



## A HYBRID SOLUTION FOR RELIABLE, SUSTAINABLE POWER GENERATION

REFERENCE CASE – MANSOURAH-MASSARAH GOLD PROJECT, SAUDI ARABIA

When Ma’aden sought a reliable power generation solution that would support solar power for its Mansourah-Massarah gold project, Larsen & Toubro selected Wärtsilä to provide engineering and equipment (EEQ) along with technical advisory services for a 58 MW power plant. Wärtsilä’s hybrid concept solution reduces reliance on fossil fuels and helps establish the mine’s sustainability credentials.

The Mansourah-Massarah gold project comprises two open-pit mines under development in the central region of Saudi Arabia. The project is part of Vision 2030, a movement to diversify revenue for the Saudi economy by moving away from oil, with a primary focus on mining underexploited resources including gold. The mine and mineral processing plant, which is expected to produce 250,000 ounces of gold annually, will be owned by Ma’aden, a Saudi state-owned company. Ma’aden required a power generation solution that would enable integration of renewable energy in order to reduce both emissions and fossil fuel use.

Execution of the project is headed by a consortium consisting of Outotec and Larsen & Toubro, who selected Wärtsilä as a technology provider for the 58 MW power plant under their engineering, procurement and construction (EPC) contract with Ma’aden. Wärtsilä will provide engineering and equipment (EEQ) to the site along with technical advisory services until the plant is fully commissioned. The solution is scheduled to be commissioned by Q3 2021 and become commercially operational during 2022. It will comprise a hybrid concept 58 MW power plant encompassing six Wärtsilä 20V32TS engines that enable and prioritise the use of photovoltaic (PV) solar power.

“Wärtsilä’s proven track record of providing power generation solutions for mines, along with their strong presence in Saudi Arabia, made them an obvious potential choice to supply the power generation technology for this project. Wärtsilä’s solution will improve performance and provide significant lifetime cost savings for the project, which has made the decision to move away from rental generation easy.”

Muaffag Mohammed Abbas  
Mansourah-Massarah gold project,  
Project Director, Ma’aden

## Improved performance and lower costs across the lifecycle

Ma'aden had originally been considering rental generation with high-speed engines burning diesel fuel. After extensive discussions between Wärtsilä and Ma'aden it became apparent that a combination of PV solar energy and medium-speed reciprocating engines using liquid fuel could offer significant improvements for power generation performance at the Mansourah-Massarrah site. A lifecycle cost analysis also revealed that while requiring a higher initial capital expenditure, opting for an owned power plant rather than rental generation would offer substantial savings in the longer term. As well as supplying the required equipment and providing engineering for it, Wärtsilä's technical advisory service will ensure expert support during the installation and commissioning of the plant.

## Hybrid concept plant minimises emissions

Ma'aden was committed to using renewable energy wherever possible. The agreed solution will be the first new-build hybrid concept power plant in Saudi Arabia. Because the Wärtsilä 20V32TS medium-speed reciprocating engine generating sets provide a fast response, they are able to quickly compensate for any shortages whenever the PV solar system is unable to generate sufficient power due to changing weather conditions or any other intermittencies. The engines therefore ensure that the Mansourah-Massarrah mine can benefit from always-on power that maximises the use of solar energy without risking any loss in performance. The high efficiency, operational adaptability and fuel flexibility of this setup will also lead to a saving of more than 25% in the levelised cost of electricity compared with high-speed engines.

## A proven track record of meeting customer needs

When Wärtsilä initially approached Ma'aden, the proactive, solution-oriented and transparent approach to discussions was central to the mining company's decision to select the proposed technology. Given the company's global mining expertise, it was clear that Wärtsilä possessed the knowledge and experience to cater for Ma'aden's requirements and provide a smooth delivery. In addition, the Wärtsilä 32 engine generating sets, which provide the added benefit of being able to handle low stand-by energy consumption, have proven success with more than 100 engines in 15 baseload installations across Saudi Arabia.

"Right from the outset, Wärtsilä demonstrated a commitment to working hand in hand with us to reach a collaborative solution that was most suitable for our requirements. Their thorough and genuine approach and willingness to listen to our needs – as well as taking suggestions from third parties on board – left us convinced that they were the ideal partner to provide the equipment and engineering for this important project," says Mohammed Meher Rizwan, DGM – Business Development, Larsen & Toubro

## Case summary

The challenge	Wärtsilä's solution	Benefits
<ul style="list-style-type: none"> <li>Need to provide sustainable power to the Mansourah-Massarrah gold mine</li> <li>Need to reduce power generation costs</li> <li>Need for a reliable energy source</li> </ul>	<ul style="list-style-type: none"> <li>A hybrid power plant that enables integration of PV solar power</li> <li>High-efficiency power generation solution enabling maximised use of PV solar power</li> <li>6 x Wärtsilä 20V32TS engine generating sets with one redundant engine (n+1 configuration) offering over 97% reliability</li> </ul>	<ul style="list-style-type: none"> <li>Uninterrupted electrical supply that minimises fossil fuel use and emissions</li> <li>Lower cost compared with rental generation throughout the installation lifecycle</li> <li>Uninterrupted and reliable energy, with quick response time compensating for any intermittency in PV solar supply</li> </ul>

## Key data

End customer	Ma'aden
<b>Solution</b>	Wärtsilä 58 MW hybrid power plant
<b>Operating mode</b>	Baseload
<b>Gensets</b>	6 x Wärtsilä 20V32TS
<b>Total output</b>	58 MW
<b>Fuel</b>	Liquid fuel
<b>Delivery</b>	2021

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