Shams 1
Abu Dhabi, UAE

In March 2013, Masdar inaugurated Shams 1 – one of the world's largest concentrated solar power (CSP) plants in operation and the first of its kind in the MENA region. Masdar partnered with Total and Abengoa to deliver the 100 megawatt (MW) solar-thermal project.

The US$600 million project took three years to be developed. In January 2016, Masdar purchased Abengoa's stake in the project. In October 2018, Abu Dhabi Retirement Pensions and Benefits Fund (ADRPBF) purchased a 29 per cent stake in Shams 1. Masdar remains the majority shareholder with a 51 per cent stake.

Covering an area of 2.5 square kilometres, equivalent to 285 football fields, Shams 1 generates enough electricity to power 20,000 homes in the UAE. Shams 1 contributes to the diversification of the UAE's energy mix and reduces the country's carbon footprint. The plant displaces approximately 175,000 tonnes of carbon dioxide per year, equivalent to planting 1.5 million trees or removing 15,000 cars from the roads of Abu Dhabi.

Incorporating the latest in parabolic trough technology, Shams 1 features more than 258,000 mirrors mounted on 768 tracking parabolic trough collectors. By concentrating heat from direct sunlight onto oil-filled pipes, Shams 1 produces steam, which drives a turbine and generates electricity.

Quick facts

- One of the largest CSP plants in the world

- A joint venture between Masdar (51%), ADRPF (29%) and Total (20%)

- Located 120 kilometres from Abu Dhabi in the Al Dhafra Region

- Powers more than 20,000 UAE homes and displaces 175,000 tonnes of CO_2 per year

- Covers an area of 2.5 km², equivalent to 285 football fields.

- Installed capacity of 100MW

- Made up of 768 parabolic trough collectors

- Inaugurated in March 2013

In addition, the solar project uses a booster to heat steam as it enters the turbine to dramatically increase the cycle's efficiency. The plant also includes a dry-cooling system that significantly reduces water consumption – a critical advantage, particularly in the arid environment of Abu Dhabi.