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BRIEFING PAPER

FEED-IN FRENZY

HOW A WIND FARM SUBSIDY LOOPHOLE IS SHORT-CHANGING BILLPAYERS AND DAMAGING BRITAIN'S CLEAN ENERGY MARKET

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Introduction

The role of onshore wind energy in meeting Britain's future energy needs is deeply contentious. This paper reveals a loop-hole in one of the government's major clean energy programmes – the feed-in tariff subsidy scheme – which, if left open, threatens to undermine both public confidence and the scheme's effectiveness in increasing low-carbon power generation in the UK.

Prime minister David Cameron said in December 2014 that voters are 'basically fed up' with wind farms. He told MPs, 'Enough is enough and I am very clear about that' (Shankleman and Murray 2014). Last year the communities secretary Eric Pickles used planning law to block six out of 10 onshore wind farm applications, having blocked nine of 10 the year before (Merrill 2014, Mason 2015). This followed a letter to David Cameron from 101 of his backbench MPs calling for 'dramatic cuts' in wind energy subsidies (Hennessy 2012). The Conservative party recently announced it will make an election manifesto commitment to end subsidies to new onshore wind farms altogether, and to put control of all planning decisions into local councils' hands, in the expectation that this could reduce the wind farm approval rate even further (Kirkup 2014).

Similarly, Ukip wants to scrap green subsidies and ensure that there would be no new subsidies for wind farms. Ukip leader Nigel Farage has previously described wind farms as 'ugly disgusting ghastly' and said that he would like personally to 'blow them up' (Webster 2012, Campbell 2014). His party has said it would repeal the Climate Change Act and strip away all legally binding commitments to reduce carbon pollution (Ukip 2015).

In contrast, Labour and the Liberal Democrats still support a greater role for onshore wind energy as a means to reduce pollution while also creating jobs and growth. Both parties have promised that they would introduce a legal commitment to almost completely remove carbon pollution from the power system by 2030 (Carrington 2012a, Platt 2012). While both parties see a role for a range of low-carbon technologies, including nuclear power and carbon capture and storage (CCS) to achieve this, both also expect to increase the number of wind farms, both on- and offshore. Similarly, the SNP want to see all of Scotland's power coming from renewable sources by the end of the decade, and have prevented local councils from blocking onshore wind developments because of the contribution they want to see from this sector (Johnson 2014).

Polling suggests that wind power still enjoys the support of more than two-thirds of the British public (DECC 2014). This level of support for the technology has remained consistent for several years (Vaughan 2012, Carrington 2012b). One recent survey found wind farms to be the most popular of any energy source in the country (Fearn 2014). Another found that 61 per cent of people would accept a wind turbine, or several turbines, within five miles of their home. Polling suggests that support remains high even among those often perceived to be hostile to wind farms: the figure is 54 per cent for Ukip voters and 57 per cent for Conservative voters (RUK 2014).

Nevertheless, these polling numbers obscure the reality felt by a number of politicians: that those opposed to wind farm developments are more likely to switch political allegiance than those who are in favour. The asymmetry of the debate in many localities means that even some MPs who support wind energy in principle are opposing new turbines in their constituencies.

The political furore over wind farms is fuelled by concerns over the cost of energy. The average household energy bill rose by 75 per cent between 2004 and 2013 (CCC 2014). While 80 per cent of this rise was completely unrelated to low-carbon energy policies, and mostly about a rise in the wholesale cost of gas, there is acute

public pressure to ensure that bills are not higher than they absolutely need to be. In response to this pressure, the prime minister reportedly called to 'cut the green crap' from energy bills ahead of the 2013 autumn statement (Groves and Robinson 2013).

Much of the media coverage of the energy costs debate has similarly focussed on the contributions that families are making towards support schemes for wind energy and other investments to reduce carbon pollution. In fact, these sums are modest. In 2013, the average household contributed £35 through their energy bill in direct support for low-carbon energy projects, around 3 per cent of a bill. Onshore wind farms are the cheapest of all the low-carbon technologies that these funds support (CCC 2014). This is important, because it means that if you advocate major cuts in greenhouse gas pollution – as all political parties aside from Ukip do – then there must be a significant future role for relatively affordable onshore wind energy.

This overall commitment, however, need not preclude a major emphasis on ensuring wind power support schemes represent good value for money. In this, the government has fallen short. This paper exposes a major loophole in the coalition's 'feed-in tariff' subsidy scheme (FiT) for onshore wind farms – this loophole is both short-changing household billpayers and undermining the national effort to clean up the energy system. At a time when trust in the energy industry is already at a record low, it is crucial for ministers to act swiftly to close down this loophole.

The feed-in tariff

In 2008, with the backing of all the main parties, then energy and climate change secretary Ed Miliband introduced an innovative new energy scheme called the feed-in tariff (FiT) or 'Clean Energy Cashback'. It came into force in April 2010 and has been continued by David Cameron's coalition government.

The intention has been to incentivise the growth of small-scale renewable energy generation, including small wind farm projects.[1] By enabling individuals and communities to participate in the national effort to go green and to secure power supplies, the policy was meant to help democratise the energy system and open up the market to many more players, as well as creating new jobs in the supply chains for these emerging green technologies.

Through the feed-in tariff, any individual or organisation that develops a small-scale clean energy project can receive cash back on a quarterly basis from electricity suppliers. The suppliers pay a fixed amount for every unit of clean power that is generated, regardless of where the power is consumed, although they receive an extra amount for any electricity that is channelled into the national grid rather than being consumed at the site where the power is being generated. The suppliers then recoup these payments through the electricity bills of their customers.

Ever since the policy was first proposed, ministers have consistently promised that there would be a major emphasis on cost-effectiveness. Before it was introduced, the government pledged:

> *'We have worked to deliver a scheme that meets public and parliamentary aspirations for this sector and also delivers value for money for taxpayers and the public.'*
> DECC 2010

In 2011, chancellor George Osborne introduced a new measure called the levy control framework (LCF) to place an overall cap on the amount that can be taken from household energy bills to fund government schemes, including the feed-in tariff. This produces a zero-sum situation for small-scale energy generators: if more

1 By law, only certain renewable energy technologies, namely anaerobic digestion, hydro, solar photovoltaic (PV) and wind projects, are eligible for the scheme and only those up to 5MW in scale.

of the funding levied from energy bills is directed at one scheme then there is less available for other low-carbon schemes.

The feed-in tariff itself is supposed to deliver value for money. Levels of subsidy vary within bands, depending on the type of technology (wind or solar, for example) and the size of the project. The level of support decreases as the size of the project increases, and the tariff bands are supposed to be set in such a way that those who invest in this kind of low-carbon generation will receive a reasonable 5–8 per cent rate of return (ibid).

A flaw in the FiT: derating and the business of turbines

For small wind projects, the amount of subsidy is determined by the maximum potential output of electricity from the machines at the site in question. These ratings need only be declared by the installer of the machinery, based on the rating it has been given by the manufacturer. This has become a major flaw in the way that the scheme works.

By exploiting a lack of scrutiny, wind turbine project developers for sites involving just one or two turbine installations have been able to label their large machines as being lower-capacity than they really are, and consequently these projects have been able to access a higher-paying tariff band. In the industry, this practice has come to be known as 'excessive derating',[2] and it enables developers to make significantly higher profits than they would do otherwise.

Excessive derating is now occurring at a significant scale among small wind energy projects involving just one or two turbines. Our modelling suggests that investors are seeing returns as high as 25 per cent from some sites. This extraordinary profitability is enabling these turbine manufacturers and installers to market their product to wind farm developers as the most effective means of accessing more generous tariff pay-outs.

After the *Spectator* magazine drew attention to the practice of derating in November 2012 (Payne 2012), the government pledged a crackdown (DECC 2012, Murray 2012). The wind industry trade body, RenewableUK, pledged to cooperate with the Department of Energy and Climate Change (DECC) to find a solution, but stressed it did not consider the practice to be occurring on a significant scale.

However, our evidence suggests that this loophole is still being exploited by certain companies in the onshore wind industry to such an extent that additional costs of £175 million for British billpayers in terms of 'excess subsidies' have already built up. If left unchecked until the end of 2015, it is likely to end up short-changing the public to the tune of more than £400 million over the life of the scheme (more detail on this estimated cost is provided in the 'How much is this costing' section below).

While planning consent for turbines will consider the actual physical size of a turbine and not just its capacity, another impact of this design flaw in the feed-in tariff is that wind turbines are being erected that are much larger than they need to be, and perhaps larger than host communities are expecting. The resulting impact on the landscape may well be exacerbating local opposition to new wind projects. That project owners are deliberately capping the output of these turbines, regardless of their size and ability to produce more power, in order to qualify for the more generous subsidies available for smaller-scale turbines will further fuel public anger.

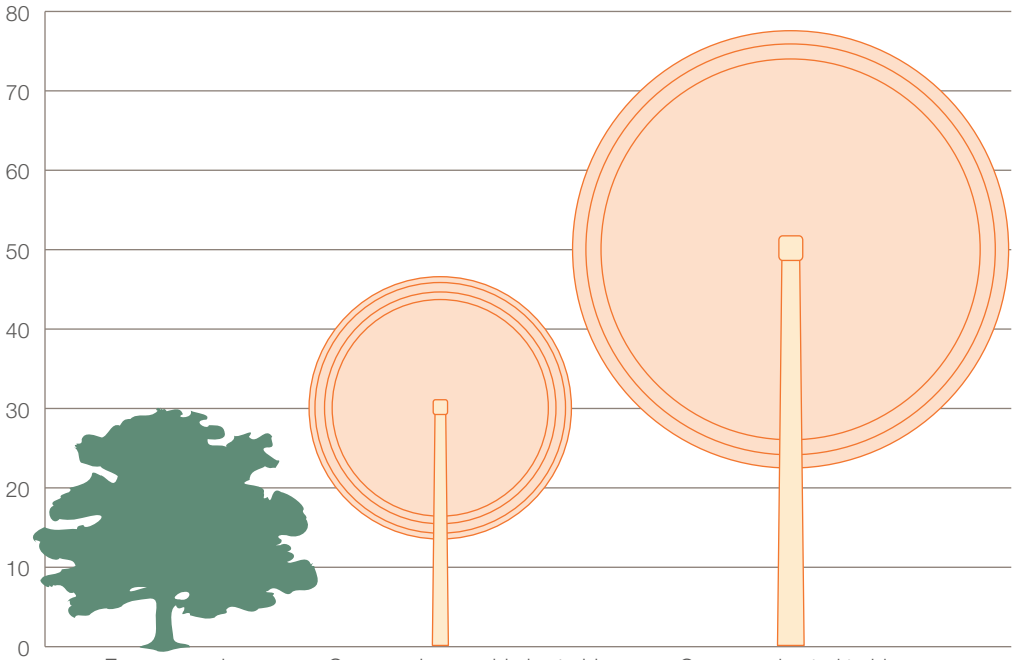
The practice is also denying other clean energy technologies of support that would otherwise be available, because it is reducing the share of the fund that remains to

2 For the purposes of this paper, the turbines in question here are those originally designed to be able to produce more than 650kW of power that are 'derated' and marketed as turbines for producing up to 500kW.

support the growth of low-carbon energy. In short, Britain should be getting more clean energy for the same money.

This design flaw is also putting a squeeze onto those companies that are making the smaller-sized turbines, which these subsidies are intended to encourage. For example, around half of the turbines now benefitting from the subsidies in the 100–500kW band of the feed-in tariff are larger 'excessively derated' turbines rather than smaller 'correctly sized' turbines (see figure 1). This squeeze on the manufacturers of smaller turbines could lead to job losses, or incentivise them to join with their competitors who are already exploiting the loophole.

Figure 1
Comparing larger derated turbines and correctly rated turbines in the same tariff band



Note: For each model, the first number is the rotor diameter (m), the second is the rated (derated) capacity (kW).

Given these impacts on value for money, public trust and approval, and the competitiveness of the wider wind energy sector, it is disappointing that the government have not acted to close the loophole. This is especially true as they were warned that this outcome could transpire. In 2012, when the scheme was being reviewed, expert consultants Parsons Brinkerhoff advised DECC that:

> *'Using rated capacity to define FiT bands provides an incentive to down-rate turbines to qualify for higher tariffs.'*
> Parsons Brinkerhoff 2012

Yet at the time DECC concluded that the rules should not be changed to prevent the practice. Again, in March 2014, then energy minister Michael Fallon – giving evidence to fellow Conservative MP Dan Byles, a member of the energy and climate change select committee – said 'DECC takes the issue of turbine de-rating under the feed-in tariff seriously' but went on to imply it was not a major problem,

because the government had identified only eight projects which had been derated, producing only a comparatively small impact on the budget for low-carbon energy (Hansard 2014).

This is not an accurate representation of the scale of the problem. In this paper, we make the case for why ministers should act immediately to close down what is becoming a 'feed-in frenzy'.

How exactly does the loophole work?

The FiT band for wind turbines that generate 100–500kW of electricity currently pays out 13.34p for each kilowatt hour (kWh) of power generated. By contrast, if a turbine pumps out 500–1,500kW then its owners benefit from a less generous tariff of 7.24p/kWh.[3]

Both a derated turbine and a correctly rated turbine can qualify for the same, more generous tariff band despite being very different sizes. Turbines that have been derated to produce 500kW – in order to qualify in the higher-tariff band – are often almost twice the height of a correctly rated turbine in this band. The most commonly derated turbines are just under 80m tall, while correctly rated turbines in this band are less than 50m tall (as illustrated in figure 1). This is important because taller and larger wind turbines, designed to output as much as 900kW, are often more efficient at generating power when wind speeds are lower, and so are more likely to spend more time generating at or close to their 500kW 'cap'. This means that even once these larger turbines are derated, they can still generate a significantly greater yield of electricity than smaller, correctly rated installations in the same band, which are less efficient in low-wind conditions. Consequently, derated turbines generate higher profits for their investors.

While this may imply value for money, in the sense that the subsidy is being directed towards more efficient turbines, the data suggests it would be more cost-effective for billpayers if these turbines did not have their output capped and instead relied upon the tariff band that is intended for bigger wind turbines. IPPR's research shows that if the level of overall subsidy was kept the same but the turbines that have been installed were run at their full capacity, so that they operated within the 'correct' tariff band – that is, in the 500kW–1.5MW band – then Britain would benefit from an additional 27MW of clean energy. While this is not a significant quantity of power, it nevertheless shows that there is no credible argument that this loophole creates any other form of value for money for the public. And, of course, if the loophole were to be more widely exploited then the amount of energy lost could rise to significant levels.

Despite larger turbines requiring more capital to build, the revenues that investors are able to raise through the loophole far outweigh the costs of developing these projects. This is distorting the market, so that derated turbines are much more attractive than correctly rated machines to any developer seeking to maximise returns from the feed-in tariff scheme. Figure 2 below shows the reality of this situation, with an apparent spike in the deployment of derated turbines.

Approaching a profit cliff-edge: how derating damages competitiveness in the wind energy market

Built into the feed-in tariff is a so-called 'digression mechanism'. This is intended to control costs and fairly reward different technologies by lowering the tariff level over time as the amount of installed clean energy increases. For example, as the deployment of turbines in the 100–500kW band rose, the tariff has lowered from 20.2p in 2011 to 17.5p in 2012 to its current level of 13.34p (for each kilowatt hour of power).

3 See http://www.fitariffs.co.uk/eligible/levels/

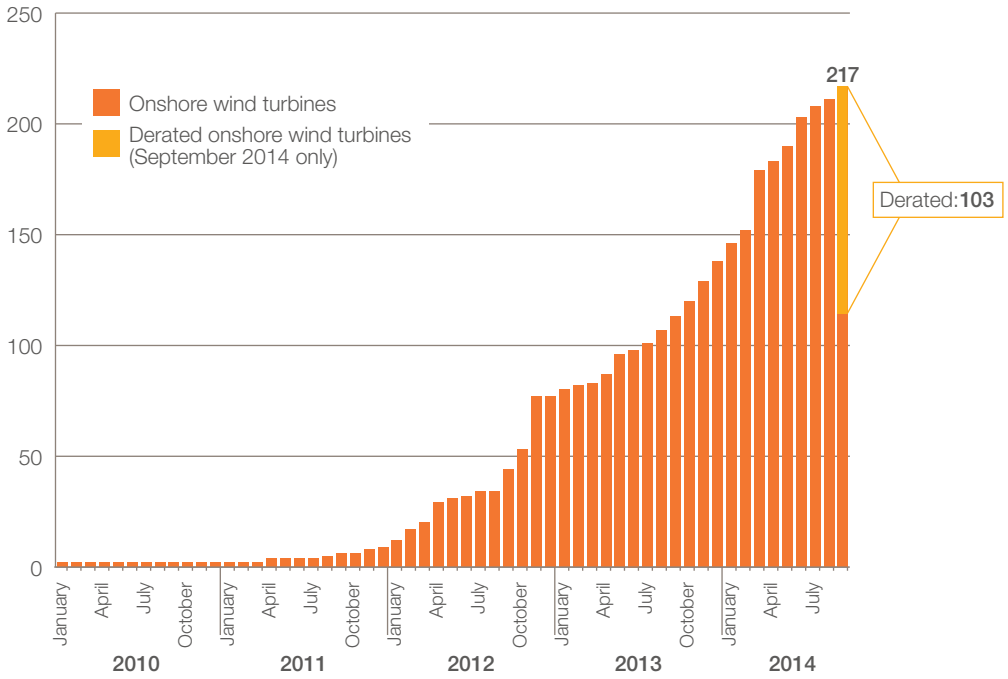
We estimate that if the deployment rates of derated turbines continue at the current pace, this would cause the digression mechanism to kick in and cut the available subsidy in this tariff band by more than 35 per cent by 2016. This would clearly lower the size of the returns to investors in wind projects. However, derated turbines are so profitable that even once this took place they would remain an attractive investment. Instead, it will be the manufacturers and developers of correctly rated turbines who suffer from a sudden drop in returns. The potential repercussions for jobs and manufacturing in the supply chain could be drastic if their market was to be wiped out altogether.

The scale of the problem

Data released under the Freedom of Information Act (FOI) showing the model and manufacturer of the turbines being deployed in this FiT band, when taken alongside publicly available information from Ofgem on the number of 100–500kW onshore wind projects, suggests that just under half (103 of 217) of all the onshore wind turbines that have qualified for the more generous FiT band between 2010, when it was introduced, and September 2014 have been derated. That is, there were 95 more derated turbines attracting the generous tariff than have been officially recorded by Ofgem, in stark contrast to the figure of eight relayed to parliament by Michael Fallon.

The FOI data on derated deployment that we have seen only runs until September 2014. However, if the growth of deployment of derated turbines continued at the same pace as it did in the previous two years, we calculate that this would have seen a total of around 70 derated turbines deployed during 2014, and would expect to see a further 116 in 2015.

Figure 2
Number of turbines deployed, plus proportion identified as derated at September 2014



Source: IPPR calculations, from data obtained by Freedom of Information request from DECC, and Ofgem, 'Monthly feed-in tariff commissioned installations' (Ofgem A)

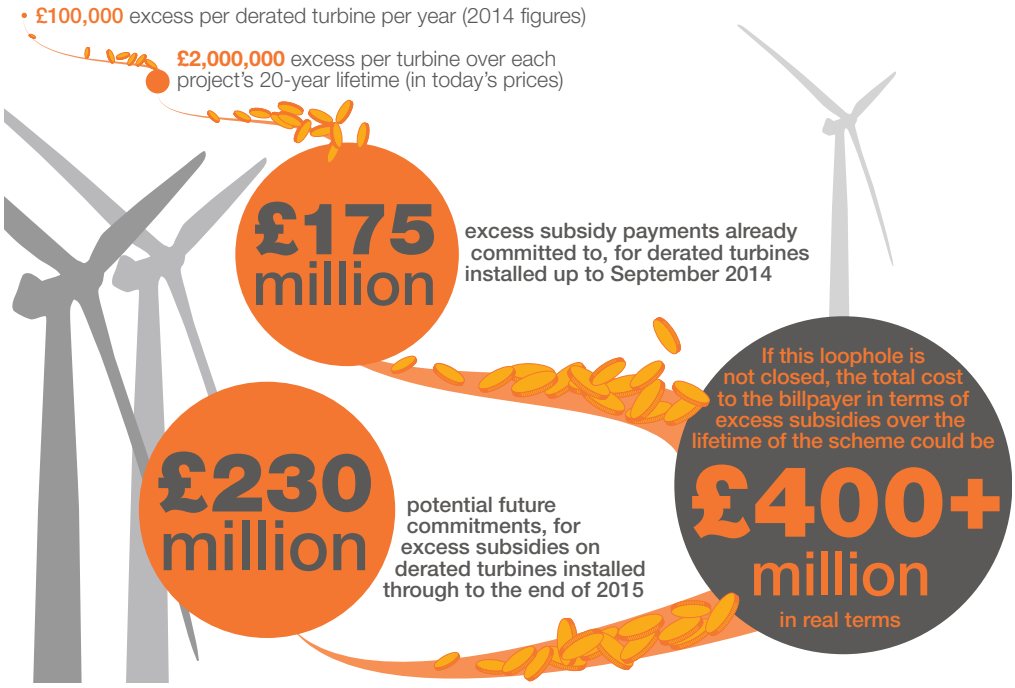
How much is this loophole costing billpayers?

We calculated the likely income that would be generated from a derated wind project (based on the most commonly deployed model of derated turbine) and compared it with the likely income from a correctly rated machine. Even taking account of the potential for the digression mechanism to lower the level of the subsidy in the future, we estimate that a derated turbine will receive around £100,000 in 'excess subsidies' each year.

This 'excess' is the difference between the return of approximately 8 per cent return that is deemed reasonable and value-for-money by the government – and which can be expected by an investor in a correctly rated turbine – and the much higher rate of return investors in derated turbines are accruing. Over the 20-year lifetime of a scheme, then, this means billpayers are liable for around £2 million in excess subsidy payments (in current prices) for each derated turbine.

Assuming the loophole was closed today, we calculate that billpayers will already be committed to paying out £175 million in excess subsidy on the 103 derated turbines deployed up to September 2014, over the lifetime of these projects. If the government does not intervene, and if the deployment rate continues to grow at the observed pace (resulting in 116 additional derated turbines in 2015, as noted above), then a further £195.6 million in excess subsidies could be committed to by the government this year. Factoring in the cost of excess payments for turbines installed in the final quarter of 2014 brings the total for future liabilities accrued after September 2014 to £230 million. As a result, the potential cost impact of this loophole remaining unchecked through until the end of 2015 would, over the lifetime of all derated turbine projects, total more than £400 million.

Figure 3
The cost of the derating loophole in the feed-in tariff



Source: IPPR calculations

Whose fault is this flaw in the scheme?

Ofgem regulates the administration of the feed-in tariff scheme. However, they have only been required by government to record each manufacturer's stated turbine rating. Only one manufacturer has been open in declaring their turbines as excessively derated. Other manufacturers have failed to make this clear, and so the majority of derated turbines have not been recorded as such by Ofgem or any other official body.

When a major review of the feed-in-tariff scheme was conducted by the government in 2012, it did not identify derating as a significant problem. This may have been because Ofgem's figures, based on data provided by the manufacturers, suggested derating was not happening on a large scale. In any case, ministers took no action to close the loophole.

This was in spite of the fact that some respondents to DECC's 2012 consultation complained it was an issue that needed addressing (DECC 2012). IPPR has also seen private correspondence from representatives of the wind industry to DECC from as recently as a year ago drawing attention to the occurrence of derating and its impact on the sector.

Responding to these critics, the government said:

> *'In regard to the so-called de-rating of turbines. We have examined the proposal and we do not consider that the technical proposals put forward to address the issue would necessarily bring net benefits, and they could potentially limit access to the FITs scheme.'*
> ibid

Closing the loophole

There are a number of options for closing the loophole. We have considered what the benefits and disadvantages of each approach might be, before setting out our preferred solution.

First, one option would be to simply cut the subsidy available. However, this would not necessarily prevent derating of large, high-capacity turbines from occurring, and it would decimate the market for smaller-scale turbines, which cannot be competitive on significantly lower tariffs. In effect, it would punish those companies which are currently losing out while having only a minimal impact on those that have been exploiting the scheme. This could remove small-scale wind turbines from the market altogether and lead to a loss of jobs in the supply chain. It would fail to address the problem of unnecessarily large turbines being built and then having their output capped in order to farm the subsidies. This approach should therefore be ruled out.

A second option would be to cap the amount of subsidy any turbine can receive each year and so remove the financial incentive to derate large turbines. This would work in a similar way to the existing Renewable Heat Incentive, which also puts a cap on the maximum annual load for which a generator can qualify for subsidy, and mirrors the approach taken in some other European countries.[4] However, the risk is that it would stifle innovation in the wind industry and could disqualify some correctly rated turbines. The FiT is in place to incentivise and encourage deployment of clean energy, and should be designed so that it rewards cost-savings and technology improvements. This sort of policy change risks limiting innovation to improve turbine competitiveness and would need to be carefully devised to ensure it did not produce unintended consequences.

4 Spain and Denmark both took a version of this approach – see PV magazine (no date) and Joureguy-Naudin 2010 respectively.

An alternative approach would be to require the capacity of each wind turbine model to be officially certified by an independent body. This could be simple and unambiguous. The Microgeneration Certification Scheme (MCS) already exists to certify the ratings for smaller wind turbine projects with an output of up to 50kW of power, and 'Roo-FiT' exists to certify larger projects up to 5MW (see MCS 2014 and Ofgem 2015 respectively). Both processes are well-established and recognised by Ofgem. The certification criteria under these existing schemes could be extended to cover independent approval of the turbine rating. Ofgem (or whichever body replaces it, if it is scrapped by a new government) could be an appropriate body to take on the responsibility to certify turbine ratings in order to ensure each one benefits from the appropriate tariff band. There is not a great diversity of wind turbine models being deployed in the UK, so there is no reason that this should be a particularly difficult or time-consuming process.

Finally, more comprehensive overhauls of the FiT would risk introducing wholly unnecessary levels of uncertainty and complexity. Such changes might include, for example, replacing the stepped banding approach with a continuous tariff, where the subsidy level is linked to the precise capacity of the turbine.

IPPR's preferred solution

In the short term, a cap on the size of the rotor for any wind turbine looking to qualify for the more generous FiT band could be introduced. There are already internationally recognised standards for wind turbines (IEC 61400-2) that are used by insurers and manufacturers of turbines. These cover the rating of turbine models based on their rotor size. Since 2006, these standards have defined 'small wind turbines' as turbines with a swept area of less than 200m^2. Forthcoming revisions to these standards, to be introduced in 2015, will define 'medium turbines' as those with a swept area between 200m^2 and 1,000m^2 (IEC 2013). Policy in the UK could be designed so that standards based on rotor size could be used to determine the FiT band when a project is seeking to qualify for subsidies.

In the medium term, a more elegant policy solution could be developed based around an overall cap on subsidy available for each of these wind projects but with a design focussed on incentivising the 'best fit' turbine for each site. Rather than stifling innovation, this could actually encourage more thinking about turbine location and design.

The government should also consider introducing another band into the FiT for onshore wind projects so that there is less of a cliff edge between the subsidy available for higher-capacity and lower-capacity turbines. A new intermediary band would remove some of the incentive to try and exploit the scheme. DECC's decision to introduce an extra band in the FiT for hydro schemes in 2012 provides a precedent for this approach.

There is no reason why reviewing the FiT, closing down this loophole and introducing remedial action should take much time. Reviews of the FiTs for other renewable technologies have been announced, conducted and completed within a matter of weeks. For example, when a loophole was identified in the FiT in 2011, relating to the extention of large-scale solar installations, the government consulted on how to reform the rules and then enacted their change in a process that lasted less than three months (Nichols 2011). While previous fast-track reviews have been contentious, the loophole we have identified is distorting the scheme to such a degree that it needs to be addressed rapidly.

This experience suggests that this problem should be straightforward to resolve. Quite simply, it is time for the 'feed-in frenzy' to stop.

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