

Port Westward Unit 2

CASE STUDY

Flexible generation keeps the lights on in Oregon

Portland General Electric Company (PGE) is an investor-owned utility (IOU) located in the Pacific Northwest, which provides electric service to industrial, commercial and residential customers in Portland, Oregon, and surrounding communities. Today, PGE serves more than 800,000 customers within their 4000-square-mile service territory comprising 52 Oregon cities. In 2009, PGE submitted an Integrated Resource Plan to the Oregon Public Utility Commission (OPUC) which stated the need for approximately 200 MW of flexible peaking capacity.

KEY DATA

Traditionally, PGE has relied on hydro resources to provide flexibility to its power infrastructure. In the past, PGE depended on contracted hydro power from the Columbia River for load-following functions, but more and more of those resources are becoming unavailable due to market reforms or are now devoted to serve local loads. Thus, new ways of achieving flexibility are needed. Due to PGE's commitment to renewable energy and the addition of new wind and solar capacity into the system, PGE needed an efficient technology capable of quick-starting, and fast ramp-up and ramp-down rates to fulfill the grid's need for flexibility.

In order to prepare for current and future challenges, PGE decided in February 2013 to build a 220-megawatt power plant adjacent to PGE's existing natural gas-fired Port Westward and Beaver plants, located near Clatskanie in the state of Oregon. Under the name of Port Westward Unit 2, the main services of the PGE power plant is providing peaking power during winter and summer periods, as well as load following and renewable integration throughout the year. Yet, the most important benefit the plant provides PGE is to help compliance with PGE's commitment to renewable portfolio requirements, increasing both the baseload capacity and flexible capacity at once.

The choice of Wärtsilä as PGE's power plant partner was no coincidence: a Request for Proposal (RFP) was conducted pursuant to competitive bidding guidelines, in which Wärtsilä came out as the top bid by providing the best balance of cost, risk, and value while also meeting PGE's customer needs for reliable and affordable electric power. Not only must the power plant be able to

run efficiently, start fast, and ramp up and down quickly, it must also provide ancillary services, including load following, regulating margin, spinning reserve and non-spinning reserve. The Wärtsilä 50SG engine, being now the heart of PGE's new plant, fulfills all these requirements.

The Port Westward Unit 2 power plant, equipped with 12 of the aforementioned Wärtsilä 50SG engines and its related auxiliary equipment, operates on natural gas, which became an obvious choice of fuel for PGE since the utility has access to an underground gas reservoir. The power plant utilizes very heavily throughout the year; making it more than merely a peaking plant. Some portion of the plant is expected to be used every week if not every day. Thus, high efficiency and reliability in line with flexibility are vital for PGE. Wärtsilä's solution addresses these challenges and fits well into PGE's energy generation infrastructure and portfolio.

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CUSTOMER

Portland General Electric (Utility)

TYPE

Wärtsilä 50SG gas power plant

OPERATING MODE

Peak load/stand-by & emergency

GENSETS

12 x Wärtsilä 18V50SG

TOTAL OUTPUT 224 MW

FUEL Natural gas

SCOPE

Engineering & equipment (EEQ)

DELIVERY 2014



| CHALLENGE | WÄRTSILÄ'S SOLUTION | BENEFIT |
|---|--|--|
| Seasonal demand variation | Wärtsilä's 50SG engines provide peaking power without efficiency loss | PGE's ability to fulfill customers' demand for electric power (no shortages) at optimal cost |
| Variability of wind and solar power | Wärtsilä's internal combustion engine with fast-start and excellent ramp rates | Operational flexibility & cost savings |
| Use of internal combustion engines, a new technology within PGE | Vast experience in detailed engineering and support in training about the solution | Quicker start of commercial operations and revenue generation |

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