CONCEPT

Concentrated Solar Power (CSP) Plants Course: Parabolic Trough, Solar Tower and Molten-Salt Storage

29 March – 2 April 2027
Dubai - Five-star CBD venue



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Ref: 1613_25705 **Date:** 29 March – 2 April 2027 **Location:** Dubai - Five-star CBD venue **Fees:** 19500 SAR

Introduction:

Concentrated Solar Power CSP Plants, covering parabolic trough, solar tower and molten-salt storage, is the subject of this 1-week course for thermal, mechanical and power plant engineering and operations staff, ending with a CSP Plant Configuration, Storage Sizing and O&M Plan. Solar thermal plants underdeliver when the solar multiple and storage hours are mismatched, heliostat and trough fields lose reflectivity to dust, and molten salt circuits freeze or degrade during transients. Nominees already work on thermal power or solar projects, and teaching is by modelling build on case plant data. CoreConcept Training Center delivers this Concentrated Solar Power course.

Course Objectives:

- Compare parabolic trough, solar tower and linear Fresnel plants on direct normal irradiance needs, temperatures and dispatchability
- Assess a site's direct normal irradiance data and desert constraints of dust, ambient heat and water availability
- Select collector field layouts, receivers and heat transfer fluids for a defined plant duty
- Size two-tank molten salt storage and the solar multiple against power block rating and evening dispatch
- Simulate annual plant yield and set O&M routines for mirror washing, freeze protection and cooling water
- Configure a CSP and PV hybrid or integrated solar combined cycle option for a case organisation

Target Audience:

- Thermal and mechanical engineers who specify collector fields, receivers, storage tanks and steam generators
- Power plant engineers who run steam cycles and want to integrate solar heat into a power block
- Project developers who screen sites and compare solar thermal against other generation options
- Owner's engineers who review contractor designs, yield estimates and performance tests for solar thermal plants
- Operations and maintenance staff who plan mirror cleaning, salt circuit care and cooling water use

Course Outline:

Day 1: CSP Technology Landscape and Solar Resource

- Parabolic Trough, Solar Tower and Linear Fresnel Collector Comparison
- Direct Normal Irradiance Ground Measurement and Satellite Data Sets
- Typical Meteorological Year Files for CSP Site Screening
- Dispatchability and Capacity Factor Metrics Versus Photovoltaic Generation
- Desert Site Constraints Covering Dust, Ambient Heat and Water

Day 2: Collector Fields, Receivers and Heat Transfer Fluids

- Parabolic Trough Loop Layout with Receiver Tubes and Drives
- Heliostat Field Layout with Cosine, Blocking and Shading Losses
- Central Receiver Design with Flux Limits and Aiming Strategy
- Synthetic Thermal Oil, Solar Salt and Direct Steam Fluids
- IEC 62862 Series Terminology for Solar Thermal Electric Plants

Day 3: Thermal Energy Storage, Power Block and Performance Modelling

- Two-Tank Molten Salt Storage Sizing in Storage Hours
- Solar Multiple Selection Against Power Block Rating and Dispatch
- Steam Generator Train and Rankine Cycle Power Block Integration
- System Advisor Model Annual Yield Simulation for CSP Plants
- Dispatch Schedule Design for Evening Peak Demand Coverage

Day 4: O&M Risks, Water Use and PV Hybridisation

- Mirror Washing Strategy and Reflectivity Monitoring in Dusty Sites
- Molten Salt Freeze Protection with Heat Tracing and Drain-Back
- Dry Air Cooling Versus Wet Cooling Water Consumption Trade-Off
- CSP and PV Hybrid Plant Configuration for Round-the-Clock Supply
- Integrated Solar Combined Cycle Concept and Fuel Saving Assessment

Day 5: Modelling Build for a Case CSP Plant

- Case Site DNI File and Demand Profile Briefing
- Case Collector Technology and Heat Transfer Fluid Selection
- Case Storage Hours and Solar Multiple Sizing Model
- Case Mirror Cleaning, Cooling and Spare Parts Schedule
- CSP Plant Configuration, Storage Sizing and O&M Plan Completion

Skills You Will Gain:

- Direct Normal Irradiance Assessment
- Heliostat Field Layout
- Heat Transfer Fluid Selection
- Molten Salt Storage Sizing
- Solar Multiple Optimisation
- Solar Thermal Yield Simulation
- Mirror Soiling Management
- Hybrid Plant Configuration

Why Attend This Course:

- Deliver a CSP Plant Configuration, Storage Sizing and O&M Plan to the project development lead and the plant operations manager
- Choose between trough, tower and Fresnel technology and set storage hours with evidence from an annual simulation
- Avoid oversized collector fields, salt freeze events and cooling water shortfalls that erode plant output
- Brief colleagues in development, finance and operations on how thermal storage makes solar output dispatchable

Conclusion:

Back at work, the participant hands the CSP Plant Configuration, Storage Sizing and O&M Plan to the project development lead and the plant operations manager, who use it to choose the collector technology, set storage hours and the solar multiple, and budget mirror washing, cooling water and spare parts. Owner's engineers can test contractor yield claims against its annual simulation. After the first operating season or the first design review, the unit should compare measured field reflectivity, storage cycling and dispatched energy with the plan and update its assumptions.

Frequently Asked Questions FAQ:

What should participants know before a concentrated solar power plants course?

Participants should understand basic thermodynamics, steam cycles and power plant terms, and already work on thermal power, solar or energy projects. Bringing resource data or a plant description from their own organisation makes the modelling build more useful.

How does a concentrated solar power plants course differ from a solar PV plant design course?

It concentrates on mirror fields, receivers, heat transfer fluids, molten-salt storage and steam power blocks that turn sunlight into heat first. A photovoltaic course covers modules, strings, inverters and DC electrical design instead.

Why do concentrated solar power plants use molten-salt thermal storage?

Molten-salt storage holds collected heat in a hot tank so the power block can keep generating after sunset. This dispatchability lets plants cover evening demand peaks, the main advantage of concentrated solar power over solar generation without storage.

What do participants take back from the concentrated solar power plants course?

Participants take back a CSP Plant Configuration, Storage Sizing and O&M Plan: a technology selection, a storage hours and solar multiple model, an annual yield simulation, and mirror washing, cooling and freeze protection schedules ready to apply to their own project.