



Case Study

A switch to natural gas leads to reduced costs and emissions with increase in productivity

Grantstown nurseries



Located in Ballygunner, Co. Waterford, Grantstown Nurseries is a family run business with a tradition of innovation and the highest quality horticultural practices. The nursery's indoor glassed area covers one hectare and produces up to 400 tonnes of tomatoes per year.

The Currid family has been a supplier of a wide range of fresh fruit and vegetables for several decades. The tomatoes grown at Grantstown are picked, packed and delivered the same day to several major retail chains.

Up until the end of 2014, when they switched from oil to natural gas, Grantstown Nurseries had been using oil for 36 years. The nursery was originally powered by an oil burner and an analysis in 2011 showed significant potential advantages in switching to natural gas including;

- Cost savings
- Environmental benefits
- Productivity increases
- Operational efficiencies
- Storage savings

Results

Annual energy saving of circa €100,000

Payback on investment less than 2 years

20% increase in efficiency leading to a reduction in fuel usage

Reduced downtime and lower maintenance costs

CO₂ reduction of 976 tonnes per annum

Virtually zero carbon emissions

Additional benefits including reduced maintenance and cleaner glass in the growing areas

No longer required to order and arrange delivery of fuels and CO₂



Natural gas boiler and burner



Hot water storage tank

Natural Gas Installation Process

The existing equipment included a medium fuel oil (MFO) boiler that was suitable for conversion to natural gas, only requiring a change to the burner unit.

Description of Plant Energy Facilities

There is one main boiler-house on site with total boiler output of 3,000 kW.

The boiler heats up the water which is then passed to the storage tank where it is recirculated at the required temperature until it is needed. During the day the boiler is used while at night the heated water from the storage tank is used to keep the temperature in the growing areas constant. The whole process is controlled automatically by a computer system which monitors the internal and external conditions.

Integration

A connection to the natural gas network was provided to an agreed meter location and a supply was taken from the meter and brought to the boiler-house, through the downstream pipework installed by Grantstown Nurseries.

Benefits of Natural Gas Over Oil

Fuel cost has decreased by circa €100,000 per year

20% overall efficiency increase in the heating system

Carbon emissions are reduced by 976 tons annually

Reduced particulate matter results in cleaner glass and higher production output

CO₂ captured from the boiler flue is reused during the process increasing production by 15% in addition to savings in storage, delivery and ordering



The old CO₂ tank that is no longer needed



Method used to transfer carbon dioxide to tomato plants



Since switching to natural gas the glasshouse windows need less cleaning

Carbon Dioxide Capture

Tomatoes require a source of carbon dioxide (CO₂) during production. In the previous process there was a requirement for purchase and storage of CO₂, and at least one delivery per week. This resulted in extra ordering, storage and delivery costs.

Following the switch to natural gas as the primary energy source, CO₂ is now captured from the boiler flue gas, meaning there is no longer a need to order or store CO₂. This also means that overall, the nursery has a net carbon output of zero.

The CO₂ is taken from the boiler and pumped around the nursery via a plastic piping system. This system has pinhole exits at specific intervals to allow enough CO₂ to reach each plant.

The facility already takes advantage of lean and organic production by avoiding the use of insecticides, and now the reuse of CO₂ to aid tomato growth illustrates Grantstown Nurseries' drive for green production.

Cleaner Windows

Particulate matter is the term for a mixture of solid particles and liquid droplets. The use of an oil based system produces more particulate matter in comparison to the use of a natural gas system. Previously the greenhouse windows required cleaning every year because of the emissions from the oil burning process.

Because natural gas is a cleaner fuel the windows require less cleaning. This results in not only a reduction in labour costs to clean these specialist windows but also an increase in production due to the additional light that is available.

Grantstown Nurseries Technical Details:

Comparisons

Payback period

2 years

Efficiency increase

20%

Cost savings per year

€100,000

Carbon reduction per year

976 tonnes

Percentage/Numerical Values (Annually)

Management Perspective

“The move to natural gas has been fantastic. It was a big decision to make the switch to natural gas, however this is the best system that we have ever introduced. It allows for greater efficiencies, lower running costs and significant environmental benefits. It has allowed the capture of carbon dioxide, reduced maintenance and maintenance costs and ensures cleaner glass in the growing areas. Had I known natural gas would offer so many benefits I would have switched sooner.”

David Currid, Managing Director



Technical Team

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This information is only a guideline in relation to the different products available for use with natural gas. Users should ensure that products are suitable for the specific circumstances in which they seek to apply them. Contact the supplier or manufacturer directly for specific information on building requirements and materials needed for installation. Professional advice specific to the project should always be sought. The current Irish Gas Standards and Technical Guidance Documents (Building Regulations) override all contents. Users should ensure they always have the most up-to-date information.