



Foster Wheeler Solar Power

Carbon Free Power Generation





FOSTER WHEELER IS
DEDICATED TO DELIVERING
INNOVATIVE CLEAN POWER
TECHNOLOGY

GO GREEN WITH SOLAR THERMAL POWER

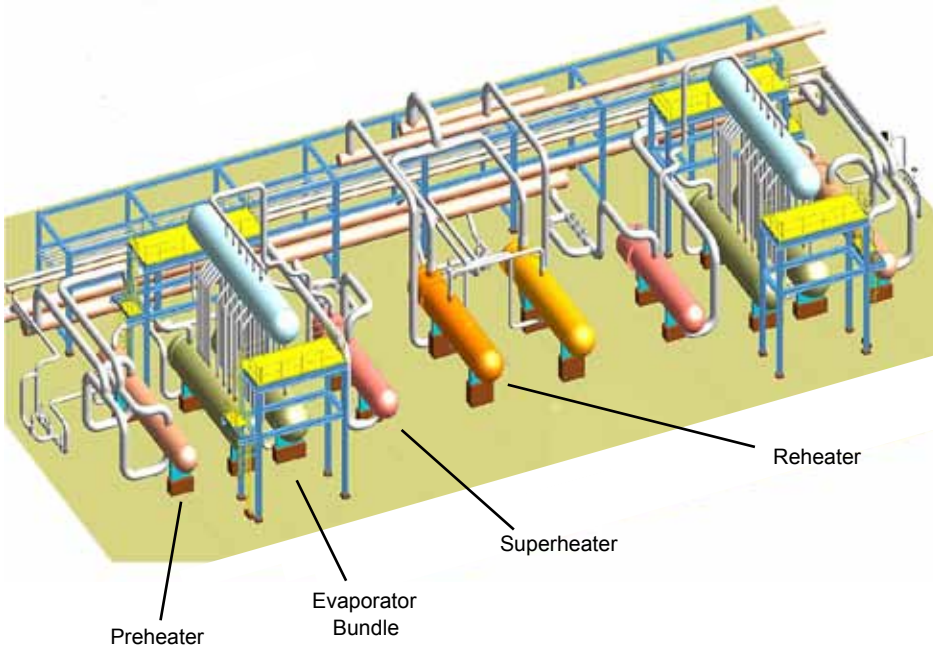
Foster Wheeler has been developing advanced solar thermal power technology since 1973 and has been involved with 40 thermal solar projects and studies for the US Department of Energy and major utilities.

Today, we offer a full line of steam generating equipment for all types of thermal solar plants. In addition to supplying individual steam cycle components like: feedwater heaters, preheaters, evaporators, superheaters, reheaters and condensers, we also offer the entire steam generating island on a turn-key basis.



ADVANCED STEAM GENERATING TECHNOLOGY FOR

Steam Generating Island Design



Steam Generating Island Consisting of 2 x 50 MWe Trains

We can provide individual steam generation components to fit your need:

- Preheater
- Kettle Evaporator
- Drum Evaporator
- Superheater
- Reheater
- Feedwater Heater
- Condenser
- Deareator

We can also supply the fully integrated steam generating island providing additional benefits:

- Integrated design, including piping, instrumentation and control system
- Homogenous design criteria
- Reliable and robust system with no weak links
- Optimized Boiler Protection System and DCS logic for smooth operation and control
- Single supplier for better project control
- All guarantees integrated under a single system by a single company

Foster Wheeler Solar Project Highlights



Gemasolar

Start-up Year: 2010
Customer: UTE Solar 3
Location: Sevilla, Spain
Capacity: 17 MWe
Plant Type: Tower with molten salt including storage
Scope: Design and supply of one 17MWe steam generating train consisting of preheater, steam generator (kettle type), superheater, and reheater, as well as 2 LP & 3 HP feedwater heaters



Valle 1 & 2

Start-up Year: 2011
Customer: Torresol Energy
Location: Cadiz, Spain
Capacity: 100 MWe
Plant Type: Trough with thermal oil
Scope: Design & supply of two 50 MWe steam generating trains consisting of preheater, steam generator (kettle type), superheater, and reheater as well as 6 LP & 4 HP feedwater heaters



CSP Plant in UAE

Start-up Year: 2011
Customer: Undisclosed
Location: Abu Dhabi, UAE
Capacity: 100 MWe
Plant Type: Trough with thermal oil
Scope: Design & supply of two 50 MWe steam generating trains consisting of preheater, steam generator (steam drum + evaporator bundle), and superheater

CONCENTRATED SOLAR THERMAL POWER PLANTS

Preheaters, Superheaters and Reheaters:



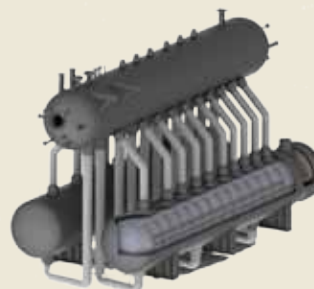
- Reliable and conservative design following FW Standards and complying with TEMA and ASME VIII Div. 1
- Designed for thermal and mechanical flexibility to ensure long life while enduring repeated start-ups, shutdowns and load changes

Kettle Evaporators



- Designed for steam generating trains below 30 MWe each
- Integrated Chevron dryers achieve high-quality saturated steam
- Conservative design throughout following FW standards

Steam Drum Evaporators



- Designed for steam generating trains above 30 MWe each
- Proven FW steam drum design backed by two million hours of operation
- Fully passive operation using the principle of natural circulation design (no pumps needed)



La Africana

Start-up Year: 2011
Customer: UTE La Africana
Location: Cordoba, Spain
Capacity: 50 MWe
Plant Type: Trough with thermal oil
Scope: Design & supply of one 50 MWe steam generating train consisting of preheater, steam generator (steam drum + evaporator bundle), superheater, and reheater as well as 4 LP & 6 HP feedwater heaters



Olivenza

Start-up Year: 2011
Customer: UTE Olivenza
Location: Badajoz, Spain
Capacity: 50 MWe
Plant Type: Trough with thermal oil
Scope: Design & supply for two 25 MWe steam generating trains consisting of preheater, steam generator (kettle type), and superheater as well as 4 LP & 6 HP feedwater heaters



USA CSP Plant

Start-up Year: 2012
Customer: Undisclosed
Location: USA
Capacity: Undisclosed
Plant Type: Trough with thermal oil
Scope: Complete boiler island supply of four steam generating trains consisting of preheater, steam generator (steam drum + evaporator bundle), superheater, and reheater

NEXT GENERATION SOLAR TECHNOLOGY



Solar Power Tower Technology with Thermal Storage

We have supplied the steam generating components to GemaSolar's solar plant in Sevilla, Spain. This plant utilizes SENER's control receiver system (CRS) technology which combines highly efficient solar power tower technology with molten salt storage, dramatically increasing the plant's daily electricity production beyond conventional solar technology. This demonstration plant is proving out the next generation for large scale solar power technology.

HIGH QUALITY, RELIABLE FOSTER WHEELER STEAM COMPONENTS TO ROUND OUT YOUR SOLAR PROJECT

Condensers

- Proven by over 300 Condensers operating at both thermal and nuclear plants worldwide
- Ranging from 50 - 600 MWe plant capacity
- Rectangular single, double or triple shell designs
- One or two passes
- Single or double pressure zones
- Down flow, axial flow or side inlet designs
- 10 - 12 months for D&S delivery



GTCC Loma La Lata

Start-up Year: 2010
Customer: Isolux
Location: Argentina
Capacity: 150 MWe
Plant Type: Combined Cycle
Scope: Design and supply of one axial condenser



Feedwater Heaters

- Proven by over 1,000 feedwater heaters operating at both thermal and nuclear plants worldwide
- Ranging from 50 - 1600 MWe plant capacity
- Vertical or horizontal designs for both LP and HP units
- 'U' Bent or Straight Tube Designs
- D&S delivery of 8-10 months



Andasol I & II

Start-up Year: 2008, 2009
Customer: Sener/Cobra
Location: Granada, Spain
Capacity: 2 x 50 MWe
Plant Type: Solar CSP trough with thermal oil
Scope: Design & supply of 6 LP and 4 HP feedwater heaters for each unit



Samcasol 1 & 2

Start-up Year: 2009, 2010
Customer: UTE (TSK + Maessa)
Location: Badajoz, Spain
Capacity: 2 x 50 MWe
Plant Type: Solar CSP trough with thermal oil
Scope: Design & supply of 6 LP and 4 HP feedwater heaters



We offer a full range of steam generator equipment, aftermarket products and services to the power, industrial, and waste-to-energy sectors. Our global manufacturing and engineering network can deliver cutting-edge products and expertise, quickly and cost competitively with best-in-class quality. Established in 1891, our experience comes from over a century of designing, servicing, and continually improving steam generating equipment.

Steam Generators

- Circulating Fluid Bed
- Pulverized Coal
- Oil & Gas
- Supercritical Steam
- Solar Power
- Package
- Grate & MSW
- Metallurgical Waste Heat
- Heat Recovery Steam Generators

Auxiliary Equipment

- Feedwater Heaters
- Condensers
- Biomass Gasifiers

Steam Generator Services

- SCR and SNCR Systems
- Low NO_x Combustion Systems
- Replacement/Upgraded Parts
- Construction Services
- Modernizations

CONTACT US

GLOBALLY

www.fwc.com

CHINA

Unit 1 on 6/F
Raffles City Beijing Office Tower
No. 1 Dongzhimen South Street
Dongcheng District
Beijing, 100007 China
T +86 (0) 10 8409 8855

8th & 5th Floor, UC Tower
500 Fushan Road
Pudong New Area
Shanghai, 200122 China
T +86 (0) 21 5058 2266

FINLAND

Metsänneidonkuja 8
FI-02130 Espoo, Finland
T +358 (0) 10 393 11

Relanderinkatu 2
FI-78201 Varkaus, Finland
T +358 (0) 10 393 11

GERMANY

Hessenstrasse 57
47809 Krefeld, Germany
T +49 (0) 2151 363 3710

POLAND

Aleja Jana Pawla II 15
00-828 Warsaw, Poland
T +48 (0) 22 697 6870

ul. Staszica 31
41-200 Sosnowiec, Poland
T +48 (0) 32 368 1300

SPAIN

Calle Gabriel Garcia Márquez, 2
28230 Las Rozas
Madrid, Spain
T +34 (0) 91 336 2400

SWEDEN

Lindövägen 75
602 28 Norrköping, Sweden
T +46 (0) 11 285 330

THAILAND

9th Floor, Maneeya Building
518/5 Ploenchit Road
Lumpini, Pathumwan
Bangkok 10330, Thailand
T +66 (0) 2 652 0760

USA

53 Frontage Road
PO Box 9000
Hampton, New Jersey 08827 USA
T +1 (1) 908 730 4000

9780 Mt. Pyramid Court, Suite 260
Englewood, Colorado 80112-7060 USA
T +1 (1) 303 784 4880