

# Spotlight

## Onshore Wind in Aberdeenshire: Growth and Performance

2016/17



### SUMMARY

The growth of the onshore wind sector in Aberdeenshire has been exceptional

**This publication provides an insight into the growth in Scotland's onshore wind sector and takes a look at the developments in Aberdeenshire and their performance over the past decade.**

- Scotland's geographic location and topography offers the country an ideal and enviable position to become a global leader in the generation of electricity from renewable sources.

- Over the past decade, government incentives and improvements in technology have encouraged

landowners and developers to install renewable energy sources across the UK.

- Onshore wind is Scotland's largest renewable power source increasing more than tenfold over the past 10 years and according to Scottish Renewables accounts for over 70% of the installed renewable energy capacity.

- The growth of onshore wind in Aberdeenshire has been exceptional with 21% of Scotland's total located there. This growth has largely been

delivered by entrepreneurial farmers and rural businesses.

- Performance of Scotland's fleet of onshore wind turbines has improved over the past decade thanks largely to improved site design and technological advancements.

- Whilst the key factor in the amount of electricity generated from an asset and therefore the financial return is the available wind resource, there is much that can be done by operators to improve electrical and financial outputs.

# OVERVIEW

## Scotland's commitment to renewable energy

The UK's renewable energy sector is driven by a combination of government legislation, environmental concerns, advances in technology, weather and geography. The challenge in the UK is to reduce carbon and other greenhouse gas emissions by at least 80%

by 2050 based on 1990 levels. Scotland's own target is to generate enough renewable energy to meet 100% of its annual electricity consumption by 2020. During 2015 it is estimated that 57% of Scotland's electric consumption came through renewable sources.

## SECTOR GROWTH

Our research illustrates the exceptional growth in the number of wind generating projects across Scotland and Aberdeenshire. At the end of 2005, there were 64 commissioned projects across Scotland compared to just under 1,100 in 2016 (Figure 1).

Similarly, the number of projects in Aberdeenshire increased from a total of two at the end of 2005 to around 220 in 2016. Indeed, Aberdeenshire is now home to 21% of all Scotland's onshore wind turbines.

The introduction of the Feed In Tariff Scheme (FITS) (announced 2008) had a significant impact on the wind power sector.

Previously projects were the preserve of utility companies, however the introduction of the FITS made the development of small/medium scale

projects possible and opened the sector up to a new breed of developers including rural businesses. The scheme enabled landowners to produce renewable electricity and receive payments for doing so.

Our research indicates that a high proportion of the wind projects in Aberdeenshire are privately owned. Indeed, since 2005 these projects accounted for 60% of wind stations commissioned in Aberdeenshire.

### Size of projects

The FITS has also impacted upon the size of the projects constructed in Aberdeenshire. Prior to the FITS, there was no incentive to build smaller scale projects and stations were built as large as the sites would allow.

The analysis illustrates that half of all projects commissioned in Aberdeenshire between 2005 and 2008 ranged from 2.5MW to 26MW

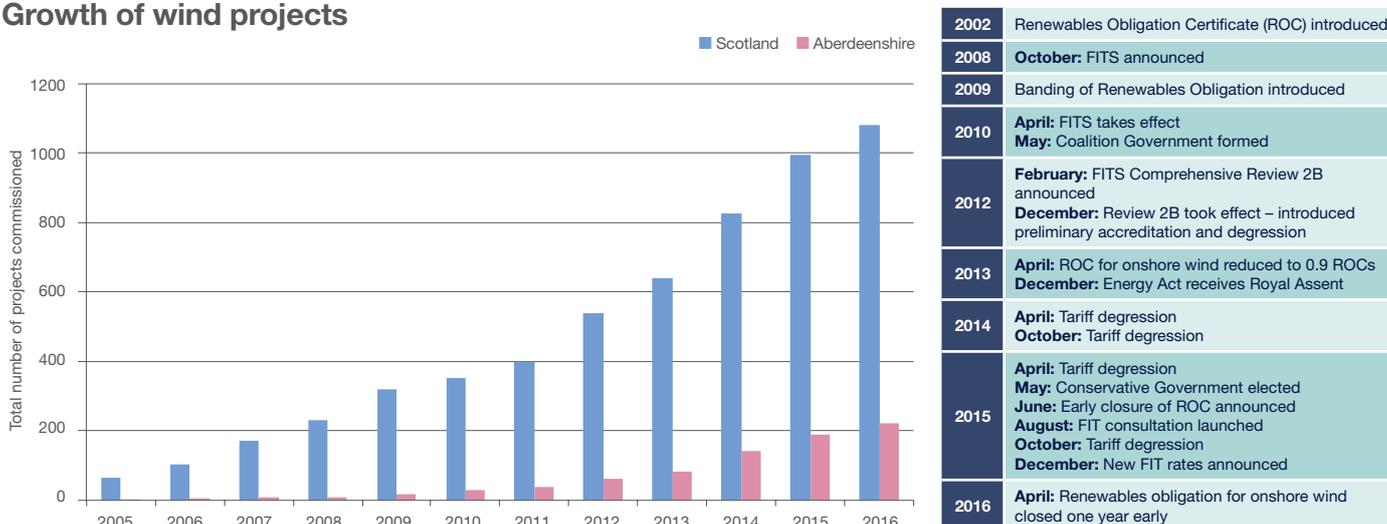
and the remainder were all under 10KW with the exception of one project.

Projects with a capacity of between 500KW and 1.5MW did not emerge until the end of 2009 and those with a capacity of 250KW to 500KW not until the final quarter of 2012.

Since 2012, owing to the generous tariff rate being offered to this scale under FITS, there has been a significant increase in the number of 250KW to 500KW projects in Aberdeenshire. Indeed, between the end of 2012 and the end of 2015 the number of such projects increased from two to 66.

According to government statistics, the amount of electricity generated by wind in Aberdeenshire exceeded the amount used by domestic users for the first time during 2014. Aberdeenshire's total onshore wind output increased from 45GWh in 2005 to 1142GWh in 2015.

FIGURE 1 Growth of wind projects



Source: Savills Research, OFGEM

## PERFORMANCE

All wind generating stations have a maximum installed capacity, but the volume of electricity produced varies considerably. Figure 2 demonstrates the total theoretical capacity of projects over 250KW in Aberdeenshire compared to the total amounts actually generated.

The growth in available capacity is seen particularly since 2010. This can be attributed to the increase in the number of turbines commissioned during this time and reported in Figure 1.

Our research assesses the performance of stations in Aberdeenshire by comparing the capacity factor which calculates the ratio of electricity generated against the theoretical capacity.

According to our research, between 2005 and 2016 the performance of projects over 250KW in Aberdeenshire ranged from an average capacity factor of 14% at its lowest point in 2007, to 32% in 2015. Average performance improved by 6% between 2014 and 2015 and actual output grew by around 60% during this period.

The increase in output is a result of technological advancements and the fact that many larger projects took longer in the development process and were not connected until 2012 onwards.

Over the past six years, the performance of the 250KW plus

wind generating projects in Aberdeenshire have generally been in line with all stations in Scotland and the UK average, albeit slightly ahead since the second quarter of 2015.

The seasons and wind speed correlate directly with performance of the station in terms of electricity generated (Figure 3). The higher the wind speed the better the stations perform.

### Managing performance

There are various factors that influence the amount of electricity generated and many are out of management control, such as the topography and seasonal/local weather patterns as illustrated in Figure 3.

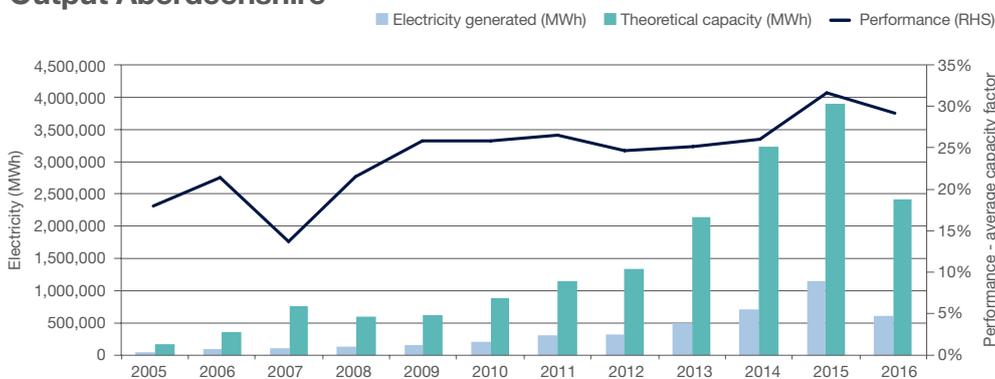
Installing the right turbine for the right site to take advantage of wind conditions as well as

the approach to management can have a significant impact on electrical output and therefore financial returns. Setting targets and measuring performance of the turbines can highlight key areas for improvement.

However, performance of the turbines is not everything; the performance of the business is of equal importance. Operators must assess where improvements can be made in their businesses, particularly in the face of reducing tariffs, removal of government support such as Levy Exemption Certificates in 2015 and more recently business rates reliefs and a continued depression of electricity prices.

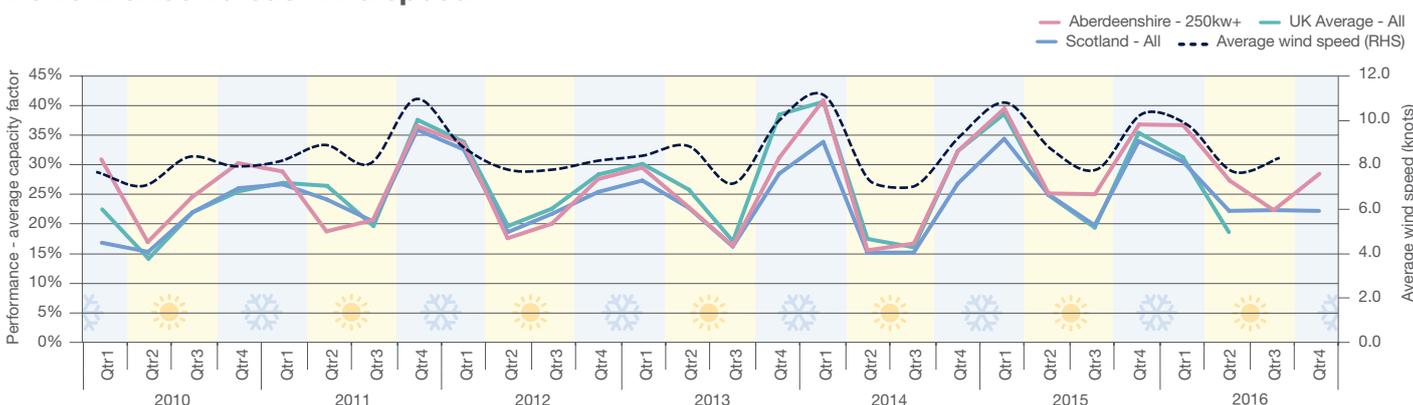
Contracts such as power purchase agreements (PPAs) and supplier contracts should be reviewed to ensure they are on the most favourable terms available.

FIGURE 2 Output Aberdeenshire



Source: Savills Research, OFGEM using REGO Scheme – projects 250KW+

FIGURE 3 Performance versus wind speed



Source: Savills Research, OFGEM and DECC

→ The financial performance of a project will also depend on when it locked into the tariff. The margins for projects that were commissioned later and secured lower tariffs, may be under more financial pressure. However, they may be offset by improving output with new turbine technologies.

Taking a proactive approach to the management of operational renewables projects can protect businesses from unforeseen events which may impact on future cashflows.

Whilst there are clear advantages to owning renewable projects for rural businesses, one major disadvantage is economies of scale.

Developers with multiple projects will be able to secure better pricing on PPAs or operations and maintenance where they are dealing with multiple projects. Operators with small numbers of projects should consider partnering with others to deliver economies of scale.

Our research demonstrates the Aberdeenshire onshore wind market has some unique characteristics. As well as enjoying consistently good performance and the highest proportion of wind stations in Scotland, the sector is dominated by privately owned wind projects. ■

## OUTLOOK

■ Our research illustrates a decade of exceptional growth in the wind sector across Scotland and Aberdeenshire. However, the market has polarised over the past 12 months with the number of developers reducing and those still active in the sector seeking larger projects on sites with an excellent wind resource that can operate viably without support from subsidy.

■ Economies of scale maximise performance and we expect to see a growth in extensions to existing projects. These projects will take advantage of the continued support of planning policy in Scotland and will benefit from the fact that a proportion of the costs associated with site enabling works have already been undertaken.

■ Opportunities remain for smaller projects to achieve a premium price for the electricity generated by establishing links with a neighbouring high-energy user capable of utilising the energy.

■ The key to success is to regularly review the performance of the business as well as the turbine.

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- Valuation and due diligence
- Acquisitions and disposals
- OFGEM registration and management
- Power Purchase Agreements (PPAs)
- Ongoing planning condition discharge and compliance
- Business Rates

**ADDITIONAL INFORMATION:** Unless otherwise stated, this report uses Local Authority boundaries rather than County boundaries. Unless otherwise stated, this report uses OFGEM data.

## Savills team

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