



**SIEMENS**

# SGT-8000H Product Line Actual Update



**IENE**  
30–31 October, 2012

Michail S. Kioumourtzidis  
Siemens AE, Energy Sector

© Siemens AG 2012  
Energy Sector

# Agenda

**Introduction / Siemens Fleet**

**SGT5-8000H / Milestones**

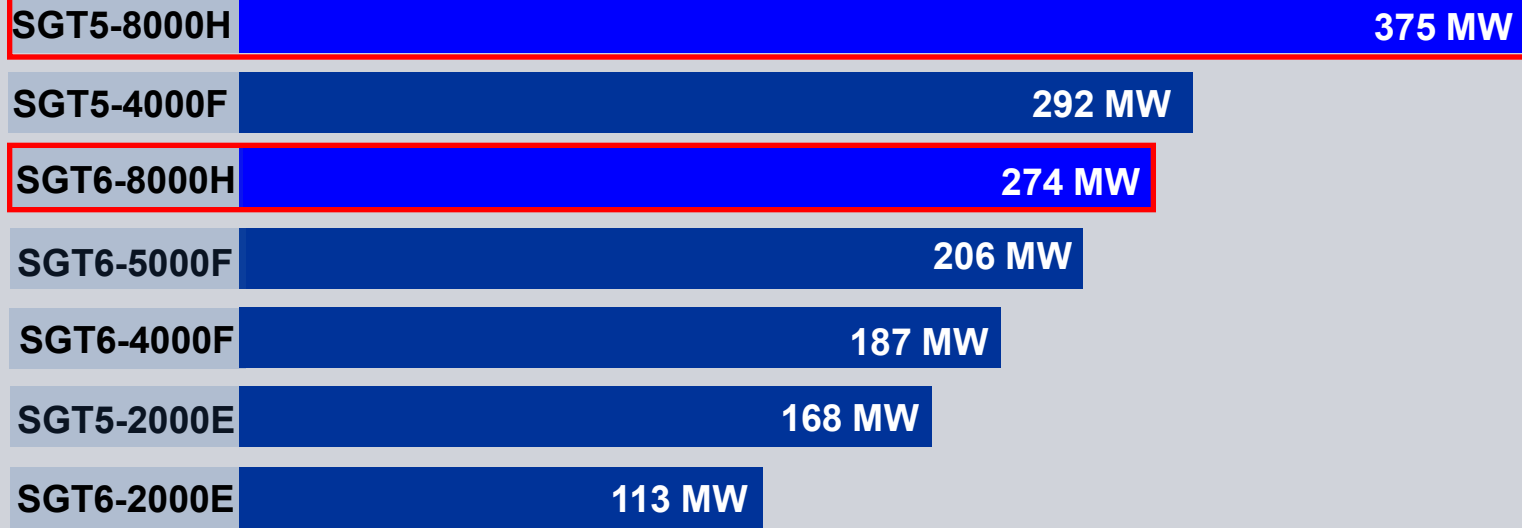
**SGT5-8000H / Irsching 4**

**Update on Further Projects**

**Conclusion**

# Large-scale Siemens Gas Turbine Portfolio for 50 and 60 Hz

**SIEMENS**



SGT5-8000H  
04/2007



SGT6-8000H  
01/2011



Direct scale  
(50 / 60 Hz)

# Agenda

**Introduction / Siemens Fleet**

**SGT5-8000H / Milestones**

**SGT5-8000H / Irsching 4**

**Update on Further Projects**

**Conclusion**

# SGT5 – 8000 H

## Major Milestones



- **Program Launch – Concept Phase** **Oct. 2000**
- **Gate 1 : Product Strategy** **Mar. 2001**
- **Gate 2 : Start Basic Design (GT)** **Nov. 2001**
- **Gate 3 : Product Release (GT)** **Aug. 2004**
- **1st engine shipment ex Works Berlin** **April 2007**

## **Agenda**

**Introduction / Siemens Fleet**

**SGT5-8000H / Milestones**

**SGT5-8000H / Irsching 4**

**Update on Further Projects**

**Conclusion**



# Irsching Units 1 – 5

owned by E.ON Kraftwerke

**SIEMENS**

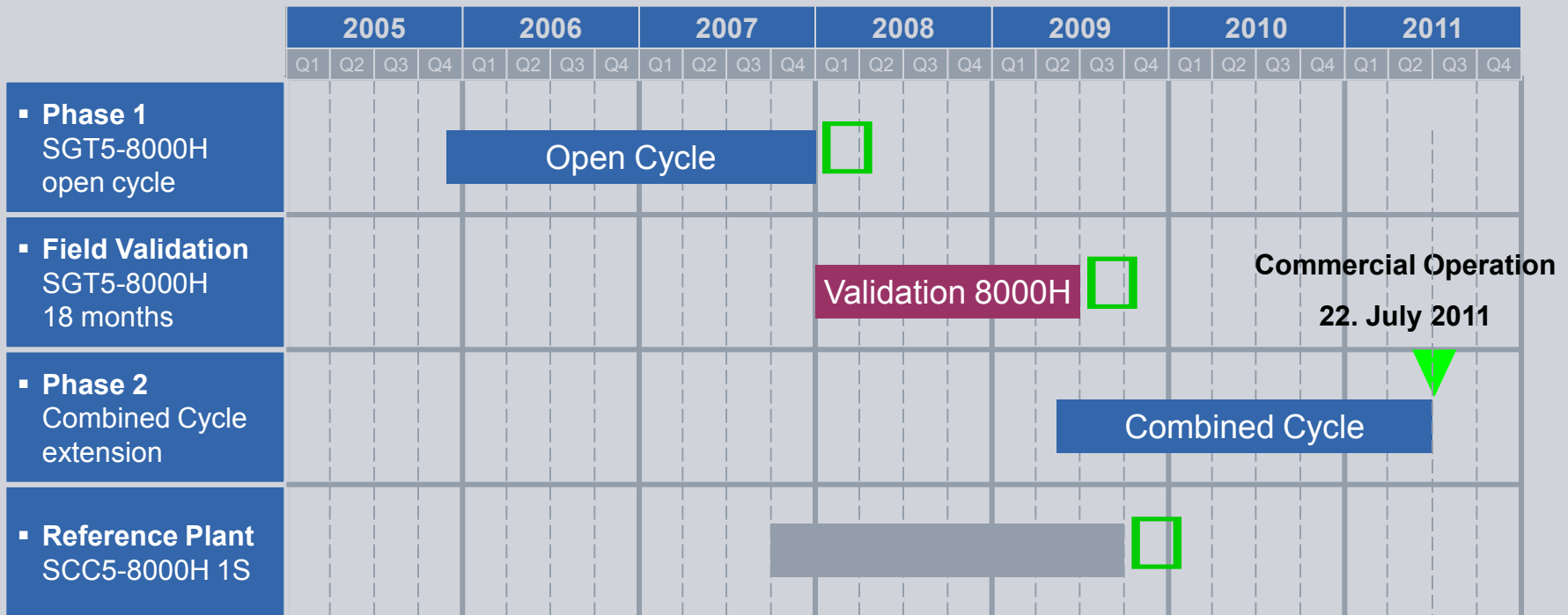
**Unit 4**  
SCC5-8000H 1S  
KW Ulrich Hartmann

**Unit 1 – 3**  
convent.  
Gas Fired Units

**Unit 5**  
SCC5-4000F 2x1



## Irsching 4, Project Overview





# Irsching 4, as of October 2012

More than 1 Year of successful Commercial Operation



22.07.2011	PAC/Commercial Operation
01.-03.10.2011	6.000 EOH Visual Inspection
06.-08.01.2012	8.000 EOH Visual Inspection Decision: defer CI to 12.000 EOH
17.-21.03.2012	10.000 EOH Visual Inspection
05.-16.05.2012	12.000 EOH Comb. Inspection



## Operational Summary:

- Daily start / stop and load following per load dispatch requirements
- more than **380 starts** and **18.000 EOH** in total, incl. GT validation
- High operational Availability and Reliability confirmed in commercial operation

# SGT5-8000H / Irsching 4

## Operational Status, as of 22.10.2012

**SIEMENS**



### Phase I **SIEMENS** GT Validation

### Phase II **e-on** Combined Cycle

Starts	85	371 / 8
Operating hrs (OH)	1525	7579
Dynamic hrs	1990	2530
<b>Sub Total (EOH)</b>	<b>4.365</b>	<b>13.899</b>
<b>Grand Total</b>	<b>9.104 OH / 18.264 EOH</b>	

## **Agenda**

**Introduction / Siemens Fleet**

**SGT5-8000H / Milestones**

**SGT5-8000H / Irsching 4**

**Update on Further Projects**

**Conclusion**

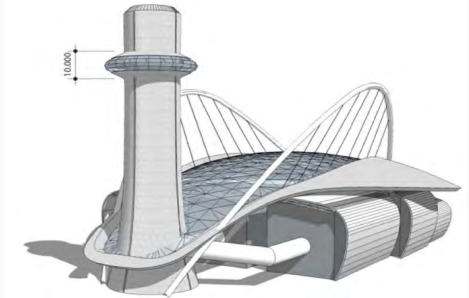
# SGT-8000H References



**1xSCC5-8000H 1S**  
**Irsching 4**  
**Germany**  
**COD 07/2011**  
  
**> 15.000 EOH**



**3xSCC6-8000H 1S**  
**N.N.**  
**South Korea**  
**COD 05/2014**  
**08/2014**  
**11/2014**



**2x3xSGT6-8000H**  
**USA, FL**  
**Canaveral**  
**COD 05/2013,**  
  
**Riviera**  
**COD 05/2014**



**1xSCC6-8000H 1S**  
**Andong (KOSPO)**  
**South Korea**  
  
**COD 03/2014**



**1xSCC6-8000H 1S**  
**Bugok III (GS EPS)**  
**South Korea**  
  
**COD 08/2013**



**SCC6-8000H 2x1**  
**Ansan (Posco E & C)**  
**South Korea**  
  
**COD 10/2014**



**total: 16 units sold or under final negotiation**



# FPL, Canaveral

as of Jan. 2012

**SIEMENS**





# Bugok, GS EPS, South Korea

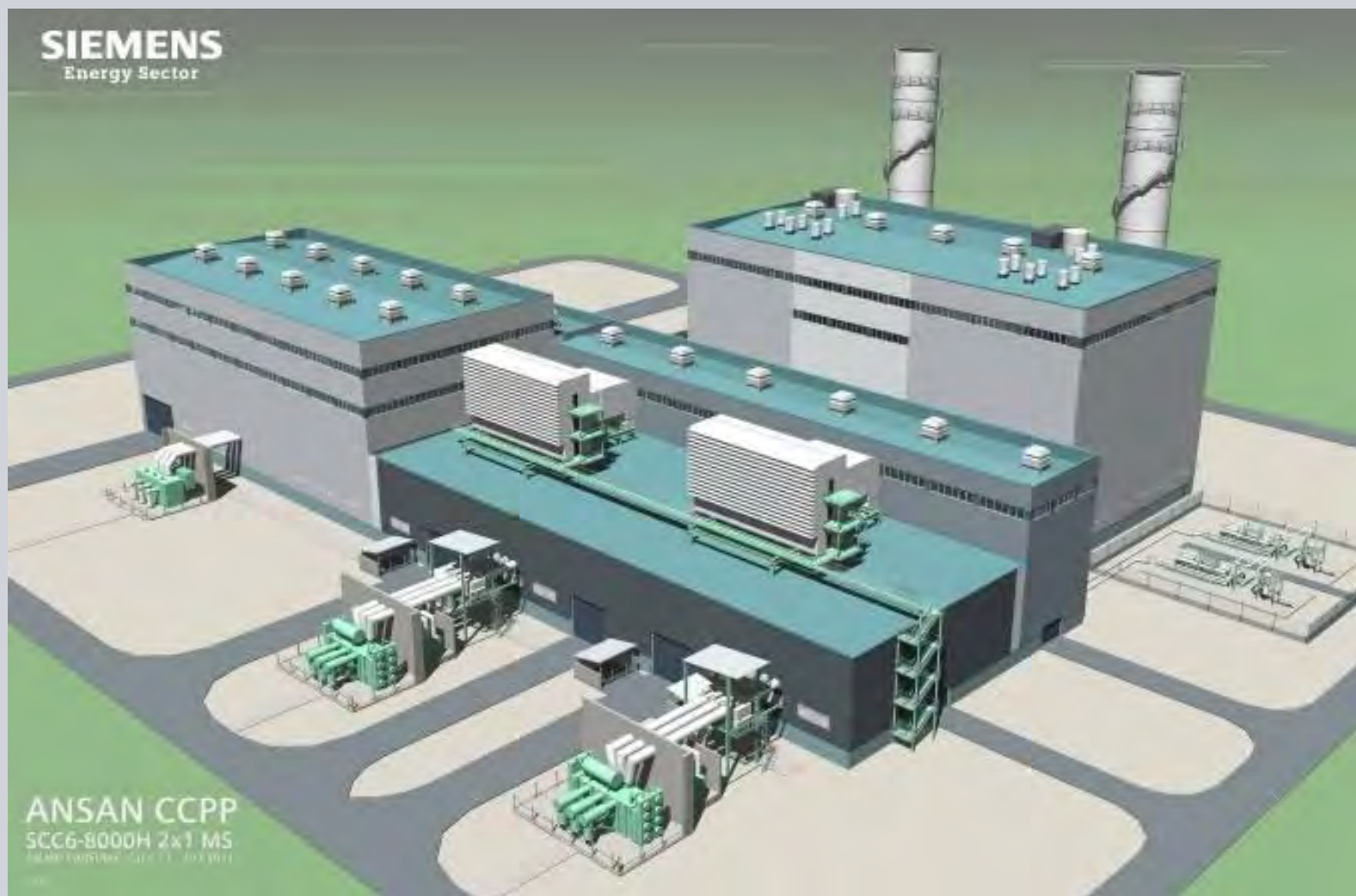


## Andong, CHP Plant, KOSPO, South Korea

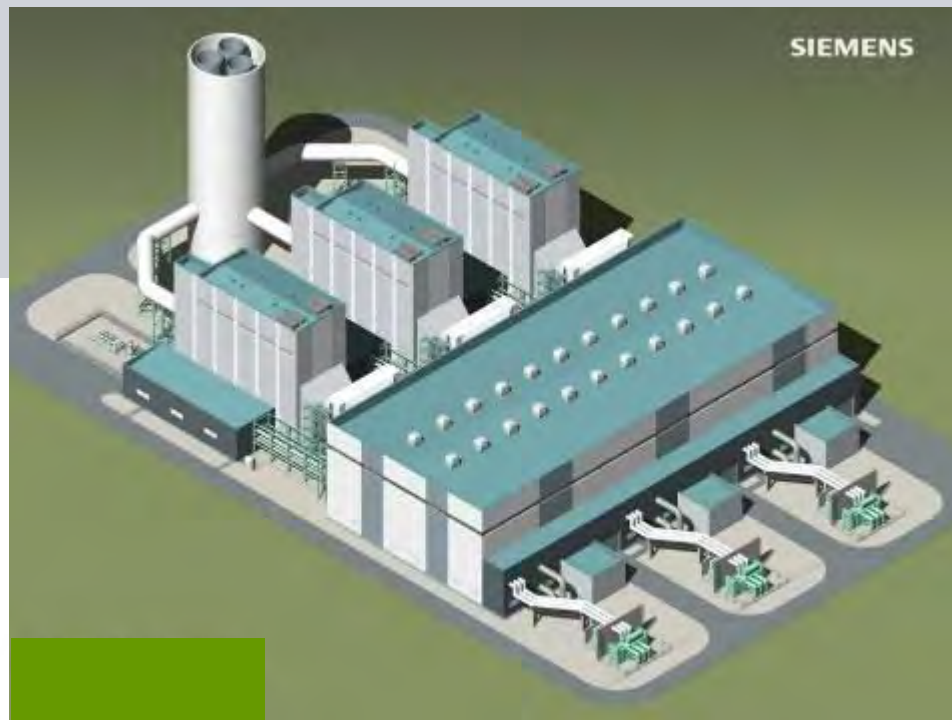
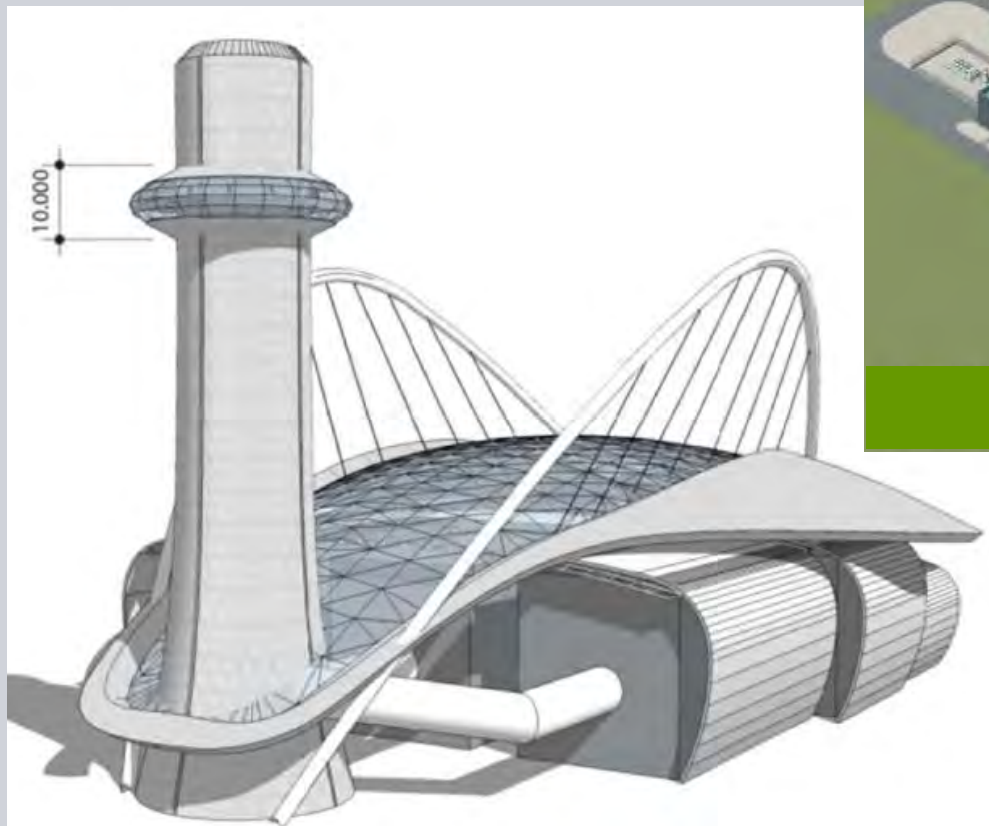




# ANSAN, Posco E & C, South Korea



3 x SCC6-8000H 1S, N.N.



# SCC5-8000H 1S, CHP Application Full EPC Turnkey, Germany

**SIEMENS**





## **Agenda**

**Introduction / Siemens Fleet**

**SGT5-8000H / Milestones**

**SGT5-8000H / Irsching 4**

**Update on Further Projects**

**Conclusion**

# SGT5-8000H / SCC5-8000H

**SIEMENS**





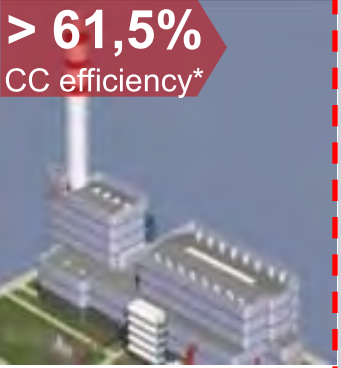
The answer to market and customer requirements



- **H Class Performance**  
SGT5-8000H: 375 MW / 40 %  
SCC5-8000H 1S: 570 MW / > 60%  
SCC5-8000H 2x1: 1.140 MW / > 60%
- **Reduced Emissions**  
25 ppm NOx, 10 ppm CO
- **Improved Operational Flexibility**  
15 and 35 MW/min. GT loading  
500 MW in < 30 min. plant hot start
- **Improved Part Load Capability**
- **Reduced Investment (less EUR/kW)**
- **High Reliability and Availability**
- **Resulting in Lower Life Cycle Costs**

Up to 5-10% higher return on investment compared to F-class technology

# Evolution of Siemens Combined Cycle Technology

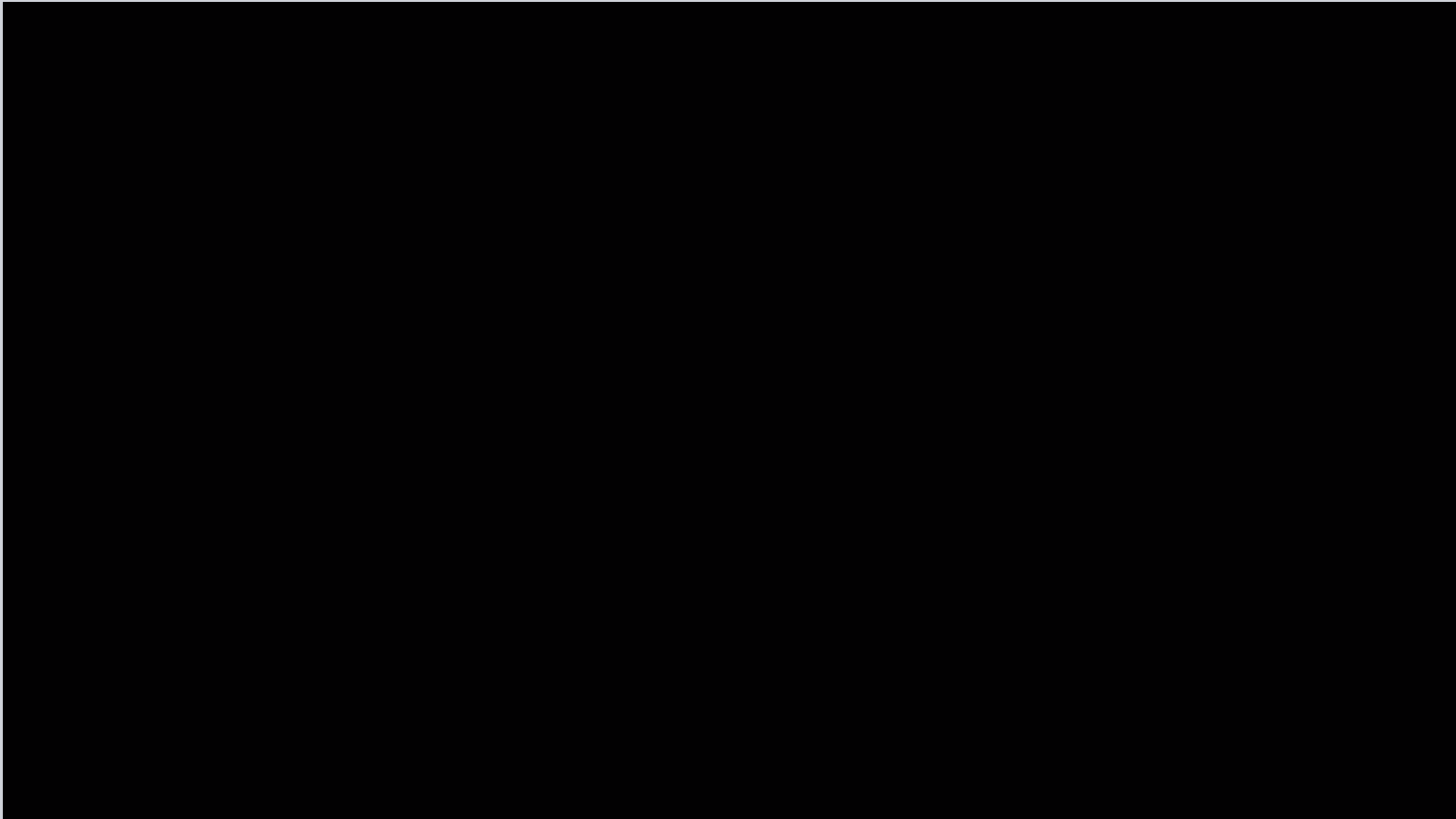
1991	1996	2008	2011	~2015
<b>SGT5-2000E</b>	<b>SGT5-4000F</b> (Intro)	<b>SGT5-4000F</b> (latest upgrade)	<b>SGT5-8000H</b> (Intro)	<b>SGT5-8000H:</b> (next steps)
<b>&gt; 50%</b> CC efficiency*	<b>&gt; 56%</b> CC efficiency*	<b>&gt; 58,5%</b> CC efficiency*	<b>&gt; 60%</b> CC efficiency*	<b>&gt; 61,5%</b> CC efficiency*
				
<b>CCPP</b> Killingholme (2x1) 2 x 450 MW	<b>CCPP</b> Didcot B (2x1) 2 x 705 MW	<b>CCPP</b> Mainz (1x1) 405 MW	<b>CCPP</b> Irsching 4 (1S) 578 MW	<b>CCPP</b> SCC5-8000H (1S) > 600 MW
<b>525 °C / 80 bar</b> 2PR-non RH	<b>540 °C / 110 bar</b> 3PR-RH	<b>565 °C / 125 bar</b> 3PR-RH	<b>600°C / 170 bar</b> 3PR-RH, Benson	t.b.d.

▶ **~10 % points increase in efficiency over approx. 20 years**

▶ **Future**

\* at ISO conditions

**Video**



## Disclaimer

This document contains forward-looking statements and information – that is, statements related to future, not past, events. These statements may be identified either orally or in writing by words as “expects”, “anticipates”, “intends”, “plans”, “believes”, “seeks”, “estimates”, “will” or words of similar meaning. Such statements are based on our current expectations and certain assumptions, and are, therefore, subject to certain risks and uncertainties. A variety of factors, many of which are beyond Siemens’ control, affect its operations, performance, business strategy and results and could cause the actual results, performance or achievements of Siemens worldwide to be materially different from any future results, performance or achievements that may be expressed or implied by such forward-looking statements. For us, particular uncertainties arise, among others, from changes in general economic and business conditions, changes in currency exchange rates and interest rates, introduction of competing products or technologies by other companies, lack of acceptance of new products or services by customers targeted by Siemens worldwide, changes in business strategy and various other factors. More detailed information about certain of these factors is contained in Siemens’ filings with the SEC, which are available on the Siemens website, [www.siemens.com](http://www.siemens.com) and on the SEC’s website, [www.sec.gov](http://www.sec.gov). Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those described in the relevant forward-looking statement as anticipated, believed, estimated, expected, intended, planned or projected. Siemens does not intend or assume any obligation to update or revise these forward-looking statements in light of developments which differ from those anticipated.

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