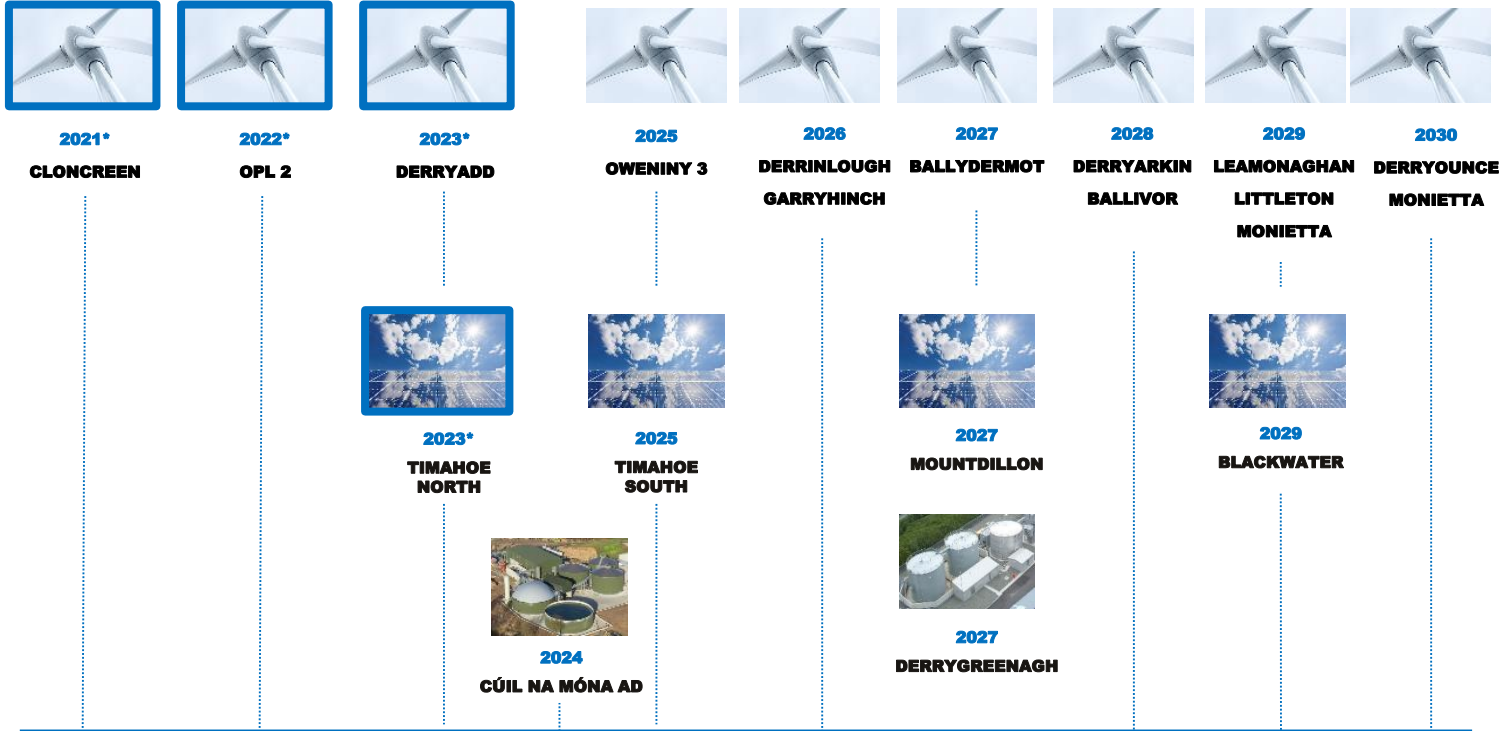
What we've achieved here and what's in the pipeline/planned



- Bord na Móna has developed & operates **185MW** over 4 windfarms
- Another **90MW** windfarm to be commissioned in 2019
- Further **340MW** in the consenting process for 2025
- Additional **350MW** in the pipeline for 2030
- **70MW** of PV planned for 2021
- Additional **400MW** of PV in the pipeline for 2027

2. EXTEND THE CORE POWERGEN DEVELOPMENT

POWERGEN: "IRELAND'S LEADING RENEWABLE ENERGY SUPPLIER BY 2030"



**Included in 5 Year Plan*

2030

13 x WIND

4x SOLAR

1 x GAS

1 X AD

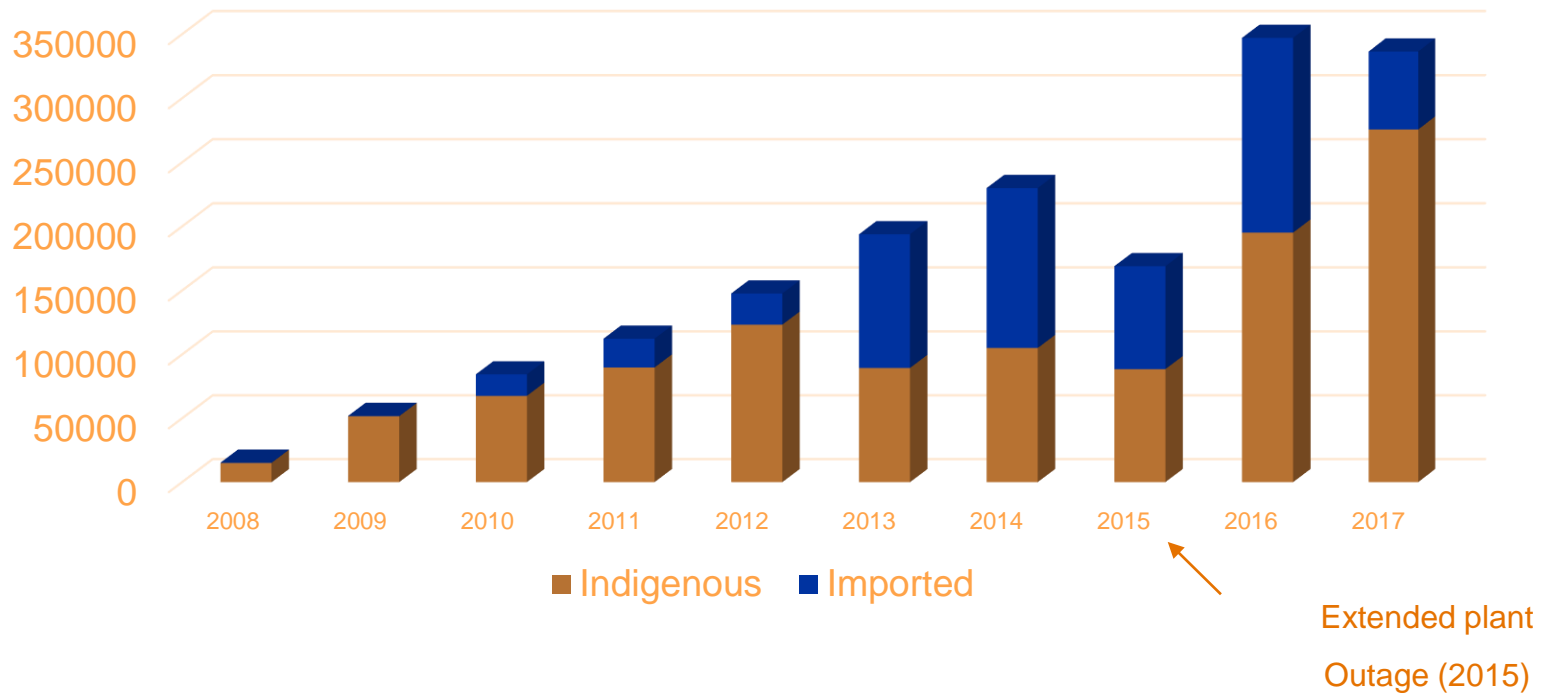
1.6 GW OUTPUT

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Peat Power & Biomass in Ireland – The Journey

RES-E (Biomass) @ EPL -MWh pa



Forestry Thinning's & Residues



Forestry Thinning's & Residues

Barriers to Mobilisation:

Cost and bureaucracy associated with:

- Securing Forest Road Licence approval
- Planning Permission for forest road entrances
- Timber Felling Licences

What could help:

- Defined timelines for granting of Felling Licences and Road Licences
- Support for the preparation of Planning Applications
- Long term economic outlets – eg the 3 biomass/peat stations

Potential for an additional 1.1 PJ per annum

Willow Establishment

- There is under utilised land ideally suited for willow growing located within 100km radius of each power plants
- The job creation and income potential from Willow is significant and could help offset the impact of transitioning away from peat
- Establishment funding for growers critical to success



13,000ha. of willow would provide 2 PJ of fuel per annum

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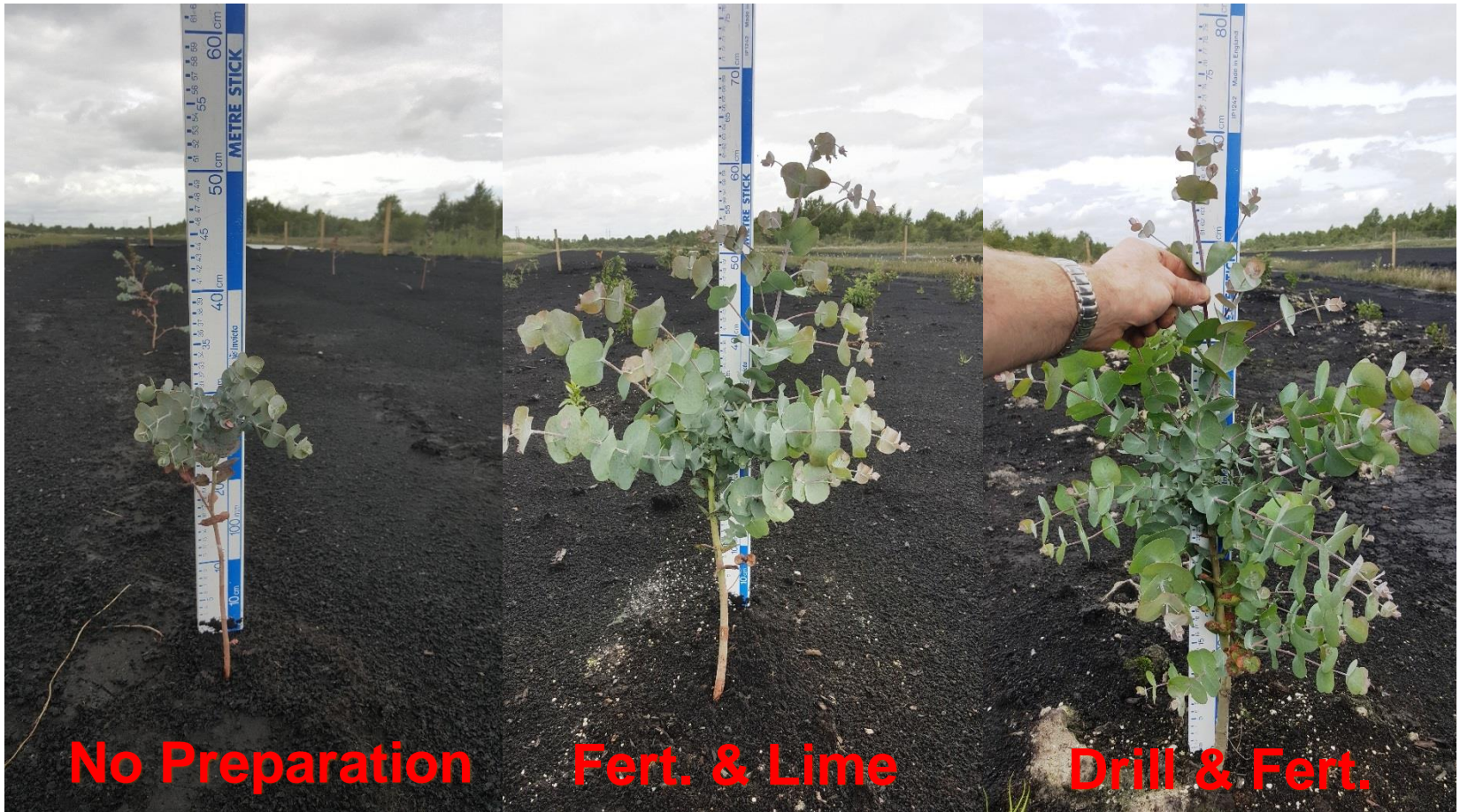
New Biomass trial on Peatlands





New Biomass trial on Peatlands – positive results

Eucalyptus – 9/6/17



INNOVATION - AQUACULTURE



Water Reservoir

Duckweed
Treatment Ponds
(1.6 ha)

Fish Ponds

In conclusion

- Bord na Móna & the Irish Midlands see ourselves as a *Region in Transition*
- A Transition that must be *Just* socially, environmentally and economically
- Our Strategy is to *Respond* to the challenge
- Need stakeholders to understand:
 - this transition will take time
 - that external 'assistance' will be needed
 - political, institutional & financial support will be required

The Transition – What's Needed?

- The Transition will be difficult
- There are social, environmental and commercial considerations
- Business reorganisation

- The existing non-peat related activities must continue to grow

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Growing Biomass on Peatlands

- Crop failure – not persistent enough – susceptible to frost damage
- Take cognisance of carbon flux



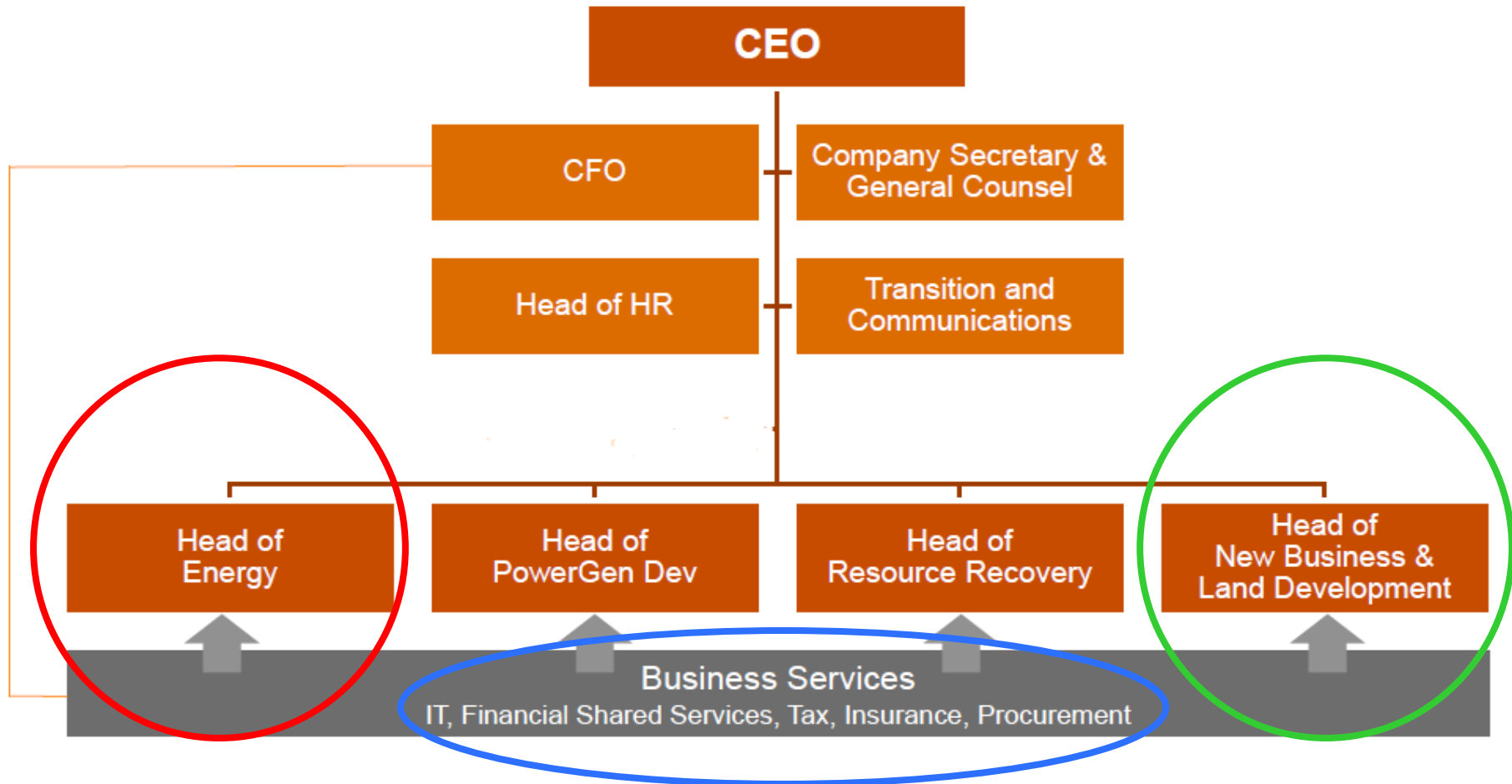


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04/09/2018



Reorganised Structure



Transition away from Peat Power

COUNTY	DIRECT	INDIRECT	INDUCED	TOTAL
Offaly	560	258	40	858
Kildare	453	208	145	806
Westmeath	262	121	20	403
Roscommon/ Longford	184	85	45	314
Tipperary	169	78	35	282
Meath	71	33	25	129
Laois	44	20	95	159
Midland Region & Roscommon	1,050	484	200	1,734
TOTAL 8 COUNTIES	1,743	803	405	2,951

