Ashalim Solar Tower

Jean-Bernard Datry, Audrey Zonco

Setec tpi, Paris, France

François Prongue

Hebetec, Hindelbank, Switzerland

Thomas Dum

Gleitbau, Salzburg, Austria

Gilles Oudin

Ferbeck Industrial Chimneys (Portugal)

Contact: audrey.zonco@tpi.setec.fr

Abstract

Ashalim solar tower is the tallest solar tower in the world, reaching a height of 240m. Its unique design allows the solar receiver to be lifted inside the tower, up to the top, resulting in an optimised construction plan but also in a very complex geometry, which required specific wind tunnel tests, as well as a challenging structural design and high expertise in formwork technology.

Keywords: solar tower; concrete; complex geometry; slipform; cushion sliding;post-tensioning; wind tunnel.

1 Introduction

The country of Israel has recently set a goal of generating 10 percent of its energy from renewable sources by 2020. It launched in 2013 a project for a solar power station established in the Negev desert in Israel, near the kibbutz of Ashalim. The station is made up of three plots, each with a different solar technology: solar thermal energy with a 121 MW concentrated solar power (CSP) plant, photovoltaic energy with a 35 MW PV plant, and natural gas (154 MW). Altogether, the plots are set to generate some 310 megawatts of power, about 1.6% of the country's energy needs — enough for about 130,000 households, or roughly 5% of Israel's population. It is the largest renewable energy project in Israel, and the 5th largest in the world.

General Electrics was responsible for the engineering, procurement and construction (EPC) of the solar power station and will also provide full operations and maintenance (O&M) activities for 25 years. BrightSource provided the advanced solar field technology. Ferbeck Chimneys was in charge of the construction of the concrete tower. Ferbeck provided the first concept design of the tower, and setec tpi carried out the schematic and detailed design of the concrete tower and the steel grid, as well as construction documents and drawings. For the construction, Ferbeck chimneys partnered up with Gleitbau for the sliding formwork, and Hebetec Engineering SA for the sliding and the single lift of the boiler.

2 General principles

There are around a dozen solar tower fields around the world, the largest being the Ivanpah

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