

Northwest Agricultural Drying

Agricultural Manufacturing

The Challenge

Hemp is quickly becoming one of the most in-demand agricultural crops in the U.S due to the declassification of the plant as a controlled substance, its abundant uses, and rapid turnaround from seed to harvest. Yet, the infrastructure to process the product struggles to keep up. The founders of Northwest Agricultural Drying (NAD) realized there was no equipment in the market capable of drying a mass volume of freshly harvested crops at the necessary speed.

Therefore, NAD developed a mobile drying unit capable of handling 25,000 wet pounds of biomass per hour. However, the job required an enormous amount of energy, which, when provided by the local utility, they found expensive and less reliable.

A pioneer in a relatively new industry, NAD strived to find a better, more innovative solution. They partnered with Arctic Energy, Inc., Capstone's authorized distributor in Alaska and the Pacific Northwest to design and install a stand-alone, combined heat and power (CHP) system that was not only more cost effective, reliable, and efficient, but also better for the environment—an important consideration for an agriculture-dependent business.

The Solution

Providing prime power to the mobile drying unit, the CHP system is a progressive solution and the first of its kind in the



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— Doug Brenton, Operations
Northwest Agricultural Drying

Power Profile

Customer

Northwest Agricultural Drying

Location

Mobile Unit, Oregon

Commissioned

May 2019

Fuel

LPG

Technologies

- 3 C65 microturbines

Capstone Green Energy Distributor

Arctic Energy, Inc.





Three propane-fueled Capstone C65 microturbines provide prime power to the mobile drying unit developed by Northwest Agricultural Drying.

USA. Three propane-fueled Capstone C65 Microturbines replaced an older gas turbine generator lacking sufficient flexibility and support.

In the new system, C65 microturbines provide power to the motors and controls on the two trailers, and the heat from the exhaust is routed through a patented heat exchanger process. Meanwhile, a conveyor belt pulls the hemp into a proprietary auger aerating system where it dries to an exacting moisture content. The hemp exits the dryer process ready to be shipped.

The Results

In its first year, the CHP system provided over 800 continuous hours of stand-alone power. It completely eliminated the need for supplemental utility power, which, in turn, offered significant cost savings. The system, on account of its unique, patented design, is now 100% more efficient than the prior method of drying.

Additionally, the C65 microturbines' remote monitoring and control systems provide Arctic Energy access to the system in real-time. This technological advantage helps to ensure the system's successful performance and provide support when needed. Between the 24/7 real-time support and the inherently low-maintenance design of the C65 microturbines, NAD dramatically reduced maintenance needs and the associated costs.

The CHP system also fulfilled strict Tier 4 requirements by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) by meeting low-noise needs and reducing emissions.

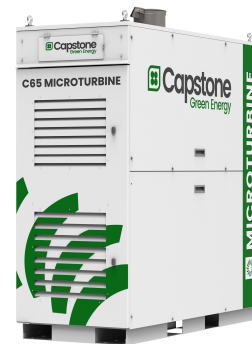
Perhaps the most critical benefit of the system is that it nearly eliminates the losses normally associated with hemp production. Typically, the drying process results in a 50% loss of the hemp product's lucrative CBD/CBG content. But with the new CHP system in place, the mobile dryer design

reduces that loss to 1%. And while previously, some growers lost entire crops to mold or rot while waiting for drying facilities to process their harvest, the NAD dryer operates at the same rate as the harvesters, thus eliminating that risk. For a crop worth \$25M per harvest, the new CHP system is capable of increasing profitability in the tens of millions of dollars.

"We have a first of its kind mobile agricultural dryer. The Capstones work fantastic. We are currently doing our second generation of changes to further increase drying efficiency. These changes should get us to more than our expected production volumes," said Doug Brenton, Operation Manager for Northwest Agricultural Drying.

"We are also discovering there is a lot of demand for this design to dry other products besides hemp. We are excited to see where this leads, and the Capstone and Arctic Energy, Inc. are an integral part of our system," added Mr. Brenton.

Capstone C65 Microturbine



A C65 Microturbine provides up to 65 kW of electrical power while the UL-Certified C65 ICHP provides up to an additional 150 kW of thermal power for CHP and CCHP applications.