



Solar power provides farms with an opportunity to reduce energy bills, maximise self-sufficiency and save money, but there are considerations when it comes to installation and economics. **Lynsey Clark** reports.

## Farm-scale renewables: Solar panels and battery storage

Using solar power to create electricity is by no means a new concept, but with electricity costs rising and the price of solar panels and battery storage falling, it is now a more financially viable option on farms, especially if there are sheds with suitable roofs already in place.

That was the case with the Neilson family, Hugh and sons Ross, Glen and Grant, who farm at Park Farm, Auldhouse, on the outskirts of East Kilbride.

At a meeting arranged by the Farm Advisory Service – part of the Scottish Government's Rural Development Programme – the Neilsons explained their decision to install a 270kW solar power system at a cost of about £200,000.

The family runs a flying herd, milking 410 cows with eight robots.

With limited acreage available, they previously reared their own

youngstock off-farm, but they now buy-in 10 replacement heifers per month and aim for smaller, more robust cows.

They have a daily average of 3.2 milkings, producing 34 litres.

Grant said: "We are not pushing the cows as hard and, as a result, they are better on their feet, more fertile and are lasting a lactation or two longer."

"We changed our breeding policy, with everything now artificially inseminated with Aberdeen-Angus semen and we have one buyer from Aberdeenshire who takes all the calves."

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HUGH NEILSON

cessing and retail unit, which currently processes 40,000 litres of the farm's milk each week.

Under the What's Fresh brand, the business, which began in 2022, already delivers to the doorsteps of 3,000 customers, as well as local restaurants and coffee shops.

Ross said: "With our central-belt location, there are one million people living within a 10-mile radius of our farm, so we have a huge market on our doorstep and lots of opportunities to upscale."

Between the robots and the processing plant, annual energy costs on the farm had soared to almost £70,000, which is why the Neilsons decided to look into fitting solar panels.

Hugh said: "We were due to renew our electricity contract and the potential costs were looking horrific, so we decided we had to do something."

With Ross having worked in the renewables sector, they had already looked into anaerobic digestion and windmills, before



The Neilsons use 50kW batteries to store charge for overnight use.

### Requirements

- Suitable roof size and quality
- Suitable grid connection
- Forklift on-site for easy solar panel offloading
- Storage space to store the solar panels safely
- Finding or creating a suitable plant room for inverters

deciding that solar panels were the best option for them.

Through Ember Energy, they installed 270kW of solar panels (594 panels) on the roof of their 79-metre x 30m (260 foot x 100ft) cubicle shed.

To help balance the varying yields achieved from the panels, the installation includes two 50kW storage batteries and the inverters needed to convert the electricity for use on the farm.

The batteries will allow the farm to use the daytime electricity generated by the panels at night, which suits the robotic milking system.

### Infrastructure

Hugh said: "We looked at the possibility of installing the panels on the ground, but taking the cost of the infrastructure into consideration, it made more sense to install them on the roof of the shed."

"They face west and east, which is not ideal, but we are getting the benefit of having them on both sides of the roof."

"We have only recently installed the system, so we do not have evidence of the full benefits as yet, but the way we look at it is, this is money we would be spending on energy costs anyway."

"We hope to have paid back the cost of the system in approximately five years and, after that, we will be saving a huge amount each year."

It is necessary to have a grid connection in order to install a solar panel system, regardless of whether the electricity will be sold back to the grid. This process was carried out by Ember Energy's Stephen Hamilton.

Mr Hamilton said: "We submit grid connections daily, which includes liaising with grid engineers all over the country to find size of connection and export capacity."

"This is one of the main criteria that helps to size the solar system."

"We then look into electric use on-site and assess roof space and roof quality for solar."

"The first step at Park Farm was to gain a grid connection from the power company – a process which took around two months."

"In this case, the farm had solar export capacity available, which we secured on their behalf."

"The next step was to maximize the amount of solar required, based on the now-secured grid connection and on Park Farm's energy requirements."

"We also needed to find a suitable roof for the solar to be installed. Modern solar panels are

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STEPHEN HAMILTON



From left to right: Glen, Hugh, Ross and Grant Neilson, of Park Farm.

now designed to last 30 years, so finding the best roof is important."

The Neilsons decided to go with a 100kW battery, as a lot of their electricity use occurs in the dark when solar does not produce.

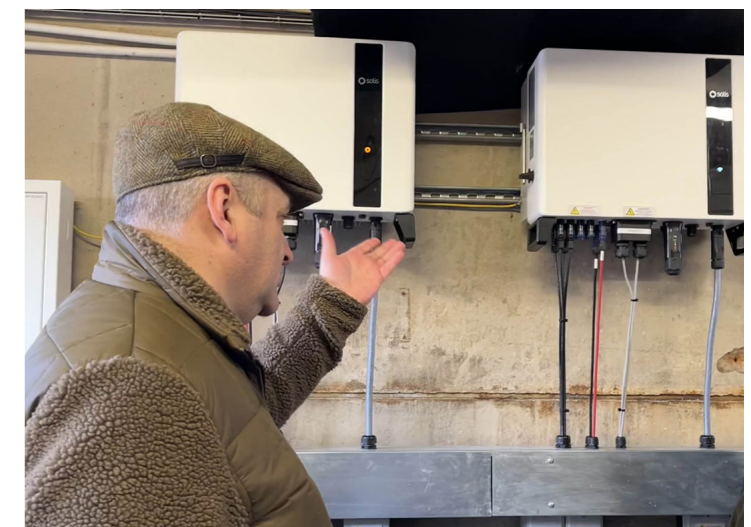
Stephen said: "A 100kW battery is a good first step in the battery journey for the Neilsons and can be added on to later if required."

"Park Farm uses around 300,000kW annually and the panels will produce around 200,000kW annually. We predict that the farm will self-consume about 75 per cent of the solar production, which

equates to 150,000kW annually, or 50 per cent of farm use.

"The entire installation cost the Neilsons approximately £200,000 plus VAT and they should save around £40,000 a year, subject to electric price, export price, and percentage used on-site, giving around a 20 per cent return."

"Panels are more efficient now and last longer, but the biggest thing is that they are cheaper now than they have ever been, as are the storage batteries, making them a great option for farms to save on energy costs," Stephen added.



Stephen Hamilton, of Ember Energy, pointing out the inverters which allow the farm to make use of the electricity generated by the solar panels.