INVESTING IN ELECTRICITY INFRASTRUCTURE AND RENEWABLES IN IRELAND†

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Like other countries, Ireland is trying to decrease greenhouse gas emissions while keeping electricity prices low. One of the main ways to reduce greenhouse gases is to switch electricity generation from fossil fuels to renewable sources, but this tends to increase electricity prices. Two features combine to make the Irish situation different:

- As a small island market, Ireland's electricity system is relatively isolated. All things equal, this tends to lead to higher costs of generation for a given security of supply standard.

- Ireland's main source of renewable energy is wind. Electricity can only be generated from wind when the wind is blowing at appropriate speeds, which in Ireland happens on average about a third of the time. Because wind power is intermittent, other sources of generation must be ready to step in and meet demand.

Two recent papers** provide insights into how best to plan for Ireland's future electricity needs. They show how better links to the British grid are necessary to allow more effective use of clean wind power and to partly overcome the problems posed by its intermittent availability. They also analyse the constraints on expanding wind energy. Diffney, Fitz Gerald, Lyons and Malaguzzi Valeri (2009) evaluate the costs and benefits of increasing wind generation on the all-island electricity market that started in November 2007. Historically, there has been wide variation in the price of oil and the price of natural gas, which in 2008 fuelled about 60 per cent of Ireland's electricity generation. The study takes this volatility into account and considers three different scenarios on fuel prices, focusing on the year 2020. The authors also consider the effects of different levels of interconnection between the electricity systems of Ireland and Great Britain. At the moment there is only one electricity interconnector that runs between Scotland and Northern

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Ireland, but a second – between Ireland and Wales – is planned for completion by 2012.

The study finds that for a small and relatively isolated market such as Ireland, a high penetration of wind is economically sound only if it is accompanied by an increase in interconnection to Great Britain. In the absence of greater interconnection some of the available wind generation will necessarily have to be left idle to maintain the reliability of the system. Not surprisingly, for low fuel prices the lowest system costs are achieved when wind penetration is low (2000 megawatts in this study), whereas for high fuel prices high levels of wind generation are optimal (6000 megawatts in this study). If wind reaches 6000 megawatts by 2020, Ireland is likely to achieve the government's target of producing 40 per cent of electricity from renewables by that date. The impact of wind generation on electricity prices means that wind power is likely to provide a hedge against the consequences of high fuel prices.

The level of investment needed in the electricity sector in the near future is extremely large when one considers the joint effect of building more wind-farms and the need to extend and upgrade transmission and distribution lines. Transmission and distribution need to be upgraded because many lines are ageing and more lines are needed to accommodate the increase in wind generation and the complementary investment in new interconnection. This highlights the need to keep capital costs down. Maintaining regulatory certainty is vital in the all-island market since it will allow banks to assess the risks more easily and, therefore, result in lower financing costs.

The high level of future investment in transmission and distribution suggests that it is also important to keep maintenance costs low. In most developed economies employees working in the utilities sectors (water, natural gas and electricity) earn more than manufacturing workers. However, in the Republic of Ireland the ratio of utility worker's pay to manufacturing worker's pay is significantly larger than in other European countries. If labour costs in Ireland remain high, the cost of updating transmission and distribution networks may be greater than necessary. There has, however, been a shift towards subcontracting maintenance work through competitive bidding, putting downward pressure on costs, and this trend should be encouraged.

The study highlights the importance of putting in place the right amount of electricity interconnection to Great Britain and of ensuring that its operation and governance are efficient. If the interconnector does not work efficiently the benefits of increased wind on the system will be smaller. Malaguzzi Valeri (2009) in another recent study shows that most of the gains from interconnection between Ireland and Great Britain derive from the difference in electricity generating portfolios in Ireland and Great Britain. Great Britain relies more on coal-fuelled and nuclear generation whereas Ireland relies more on generation fuelled by natural gas. Malaguzzi Valeri (2009) shows that there are decreasing returns to investment in interconnection, both for society as a whole and for interconnector investors in particular. Returns decrease

particularly quickly for independent interconnector owners, in part because they are unable to capture all the positive externalities from interconnection, such as increased returns to generators or lower greenhouse gas emissions in electricity generation. Increased interconnection also lowers the cost of electricity reserves (not measured directly in this study), which further widens the gap between interconnector returns and the returns to society. Privately owned interconnectors are, therefore, likely to invest less than would be socially optimal, which suggests that there is a role for public investment in interconnection.

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