

ENERGY
ENVIRONMENT
ECONOMY



” This is my third project with Wärtsilä and I've again appreciated Wärtsilä's focus and support for their customers as their number one goal during both construction and operations.”

*Tony Warnett, Power Station Superintendent,
Grande Côte Operations*

FLEXIBLE ENERGY OPTIONS FOR A GROUNDBREAKING MINING OPERATION

The Grande Côte Mineral Sands Project aims to extract valuable zircon and titanium dioxide from sandy deposits along the Senegalese coast from 2014 for at least the next 20 years. The project uses dredge-mining techniques in a dammed reservoir that will slowly shift through the sand dunes. A floating electrically powered dredge vessel will suck up sand and centrifugally separate heavier minerals for further treatment in a processing facility at the mining camp.

The mining camp also has workers' accommodation, medical facilities and a wastewater treatment plant, all in a location far away from any larger settlements and unconnected to the national grid. A reliable, clean, on-site source of energy, operable in island mode, is essential vital for the whole operation.

Grande Côte Operations soon turned to Wärtsilä for their energy solution. One of the joint

venture operation's main partners, Australian-based Mineral Deposits Ltd, had already procured a power plant from Wärtsilä for their Sabodala gold mine in Senegal.

One key issue at Grande Côte concerned the need to keep different fuel options open. The mining operations have initially been using heavy fuel oil, but they will later shift to cheaper and cleaner gas when piped supplies become available. Wärtsilä's multi-fuel 34DF engines make this perfectly possible.



THE CHALLENGE	WÄRTSILÄ'S SOLUTION	BENEFIT
High variability in energy demand between full operation and standby mode, when only base camp and mineral separation plant is running	Flexible configuration with four large engines and one smaller engine	High rates of efficiency during periods of both high and low energy demand
Hot, dry, dusty conditions	Specially selected air intake filter and radiator cooling solutions	Effective prevention of dust problems, and low cooling water requirement
Natural gas may later become available as a favoured fuel	Multi-fuel Wärtsilä 34DF engines can easily switch from oil to gas	Option to switch to cleaner and cheaper gas if pipeline built

The power plant needs to operate in island mode to provide a flexible baseload for the newly developed mining operations. Since demand for power will be much lower during the periods of relocation of the power supply of the dredge vessel, Wärtsilä came up with a special engine configuration for the power plant with four larger Wärtsilä 20V34DF engines, and one smaller Wärtsilä 9L34DF that can efficiently meet lower weekend demand up to 2.2 MW. When mining operations are under way three of the four larger generating sets will typically provide up to 28 MW of power at any time.

Conditions in the sand dunes of the Senegalese coast are hot and dry, with plenty of dust about. This was a key factor affecting the choice of air intake filters for the engines. Water is a precious resource

Wärtsilä came up with a special engine configuration to enable the power plant to efficiently meet a highly variable baseload demand.

here, so an air cooling system was chosen for the power plant's radiators.

Health and safety issues have been given the utmost priority at Grande Côte right from the start of the whole project. Wärtsilä has organized wide-ranging practical training on safety issues at the power plant, getting all contractors involved as well as people from the mining operations. The

plant's health and safety record has consequently been excellent.

The clean technology solutions applied in the new power plant fully meet the tough emission guidelines set for the mining project by the International Finance Corporation. Mining operations are today increasingly looking to minimise their environmental footprints including energy-related impacts.

The self-sufficient and flexible energy solution supplied by Wärtsilä will form an essential element of the Grande Côte Mineral Sands Project over the next 20 years, enabling the efficient utilisation of Senegal's valuable natural resources through an international collaborative initiative where the Republic of Senegal is a significant owner and beneficiary.



Grande Côte, Senegal



MAIN DATA

Customer	Grande Côte Operations (Mining industry)
Type.....	Wärtsilä 34DF multi-fuel power plant
Operating mode.....	Flexible baseload
Gensets	4 x Wärtsilä 20V34DF + 1 x Wärtsilä 9L34DF
Total output	36 MW
Fuel.....	LFO/HFO with the option to use natural gas when available
Scope.....	EPC (Engineering, Procurement & Construction)
Delivered	2013