Ashalim (Plot A) Project
110 MW CSP Thermo-Solar Power Plant
The Eilat-Eilot International Conference
November 29, 2016
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The Vision Becomes a Reality
60 Years Vision for Solar Energy Power in the Negev...

“The largest and most impressive source of energy in our world and the source of life for every plant and animal, yet a source so little used by mankind today is the sun... This energy can be converted into a driving, dynamic and electric force, and even after all the uranium and thorium deposits in the earth are exhausted, solar energy will continue to flow toward us almost indefinitely.”

David Ben Gurion, Southward, 1956.
...turning into reality – a national-scale strategic project

Generation of 10% of Israel’s electricity needs from renewable energy sources by 2020

Generation of 17% of Israel’s electricity needs from renewable energy sources by 2030

Generation of **only 2.6%** of Israel’s electricity needs from renewable energy sources – significantly below target

By 2018 (end of construction) the Ashalim (Plot A) CSP Thermo-Solar Power Plant will generate 1% of Israel’s electricity needs = Approx. 10% of the 2020 target
The Project and Technology in a Nutshell
Project Summary

Global Cooperation

• Sponsors: SHIKUN&BINUI, NOY, TSK

• Intl. consortium of financing entities – OPIC, EIB, Leumi, Hapoalim and local institutional investors

Mega Project Scale

• Total project volume – approx. 1.1 billion $

• Electricity production equals to annual consumption of 60,000 households (equivalent to Netanya)

Description

• BOT for planning, financing, construction and operation of a thermo-solar power plant

• For 28 years through 2043
The Project in numbers

- **3,900 dunam** (390 hectare) footprint (equivalent to Kiryat Ono) solar field, where **16,244 parabolic collectors** are installed.

- **454,832 mirrors** track the sun and focus the energy of sunlight along the focal line of the troughs, where **203 km.** of special tubes are installed.

- A heat transfer fluid (a synthetic oil with unique thermal specifications) that flows inside the tubes is heated to a temperature of about **390°c**.

- **1,200 workers** during construction, 50% of which reside in the south.

- Advanced sustainability and ESHS standards.
Working on site
Project Ownership Structure

- **Negev Energy**
  - **TSK**: 32.5%
  - **Shikun & Binui Arison Group**: 67.5%

- **Negev Energy Ashalim O&M**
  - **TSK**: 10%
  - **Shikun & Binui Arison Group**: 50%
  - **NOY**: 40%

- **SHIKUN & BINUI ARISON GROUP**
  - **TSK**: 10%

- **NOY**
  - **TSK**: 10%

**Ownership Breakdown**
- TSK: 10%
- Shikun & Binui Arison Group: 40%
- NOY: 50%

**Ownership Structure**
- Negev Energy: 100%
- Negev Energy Ashalim O&M: 100%

**Partnership**
- Negev Energy and its partners collaborate in the development and management of energy projects, showcasing a strategic partnership for sustainable energy solutions.
Project Location

Surrounding Ashalim, a complex of four projects with a total power capacity of 300 MW form the “Solar Energy Valley of Israel”

PLOT A: 110 MW Thermo-solar Negev Energy

PLOT B: 110 MW Thermo-solar Megalim

40MW PV (under bid)
30MW PV Clal Sun/EDF

Beersheba
Yeruham
Sde Boker
Mitzpe Ramon
Project layout

- Sde Pakoa Stream Rerouting
- Viewpoint
- Main Entrance
- Poultry Farms
- Access Road
- Road 211 Junction
- Solar Field
- Power Block
- Ashalim
- Road 211
Power Block zoom-in

- Parabolas Assembly Bldg.
- Thermal Energy Storage - Molten Salt Tanks
- Turbine hall
- HTF Tanks
- Main Electrical Building
- Administration Building
- Cooling Tower
- Water Treatment Plant
Project timeline

Development Phase

Signing of concession Agreement - September 2013

Construction Phase (36 months)

Financial close - July 16, 2015

Notice to Proceed (NTP) - July 17, 2015

Operational Phase (25 years)

Commercial operation - July 17, 2018

Concession end - 2043
Main Technology Characteristics

<table>
<thead>
<tr>
<th>Natural gas</th>
<th>Thermal storage</th>
<th>Cooling</th>
<th>Land area</th>
<th>Technology</th>
<th>Annual output</th>
<th>Power</th>
</tr>
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<tbody>
<tr>
<td>Up to 15% of generated energy</td>
<td>Molten salt; 4.5 hours</td>
<td>Water</td>
<td>~400 hectares Israel Land Authority land</td>
<td>Parabolic trough</td>
<td>~ 440 GWhr Equivalent to 60,000 households (Netanya)</td>
<td>121MW</td>
</tr>
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Technology – Parabolic Trough

Parabolic trough

Trough tracking the sun during the day from east to west
Turbine unloading
Financing
Financing Structure

**Equity 20%** - NIS 750M (Shikun & Binui, NOY Fund and TSK)

**Senior Debt 80%** – NIS 3B, provided by an international consortium:
Sustainability
Main Sustainability Aspects of the Project

**Local Content**
- Local “blue white” procurement (equipment, works, materials and services)

**Regional Development**
- Employment during construction >1,000 workers
- Employment during operation – 60 direct + 80 indirect
- Erection of a vantage point - a tourist attraction
- New infrastructures: NG, water, 161kw electricity line - facilitate development

**Dialog with Stakeholders**
- Dialog and regular contact
- Sharing information
- Status updates
- Problem solving
- advancing cooperation

**International Standards**
- The foreign banks impose standards in the fields of: environment, social, ecology and natural habitat, protection of workers’ rights

**Environmental Friendliness**
- A power station running on environmentally friendly solar energy
Preserving the Environment

• Dedicated staff on Site and on SPC level
• Monitoring noise by monthly noise inspections at Ashalim village
• Wetting internal and access roads to mitigate dust hazards
• Monitoring air station at Ashalim village
• Segregation and waste management
• Conducting emergency drills
• Monitoring and managing asbestos findings
• Environmental training to every worker
Preserving Ecology and Natural Habitat

• **28 animal crossings** along the perimeter fence
• **Diversion of Sde Pakoa Stream**
  • Maintaining the natural route
  • Preserving Top Soil (10cm)
  • Collecting animals prior to the commencement of the works
  • Collecting and removing invasive plants
• **Light pollution**
  • Zero light pollution outside the perimeter fence
  • Ecological lighting at the logistic area
• **Training workers** to identify and protect bird nests, and protected plants

![Image of a fox](image)
Stakeholders Engagement Main Activities

- Maintain regular contact
- Environmental development of Ashalim village through the utilization of NIS 7M
- Devolving and carrying-out a mutual Jewish-Bedouin sustainability educational program

- Maintain ongoing dialog with the settlement representatives
- Periodic newsletter and information package
- Site tours
- Reference to complaints and problem solving
- Mutual events

- Meeting with the leadership of the village
- Conducting a recruitment day in the village
- Currently 42 village residents are working for the project

- Periodic newsletter containing information on the status of the project to 14 Ramat HaNegev settlements
- Mutual visits and collaboration (Nitzana)

- Maintain regular contact and mitigate problems
Toda Raba!

Photo: G. Kavalerchik