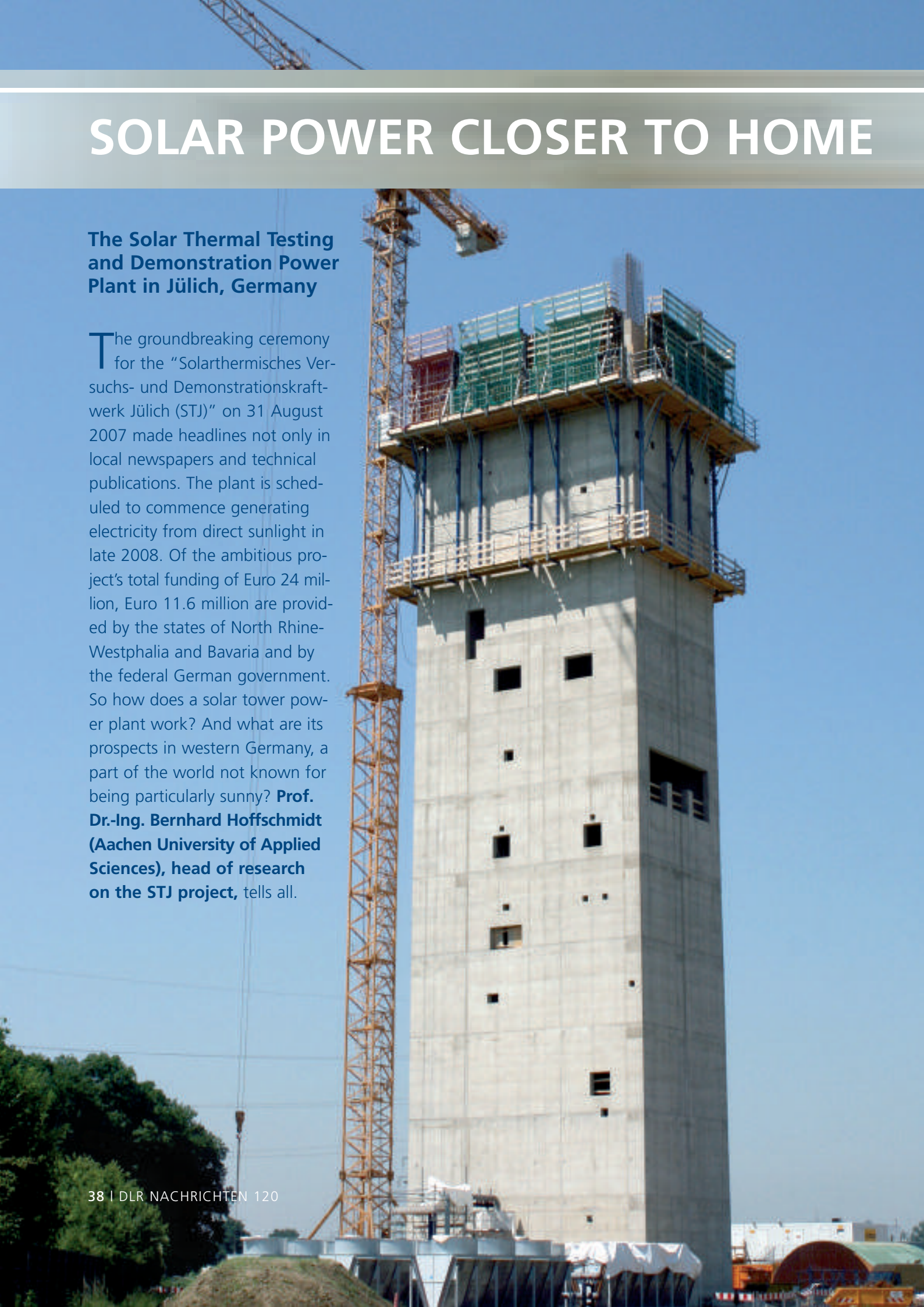
SOLAR POWER CLOSER TO HOME

The Solar Thermal Testing and Demonstration Power Plant in Jülich, Germany

The groundbreaking ceremony for the "Solarthermisches Versuchs- und Demonstrationskraftwerk Jülich (STJ)" on 31 August 2007 made headlines not only in local newspapers and technical publications. The plant is scheduled to commence generating electricity from direct sunlight in late 2008. Of the ambitious project's total funding of Euro 24 million, Euro 11.6 million are provided by the states of North Rhine-Westphalia and Bavaria and by the federal German government. So how does a solar tower power plant work? And what are its prospects in western Germany, a part of the world not known for being particularly sunny? **Prof. Dr.-Ing. Bernhard Hoffschmidt (Aachen University of Applied Sciences), head of research on the STJ project,** tells all.



Virtual institute uses solar power plant for process research

To further cement DLR's leading international position in the field of solar thermal power generation, a joint virtual institute has been formed by DLR, Solar Institut Jülich, several institutes of RWTH University Aachen, and a Belgian university, with the aim of creating a computer programme for calculating the highly dynamic processes that occur in solar thermal power plants. This is expected to generate many new insights that will further help to reduce the costs of solar-based power production.

In the flat region around Jülich, this "sun tower" will be a prominent feature on the horizon. As soon as the sun peeps through the clouds, the plant's array of mirrors – "heliostats" – focus the sunlight onto the top of the tower. The mirrors automatically track the course of the sun. The heart of the solar plant is the energy receiver at the top of the tower. This draws in air from outside and from the exhaust cycle, and heats it up to 700 degrees Celsius. This hot air is used to generate steam, which in turn is used to drive a turbine. In the last stage, a generator converts the rotational energy of the turbine into electricity.

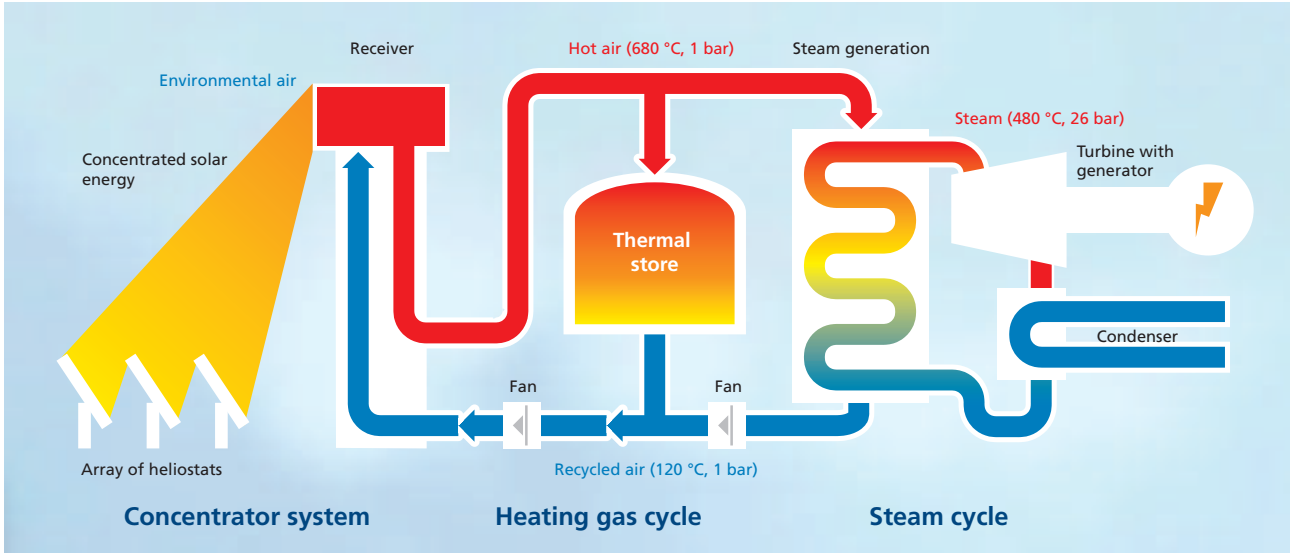
The integration of a thermal store, which is being developed at the DLR Institute of Technical Thermodynamics, permits the generator stage to be decoupled from the solar energy inlet, thereby eliminating the need for a fossil-fuel-based backup system (as necessary in plants based on wind power or photovoltaics). Running this plant with ambient air is making its operation simple and reliable and thanks to the high process temperatures achieved, the plant is very efficient, too.

This technology is based on 15 years of research and development, starting with the DLR solar furnace and continued in individual component testing systems at the Plataforma Solar de Almería (PSA). As the leading developer, DLR holds several patents on the technology, which were licensed to Kraftanlagen München (KAM) in 2004. DLR supported the construction of a first demonstration plant by Aachen University of Applied Sciences's Solar-Institut Jülich (SIJ) and KAM.

The testing and demonstration plant in Jülich is designed for an output of 1.5 megawatts electrical (MWel). It belongs to a public-private partnership consisting of KAM as general contractor, Stadtwerke Jülich (public utility company) as operator, and DLR and SIJ as scientific partners. The size of the plant has been designed so that its operating and construction parameters can be translated to large-size systems around the world that produce up to 100 MWel. As DLR's prime licensee and the project's general contractor, KAM will handle all international marketing of the technology. As part of the development and construction of the Jülich testing plant, DLR and SIJ have the exclusive right to conduct research and development activities at the plant.

The possibility of running R&D projects in a real-world power plant that is practically just around the corner is of great strategic importance to DLR.

The solar thermal power plant in Jülich will serve as a benchmark for future commercial projects in the solar energy markets of southern Europe and northern Africa.



Flow chart of the processes in a solar thermal power plant