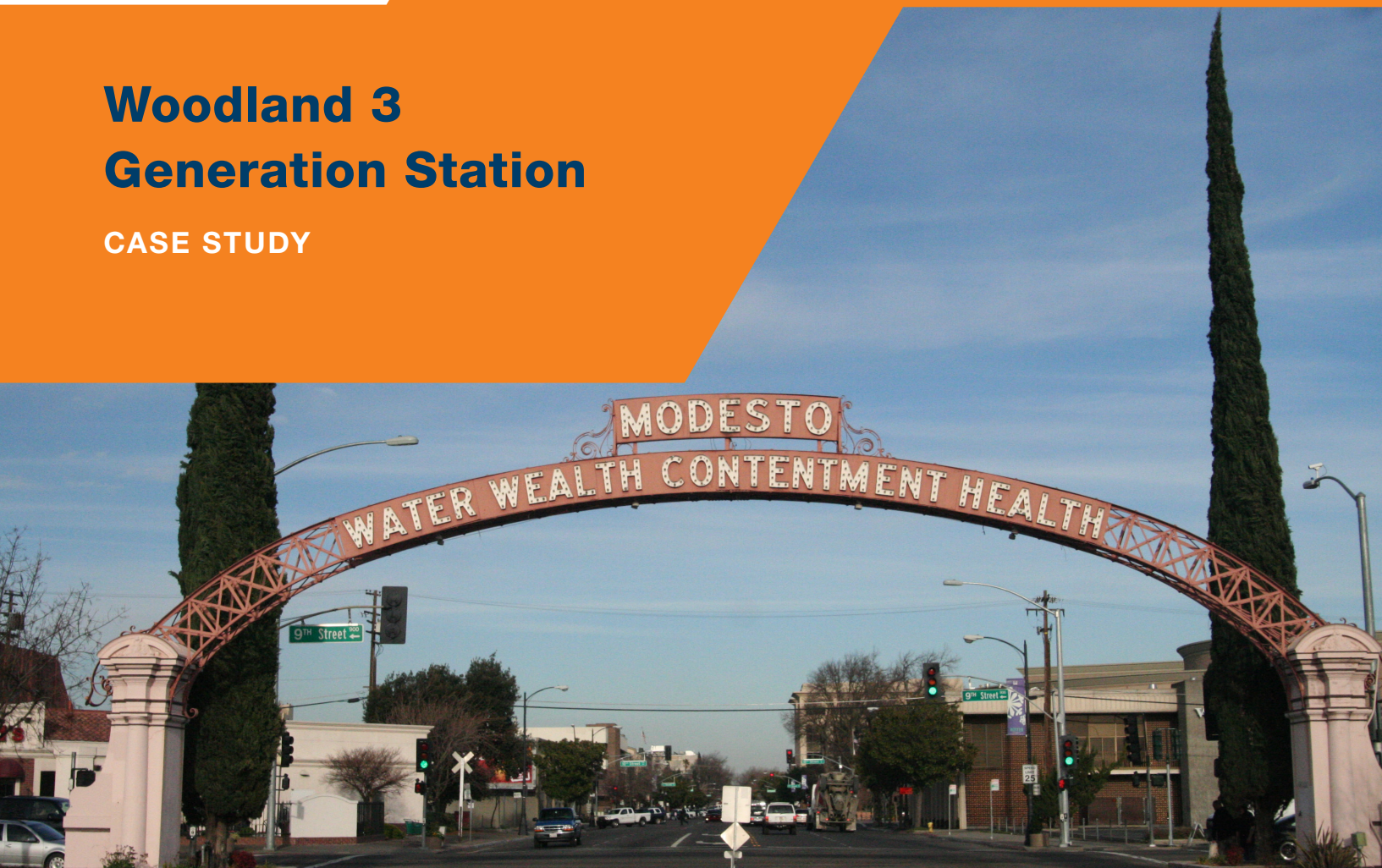


Woodland 3 Generation Station

CASE STUDY



Integrating wind and solar power with Wärtsilä flexible generation

The state of California is known for its amazing nature and climate. Being home to beautiful beaches, sandy deserts and redwood forests alike, it is hard to find a corner of the planet with comparable natural and climatic diversity. It's certainly called the Golden State for a reason! But to keep it golden, its inhabitants and regulators are very aware that its fate cannot be left to chance. Climate change is a real threat, and biological degradation could pose a serious risk to an agricultural region that feeds well over 100 million people.

At the forefront of environmental regulation worldwide, Californians have pioneered almost every piece of legislation aiming to keep pollution in check and natural resources plentiful. Binding targets for increasing renewable capacity, stricter-than-anywhere limitations to power plant emissions, ban on wasteful cooling systems in power generation... the list is long and thorough. This puts a huge pressure on the power generation technology to develop and adapt to the ever-tightening standards, but all of it is for the greater good.

The Modesto Irrigation District (MID hereafter), a community-owned utility dedicated to supply a reliable stream of water and power to the city of Modesto and its surroundings, has been operating since 1887. In year 2011, the growing power needs made it necessary for MID to enlarge its locally-owned power generation portfolio, then consisting of roughly 150 MW of baseload power capacity, supplied by combined cycle gas turbines and hydro plants; plus another 200 MW of peaking capacity, supplied by simple cycle gas turbines.

In order to ensure that renewable energy intermittency was not an issue, MID acquired a state-of-the-art Wärtsilä plant, powered by six fast-start Wärtsilä 20V34SG gas engines, providing up to 49.6 MW. The Woodland 3 Generation Station, as it was named, can supply anywhere from 4 to 49.6 MW to the grid in less than 8 minutes, based on the real-time needs, and all of it without any loss in efficiency. The plant can withstand multiple starts and stops without any extra cost or impact on maintenance, which makes it much more effective at responding to intermittency issues.

Not only have the Wärtsilä units complemented MID's intermittent renewable resources, they have also helped optimize the efficiency of MID's entire generation portfolio.

Their operation either offsets the use of simple cycle turbines (which have a significantly lower efficiency) for peaking power needs; or provides load-following capability that would otherwise be provided by a combined cycle plant. Rather than turning to combined cycles for fast ramp needs, which would imply a significant efficiency loss, the Wärtsilä engines take care of the quick-starting and fast load ramps needed while the combined cycle plants are used more to serve the baseload needs for which they are better suited.

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CUSTOMER
Modesto Irrigation District (Utility)

TYPE
Wärtsilä 34SG gas power plant

OPERATING MODE
Peak load / standby & emergency

GENSETS
6 x Wärtsilä 20V34SG

TOTAL OUTPUT 49.6 MW

FUEL Natural gas

SCOPE
Engineering & equipment (EEQ)

DELIVERY 2011



CHALLENGE	WÄRTSILÄ'S SOLUTION	BENEFIT
Demand variation	Multi-unit approach allows to supply any amount of power without efficiency loss	Enhanced reliability, significant fuel savings and lower electricity price for consumers
Intermittency of wind and solar power	Wärtsilä internal combustion engines with excellent dynamic capabilities	Operational flexibility & supply security
Total portfolio optimization	Wärtsilä 34SG engines taking care of demanding load peaks and ramps	Existing assets can run more efficiently and generating less emissions