

Organic Rankine Cycle technology for flexible combined-cycle power plants in the MENA regions

In today's MENA regions electricity market, characterized by a growing emphasis on decentralized power generation and facing an increasing penetration of intermittent renewable power generation, the needs of flexible, reliable and simple power generation technology is more and more relevant for utilities as well as industrial players and energy companies.

These power plants are typically developed with open-cycle small/medium reciprocating engines (ICEs) or gas turbines (GTs), depending on fuel availability, operator skills, plants location.

atmosphere as exhaust gases at medium temperature (~400°C).

These ICEs and GTs though tend not to be optimised for combined-cycle operation, and their exhaust gas temperatures are not sufficiently high, especially under part-load conditions, to generate steam at the conditions needed to achieve a high overall electrical efficiency. Nonetheless, other compelling technologies are available. Thanks to its impressive development in high-enthalpy applications, such as biomass energy and waste heat recovery in industries, Organic Rankine

Cycle (ORC) technology, using specific organic working fluids, permits the efficient exploitation of low-temperature exhaust gas streams, also at variable load and/or on poor quality fuels.

Thus, ORC enhances the efficiency of these decentralized power plants permitting the realization of efficient medium/small combined-cycles power plants.

In addition, ORC meets the need of realizing reliable and flexible plants very



However, this plant configuration achieves a low efficiency because a relevant amount of power is throw into the

well, thanks to the fact that the overall ORC systems are water-free, completely automatic, with simple

start-stop procedures and present high availability and flexibility while maintaining long lifetime (>20 years) in addition to minimum O&M requirements and costs.

Among its 310 ORC plants operating worldwide and other 60 under construction, Turboden has field-proven experience in more than 30 combined-cycles. The fleet results confirm the extraordinary suitability of ORC technology for the development of flexible, reliable and simple power generation plants, as those needed in the MENA regions.

