

DEVELOPMENT OF AN INTEGRATED SOLAR AND FOSSIL FUEL POWERED STEAM GENERATION SYSTEM FOR INDUSTRIAL APPLICATIONS

VISSMANN

- One of the world's leading international manufacturers of heating systems
- Staff approx. 10,600 employees
- Generates 1.89 billion € in annual group turnover
- Development, design and manufacturing of steam boilers since 1962

INDUSTRIAL SOLAR

- The leading manufacturer of Fresnel process heat collectors
- Turnkey provider of solar process heat and solar cooling systems
- Eight years operating experience with its systems

DLR INSTITUTE FOR SOLAR RESEARCH

- Germany's largest research unit for the exploration and development of concentrating solar systems
- 30 years experience
- Projects on direct steam generation with concentrating solar collectors since 1992.

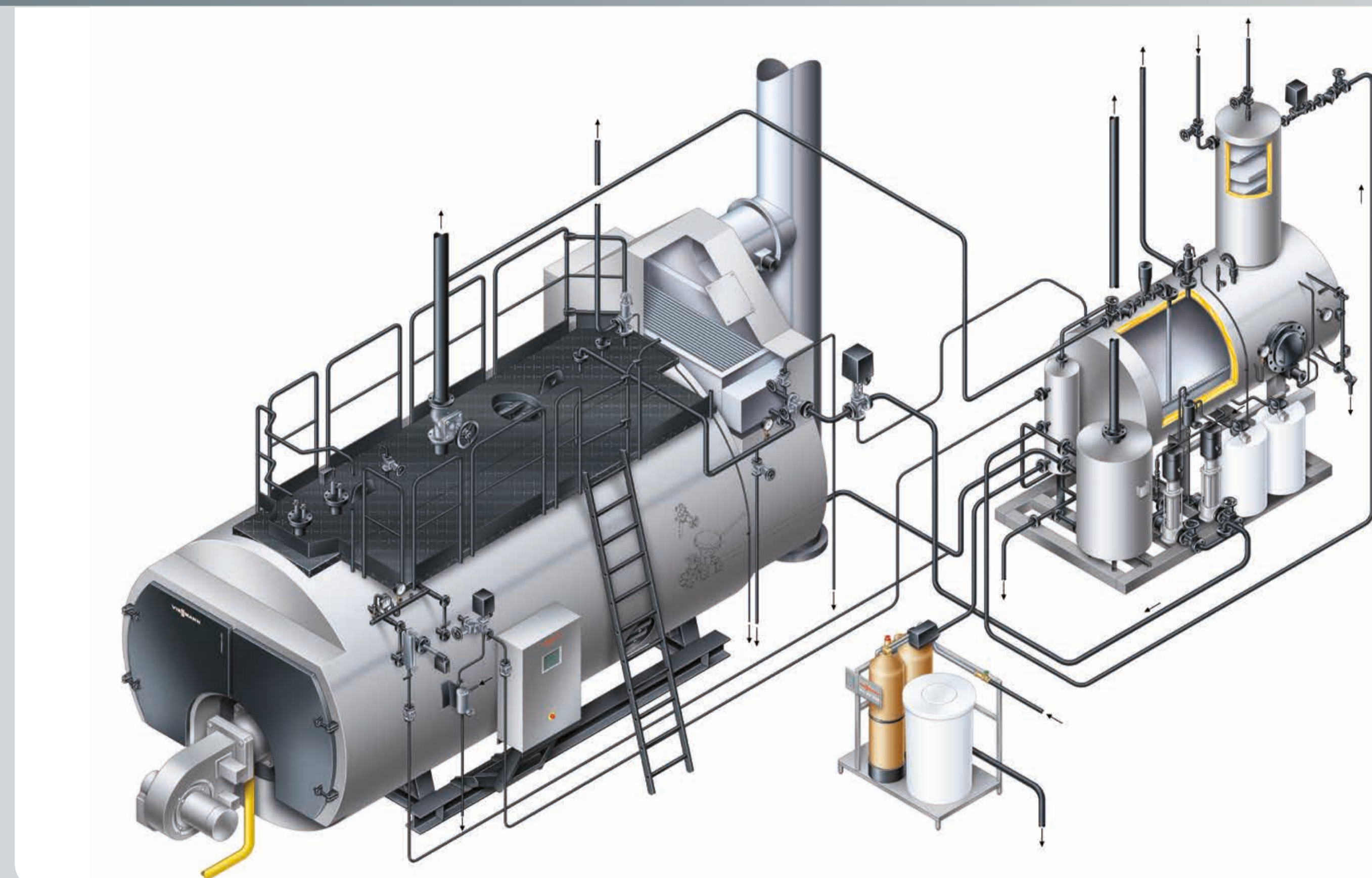
STANDARDIZED INTEGRATED SYSTEM FOR "SOLAR & FOSSIL FUEL" GENERATED PROCESS STEAM

To this day solar technologies do not cover a significant share of the industrial steam demand, even though concentrating solar collectors are market available, are well capable of reaching the required operating temperatures and can generate steam directly. Besides the fact that fossil fuels and emission permits are still inexpensive, further reasons for the lacking market penetration of solar thermal technologies for industrial process heat applications are the lack of awareness within industry, that such technologies exist and the lack of standard solutions. Currently every solar process heat system must be custom tailored and integrated into the fossil fuel fired heat source of the system. This can be considerably costly for engineering services and approval, leaving the customer with technical risks.

Therefore Viessmann, a leading provider of industrial steam boilers, and Industrial Solar, a renowned manufacturer of linear Fresnel collectors and turnkey provider of solar process heat systems, have joined forces to develop a standardized solar and fossil fuel powered steam generation system for industrial applications. The two industrial partners are being supported by DLR, the national aerospace center of Germany. Its Institute for Solar Research focuses on concentrating solar thermal technologies and has long standing experience in the fields of direct steam generation and process heat systems, along with their practical applications. This development is funded by the Federal Ministry for the Environment under the project title "SolSteam" and will form the basis for product development.

VISSMANN STEAM BOILERS

- High efficiency and low emissions
- High steam purity
- Minimized use of refractory materials provides less wear and tear
- Symmetrical boiler design for reduced thermal stress and longer lifetime



ISG LF-11 PROCESS HEAT COLLECTOR

- Fresnel collector with uniaxially tracked mirrors focusing the sunlight on a vacuum absorber tube
- Operating temperatures up to 400°C
- Precise and reliable temperature and power control
- Direct steam generation

OUTLOOK

- Development and design of a hybrid solar and fossil fuel driven steam generation system
- Installation of a pilot system for an industrial customer in 2014
- Monitoring by DLR until 2016
- Optimization and product development



Dr. BERND HAFNER,	Viessmann Werke GmbH & Co. KG, Allendorf / Germany,	Tel. +49 6452 701583, DrHf@viessmann.com
OLAF STOPPOK,	Viessmann Werke Berlin GmbH, Berlin / Germany,	Tel. +49 30 6602457, StoO@viessmann.com
CHRISTIAN ZAHLER,	Industrial Solar GmbH, Freiburg / Germany,	Tel. +49 761 76711144, christian.zahler@industrial-solar.de
MICHAEL BERGER,	Industrial Solar GmbH, Freiburg / Germany,	Tel. +49 761 76711147, michael.berger@industrial-solar.de
KLAUS HENNECKE,	DLR – Institut für Solarforschung, Köln / Germany,	Tel. +49 2203 6013213, klaus.hennecke@dlr.de
DIRK KRÜGER,	DLR – Institut für Solarforschung, Köln / Germany,	Tel. +49 2203 6012661, dirk.krueger@dlr.de