GE VERNOVA

AERODERIVATIVES

for municipalities and co-ops

Please click the **Read on** button below to explore our aeroderivative solutions

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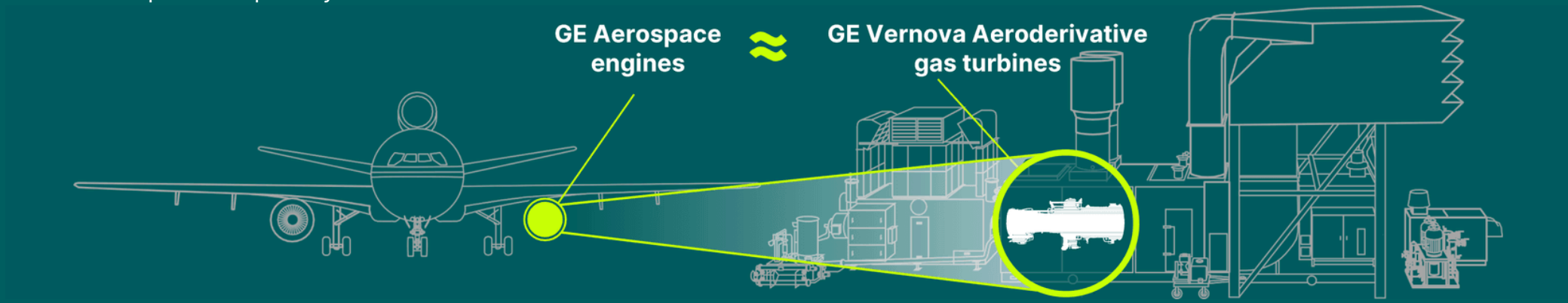
OPERATING AT THE SPEED OF FLIGHT

Originally engineered for airplanes, GE Vernova's aeroderivative gas turbine solutions are highly available, flexible, and reliable, with the ability to achieve multiple starts per day.



21-117 MW output range

up to **44.2%** efficiency

5 min. start time

>99% reliability/ availability

<2.5 ppm NOx with SCR

100% H_2 capable

VALUES ACROSS GE VERNOVA AERODERIVATIVE PORTFOLIO

2,800
Active Units

55 YEARS
of Experience

180MM+
Total Operating Hours

Challenges for Munis & Co-Ops

Installing in power-dense locations such as a populated cities.

Ability to have an available resource when required.

Meeting sustainability and clean energy goals.

Managing grid intermittency due to

- Higher renewable penetration
- Big data

Challenges for peaking power technologies

COST

- Capital Expenditure (CAPEX) – total installed cost – $/kw
- Operating expenditure (OPEX)
  - Fixed and variable O&M
- Fuel cost – heat rate

OPERABILITY & CONSTRUCTABILITY

- Start time and ramp rate
- Higher number of starts/cycling
- Minimum emissions compliance load
- Quick I&C and modular design

RELIABILITY

- Overall plant reliability/availability
- Fuel flexibility – dual fuel & on-line transfer
- Operations in cold weather – winterization
- Grid stability – sync condensing

EMISSIONS

- NOx and CO levels – maximize operating hours
- GHG emissions
  - CO_2
  - Methane Slip

Munis and Co-Ops need a solution with low CAPEX and OPEX that can start multiple times a day without impacting reliability/availability

Why Aero Technology?

Aeroderivatives help municipalities and co-ops tackle the energy transition by being:

Flexible
Modular design, quick installation and commissioning

Hydrogen fuel capabilities

GE Venova’s aeroderivative gas turbines—
like the **LM6000VELOX*** (at left)—can burn

100% H_2 meaning
0% CO_2 EMISSIONS

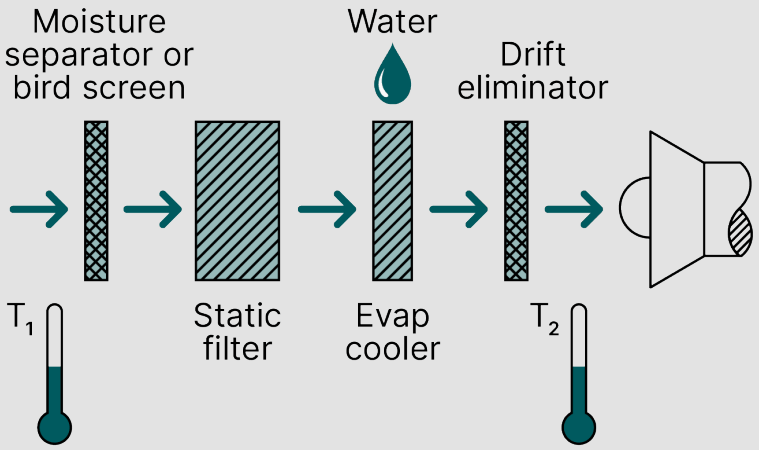
Carbon-free emissions can help utilities/municipalities and co-ops decarbonize their peaking assets.

Hydrogen Flip Book

**Trademark of GE Vernova and/or its affiliates*

Efficiency

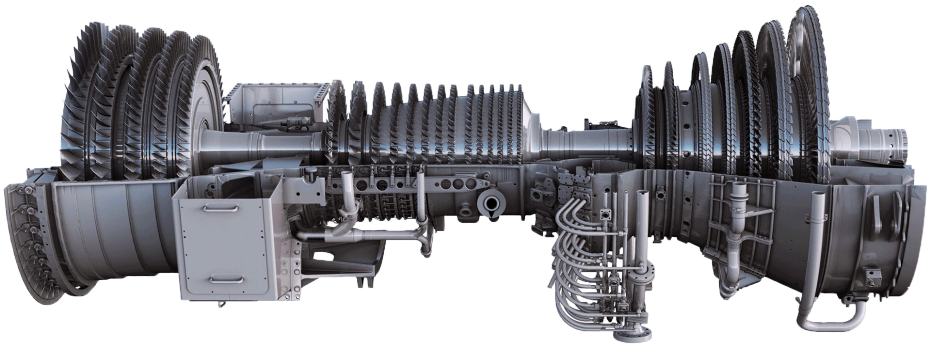
Increase* aeroderivative power plant efficiency using either



An evaporator cooler

This helps **reduce CO_2 output** compared to older gas turbines that are 20% or more.

*Depending on ambient conditions



SPRINT

Further increase efficiency by either:

- *Going into a cogeneration application*
- *Closing the loop in a combined cycle system*

Grid stablity

Aeroderivatives vs reciprocating engines:

Lower methane slip

Faster ramp rate (20–50 MW/min)

- Supports intermittent renewable power
- Helps ensure a stable grid at times when renewables may not be available

No pilot liquid fuel needed for combustion in dual-fuel mode

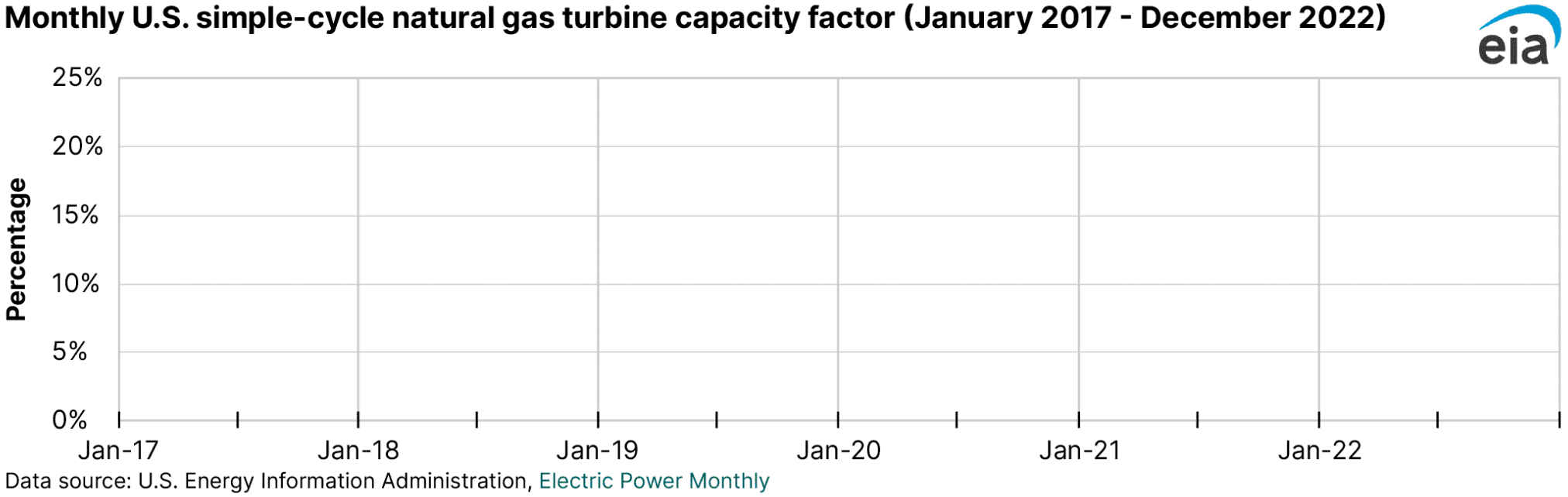
Simple-to-low maintenance cost with very little lubricating oil usage

Lower Nitrous Oxide (NOx) levels

Powers down quickly as more renewables come online, helping utilities make the most of their low-cost assets

Grid stablity

Peaking plants are vital to the energy transition...

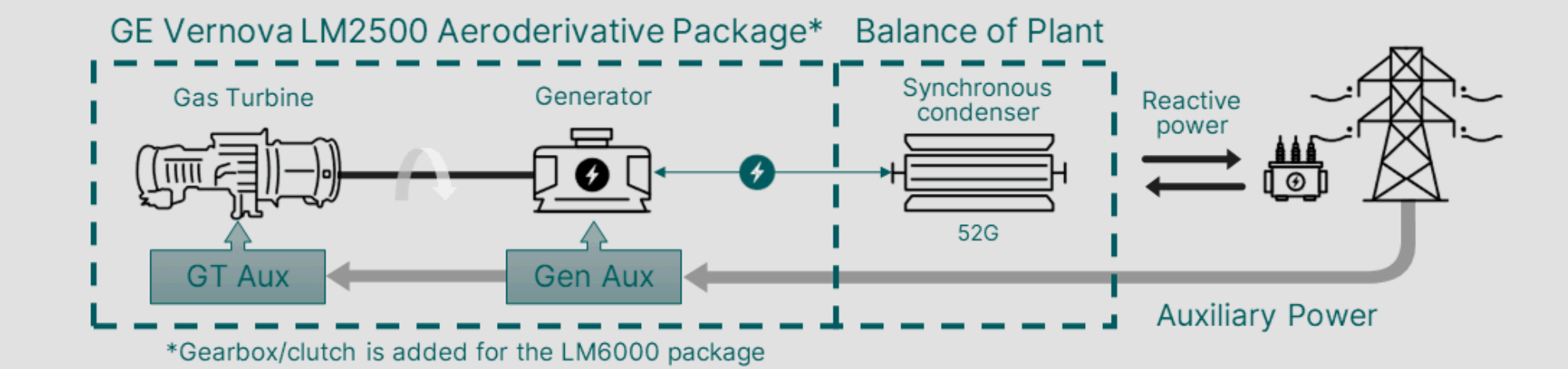


A peaking plant:

- Helps balance the intermittency gap
- Must be able to start quickly to address this gap
- Handles high cycle loads with 5-minute start time

Grid stablity

Synchronous condensing complements the influx of renewables...



Benefits:

- Provides reactive power for both high- and low-grid voltage
- Absorbs VARS (reactive power) in small increments, correcting lagging/leading power factors
- Provides power factor/voltage support in urban centers and industrial areas
- Provides stability and ensures increased power transmission
- Generates additional revenue in deregulated markets
- Can provide qualification for spinning reserve requirements or credits
- Switching between Power and Synchronous Condenser Mode is allowed without need to re-synchronize the generator with grid

GE Vernova Aeroderative Package with Synchronous Condenser Option
can provide active and/or reactive power within ~8 minutes

CUSTOMER STORIES

Aeroderivatives at work...

GE Vernova provided and installed two LM6000 aeroderivative gas turbines to update an older cogeneration plant in Freimann.

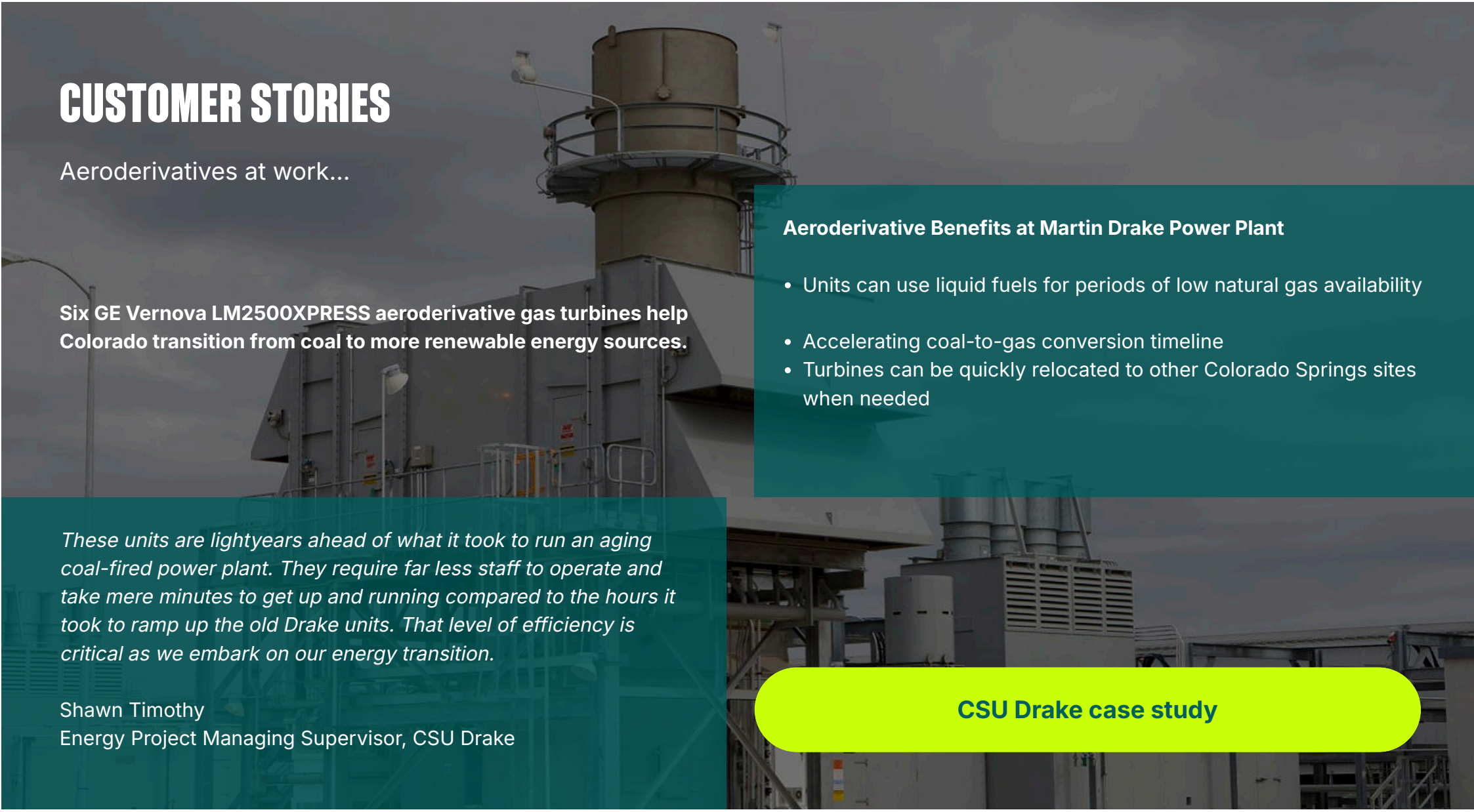
Aeroderivatives Benefits at Freimann power plant

- Able to be installed in an existing structure, with GE Vernova collaboration
- Units are almost always running as long as there is a need for heat
- Fast startup allows plant to react spontaneously to gas and power prices

Because the units are very available and reliable, we can trust the units whenever we need them. Combine that with their fast start capabilities, and we've been able to use them for many different business cases—including combined heat and power production, selling to the normal grid for power, and even black start scenarios.

Simon Weig
Plant Manager, Freimann power plant, Stadtwerke München (SWM)

Freimann case study



CUSTOMER STORIES

Aeroderivatives at work...

Six GE Vernova LM2500XPRESS aeroderivative gas turbines help Colorado transition from coal to more renewable energy sources.

Aeroderivative Benefits at Martin Drake Power Plant

- Units can use liquid fuels for periods of low natural gas availability
- Accelerating coal-to-gas conversion timeline
- Turbines can be quickly relocated to other Colorado Springs sites when needed

These units are lightyears ahead of what it took to run an aging coal-fired power plant. They require far less staff to operate and take mere minutes to get up and running compared to the hours it took to ramp up the old Drake units. That level of efficiency is critical as we embark on our energy transition.

Shawn Timothy
Energy Project Managing Supervisor, CSU Drake

CSU Drake case study

CUSTOMER STORIES

Aeroderivatives at work...

TECO's LM6000 aeroderivative gas turbine helps keep chilled water and steam in steady supply to institutions in the Texas Medical Center in Houston, TX.

Aeroderivatives Benefits at TECO

- Constant supply of chilled water and steam at all mission critical facilities, especially during severe weather episodes
- Significantly lowered CHP costs over time
- Excess revenue from grid off-loading helps fund new projects or improve the plant

As a not-for-profit, when we are more efficient, our customers benefit. If there is excess power not used internally to support our operations, the excess goes to support the grid. This practice has helped lower our customers' overall rates over time.

Michael P. Manoucheri
President and CEO of Thermal Energy Corporation (TECO)

TECO case study

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Thank you for reading

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