Novatec’s patented solar steam generator technology is based on the principle of linear Fresnel reflection. It uses glass mirrors which are almost flat. During manufacturing, flat glass mirrors are bonded to a virtually flat structure. Sixteen (16) parallel lines of mirrors (primary reflectors) are arranged in such a way to reflect direct solar radiation to a secondary mirror and receiver which are mounted above the primary reflectors.

The energy efficiency of the solar steam generator has been proven at a demonstration plant. This plant has had its thermal output and efficiency measured by the DLR, the German Aerospace Center, a German Government research organisation.
Technology Description

Water is pumped through the collector absorber tube, generating steam directly.

Receiver showing steam generation at demonstration plant in Spain.
Novatec BioSol’s Uniqueness

Automated solar field component production system
- developed and patented for high-volume production of primary reflector mirror elements
- Automated system being commissioned at subcontractor’s facility in Germany
- Production line to be relocated to vicinity of future power plant; this will allow
  - utilization of local workforce
  - short-distance transport to site of bulky primary reflector elements

- Allows for rapid deployment of high quality and precision elements
- Uses local semi-skilled labor
- Ability to rapidly adapt to scale requirements in a modular fashion (140,000 m² of solar field for each 15 MW electricity produced)
1. **Improving Economic Benchmarks**
   - Fresnel collectors suitable for high-volume scalable production
   - Simplified system of concentrated solar steam generation

2. **Rapid Project Implementation**
   - Flexible high-volume production lines close to target markets
   - Meeting and exceeding economic targets even with 15 MW air-cooled power plants

3. **Client-friendly Partnership**
   - Provision of turn-key solar steam generators / power plants
   - Engineering support for system implementation
   - Supporting development with appropriate funding strategy
   - Long-term commitment through O&M capability

www.novatec-biosol.com
1. Completing high-volume production line (capable of producing primary elements for 25 MW per year) in South of Spain in March 2008, to be followed by additional production lines

2. Start-up of 2 MW Novatec solar thermal power plant in mid 2008

3. Novatec is developing CSP plants with a total capacity of 90 MW

4. Expand solar field production capacity in Spain initially to 110 MW per year by 2009
Scenario of implementation CSP technology by NOVATEC BioSol in Egypt

Calendar year | Number of production lines | Installed power capacity (GW) | Yearly installed power capacity (MW/a)
--- | --- | --- | ---
2007 | 2 | 0.1 | 34
2008 | 4 | 0.3 | 68
2009 | 8 | 0.6 | 204
2010 | 12 | 1.0 | 306
2011 | 16 | 1.5 | 408
2012 | 20 | 1.9 | 510
2013 | 24 | 2.3 | 612
2014 | 28 | 2.7 | 714
2015 | 32 | 3.1 | 816
2016 | 36 | 3.5 | 918
2017 | 40 | 3.9 | 1020
2018 | 44 | 4.3 | 1122
2019 | 48 | 4.7 | 1224
2020 | 52 | 5.1 | 1326
2021 | 56 | 5.5 | 1428
2022 | 60 | 5.9 | 1530
2023 | 64 | 6.3 | 1632
2024 | 68 | 6.7 | 1734
2025 | 72 | 7.1 | 1836
2026 | 76 | 7.5 | 1938
2027 | 80 | 7.9 | 2040
Job effect caused by implementation of NOVATEC BioSol’s CSP technology in Egypt

- More than 16,000 thousand new jobs within 20 years
- 6,000 thousand new jobs within 10 years

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### CSP Jobs

<table>
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<tr>
<th>Year</th>
<th>Local Suppliers</th>
<th>Transportation</th>
<th>O &amp; M Powerplants</th>
<th>Assembly of Solar Field</th>
<th>Indirect Stuff Fabrication</th>
<th>Shift Workers Fabrication</th>
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Novatec BioSol AG excels at providing highly efficient, low-cost solar fields for fully integrated solar thermal power stations and associated applications.