

**Case study**

Growing tomatoes in the snow: LNG proves perfect solution for one of Australia's largest and most advanced glasshouse growing facilities

Located on the Northern Tablelands of New South Wales, Guyra is one of the highest towns in Australia. Known for its cold winters, in summer the temperature rarely exceeds 30 degrees centigrade

This climate of cooler summers and high light levels in winter make it the perfect location for the Costa Group's 20 hectare tomato glasshouse facility – one of Australia's biggest, producing 11 million kilograms of premium truss tomatoes each year.

Costa Group planned to construct an additional 10 hectare glasshouse in Guyra in which to grow a further 450,000 plants. To achieve optimum harvest levels, the climate in the glasshouse was required to remain within a temperature range of 16 to 28°C all year round and be kept rich in Carbon Dioxide (CO₂). The expert growers chose LNG as the best fuel for their energy needs.

Paul Andersen, Costa's glasshouse manager at Guyra, said: "LNG was an unknown for our operations but it has given us some really great results."

The challenges

Need for installation within short time frame and to deadline

As part of a complex project, the company required their LNG system to be installed and commissioned by an absolute deadline in order to prepare the tomato seedlings for planting.

"Some 50 days before we plant them out in the glasshouse," explains Paul, "we have to propagate those plants. There's a significant cost in getting those plants into that glasshouse. Once the decision to propagate has been made, we simply have to meet the deadlines on the project."

Need for a reliable and readily available energy source

Located on a volcanic uplift 1,330 metres above sea-level, Costa's Guyra facility has no piped gas supply. The greenhouse requires heating all year round and with thousands of plants representing millions of dollars of investment, the energy type had to be readily available and reliably delivered.

Producing a consistent quality supply of tomatoes during any season requires a consistently reliable supplier. In the agricultural industry, being able to better predict future fuel prices is particularly desirable as it allows growers to better budget for each harvest.

Need for an environmentally sustainable and safe fuel

The Costa Group has a focus on sustainable and environmentally responsible farming practices, such as efficient water management and the use of natural predators where possible to control pests. In keeping with their ethos, the company wanted to use a fuel source that was cleaner than the fossil fuel alternatives.

Growers also wanted a fuel source that would provide clean CO₂. During the growing hours of the tomato plant, feeding CO₂ into the glasshouse speeds up the photosynthesis process meaning each plant grows quicker and bears more fruit.

Need for monitoring of levels and ongoing support

Supplying tomatoes to all the major Australian supermarket chains, as well as independent grocers and a range of food industry stakeholders, every day of the year requires an energy supply that can be easily measured and its use predicted. It also needed to be safe and secure.

Solution and results

Need for installation within short time frame and to deadline

BOC and Elgas delivered and installed an 18m tall vessel that connected to the facility's water heater and provided CO2 to the glass houses. The work was carried out by BOC and Elgas with some of the work completed by Costa Group civil engineers. The LNG fuel helps heat around five mega litres of water that runs along more than 60 kilometres of heating pipes.

The solution faced a challenging first week of operation. Installed over a period of six weeks in the middle of winter, on the system's first day of operation temperatures dropped to minus five degrees.

"We had snow that week, some very cold conditions" explains Paul Andersen. "We had the gas boiler operating up to its maximum limit because we were on a deadline for planting; everything had to be working properly during the commissioning process."

"And it did. There were quite a few extremely happy people jumping up and down at the successful outcome!"

Need for a reliable and readily available energy source

Australia has an abundance of natural gas, enough for the next century of projected use. BOC has a number of LNG plants in Queensland, Victoria and Tasmania and a dedicated delivery fleet of tankers to supply businesses across Australia.

Unlike the price of diesel and LPG which are linked to overseas indices, the price of LNG is much more stable, which allows for more control in business budgeting. As diesel supplies are increasingly imported into Australia, there will be a greater reliance on the international oil market, whereas Australia's natural gas reserves ensure local supply and freedom from international issues.

Need for an environmentally sustainable and safe fuel

LNG is an environmentally cleaner fuel than many alternatives and the CO2 emitted can be utilised by the plants.

"This works out very well," explains Paul Andersen, "as the flue emissions from the heating are actually pumped directly back into the glasshouse to the plants, which thrive on it."

The resulting increase in crop yield is significant. "It's difficult to correlate the direct benefit with so many other variables but it represents a very significant monetary amount every year."

BOC and Elgas developed an innovative way of utilising the chilling effect that is generated when the liquid LNG is turned into gas. This will be used to cool the CO2 released into the glasshouses so that it stays in the 'growing zone' of the plants for a longer period, optimising its effect.

LNG is harder to ignite than diesel and is less of a fire hazard than many commonly-used fuels. LNG is not held under pressure which greatly reduces the likelihood of explosions. LNG is non-toxic and non-corrosive and will not pollute land or water resources in the event of a leak into the environment.

Nevertheless, BOC and Elgas gave full safety training to site personnel and briefed local authorities.

Need for monitoring of levels and ongoing support

During the first few weeks of operation, demand on supplies was particularly high. BOC monitor the gas levels remotely 24 hours a day, meaning customers are always supplied when they need to be and the risk of running out of fuel is removed. BOC changed the scheduling of its delivery fleet to ensure the Tomato Exchange didn't run out of gas.

"At that time," says Paul Andersen, "with all the other pressures that were placed on the team, having BOC and Elgas was great. They provided certainty on one of the most important aspects, the heating. We didn't have to worry about it. It wasn't a concern. We were told when we would need more fuel and when the trucks were going to arrive. We didn't have to worry."

BOC and Elgas report on the amount of gas used and devise convenient delivery plans with the facility managers.

Conclusion

"BOC and Elgas were fantastic," says Paul Andersen. "LNG kept those plants alive during that crucial planting out phase in a very cold period at Guyra. BOC and Elgas kept us well stocked to ensure the system kept running smoothly."

"It's the ideal solution for us; it is working very well and is increasing the quantity and quality of the tomatoes we produce."

Contact

David McCowatt

Business Development Manager
BOC Limited
Mob: +61 (0)401 605 205
Email: david.mccowatt@boc.com

Tony Weber

LNG Manager Southern (VIC/TAS/SA)
ELGAS Limited
Mob: +61 (0)401 987 636
Email: tony.weber@elgas.com.au

Peter Dewhurst

LNG Manager Northern (QLD/NSW)
ELGAS Limited
Mob: +61 (0)477 383 445
Email: peter.dewhurst@elgas.com.au

BOC is a trading name of BOC Limited, a member of The Linde Group. © BOC Limited 2015. Reproduction without permission is strictly prohibited.

Details given in this document are believed to be correct at the time of printing. Whilst proper care has been taken in the preparation, no liability for injury or damage resulting from its improper use can be accepted.