

# Farming for a Better Climate



## Improving fuel use; hydrogen technology

David Barron farms at Nether Aden in the north east of Scotland, operating a mixed farming system extending to approximately 203 hectares of land. The business grows a range of arable crops and also maintains a herd of approximately 130 suckler cows with the progeny all finished on the farm.

As a volunteer Climate Change Focus Farmer, David was interested in how new technology could also help him to cut emissions and improve the farm carbon footprint.

David looked into this in more detail and with support from Scottish Government under the Focus Farm project, installed a hydrogen electrolyser on one of the farm vehicles to see if he could improve fuel use and reduce emissions.

Name:	David Barron
Farm:	Nether Aden
Locality:	Aberdeenshire
Farm type:	Mixed



### What does a hydrogen electrolyser do?

Installing a hydrogen electrolyser means the vehicle runs on a combination of diesel and hydrogen. The electrolyser is fitted to vehicles with a conventional diesel engine and claims to improve fuel efficiency while also reducing emissions.

This trial used a product marketed as HydroGen. The machine itself consisted of an electrolyser, a control unit and a water reservoir (using distilled water). The electrolyser effectively “splits” water into its component parts of oxygen and hydrogen by passing an electrical current through distilled water and collecting the gases. Rather than trying to collect these gases separately, the system collects “oxyhydrogen” which is injected into the conventional diesel engine at a rate of approximately 6%. It is claimed that introducing the hydrogen to the mix results in a more efficient combustion in the engine, so less fuel is used meaning lower emissions. The manufacture suggests a reduction in the use of fossil fuels in the region of 20-25% is possible and an 80% cut in vehicle emissions.

The electrolyser is a ‘bolt on’ system designed to work alongside conventional engines, rather than replacing them. It allows vehicles to produce the gas as and when it is required, meaning that there is no need to store the hydrogen.

### Case Study

Find out what other farmers are doing to improve profitability and adapt to a changing climate in our series of informative case studies.

Our Practical Guides cover 5 key topics:

- Reducing energy and fuel use
- On farm renewables
- Locking in carbon on the farm
- Making best use of nutrients
- Optimising livestock performance

Find further information, including links to other Case Studies, Practical Guides and our newsletter at

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### Websites

[www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)

[www.adaptationscotland.org.uk](http://www.adaptationscotland.org.uk)

[www.agrecalc.com](http://www.agrecalc.com)

## How easy was this equipment to put in place on a working farm?

David was one of the first farmers in the UK to take the leap and fit the HydroGen technology to a working farm vehicle. The electrolyser, which comes in a box about the size of a small suitcase, was fitted to the farm telehandler.

Technicians from the company fitted the box in a couple of hours and were also able to provide ongoing support to David once the kit was in use. The performance of the electrolyser can now also be monitored remotely.

The manufacturers claimed other benefits aside from fuel use, in that the equipment produced a 'better burn' of the fuel, contributing to keeping vehicle engines cleaner, meaning diesel particulate filters need to be replaced less frequently. It's also claimed that the period of time between oil changes can be extended and that the need for AdBlue could be removed (although this is not proven at the time of writing).

Although there was initially room for scepticism at some of the manufacturers' claims, once the product was in use David reported that in his opinion, his telehandler performed better with improved fuel consumption and more torque.

## Purchase cost and actual savings

As part of the Climate Change Focus Farm project, David had been keeping detailed fuel use records for the different machines on his farm. This therefore allowed a good comparison of the performance of the telehandler, both before and after the installation of the hydrogen electrolyser.

The technology has now been in use on the farm for a period of 15 months (2019). Although manufacturers' predictions were initially viewed as optimistic, data collected over a 15 month period at Nether Aden did indeed show a fuel saving of 20% on the telehandler.

This equates to a saving of 1,083 litres of fuel per year, equivalent to 43,440Kg CO<sub>2</sub> and an annual saving of £596 at current red diesel prices. On this basis, David could save 217,200 Kg CO<sub>2</sub> and £2,980 over a five year period. Further savings of around £500 per year could be realised if the need to use AdBlue was removed (David has continued with use of AdBlue to preserve manufacturers' warranty on the vehicle).

At the time of the trial, the hydrogen electrolyser was still in development and cost around £7k, but prices have fallen significantly as more farmers adopt the technology and the company re-assessed its pricing structure. Its estimated the electrolyser has a working life of 20 years. Due to the success of the trial and experience with the telehandler, David decided to go ahead and purchase a second hydrogen electrolyser to fit to his New Holland TS 115 Tractor.

## Find out more

For other practical ideas to improve farm efficiency and reduce the farm carbon footprint visit the website [www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org).

You can also follow us on Twitter @SACFarm4Climate or find Farming for a Better Climate on Facebook.

