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World's tallest solar tower to be fitted with a CMI receiver

In 2021, a 260-meter high solar tower is set to rise in the Emirate of Dubai and, when the thousands of mirrors of its solar field turn to face to its summit, they will light up a CMI Energy receiver.

The *Mohammed bin Rashid Al Maktoum* solar park, named after the Emir of Dubai, is one of the world's largest renewable energy projects and forms part of Dubai's ambitious strategic vision of reaching 75%-use of renewable energy by 2050. For a total investment of 50 billion dirhams (approx. 12 billion euros), the plant will have an installed capacity of 5000 MW in 2030.

In comparison, the Bouchain power plant (France), representative of the latest generations of combined cycle thermal power plants, has a capacity exceeding 600 MW, whereas an average nuclear reactor has a 900 MW output, while a large wind turbine averages between 2 and 5 MW.

Launched in 2013, this energy park project currently comprises three sections (phase 1, 2 and 3) dedicated to photovoltaic power (PV), the well-known solar panel technology that directly converts solar energy into electricity. The first stone of "phase 4" was laid in March 2018; with the difference that, this time, it is dedicated to Concentrated Solar Power (CSP).

Electricity production 24 hours a day

Unlike PV, CSP absorbs solar energy into a heat transfer fluid (here molten salts) reaching very high temperatures (560⁺°C). This fluid then feeds equipment that produces steam at high temperature and pressure, which in turn rotates a turbine and its alternator, thereby generating electricity. Today, CSP brings with it a significant advantage; it allows large-scale energy storage to be more competitive than PV technology. In point of fact, molten salts at high temperature are accumulated in enormous tanks at the base of the tower, enabling an energy reserve that is sufficient to feed the power station during the night and, thereby enabling it to operate 24 hours a day!

An ultramodern heat exchanger

Phase 4 of this project is to include, among other things, a 100 MW solar tower. This huge concrete tower will have thousands of mirrors mounted on motorised supports at its base, spread over several square kilometres, constantly shifting their orientation in relation to the movement of the sun, so as to reflect, at every moment, its rays onto the summit of the tower, where the central CMI receiver will be positioned; an ultra-modern heat exchanger able to absorb gigantic energy flows from all these mirrors, and transfer them into molten salts.

This solar receiver is an impressive metal cylinder more than thirty metres high and with a diameter of more than 20 metres. Molten salts continuously circulate around its periphery, in special alloy tubes designed to withstand the infernal temperatures imposed by the solar flux coming from the mirrors below. Inside is a complex system of piping and tanks riddled with temperature and pressure probes, and maintenance platforms and other access ladders that will enable the teams in charge of running and maintaining the power plant to get to any point within it. The installation as a whole shall be supported by a tailor-made, solid metal structure weighing over 1,500 metric tons.

Project of the year

This gigantic 4th phase, better known as the "DEWA project", after the **Dubai Electricity and Water Authority**, the Dubai authority at the centre of this great project, is unquestionably the project of the year for the global CSP industry. During the past 18 months, the industry's titans have clashed to obtain this flagship project worth over 14 billion dirhams (over 3.3 billion euros). **ACWA Power** finally won the contract, shattering all the price records for CSP produced energy.

ACWA Power is one of the world's largest developers of CSP solar power plants, especially when looking at the Noor 1, 2 and 3 power plants currently under construction in Morocco. ACWA Power has worked in collaboration with the Chinese group **Shanghai Electric (SEC)**, in the role of EPC contractor (Engineering Procurement and Construction), on the DEWA project which is being offered at an unbeatable price.

Shanghai Electric is a large integrated equipment manufacturing group specializing in energy and industrial equipment and integration services.

A marathon full of new developments

In early 2017, CMI Energy began working on this project with a view to winning the contract for the tower's central receiver. A real marathon for CMI Energy, which has linked its offers together by constantly refining its design and optimising costs. In October 2018, the race intensified, finally closing in style with **Shanghai Electric's** signature at the bottom of the contract with CMI.

Looking to the future

Beyond the flamboyant reference it provides to CMI and which strengthens its commercial position, this contract gives it the opportunity to forge close links with the leaders of the

CSP industry. The **Shanghai Electric** group is an essential partner in China's CSP market. Now, the country is set to launch a new wave of 3000+ MW projects in 2019. The CMI Energy sales team is following the programmes closely.

About DEWA

The Dubai Electricity and Water Authority (DEWA) is a public utility infrastructure company established on 1 January 1992 by Sheikh Maktoum bin Rashid Al Maktoum. The aim of this public company is to provide the people of Dubai with an adequate and reliable electricity and water supply. By the end of 2017, DEWA employed over 11,000 people and was supplying electricity to nearly 800,000 customers and water to 700,000. In 2017, DEWA had an installed capacity to supply 10,200 MW of power and more than two billion litres of desalinated water per day. Having used gas-fired power plants for most of its history, DEWA has recently added solar power to its energy mix, with the Mohammed bin Rashid Al Maktoum solar park.

About ACWA Power

ACWA Power is a developer, investor, co-owner and operator of a large number of power and desalination plants. In 2002, the Saudi Government decided to strengthen the role of the private sector in the Saudi economy by opening up electricity and desalinated water to the private sector. ACWA Holding and the MADA group set up a joint venture, ACWA Power Projects, in 2004. The latter was the precursor of the current ACWA Power, which was then founded in 2008. With the Noor 3 and Redstone power plants and, of course, the Solar Tower in Dubai, ACWA Power has become a big name in the CSP world.

About Shanghai Electric

Shanghai Electric is a large integrated equipment manufacturing group specializing in energy and industrial equipment and integration services. It is committed to providing customers with technology integration solutions and systems that respect the environment. It produces thermal and nuclear power plants, wind turbines, energy transmission and distribution equipment and environmental protection equipment. Shanghai Electric's history dates back to 1902.

About CMI, Cockerill Maintenance & Ingénierie

CMI designs, integrates, modernises and maintains equipment for energy, defence, iron and steel, the environment and industry in general. CMI supports its customers throughout the life cycle of their tools, enhancing their commercial, technical and environmental performance.

CMI has a number of strengths - a unique combination of expertise in engineering, maintenance and management of international technical projects, a vast geographical and technological influence and a capacity for innovation focused on the specific needs of its customers. With already more than 200 years of commercial success behind it, CMI has a turnover of the order of a billion euros and has 6,000 experienced employees in all the four corners of the world. www.cmigroupe.com/thermal-solar-receivers

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