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Hybrid solar-gas plant in Hassi R’Mel, Algeria

Hybrid solar-gas plant in Ain Beni Mathar, Morocco
Abengoa’s answer
Pioneers in developing the first and largest hybrid solar-gas plants in the world

Abengoa bases its competitive advantage in the solar energy sector on a vertical integration business model. Abengoa participates in the value chain from the initial phase, the promotion and financing of the company projects, through the main nucleus of the project, the engineering and construction, concluding in the operation and maintenance of the projects that it develops. This model makes Abengoa the only company able to offer the best solutions for each client’s needs, with highly competitive deadlines, budgets and benefits. Abengoa also offers turn-key projects for third parties, as well as the sales of separate components.

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**Integrated Solar Combined Cycle**  
**Sustainability and efficiency**  

Sustainability and efficiency increase when hybrid solar-gas plants are used. The fuel is burned in the combustion chamber of the gas turbine, and the exhaust gases are captured in a heat recovery boiler. The steam generation capacity of this arrangement increases the efficiency of the plant, resulting in subsequent fuel savings and reduction in greenhouse gas emissions, as well as lower operating costs and the overall cost of solar thermal electricity.

**Technology**  
**Environmental and economic benefits**  

Hybrid solar-gas plants work in a similar way to conventional combined cycle plants. The fuel is burned in the combustion chamber of the gas turbine. The exhaust gases from the combustion chamber are then combined with the heat from the solar field, either parabolic trough or tower technology. This increases the steam generation capacity, resulting in subsequent fuel savings and reduction in greenhouse gas emissions, as well as lower operating costs and the overall cost of solar thermal electricity.

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- **Abengoa, in its efforts to provide solutions for sustainable development and offer products that fit the needs of each client, develops hybrid solutions with a combined cycle plant.** The solar ISCC technology is a hybrid solution that combine solar thermal energy with conventional technologies. Specifically, Abengoa offers hybrid plants such as natural gas combined cycle (IGCC: Integrated Solar Combined Cycle), or with conventional coal plants (IGCoal, Integrated Solar Coal). In both cases, hybrid plants can either be added to existing conventional plants or the possibility to hybridize an already existing conventional plant by adding a solar field.

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  - **Hassi R’Mel**
    - The first Independent Power Producer hybrid solar-gas plant worldwide
    - 150 MW (20 MW solar field)
    - 22,000 t/year of CO₂ avoided
    - Algeria
    - Operation in 2011

  - **Ain Beni Mathar**
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    - 470 MW (20 MW solar field)
    - 33,000 t/year of CO₂ avoided
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  - **Agua Prieta II**
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Innovative technology solutions for sustainability

Integrated Solar Combined Cycle

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