PÖYRY POINT OF VIEW - APRIL 2015

The death of ‘invest and forget’

A brave new world for European renewables investors

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For many investors, renewables have been seen as an 'invest and forget' class of assets – with the upfront capital outlay opening up a long term and (fairly) dependable cash flow. But with renewables now facing growing power market risks in many European countries investors are going to need to take a much more active role in managing their portfolios. This exposure to electricity market risk is down to changing support mechanisms or simply the result of projects reaching the end of their support period with many years of operational life left within the investment horizon. Additionally, wind farms face other risks in their lifecycle: development, construction, operational and weather, but these market risks are a new and important development for many continental European renewable generators. Furthermore these market risks can be higher than the risks faced by thermal generators; so renewable investors will need to fully understand the value proposition they are putting their money behind.

"Renewable investors will need to fully understand the value proposition they are putting their money behind"

SUPPORT SCHEMES ARE CHANGING FOR NEW DEVELOPMENTS...

Recent pressures on the general level of support being provided for renewables by governments, combined with new State Aid guidance on appropriate support scheme design, are significantly changing the landscape for investors.

Historical Feed-in Tariff support mechanisms (FiTs) favoured by countries like Germany cushioned wind and solar technologies from wholesale energy price fluctuations as well as market imbalance risks. But current trends are seeing renewable support mechanisms for new projects converge on a single model – the variable 'top-up tariff':

- the ROC scheme in the UK will end to new projects in 2017 and be replaced by a contract for difference support (the 'FiT CfD') under which projects will be insulated against wholesale price movements but retain exposure to balancing costs;
- Germany is evolving its support mechanisms from traditional FiTs to new top-up tariff support schemes (e.g. the 'Direct Marketing – claiming a premium' option) that tops up revenues from a market reference price to a fixed support level. These will expose renewables to Balancing Market risks on top of the normal

operational risks (weather, plant availability etc.);
- the Netherlands' SDE+ support scheme is a contract for difference with limited exposure to market and balancing risks;
- Belgium has adopted a similar approach for its offshore wind support mechanism;
- France has clear plans to do something similar; and
- Ireland has clear ambitions to "...give no special treatment..." to renewables in the new I-SEM market and so exposing wind farms to balancing risk.

...AND MANY OPERATIONAL WIND FARMS ARE NOW REACHING AN AGE WHERE THE END OF THEIR SUPPORT IS IN SIGHT

Support afforded under renewables schemes is time limited, e.g. 20 years for the historical German FiTs and UK Renewables Obligation (RO) and 15 years for French FiTs. After the end of this support period, renewable assets are typically exposed fully to wholesale market risks.

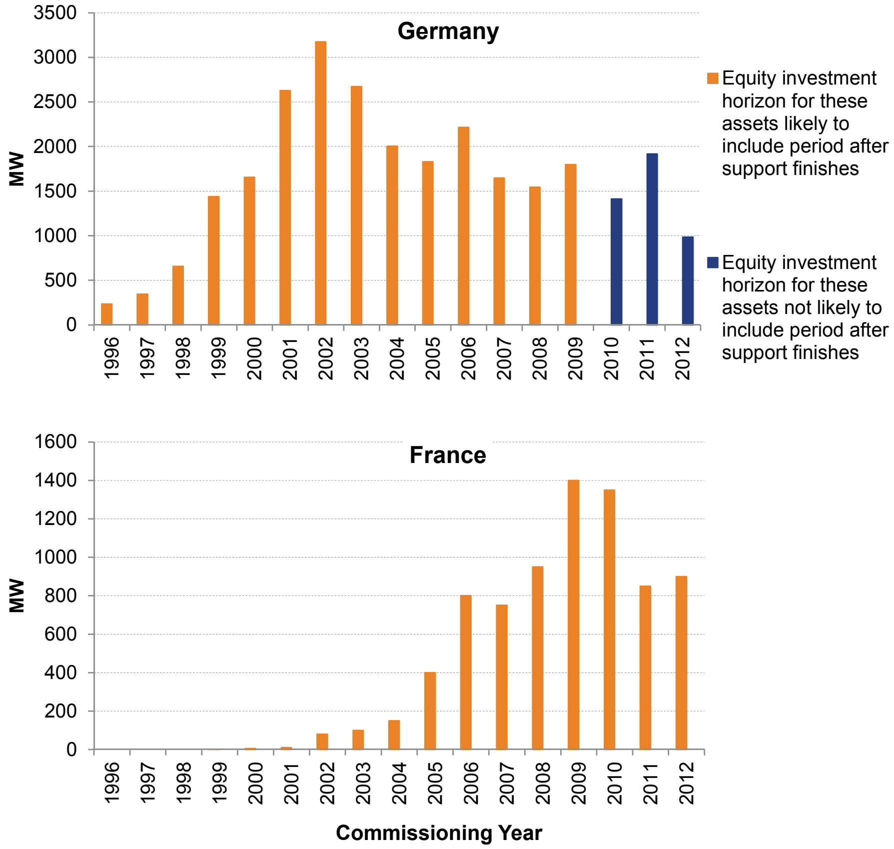
Furthermore, there is increasing investment interest from infrastructure funds, many investing pension money with a very long term investment horizon. For these investors the back-end period beyond the Feed-in Tariff is important, even for new build projects (as the duration of support is reduced under new schemes). Figure 1 shows the relevance for France and Germany.

FEED-IN TARIFFS CUSHIONED MANY DIFFERENT RISKS FOR INVESTORS

Traditional Feed-in Tariff support mechanisms, in principle, seek to enhance investor returns by addressing four aspects of market risk:

- A higher absolute price than would be received from wholesale market price alone;
- cutting out exposure to fluctuations in spot market;

FIGURE 1 – AGE PROFILE OF ONSHORE WIND FARMS IN GERMANY AND FRANCE



- removing market volume risk by ensuring all generation will receive the support payments; and
- reduced exposure to, or elimination of, balancing costs.

Once the support period has ended, projects are fully exposed to these four aspects of market risk.

Looking forward, new wind farm developments in France, Germany, the Netherlands and the UK will have very similar top-up tariff support schemes – consisting of a wholesale market income, a top-up payment, a market balancing risk (payments due to short term forecast errors) and some basis risk (that the wind farm's output does not actually earn revenues at the same price as the benchmark against which top-up tariff payments are made).

The trend towards top-up tariffs removes protection from up to three of these four forms of market risk:

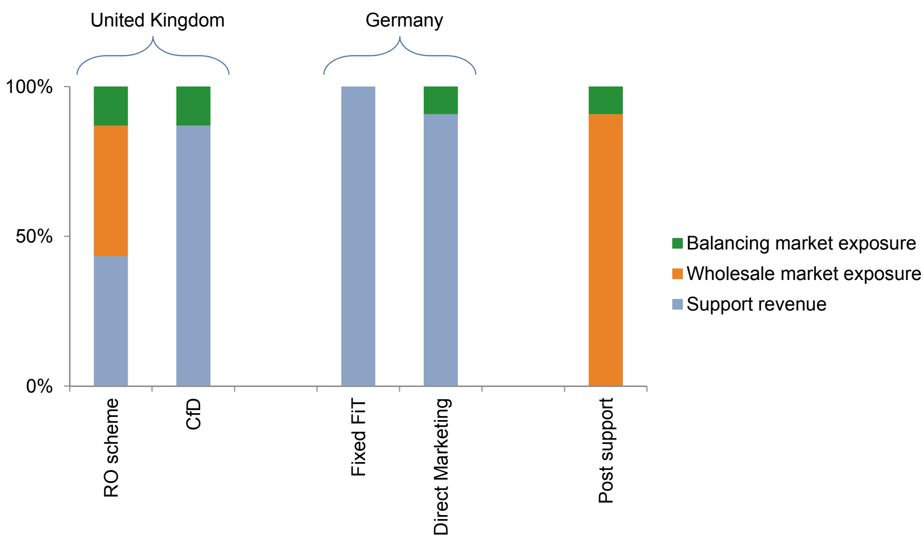
- exposing the generator to balancing risk;
- introducing a basis risk on a generator's ability to sell its output at the market reference price used for the top-up tariff; and
- removing volume certainty during periods of negative market prices.

For example, whilst the move from RO to CfD in the UK is removing some exposure to wholesale market price risk, the new Direct Marketing option in Germany will introduce significant balancing risk exposures, as illustrated in Figure 2.

Many markets have support mechanisms with tariff structures that vary over time, often with an initial higher price compensating for a shorter duration of support. However, this front-loading of support typically benefits debt repayments, and whilst it may enhance the proportion of debt funding that a project can attract, it may also hasten the equity investment's exposure to market risks.

So wind farms' revenues post-Feed-in Tariff will be affected by all four of the identified aspects of market risk; and the recent changes to the support regimes in many continental countries will affect the last three.

FIGURE 2 – ILLUSTRATION OF SOURCE OF PRICE EXPOSURE RISK UNDER DIFFERENT SCHEMES



Recent pressures on the general level of support being provided for renewables are significantly changing the landscape for investors

PRICE RISKS ARE A VERY SIGNIFICANT FACTOR IN VALUATIONS

It is interesting to examine the way that these risks might manifest themselves. Gas-fired CCGTs have always had some fuel price hedging (because in general gas-fired power stations set wholesale electricity prices and can pass through some of their fuel price risk). In contrast, wind farms will be exposed to the full volatility of the power market price which, as can be seen from the Figure 3, can move wildly in a short period of time, even on a monthly average basis. In Germany the balancing market price regularly moves between €-100 and €+200/MWh . Balancing markets tend to be less transparent, and subject to national rules and regulations. To manage the exposure of renewables to balancing market risks, generators typically adopt commercial contracting structures to transfer the management of this risk to more competent operators. For example, in the UK balancing risk for a wind farm is typically transferred to the offtaker, in return for a discount in the received market price. A similar structure is increasingly being seen also for assets operating under the German Direct Marketing scheme.

For many renewable generators the end of their FiT support period (or the introduction of new top-up tariffs) will see them exposed to the market for the first time and their generation will have to be actively traded in the wholesale and balancing markets. They will have to choose whether to set up their own trading organisations to manage these activities or to seek a partner to take on this risk, but either way this may well come at a significant cost.

FIGURE 3 – HISTORICAL MONTHLY AVERAGE POWER PRICE IN KEY EUROPEAN MARKETS (€/MWH REAL 2013)

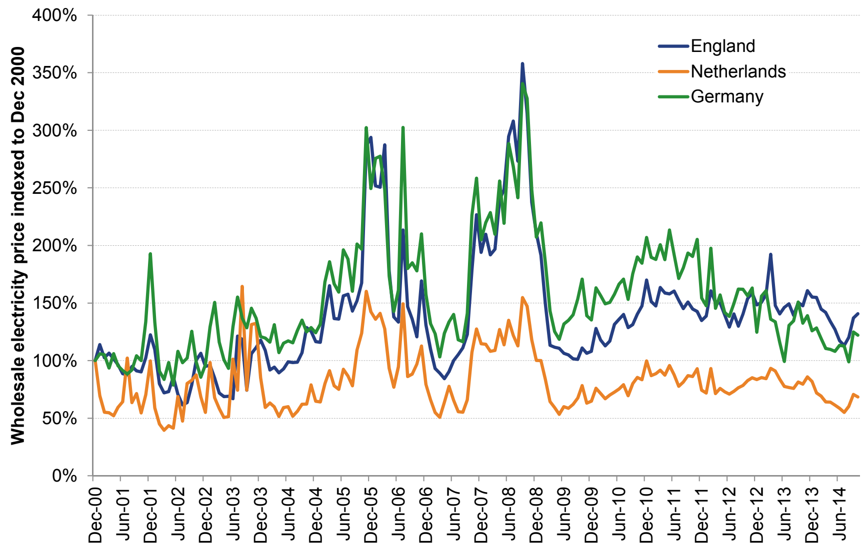
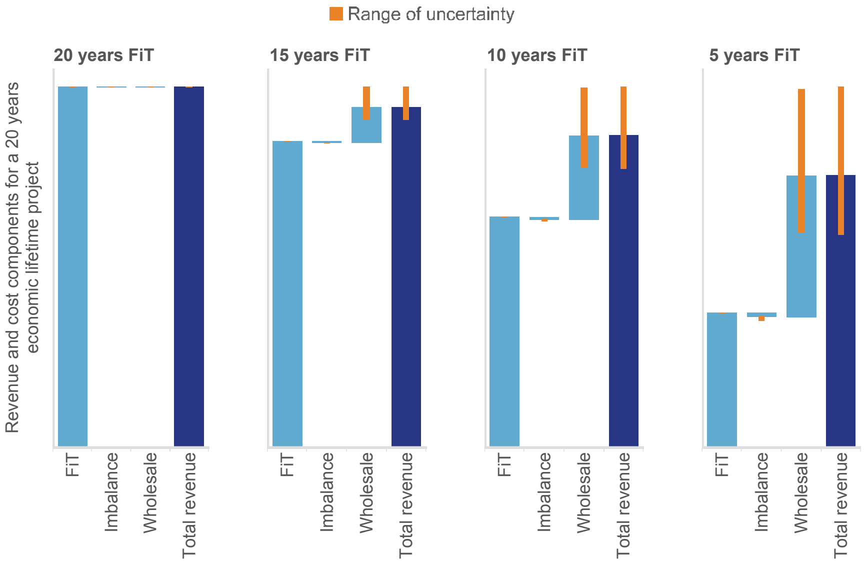


FIGURE 4 – ILLUSTRATIVE CONTRIBUTION AND UNCERTAINTY OF VALUE FOR ASSETS AS A FUNCTION OF REMAINING YEARS OF FIT SCHEME



VALUE PROPOSITION OF WIND FARMS

To get a better idea of how these new market risks affect asset valuations we can consider the range of possible outcomes for these assets, that under traditional FiTs many considered 'invest and forget' (i.e. returns are not affected by market turbulence). Under the new regimes they will need constant attention.

Wind farms with limited FiT life left

Let's examine a wind farm in Germany as it approaches the end of its FiT – with more and more of its value progressively derived from the post-FiT period. This is illustrated in Figure 4 for different residual FiT periods.

However, the market price uncertainty means that the valuation of the asset now has a wide range - for an asset that previously would have been considered very low risk. Understanding the drivers of the alternative outcomes is therefore of fundamental importance to investors looking at assets which may have a more limited life remaining under existing RES support schemes.

Wind farms under top-up tariff support

New wind farms supported through top-up tariff regimes – under which they are exposed to balancing markets, basis risk and negative market prices – carry greater risk than under the previous FiT regime, suggesting these investments too cannot be considered 'Invest & Forget' assets.

These risks are not straightforward to assess, as market rules evolve (for example with the introduction of capacity mechanisms and/or more penal balancing prices) and the nature of the electricity market changes, especially with increasing renewables penetration (leading, for example, to more correlation between price volatility and weather patterns and to the greater frequency of negatively priced period). Together these factors are likely to increase balancing and trading risks going forward, and while good operational practice and a more diverse portfolio can mitigate the risks, they are likely to have a material impact on the value of renewable assets.

The diagram below in Figure 5 shows the potential value make up for a wind farm in Germany, illustrating the reduction in value and range of uncertainty that exposure to market risks can have on the value of an asset.

SUMMING UP

Exposure to market risks is not by itself a barrier to investment in renewables. In Pöyry's experience the investment community became very comfortable with the risks associated with the UK ROC regime – indeed the various market risks were common currency in investment decisions and asset transactions – but so too were the higher returns demanded by investors for taking on those risks.

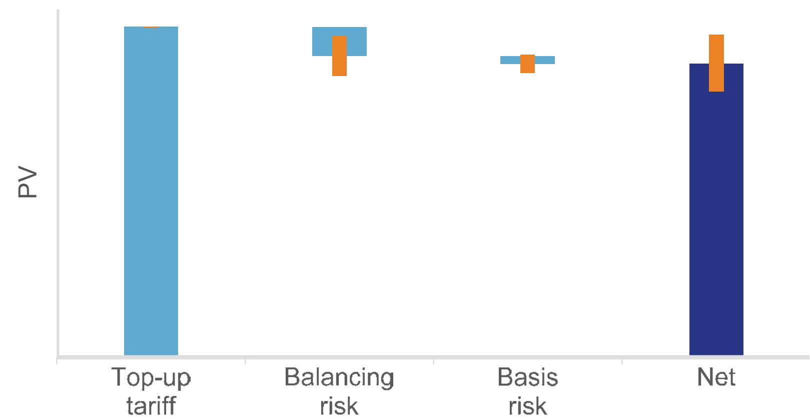
In many continental European markets, exposure to market risks to date has been far more limited, so the changes we have outlined in this paper are likely to be far more marked – the contrast between the virtual absence of risks for investors under the 'Invest and Forget' world of the Feed-in Tariff, and the exposure to market prices and imbalance risks may result in very different values for current and future asset portfolios.

To make good judgements, renewables investors must fully understand the current nature of the markets from which the assets earn their revenues, and evaluate the complex dynamics at play that influence market revenues.

They will also face the prospect of having to actively manage these risks by setting up trading operations, finding financial or physical trading counterparties and then maintaining risk management strategies.

Whichever path they choose, this will be a very different world from 'Invest and Forget'.

FIGURE 5 – VALUE COMPOSITION OF NEW WIND FARM UNDER NEW TOP-UP TARIFF SUPPORT REGIME IN GERMANY



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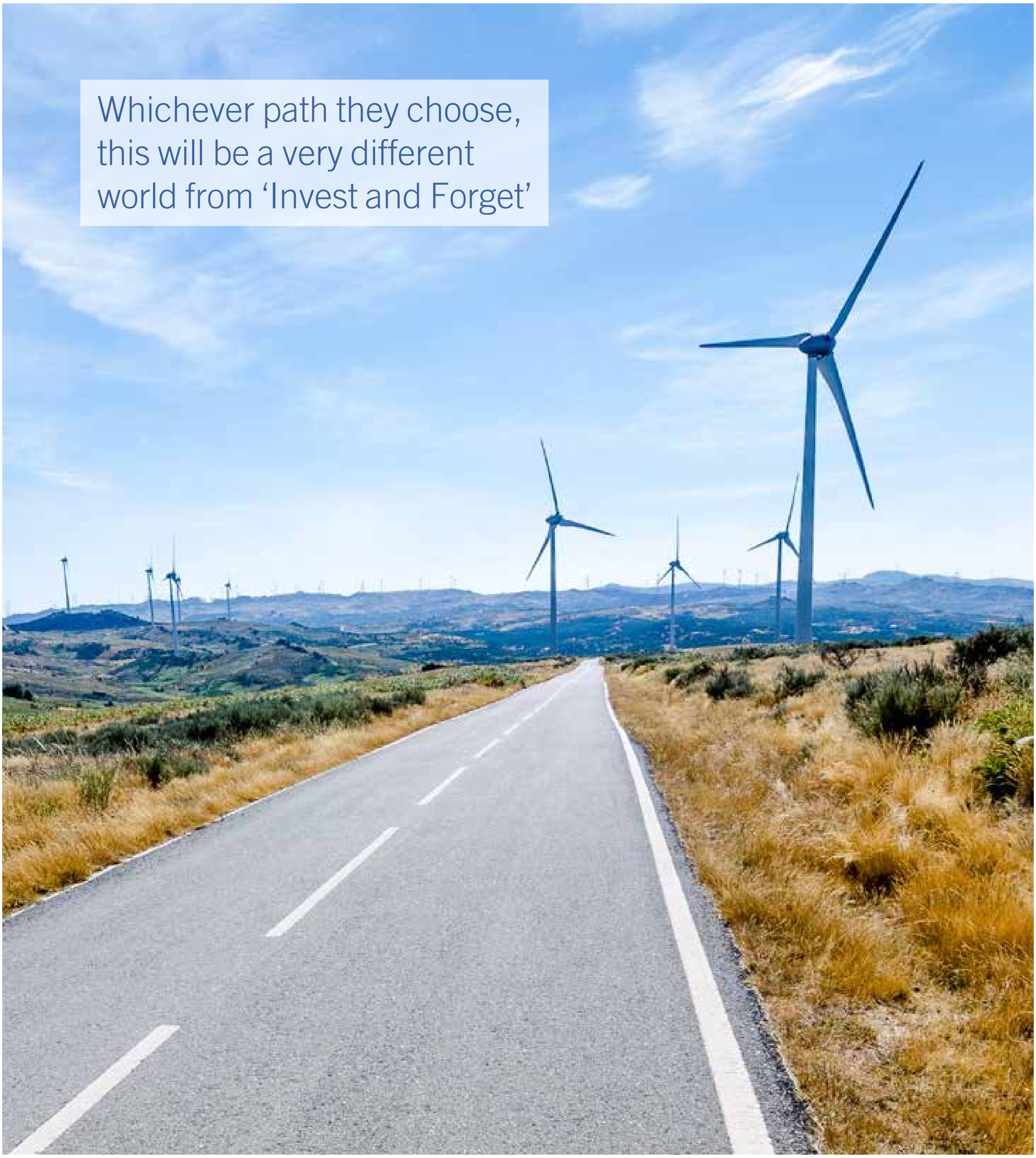

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