Case Study

APPLICATION **FARM**

Harvesting Electricity for Potato Storage

Location Newport-on-Tay, Scotland

Model NPS 100-21

Average wind speed 6 m/s

Wind incentive Feed-in-Tariff (FiT)

Current electric rate 12p/kWh

380 Acres of Potato Fields Requires a Lot of Cold Storage

Newington Farm is run as a family affair, with Russell Brown and his wife Hilary's two sons Robbie (23) and Steven (21) both employed full time in the enterprise. In addition to Newington, the family contract farm another 1600 acres. The route to the installation of the Newington turbine started about four years ago. The family looked online initially because they wanted to see if a wind turbine would benefit their business given the considerable amount of power they used for their potato storage. Following that, they spoke to other farmers who had installed machines and listened to their advice, and then they turned to Scotland's Rural College (SRUC) who proved to be a crucial part of the success. SRUC Carbon Management Centre supports research, learning and consultancy activities that contribute to a reduction of carbon emissions from agriculture and food production.

> **"We were completely out of our comfort zone with regards to wind speed, kW hours, grid connections and the like so it was important that we asked for help from those with more experience."** --Russell Brown

SRUC took the turbine through the planning procedure, which did uncover a few niggles, but nothing major, and then Russell set out looking for quotes from different companies, and found there to be a fair variation when it came down to cost.

The wind turbine for Newington Farm: NPS 100-21

Situated in windy central Scotland, Newington Farm needed a turbine that could harness this abundant natural resource to provide a regular source of power and additional income. The Browns chose the NPS 100-21 because it had:

STEADY SOURCE OF INCOME Newington Farm wanted turbines that would take advantage of the UK Feed-in Tariff (FiT) and guarantee payment for the electricity they generate and feed back into the grid.

THE "GREENING" OF BUSINESS Farms that use wind power in their daily operations are valued by wholesalers who sell their products to discerning consumers who put a premium on sustainable and environmentally friendly business practices.

Northern POWER SYSTEMS

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RELIABLE TECHNOLOGY The NPS 100-21 is designed for ultimate reliability, so you don't have to be in the business of generating electricity or hire a team of full-time professionals to reap the benefits of wind power. The last thing the Browns needed was to worry about their turbine failing. The robust, reliable design coupled with Northern Power's 5 year factory warranty, fleet availability over 98 percent, 24x7 monitoring and local service assured the Browns that their turbine will continue to perform for many years to come.

> **"By this stage we knew that our existing transformer could handle a 100kW turbine, so it would have been silly to look at replacing that in order to get a bigger turbine given the cost involved."** --Russell Brown

Northern Power's advanced Permanent Magnet Direct Drive technology opened a new market for wind power solutions beyond the traditional large wind farm applications that have dominated the recent wave of wind turbine development. Due to its gearless design, the NPS100 has a lower cost of ownership than traditional, gear-driven wind turbines. Its compact form factor, with a tip height of under 40m, facilitates planning and makes it more community friendly.

Once the turbine model was selected, the rest of the implementation was fairly quick. The planning was passed in March of 2012, the turbine was installed by September and grid-connected by the beginning of November. The farm now uses all the power it requires and the remainder is exported into the grid. Over the first nine months after installation, the farm, even with its high usage of electricity, has taken just over half of the 150,000 kWh the turbine has produced from an average wind speed of 6m per second .

> **"I'm expecting a payback time of seven to eight years, which I'm happy with given its 20-year expected life. It's doing exactly as Northern Power told me it would."** --Russell Brown

The 380 acres of potatoes all go into three cold stores at Newington, having a storage capacity of 4500 boxes.

Russell is optimistic about this year's crop: "It is too early to tell for definite, but I'm expecting this year's yield to be higher than last year given the difference in weatfier. I would also like to think that the blackleg cycle will be broken as a result of the weather, which would be good news for potato growers."

Alongside the potatoes, the other crops grown are wheat, barley, oats and oilseed rape, with 200 cross ewes running on higher ground.

> **"I would definately recommend that other farmers look at the viability of having a turbine, with the outgoings of a farm being as high as they are, anything that can cut costs has to be a good thing. The first step is to check out your grid connection to see the possibilities, get expert advice, and then shop around for quotes before going ahead."** --Russell Brown

Energy solutions for farmers

Business owners have to work hard to maximise profits and keep expenses to a minimum in the face of mounting uncertainties — drought, storms, disease, and a volatile market for farm produce. Although the team at Northern Power Systems can't help farmers control the weather, our state-of-the-art turbines can harness the wind and take the unpredictability out of their electrical costs. In doing so, farmers are able to safeguard their agricultural or dairy operations against rising energy costs and make their farms leaner and more profitable businesses.

Harvests vary but the wind is almost always blowing. Because turbines take up only a small percentage of the land on a farm, farmers can, in effect, double-crop their land, simultaneously harvesting electricity while producing cattle, potatoes or wheat.

Northern
POWER SYSTEMS

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