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PLANNING FOR THE END OF ENERGY PEAT PRODUCTION IN BORD NA MONA

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SUMMARY

Bord na Mona has announced that it will cease to produce energy peat by 2030. The peatland, currently tied up in the production of energy peat will be released for other uses. With a commitment not to develop any new bogs for production, the defined and declining peat resource must be managed to meet ongoing power generation requirements. This paper looks at the planning and optimisation of energy peat production to closure in 2030, how outlying bogs will quickly become surplus to requirements as co-firing with biomass grows and how some of these bogs will later return into production as the peat resource adjacent to the power stations continues to decline. It presents a picture of what the overall peat resource will look like when production ceases: how the depth of peat remaining will be different in each bog, how the post-production drainage conditions will vary between bogs and how the potential exists for energy in the form of renewables to continue to be produced on the peatlands.

Keywords: *peat, energy, planning*

THE CHALLENGE

The peat-fired power stations in Ireland were originally solely supplied from the surrounding bogs connected by Bord na Mona's extensive narrow gauge railway network. In effect a constant and level demand for energy was met with a declining, and ultimately finite, fuel resource.

As bogs became cutaway and fell out of production, and as the generating capacity of the stations were increased, bogs were developed in the outer hinterland at a longer radius from the stations. Over time the replacement bogs that were available for development were too distant to be connected into the rail network and haulage by road became a necessity. This has resulted in a transport mix of supply by rail and by road.

The decision by Bord na Mona not to develop any new bogs for production has made the management of a level demand for energy with a declining resource more difficult than in the past when new production areas could be developed as needed to replace cutaway bogs.

Bord na Mona has established the peat resource remaining by surveying its bogs using LIDAR and GPR and modelling the results using GIS software. The removal of peat and reduction of peat depths in line with potential production is modelled, offering a window into the future. The categorisation of peat as suitable for horticultural applications or energy production is also required.

Projections of bog production capability to the end of 2030 show a continuing gradual decline in the capability to supply peat over the rail network. The requirements for supply by road should therefore continue to grow. However for the ESB[15] owned peat-fired power stations to maintain their base-load (constant running) status beyond 2019 will require co-firing with biomass to reduce carbon emissions to the levels of the reference thermal plant deemed to be displaced. These biomass volumes will grow and displace peat to the extent that the need for peat to be hauled by road will be completely eliminated, before this need returns as production areas linked by rail to the stations continue to become cutaway over time.

A number of the bogs rendered surplus when peak co-firing is reached will be retained to cover peat production areas which will later become cutaway between 2020 and 2029. This will require a new approach to production and bog maintenance to ensure these bogs are available to replace cutaway bogs as this deferred need arises. This results in a complex supply demand mix which must be modelled to cater for, in particular, the uncertainty around production achieved in any year due to the variability of Irish summer weather and also some uncertainty around demand.

[15] Electricity Supply Board

THE SUPPLY-DEMAND MODEL

Premium Solver Platform[16] linear programming software is used for supply-demand modelling and optimisation, The model seeks to maximise the production and sales each year from the individual bog areas linked by rail to the stations, while minimising road haulage, within the constraints of the chosen stockholding policy (stock: sales ratio). The model provides for rapid optimisation of a range of scenarios, catering in particular for the risk and impact of adverse weather and poor production seasons as well as possible changes to the demand scenario. See Fig.1 below.

The risk associated with poor production seasons is managed by the maintenance of high stock levels. Current contracts require a multiple of 1.5 times next year's sales to be held in stock each year at the end of March. These are high stock levels but in the past, following a succession of poor summers, have proved vital in maintaining supply to the stations, and this stock to sales ratio is used for forward planning to 2030.
The supply of peat for power generation will cease in 2030 and, given our planned stocking strategy, the last year of planned full production will be 2028 with minimal production in 2029 and no production planned for 2030. The supply-demand optimisation model, utilising the GIS resource data, identifies the individual production areas which will become cutaway or surplus to requirements and when this will occur. Bogs will be categorised as surplus based on relative production and transport costs or specific issues such as the likelihood of floods with consequent loss of stock occurring. A further output of the model is the level of road haulage that should be provided for in future planning permission (permit) applications with due consideration given to the risk of poor production seasons.

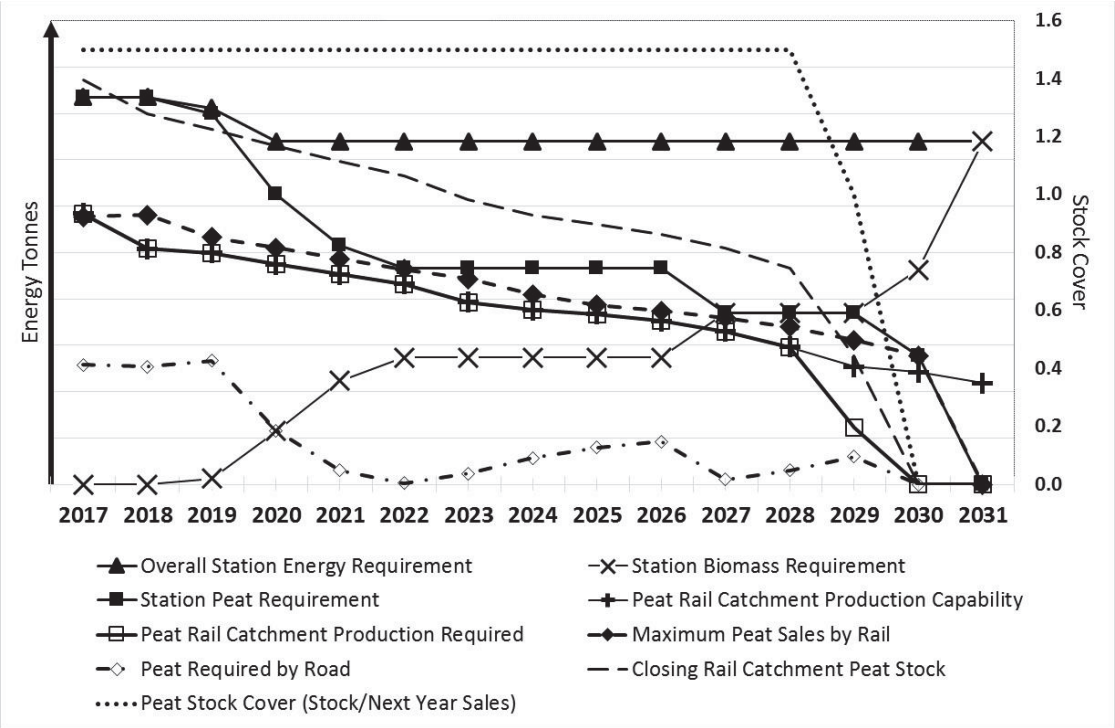

Fig.1 A forecast power station supply-demand scenario

Knowing the extent to which production areas will become surplus to requirements allows the critical examination of all production bogs and, for example, to further extend buffer zones around areas of environmental interest. Manpower and machinery requirements associated with optimising the various chosen scenarios can be identified together with costings.

OPPORTUNITIES

As peat is displaced by biomass the active peat production footprint will be reduced. Between 2017 and 2021 alone over 5,000 ha will be released from peat production with the potential for other uses including continuing energy production in the form of renewables and peatland rehabilitation. See Fig.2 below.
Because cutaway emerges in an incremental and fragmented way, the release of bog areas is complex and requires detailed consideration.

[16] Frontline Systems Inc.

After production ceases, bogs will be cut away to varying degrees and varying depths of peat will remain. The peat depths remaining in 2030, can be projected today and considered at an early stage in future land-use and rehabilitation planning. The post-production drainage conditions can be forecast, and for example, areas with high potential for natural wetlands can be identified.

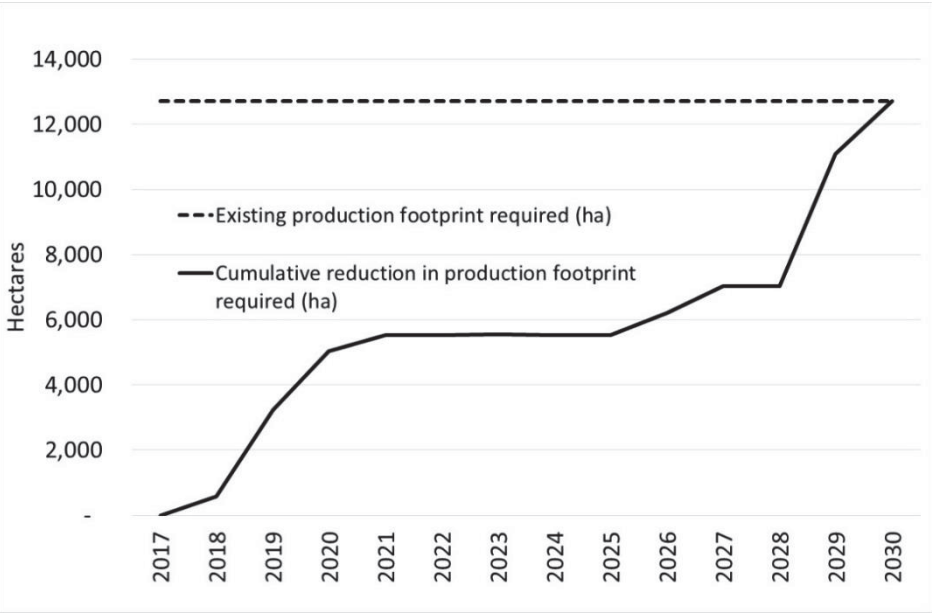

Fig.2 Cumulative reduction in required active peat production footprint (ha) for ESB owned peat-fired power stations to 2030

CONCLUSIONS

The management of the supply of energy peat from now to ultimate closure will be more complex than heretofore. The application of optimisation software in supply demand modelling will identify the minimum cost production and supply configuration and will facilitate a long term view today of when in the future individual bogs will be retired from energy peat production and what they will look like when they are retired.