

Based in the Scottish Borders, Mountfair Farming covers more than 2,000 hectares, drying being handled using heat from a 1MW biomass boiler. **Farmers Guardian**

Biomass grain drying offers

Growing a significant area of combinable crops in the Scottish Borders will always involve some catchy weather and less than ideal cutting conditions.

To address this, Mountfair Farming uses a mixture of drying systems across multiple sites to achieve the 16,000-tonne capacity it needs.

Aidan and Jorin Grimsdale know the challenges only too well, but it has taken a while to get to the point where they are now comfortably able to handle all that the elements can throw at them.

Aidan says: "For years we have focused on having enough drilling, spraying and combining capacity, because without those vital tools you have got nothing ultimately."

"Being a relatively young business we had to make do with what we had in other areas, particularly with our drying and storage facilities."

Solution

The solution to the storage and drying challenge was started in 2015 with the construction of a new 30 by 72-metre building, which was extended further in 2021 to 102m.

Comprising of two 700-tonne drying floors, there is also a 2019 48t Opico 4810 Magna batch dryer, which has recently been resited to its permanent position.

The storage site is one of four grain stores, with Opico dryers operated by the business.



The main store at Mountfair Farming dries 10,000 tonnes of cereals and oilseeds annually.

The site utilises a 1MW biomass boiler as its main heat source to dry a combination of feed-wheats and oilseed rape, totalling 10,000t annually.

The Opico 4810 unit is a conventional diesel-fired model operated in combination with a heat exchanger fuelled with hot water from the main biomass plant.

Positioned about 60m from the main boiler, an additional insulated pipe circuit has been installed to bring the hot water to the dryer-mounted radiator.

The hot water is pumped through a large radiator mounted on the air intake for the dryer, lifting the air up to 55degC from the ambient temperature before being blown in.

The diesel burner then lifts the air temperature the remaining 45degC to reach the 100degC target operating temperature.

Reduction

The process of pre-heating the intake air has allowed for a more than 50 per cent reduction in the diesel requirement to run the unit.

"Most of the time it runs on the low flame, except on colder nights, the high flame is switched on too," Aidan says.

"Initially we had some challenges setting up the diesel burner as it required some unusual nozzle jets.

"Originally, even the low flame was burning far too hot. However, once that was sorted and set up correctly it works well."

Included in the assembly is an automated valve which diverts the water flow once the dryer burner cuts off during the cooling cycle.

The addition of the radiator has increased the cooling cycle by 25-30 minutes, as this must be cooled down before cooler air can be pushed through the grain.

"The cooling cycle is longer, but this is fairly consistent so we factor this in when running the plant and the time it takes to run a batch through the dryer," says Aidan.

In terms of operating costs, using the biomass to pre-heat the air has made a significant difference to the cost per tonne to process the crop.

"Fuel usage on the Opico in the first two years running on straight diesel was £4-£5 per tonne," Aidan says.

with a large proportion of the cereal finds out more.

cost savings



Aidan Grimsdale

"Now it is running biomass we are around the £2-£2.50/t mark. It has halved the drying costs."

Alongside the biomass, other adjustments have been made to improve the economics of using the Opico dryer.

"We have also managed to reduce our electricity consumption," Aidan adds.

"Because we do not currently have a meaty enough three-phase supply to run the dryer, we have been reliant on a generator.

"It requires an inverter which has enabled us to tweak the dryer fan. Rather than running at the standard 50 hertz, we have reduced it to 40Hz.

"The downside of that is that we have to run the dryer slightly slower – it is 10-15 per cent down – but it means we have halved the generator fuel consumption.

"That reduction in capacity is a penalty that is well worth paying. The whole set-up is now so much more energy efficient."

The biomass source is predominately windfall softwood which is purchased in round and chipped on site as required by a specialist contractor.

Moisture

"We use roughly 300t of dry chip a year, but that does vary a bit depending on our intake source," Aidan says.

"Usual moisture content for the chip is 20 per cent. We have had it as low as 18 and as high as 23 per cent. Obviously the wetter the chip, the more we use."

The biomass plant supplied by Topling is automated and controlled through a central touch-screen.

A hydraulic walking floor pushes the chips into the boiler intake auger, which regulates the fuel input based on the demand from the system.

The boiler is aligned to a renewable heat incentive scheme, so the capacity and its use to dry grain and a small amount of firewood on the drying floors are matched to optimise this system.

The dryer, elevators and store handling are all automated through a central control, linking the demands of the dryer and the output of the dried crop.

A recent installation of a large wet pit has allowed more utilisation of this system, reducing the labour requirement to operate the plant.

"For the first two seasons we had the 48-tonner set up outside with a 25t bin feeding it, but it meant having someone on hand all the time to keep it running at full capacity," Aidan says.

"Last winter the store was completed, the dryer fully integrated, conveyors installed and a 300t wet grain bunker installed with a proper trench intake conveyor to keep it constantly fed.

"With it wired into the dryer's touch-screen computer, it now loads and unloads itself under its own steam.

"It has totally revolutionised the job so that it will process 150t without anyone going near it. I can now load up the bunker at 11pm and leave it running all night."

With addition of the 300t intake bunker and some changes to the store discharge system, Aidan estimates the requirement for human input has been reduced by an average of six hours every day.



The radiator heated with water from the biomass plant pre-heats the intake air to 55degC.

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