

UNLOCK A 100 PERCENT RENEWABLE ENERGY SOLUTION

The City of Denton, Texas, announced plans to increase renewable energy use to 100 percent by 2020. But before adding more solar and wind power to its energy portfolio, it first would need a way to produce power when renewable sources were unavailable. And it would need it quickly.



A TECHNOLOGY SOLUTION DELIVERS RELIABILITY TO THE SYSTEM

EPC sets the pace to design and build one of the nation's largest reciprocating engine plants in less than two years.

When introducing the Renewable Denton Plan, the Denton officials aimed to make Denton Municipal Electric one of the greenest power systems in Texas. But achieving the community's 100 percent renewable energy goals would take more than simply adding new sources of solar and wind power to its energy portfolio. Fluctuations in its growing renewable energy supply could potentially subject citizens to increased rates, especially during periods of peak demand when the sun didn't shine and the wind didn't blow.

To add reliability to its system and hedge during peak hours, the city needed a low-cost, supplemental source of power generation that could quickly fill the gap when renewable sources were unavailable or insufficient. To meet its deadline, it would also need this solution to be delivered sooner, rather than later.

The city found the answer it was seeking in reciprocating engines. Drawing on the same technology used in the internal combustion engines found in automobiles, these efficient engines can be brought online and ramped up to produce precisely the amount of power needed on only a few moments' notice. A newer, turbocharged version of the engines replaces the diesel fuel formerly needed to operate the engines with cleaner-burning natural gas.

In September 2016, Denton Municipal Electric contracted our team to provide comprehensive engineer-procure-construct (EPC) services for a new 225-MW reciprocating engine plant. Permitting and design of the grassroots,

\$225 million plant began immediately so that our construction team could begin site work two months later. The aggressive timetable, made possible by our integrated EPC approach and the self-performance capabilities of our wholly owned subsidiary, AZCO, was necessary to meet the established project completion date of July 2018 — in time to meet peak summer demand.

To reach Denton's renewable energy goals without subjecting ratepayers to increased rates, the design allows the plant to reach 20 percent power in two minutes and full plant output in less than five minutes. This aggressive design includes 12 Wärtsilä 18V50SG reciprocating engine generators configured to provide flexible, fast-start power. The "plug and play" design makes it possible for each engine to be dispatched independently to scale output up or down during fluctuations in demand — all with minimal sacrifice in peak efficiency. The plant also has black start capabilities, enabling Denton Municipal Electric to bring the plant back online quickly following a widespread outage and without drawing power from the grid.

The Denton Energy Center is among the largest and most flexible reciprocating engine plants in the country. Due to its use of selective catalytic reduction to minimize pollutants, the plant is designed as one of the industry's cleanest natural gas-fired — earning the 2018 Award of Merit in the Energy/Industrial category by *Engineering News-Record Texas & Louisiana*.

PROJECT STATS

CLIENT

Denton Municipal Electric/
City of Denton, Texas

LOCATION

Denton, Texas

225

**MW RECIPROCATING
ENGINE PLANT**

12

**NATURAL GAS-FIRED
WÄRTSILÄ RECIPROCATING
ENGINE GENERATORS**

<5

**MINUTES FOR PLANT TO
REACH FULL POWER**

25%

**MINIMUM LOAD TO
SUPPORT GRID STABILITY**