
Power Technology

Projects March 6 2020

Noor Ouarzazate Solar Complex

The Noor Ouarzazate Solar Complex is a 580MW power plant located 10km north-east of the city of Ouarzazate, Morocco.

Project Type

Concentrated solar power (CSP) complex

Operator

ACWA Power subsidiary NOMAC and Masen

Construction Started

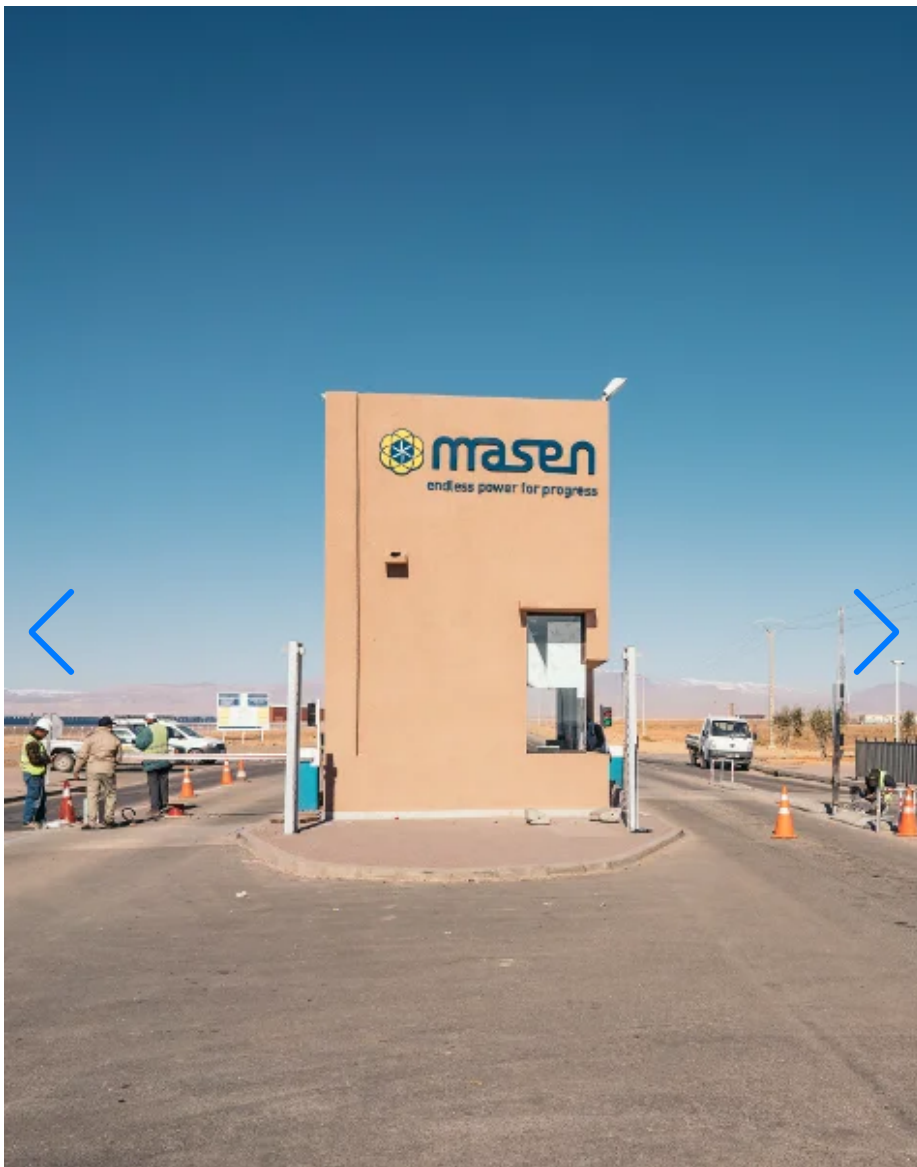
Phase 1: August 2013

Start of Commercial Operations

Noor I: February 2016, Noor II: 2017, Noor III: 2018

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Noor Ouarzazate solar power station is part of the Morocco

The Noor Ouarzazate Solar Complex is a 580MW power plant located 10km north-east of the city of Ouarzazate, Morocco. It is the largest concentrated solar power plant in the world.

Phase one of the Ouarzazate solar power station project involved the construction of a 160MW concentrated solar power (CSP) plant named Noor I, while phase two involved the construction of the 200MW Noor II CSP plant and the 150MW Noor III [CSP plant](#).

Phase three involved the construction of a 70MW photovoltaic (PV) Noor IV CSP power plant.

Phase one construction works started in August 2013 and Noor I was officially commissioned in February 2016. Noor II and Noor III were commissioned in 2018.

The project was developed on a build, own, operate and transfer (BOOT) basis by ACWA Power Ouarzazate, a consortium of ACWA Power, the Moroccan Agency for Solar Energy (Masen), Aries and TSK.

The Noor complex is operated and maintained by a consortium led by NOMAC, a subsidiary of ACWA Power, and Masen.

Noor Ouarzazate Solar Complex benefits

The Ouarzazate solar power station project forms part of the Moroccan Solar Energy Programme (NOOR), which aims to develop five solar complexes with a combined capacity of approximately 2GW by 2020 to meet the energy demands of the country, which depends on 95% imports.

The Noor I CSP plant offsets 240,000t of CO₂ emissions a year and generated approximately 1,000 [construction](#) jobs and 60 permanent jobs during the operation and maintenance phase. Together, the Noor II and Noor III plants can offset 533,000t of CO₂ emissions a year.

Noor Ouarzazate Solar Complex details and technology

Sener is the technology licensor for the first three plants. Noor I is equipped with Sener's proprietary SENERtrough cylindrical parabolic troughs, Noor II integrated the SENERtrough-2 parabolic trough collectors and Noor III used the central tower technology with salt receivers. Noor IV is a PV solar plant.

The Noor II and Noor III plants have a molten salt storage capacity of seven hours each, while Noor I has a molten salt storage capacity of three hours.

Noor I uses a wet cooling system, while other plants will use a dry cooling system. The water required for the plants will be sourced from the Mansour Eddabhi dam located approximately 12km from the project site and stored in water storage reservoirs with a total capacity of 300,000m³.

II covers an area of approximately 612ha and is
ped with 400 loops, with each loop comprising of four

connected solar collector assembly (SCA) modules that will further incorporate 12 solar collector element (SCE) modules. Noor III covers an area of approximately 598ha.

Power transmission and off-take agreements

The output from the Noor complex is conveyed to the Ouarzazate 225/60 KV station located near the complex. Masen signed two separate power purchase agreements (PPA) to off-take the entire output from phases one and two.

Moroccan solar complex financing

The financial closure for phase one of the Ouarzazate solar power station was announced in June 2013, while phase two achieved financial closure in May 2015.

“Together, the Noor II and Noor III plants can offset 533,000t of CO₂ emissions a year.”

The estimated investment for phase one was €500m (\$537m). It was solely financed by the African Development Bank (AfDB) Group.

The overall investment for phase two of the Noor complex was \$2bn funded through 80% debt and 20% equity. The debt facility was entirely provided by Masen with funds secured from the AfDB, the Agence Française de Développement, the Clean Technology Fund, the European Commission, the European Investment Bank, Kreditanstalt für Wiederaufbau and the World Bank.

Contractors involved in Ouarzazate solar power station

The engineering, procurement and construction (EPC) contractor for phase one was the consortium of TSK Electrónica y Electricidad, Acciona Infraestructuras, Acciona Ingeniería, and Sener Ingeniería y Sistemas, while the EPC contractor for phase two was a consortium led by Sener and Sepco III.

The technical advisory services for phase two were provided by [redacted] meyer International. The specific environmental and [redacted] impact assessment (SESIA) for phase two was prepared

by 5 Capitals Environmental and Management Consulting (5 Capitals).

Azelio installed [renewable energy](#) storage at the Noor Ouarzazate solar complex in March 2020.

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