

The Magazine



Malta's first CCPP

An advanced energy solution for an ancient island

Malta's popularity as a tourist destination has exploded recently, driving the demand for more – and cleaner – energy. The new LNG-fired power plant in the bay of Marsaxlokk makes electricity cleaner and cheaper for residents and industry alike

Sheathed in their sleek and shiny towers, Max, Maximilian, Anna and Vilhelmina represent the future of Malta. These three industrial gas turbines and one steam turbine – named for Swedish saints at their birthplace in Finspång – are the most visible representation of a new power plant project bringing cleaner, more reliable and flexible energy to this small Mediterranean country.

Malta has been a cultural crossroads for more than 5,000 years, but its popularity as a tourist attraction has exploded recently, driving the demand for more – and cleaner – energy. For decades, the country's electricity had been provided by turbines on a plant site called Delimara, across the bay from picturesque Marsaxlokk in southeastern Malta. The outdated turbines were powered by heavy fuel oil – unclean, unsustainable, unreliable, and expensive.

The system was unclean and unsustainable because "heavy fuel oil is one of the most polluting energy fuels around," explains Franz Dörfler, CEO of ElectroGas Malta Ltd (EGM), developer of the new power project. The plant was unreliable because of Malta's growing economy. The stage was set for a new approach.



EGM was tasked with the challenge of creating cleaner as well as cheaper electricity generation capacity for Malta, explains CEO Franz Dörfler.

For Malta, the answer is LNG

In March 2013, the winning candidates in a national election pledged to improve environmental conditions and reduce electricity prices. They created the EGM consortium to reach these goals. EGM identified natural gas as the best solution for the country's energy needs. Natural gas has dramatically lower emissions than heavy fuel oil and significantly lower CO2 emissions per unit of energy produced, compared to other fossil fuels. Plus, it generates less noise and less smell, and delivers greater efficiency.

The project developers opted for liquefied natural gas (LNG) as the fuel source and a double-hulled purpose-built tanker as a floating storage unit (FSU), to be moored in the water adjoining Delimara.

With these guidelines, Siemens developed the unique configuration of the new Delimara 4 power plant based on three key components:

The FSU tanker docked just offshore where the LNG is stored at -162 degrees Celsius. It is transferred by pipe to an onshore regasification plant where the LNG is reconverted to natural gas. The regasification compound operating capacity is sufficient to handle both the new Delimara 4 facility and eight turbines from the existing Delimara 3 plant on the same site. The latter used to run on heavy fuel oil but all have been converted to gas, as well.

Finally, the combined cycle power plant (CCPP) consisting of three Siemens SGT-800 gas turbines, three boilers, and one Siemens SST-900 steam turbine, equipped with the SPPA-T3000 control system, has a totaling capacity of 215 megawatts.

"Distributed generation ensures a reliable power supply. The SGT-800 is the best in its category in this power range, and being equipped with the modern dry low emission technology it meets emissions standards for a wide range of operation modes," notes Franz Haslinger, Siemens' General Project Manager for the Malta project.

In addition to providing a customized technology solution, Siemens – through its Financial Services division – helped structure the overall financing concept and, ultimately, became one of three investors in the project. The capital support from Siemens underscores its confidence in the project's long-term success and positions the company as a key partner.



Franz Haslinger (center) with Commissioning Manager Alexander Krewenka (left) and Site Manager Markus Bratok.



Each of the three SGT-800 gas turbines has its own chimney and bypass stack.



The Delimara power plant site is located on the bay of Marsaxlokk.



The electricity is needed for tourism, which has grown by 10 percent from 2015 to 2016.



But Malta is also home to industries like ship building and online gaming.



In the control room of Delimara 4, the operator keeps a close eye on the steam turbine "Vilhelmina".



"Anna", the SGT-800 gas turbine, can generate up to 57 megawatts electrical energy.



The Delimara site from Marsaxlokk: The old chimney on the left will soon be dismantled.

Efficient plant setup

The great advantage of a CCGP is its flexibility. The gas turbines can run alone without the boilers or steam turbine in a so-called open cycle. In combined cycle mode the gas turbines, boilers, and steam turbine run simultaneously. In this case, the steam generated by one or more of the gas turbines and boilers is used to drive the steam turbine, so the latter runs without an additional source of fuel. "The three-to-one ratio of gas to steam turbines increases the efficiency of the plant significantly," Dörfler points out. While a combined cycle plant is nothing new in Europe, it is new for Malta.

The novelty of a combined cycle plant was not the only challenge. Lay-down room on the building site was also an issue, since construction was restricted to the existing Delimara plant boundaries. Markus Bratok, Siemens Site Manager at Delimara, recalls that sometimes only half the desired number of square meters was available. "Our space was very narrow. To cope, we practiced just-in-time inventory because we had no room for

storage.”

Time pressures were another challenge. Siemens Commissioning Manager Alexander Krewenka recalls: “EGM wanted the gas turbines to enter commercial operation as soon as possible to produce electricity for the hot high season here in summer.”

The outcome: reduced emissions, reduced costs

In March 2016, IJ Global Awards honored the Delimara plant as the best European Power Plant Project of the Year. On August 10, 2017, it was handed over to EGM and virtually all – 99 percent – of testing had been completed to “very satisfactory results,” reports Dörfler.

One happy result: The efficiency of the gas turbines was higher than expected.

Another measure of success: Particulate matter in the air was reduced by 90 percent with the gas turbines. Overall, the plant is 50 percent below EU emission standards. Reduced electricity costs of 20 percent have already been passed on to domestic and commercial/industrial sectors in Malta.

These results have been noticed abroad, and Malta’s CCPP has received many visitors to the project from other islands in Europe and worldwide – from Corsica to New Caledonia. You might call them pilgrims to the shrine of Max, Maximilian, Anna and Vilhelmina.

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