

ESMAP Solar Learning Event on Large-Scale Solar Energy 2019 Ouarzazate, Morocco.

**Federal Commission of Electricity
MEXICO**

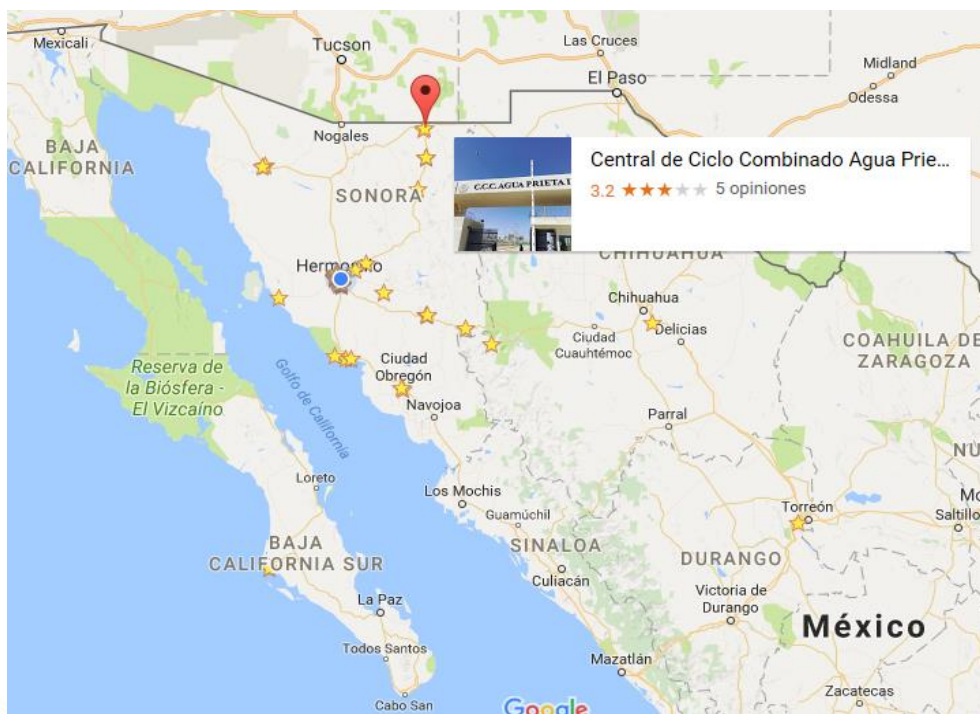
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Combined Cycle Plant Agua Prieta II integrated with concentrate solar power (CSP), or Solar Thermal for electricity generation (STEG),

The **Combined Cycle Plant Agua Prieta II** integrated with concentrate solar power (CSP), based on Solar Thermal for electricity generation (**STEG**), is located in the area called Ejido Agua Prieta located in the North part of Mexico. In this place we have excellent conditions of solar radiations.



Power Installed
409.1 MW

Gas Turbine U1 = 129.4 MW

Gas Turbine U2 = 129.4 MW

Steam Turbine U3 = 150.3 MW

CSP = 14 MW (thermal energy)

Rational of choosing CSP technology in this Project

Since the beginning, the technology for the project was defined by using a Combined Cycle, therefore, the best technology and the one that best adapted to a Combined Cycle was the CSP, for its contribution as thermal energy (steam).

It is also important to mention that the project is located in the solar belt of the best radiation in the global geographical area located on the northern border of Mexico.

The contribution of steam to the combined cycle fulfilling the delivery conditions indicated in the technical specifications defined on the Contract, has been a success, obtaining a contribution of steam of up to 16 thermal MW, having 100% of the Solar Field available.

Combined Cycle Plant Agua Prieta II integrated with concentrate solar power (CSP), or Solar Thermal for electricity generation (STEG),

Investment and Financing

CONCEPT	CONTRACTOR / BUILDER	
Combine Cycle &	SENER Ingeniería y Sistemas S.A. / ELEC NOR S.A. / Proyectos Eléctricos Agua Prieta (PEAP) S.A.P.I. de C.V.	\$ 251.6 MUSD
Turbines (gas & steam)	MITSUBISHI Power Systems Americas, Inc. (MPSA)	\$ 108.6 MUSD
Solar Field	ABENER Energía S.A./ABENGOA Solar S.A./Teyma Gestión de Contratos de Construcción e Ingeniería S.A	\$ 46.16 MUSD * (Wold Bank Donation)
	Total	\$ 406,484,163.00 USD

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Capacity	Cost	Project Status	100%	Diciembre 17 2017
14 MW	46 MDD			
Operation Mode				

The CSP Project is associated with the Agua Prieta II Combined Cycle Power Plant with a **thermal energy** input of **14 Mega-Watts (MW)**, using a Solar Collector System (1,248 Cylindrical Parabolic Concentrator Modules) and equipment and thermal transfer fluid (HTF), with the purpose of taking advantage of the solar radiation and the facilities of the Power Plant to increase the Electricity Generation with a sustainable source of Energy

PARABOLIC TROUGHS or CYLINDRICAL PARABOLIC COLLECTOR



Effective Area of Solar Concentration:

8.1 hectares

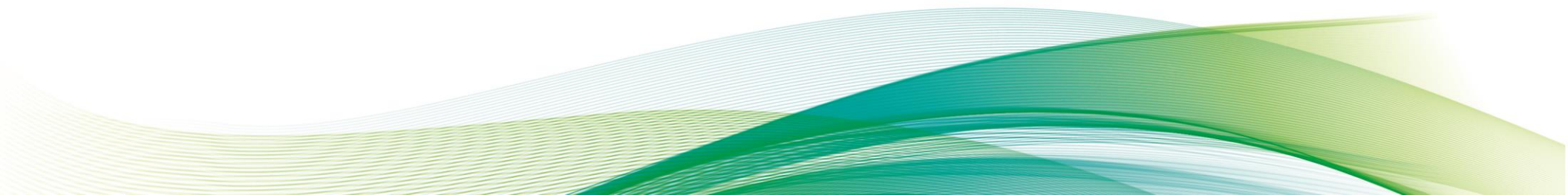


THERMOSOLAR POWER BLOCK



Achievements.

With the integration of the CSP technology to the Combined Cycle, 24,500 cubic meters of natural gas per day won't be consumed in the Gas Turbine, during the effective hours of operation with solar radiation, and 16,759 tons of CO₂ emissions into the atmosphere per year will be avoided.



FINAL REVIEW

Mexico has a goal in terms of renewable energies: by 2024, it expects 35% of electricity produced in the country to come from clean sources.

Currently the country has an installed capacity of 36.8 megawatts (MW) in solar projects, mainly for rural and industrial electrification.

Mexico is one of the five countries in the world with the greatest attraction to invest in solar energy, Mexico's geographic location allows the development of these projects.

However, Mexico's potential in this area, lower costs and greater financing capacity can make Mexico achieve this goal .

Thank you for your attention

