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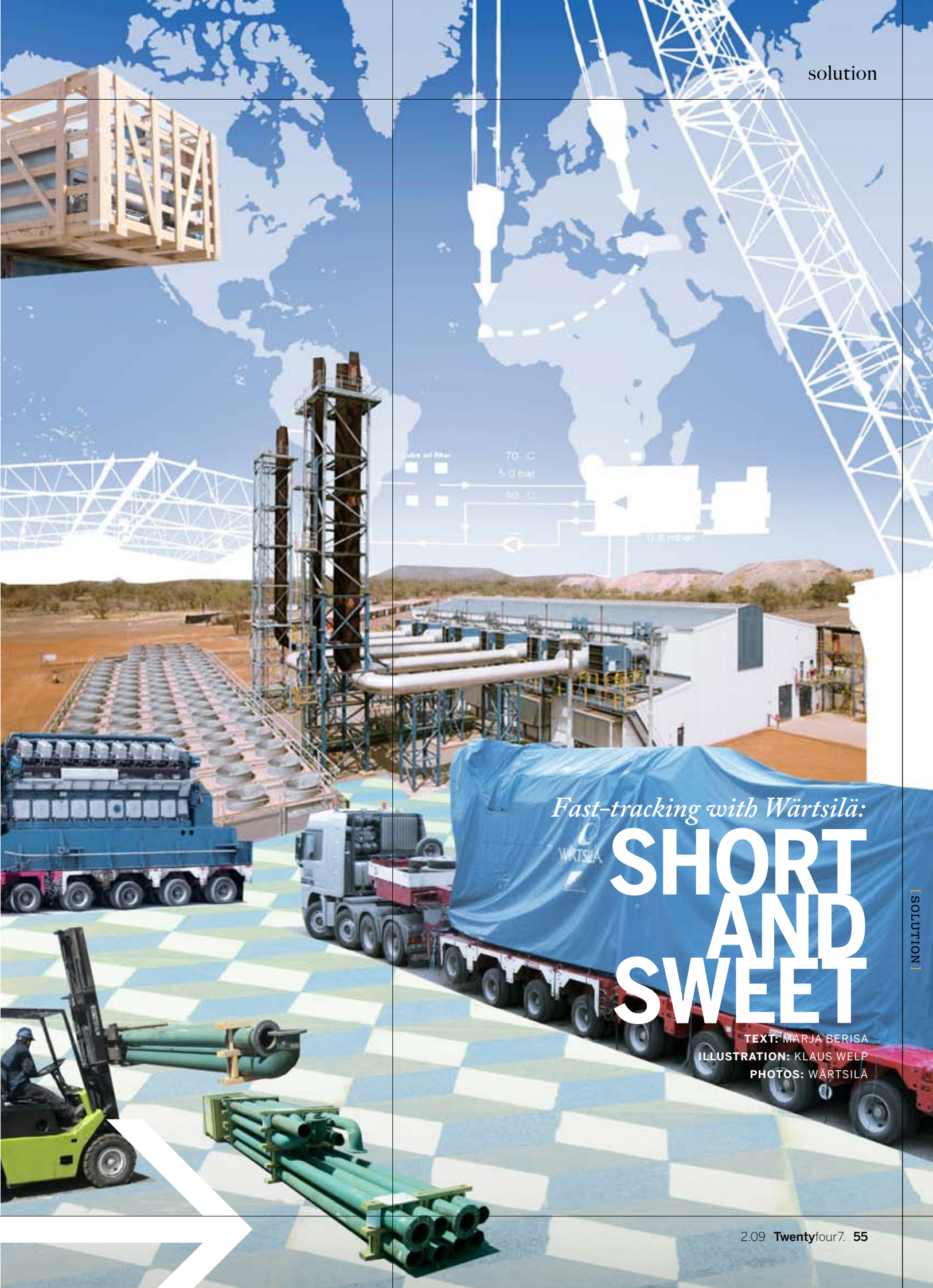
WÄRTSILÄ STAKEHOLDER MAGAZINE

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Fast-tracking with Wärtsilä:

SHORT AND SWEET

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[SOLUTION]



Project management on a global scale is a science in itself. Communication and teamwork between customer and supplier were the high-tech components in a massive relocation project which involved three Wärtsilä power plants being dismantled, shipped across continents and reassembled.

WÄRTSILÄ'S PROJECT SERVICES

took on a truly demanding task when the Australian mining company Mineral Deposits Limited (MDL) commissioned the relocation of three existing power plants within a 19-month timeframe. The target was to launch gold-mining operations in Sabodala, Senegal, in December 2008. The Sabodala gold deposit is situated in the Mako Mafic Volcanic Belt and lies within the west Birimian province, home to some of the world's largest gold deposits.



Natural bounty. For several decades, development of this resource has been pioneered in the main by a number of smaller but innovative and energetic Australian miners. Starting in Ghana in the 1980s, these pioneers moved west through Burkina Faso, Niger, Mali, Sierra Leone, Guinea and into Senegal. Mineral Deposits Limited (MDL) is one of these companies.

Situated in a remote rural area north of the Gambia River and 38 km from the Mali border, the mine is 90% owned by MDL and Senegal's government has a 10% stake. Sabodala is an open-pit operation with an average life of mine (LOM) grade of 2.1 g per tonne and will produce 150,000 ounces of gold each year. Recovery of gold will take place using industry-standard Carbon in Leach / Carbon in Pulp (CIL/CIP) technologies with processing at an annual rate of two million tonnes currently forecast.



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Exploration drilling at Sabodala started in the middle of 2005 and design of the process plant and infrastructure was carried out in 2007. The project involved not only process design, but also construction of the process plant, village and infrastructure, as well as the open-pit operations.

Turkish power. A remote operation such as the Sabodala Gold Project requires a power supply that matches the quality of the project’s other elements. A 30 MW, 5+1-engine Wärtsilä heavy fuel oil (HFO) power plant was constructed at the same time as the mine and processing plant.

Once the processing plant and infrastructure design were under way, **Rod Unwin**, MDL’s Manager of Projects, and the MDL board decided on an engine conversion and relocation approach rather than acquiring brand new equipment for the power plant.

“The decision to opt for used engines was driven by **Adam Smits**, MDL Assets Manager, and process designer **Paul Criddle**,” says **Mika Martonen**, Project Manager in Wärtsilä Services. “As the delivery period for new engines was comparatively long, a fast-tracked relocation would produce the required results in a shorter time frame.”

Fortunately three Wärtsilä-delivered power plants were available in Turkey. One was a 12 MW two-engine installation at Akteks in Gaziantep near the Syrian border. The other two plants were a 12 MW two-engine installation

at Cayirova on the eastern side of Istanbul and a 12 MW two-engine installation at Topkapi on the city’s western side.

An easy choice to make. “Our task was to dismantle, overhaul and transport the three plants from Turkey to Senegal, and then to design, construct and commission the new power plant. Refurbishment included converting four of the Wärtsilä Vasa 32 series engines to run on HFO – the engines from the Akteks plant were already of the Wärtsilä Vasa 32LN type. Construction of the main tank farms; storage tanks, day tanks and buffer tanks was carried out by MDL,” says Martonen.

The conversion from dual-fuel (DF) and gas operation to using HFO was in part a decision dictated by the location of the mining site. As Sabodala, located some 650 km east of Dakar, is not connected to any existing gas pipeline infrastructure, HFO was the obvious choice.

“Even though the running hours already clocked up by the engines varied from 24,000 to 64,000, reliability, competitive operational economics, after-sales support and the good emissions performance of Wärtsilä’s medium-speed technology made the choice a simple one,” says Smits.

Go fast, but don’t cut any corners. In ‘fast-track’ projects, activities that can take place at the same time are usually scheduled to do so, thus shortening the overall project →

Sabodala is located 650 km from Dakar.



Sabodala Gold Project milestones

May 2007 MDL purchases three power plants in Turkey. Contracts regarding relocation have already been agreed.

June 2007 Plant dismantling, engine overhauls and conversion begin in Turkey.

July 2007 Design and contract discussions in Dakar. Cost and time savings evaluated based on the availability of existing buildings and equipment.

September 2007 Design concept completed and approved. Refurbishment work on the engines starts in parallel with dismantling of the three power plants.

October 2007 Earthworks and civil engineering works begin at Sabodala.

December 2007 Vessels chartered by Wärtsilä arrive in Dakar, Africa's westernmost city. The three dismantled Turkish plants and new components and equipment shipped from Finland (more than 160 containers and six 101-ton engines) are unloaded. Transportation of containers to the construction site begins.

January 2008 Mechanical pre-assembly operations begin at Sabodala well before the civil engineering works have been completed.

March 2008 Erection of building structures and mechanical operations well advanced, preparations made to transport the engines to site.

May 2008 Engines placed in position as soon as they arrive, building sealed before the wet season begins.

November 2008 The pace of civil engineering operations slows during the wet season, but the power plant is up and running by 5 November 2008.

January 2009 Operational power supplied to the process plant commissioning team as and when required.

March 2009 Production operations at the Sabodala Gold Project running at full speed with two bars totalling 8.9 kg smelted and poured on site on 15 March 2009.



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timeline. "As well as having a clear-cut division of labour internally, Wärtsilä and MDL oversaw certain project stages based on their experience and the available resources," says **Don D'Arcy-Evans**, Project Manager with MDL.

"For example, Wärtsilä in Turkey was responsible for operations involving the engines in Turkey; Wärtsilä Services handled the organization and execution of transport to Dakar and construction of the power plant site, including all the mechanical and electrical installation work. As MDL had better contacts with local providers of civil engineering and tank-building services, we carried out those sections of the project."

"In overall terms, this was a showcase example of excellent engineering, workmanship and project management,"

says D'Arcy Evans. The good relationship between MDL and Wärtsilä continues in the form of training and other support packages, and construction of a power plant at Grande Cote is a possibility in the near future.

Sustainability on the agenda. Even though huge efforts were required to construct a processing plant and mining infrastructure in this extremely remote and challenging environment, MDL is also viewing the possibility of eventually expanding its operations to include the possibility of a regional power plant.

"As such, this asset may have to last for decades, not just years," says **Peter Spivey**, MDL Country Manager. "It will also have to be 'lean and green', and comply with another of MDL's sustainability directives - the development and use of biofuels such as those that can be recovered from *Jatropha* seeds."

MDL conducted initial trials with *Jatropha* plants for potential future biofuel production in Senegal during the 2008 wet season. The project is continuing with selection and stability trials on different *Jatropha* species and the investigation of palm oil sources. The plan is to proceed to production testing in the next few years. ●