



Siemens Post-Combustion CO₂ Capture Technology

for combined cycle and steam power plant applications

Answers for energy.

SIEMENS



Siemens technology for post-combustion CO₂ capture

Development of post-combustion CO₂ capture process

To achieve the global CO₂ emission reduction targets, several measures need to be taken simultaneously:

- Increase efficiency of fossil power plants
- Develop CCS¹⁾ technology with low energy demand
- Offer capture-ready and retrofit solutions for power plants

Siemens develops a proprietary post-combustion capture process that is designed for both new steam power plants and retrofit of existing power plants with a CO₂ capture plant. The Siemens CO₂ capture process features several significant advantages compared to the common MEA²⁾ process and will be optimally integrated in the power plant.

For retrofit solutions, Siemens develops capture-ready design for power plants that enables or facilitates later integration of a CO₂ capture plant.

Siemens Reference Steam Power Plants are offered in capture-ready design with different options to consider project-specific requirements.

The whole chain from process and model development to engineering and construction is mastered through the synergies with Siemens chemical engineering know-how at Hoechst Industrial Park. Moreover, Siemens Energy runs a fully-automated lab plant for CO₂ capture there.



¹⁾ Carbon Capture and Storage

²⁾ Monoethanolamine

In-house competencies for steam power plants with CO₂ capture

Siemens can provide technology along the whole process chain from power generation to flue gas cleaning and CO₂ scrubbing as well as CO₂ compression for pipeline transport.

Therefore, Siemens is an ideal partner for the implementation of power plant solutions with CCS.

Examples of Siemens in-house technology applicable for steam power plants with CO₂ capture:

Reference Power Plants



SSP5-6000

Data (without CSS):

Gross plant output	600 MW
Efficiency	46% *
Steam turbine	SST5-6000
Generator	SGen5-3000W

BENSON® once-through boiler (tower type):

- HP 285 bar/600 °C
- IP 60 bar/620 °C
- LP 5.5 bar/269 °C

* depending on ambient conditions

Environmental Systems & Services



Air pollution control systems:

- Flue gas desulfurization
- Electrostatic precipitators
- Fabric filters

Advanced burner technologies:

- NO_x and ancillary products

Parts and Service:

- Replacement parts
- Inspections
- Upgrade service
- Boiler service

Chemical processes and CO₂ capture technologies



Field of work:

Simulation, evaluation, development and optimization of chemical processes for power plants – focus on CO₂ capture.

Software and tools:

- Comprehensive chemical databases
- Established forefront process simulation and design tools

Laboratory:

- Small pilot plant for CO₂ capture
- Equipment for measurement of physical properties of substances

Pilot plant:

- Pilot plant at E.ON's coal-fired power plant Staudinger, operated by Siemens since 2009

CO₂ compression solutions



CO₂ compressor details

Volume flow:	52,500 m ³ /h
Suction pressure:	1.05 bar
Discharge pressure:	61.55 bar
Suction temperature:	20.8 °C
Compressor type:	STC-GV

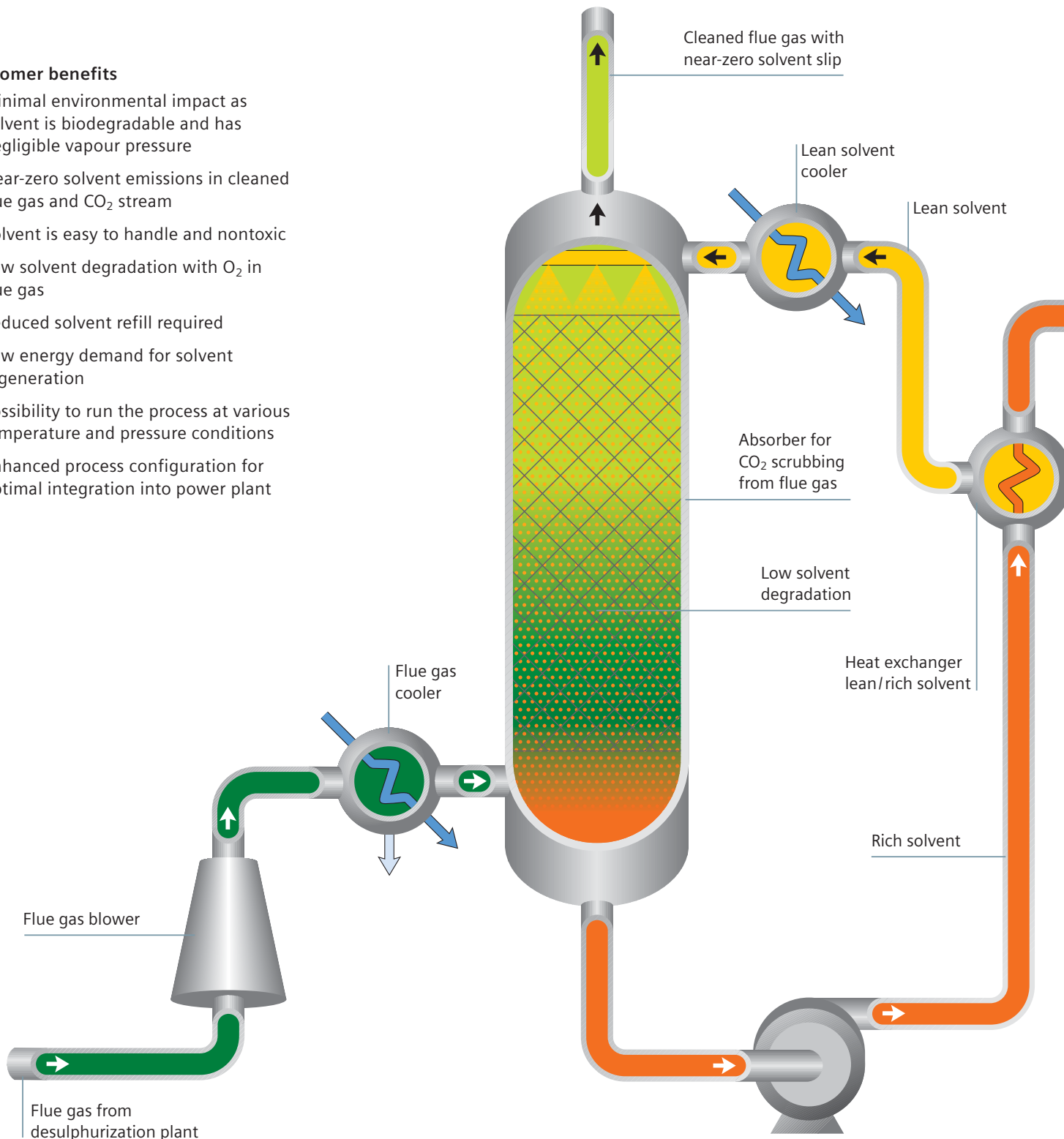
Driver:	Electric motor (12 MW)
Start of operation:	April 2008
Compressor type:	Radial
Reference projects:	Ningxia, China Snohvit/Hammerfest, Norway

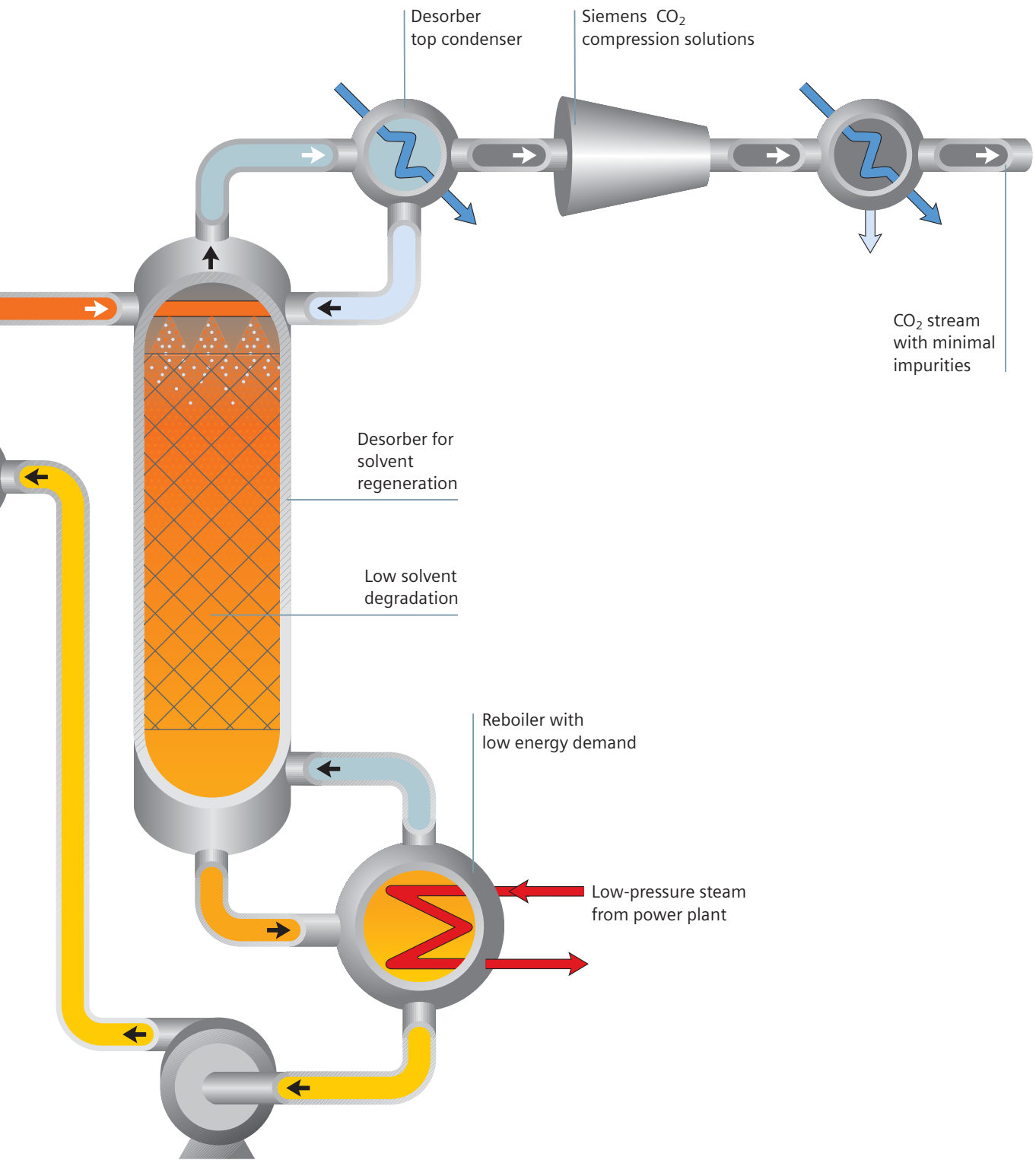
Major advantages of the Siemens post-combustion CO₂ capture process

Low environmental impact and reduced auxiliary energy need through use of aminoacid salt solution and optimized process set-up

Customer benefits

- Minimal environmental impact as solvent is biodegradable and has negligible vapour pressure
- Near-zero solvent emissions in cleaned flue gas and CO₂ stream
- Solvent is easy to handle and nontoxic
- Low solvent degradation with O₂ in flue gas
- Reduced solvent refill required
- Low energy demand for solvent regeneration
- Possibility to run the process at various temperature and pressure conditions
- Enhanced process configuration for optimal integration into power plant





Published by and copyright © 2010:
Siemens AG
Energy Sector
Freyeslebenstrasse 1
91058 Erlangen, Germany

Siemens Energy, Inc.
4400 Alafaya Trail
Orlando, FL 32826-2399, USA

For more information, please contact
our Customer Support Center.
Phone: +49 180 524 70 00
Fax: +49 180 524 24 71
(Charges depending on provider)
E-mail: support.energy@siemens.com

Fossil Power Generation Division
Order No. E50001-W220-A104-V1-4A00
Printed in Germany
Dispo 05400, c4bs No. 7801
TH 214-100352 WS 04101.5

Printed on elementary chlorine-free
bleached paper.

All rights reserved.
Trademarks mentioned in this document
are the property of Siemens AG, its affiliates,
or their respective owners.

Subject to change without prior notice.
The information in this document contains
general descriptions of the technical options
available, which may not apply in all cases.
The required technical options should therefore
be specified in the contract.