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PUBLIC ACCEPTANCE OF NEW RENEWABLE ELECTRICITY GENERATION AND TRANSMISSION LINES

MANUEL TONG KOECKLIN, GENARO LONGORIA, DESTA FITIWI, JOSEPH
F. DECAROLIS AND JOHN CURTIS



Public acceptance of new renewable electricity generation and transmission lines¹

Manuel Tong Koecklin, Genaro Longoria, Desta Fitiwi, Joseph F. DeCarolis, John Curtis*

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OVERVIEW

Ireland has ambitious targets for renewables (i.e. wind, solar) in electricity generation, growing from 36.5% in 2019 to 70% by 2030. In parallel, it is anticipated that electricity demand will be between 28% and 55% higher in 2030 compared to 2018. To meet anticipated growth in electricity demand, as well as achieve the renewable electricity policy targets, substantial investment in electricity infrastructure is required. However, new developments of large-scale power system infrastructure, such as wind farms and transmission lines, often face strong public opposition. This research examines the impact of incorporating public preferences for new energy infrastructure in electricity generation and grid expansion planning in terms of system costs and electricity prices.

Over three-quarters of people surveyed are positively disposed to wind turbines but just 36% are willing to accept the development of wind farms within 5 km of their homes. Acceptance levels for overhead transmission lines within 5 km of respondents' homes stands at 28%. There are regional variations in preferences. For example, the highest share of outright opposition to wind farms is in the Midlands, at 21% of respondents, and the lowest is in the Border region at 9%. Outright opposition to new transmission lines is highest at 44% in the South-West and lowest in the West at 18%.

Accommodating public opposition to wind farm and transmission infrastructure into investment decisions leads to capital and operating cost increases, some of which will ultimately be absorbed by electricity customers. For example, where there is public opposition to on-shore wind farms, energy companies may switch investment to off-shore wind farms, which are more expensive to construct and operate. Under the four scenarios examined, capital costs are 12–13% higher

¹ This Bulletin summarizes the findings from: Koecklin, M., Longoria, G., Fitiwi, D. DeCarolis, JF., Curtis, J., "Public acceptance of renewable electricity generation and transmission network developments: Insights from Ireland", *Energy Policy*, Vol. 151. Available online: <https://doi.org/10.1016/j.enpol.2021.112185>

*john.curtis@esri.ie

when investments accommodate public preferences related to energy infrastructure rather than follow the least cost option. Total power system-wide costs are as much as 33% higher in the most extreme scenario examined. The research also finds that additional power system costs are likely to increase at a relatively faster rate as public acceptance of new energy infrastructure declines. In a moderate public acceptance scenario electricity prices are projected to increase by 14% relative to a least cost scenario disregarding public preferences and increase by 263% in the lowest public acceptance scenario examined. While the Irish electricity market operates on the basis of a single price for the whole country, if zonal prices were in operation the Dublin region would potentially see the highest price increases, exceeding 500%, largely attributed to congestion at a number of demand nodes within the region.

METHODS

The public attitudes data used in the analysis are from a 2016 survey of 1057 adults about community involvement in the development of energy projects where the survey sampling was designed to be representative on a national basis. The analysis is undertaken using a computer model based on the power system of the island of Ireland. The model is designed to simultaneously determine optimal investments in generation and transmission infrastructures that minimise system-wide cost while respecting technical, economic, spatial and environmental constraints, including constraints related to the public's acceptance of energy infrastructure.

POLICY IMPLICATIONS

The research shows that the power system can accommodate the public's preferences for new energy infrastructure, although subject to additional costs. What the research additionally shows is that in the 2030 power system, comprising 70% renewables generation and substantially higher electricity demand, system costs and electricity prices could dramatically escalate if there is a sharp deterioration in the public's acceptance of new energy infrastructure. The implication for policy and the wider electricity sector is that community and stakeholder engagement should remain a top priority.

The impact of the public's acceptance of new energy infrastructure in one region can manifest itself elsewhere in the country in terms of unserved power or higher electricity prices but public acceptance of energy infrastructure is often characterised as a local issue. While policy initiatives are underway to encourage public acceptance of energy infrastructure in local communities, the issue of public acceptance is not solely an issue local to where specific infrastructures are proposed for development but a wider national issue. Any negative externalities associated with energy infrastructure are usually local whereas the benefits are enjoyed nationally. Public debate on the merits of new energy infrastructure, such as wind farms or transmission lines, should not be limited to the local externalities but include discussion about the wider context of the transition to a low carbon economy and ensuring provision of a reliable power system with a very high share of renewable generation.

Whitaker Square,
Sir John Rogerson's Quay,
Dublin 2
Telephone **+353 1 863 2000**
Email **admin@esri.ie**
Web **www.esri.ie**
Twitter **@ESRIDublin**