

International Hotels – Delight and Argony of Reneweable Energies

Solar based Air-Conditioning and Steam Generation

**Dr. Ahmet Lokurlu
Managing Director**

SOLITEM GmbH, Aachen, Germany

Content of the presentation

This presentation will illustrate and describe an example application of how intelligent solar systems can be used to achieve the common goal:

- to optimise savings of primary energy resources
- to reduce CO₂ emissions

World Energy Situation 2000 - 2030

[World Energy Outlook 2002]

Fossil fuels will remain the primary sources of energy, meeting more than 90% of the increase in demand (1.7 % p.a. 2000 – 2030; 2.1 % 1970 - 2000). More than 60% of the increase in world primary energy demand will come from developing countries, especially in Asia

Global oil demand will rise by about 1.6 % p.a., almost three-quarters of the increase in demand will come from the transport sector

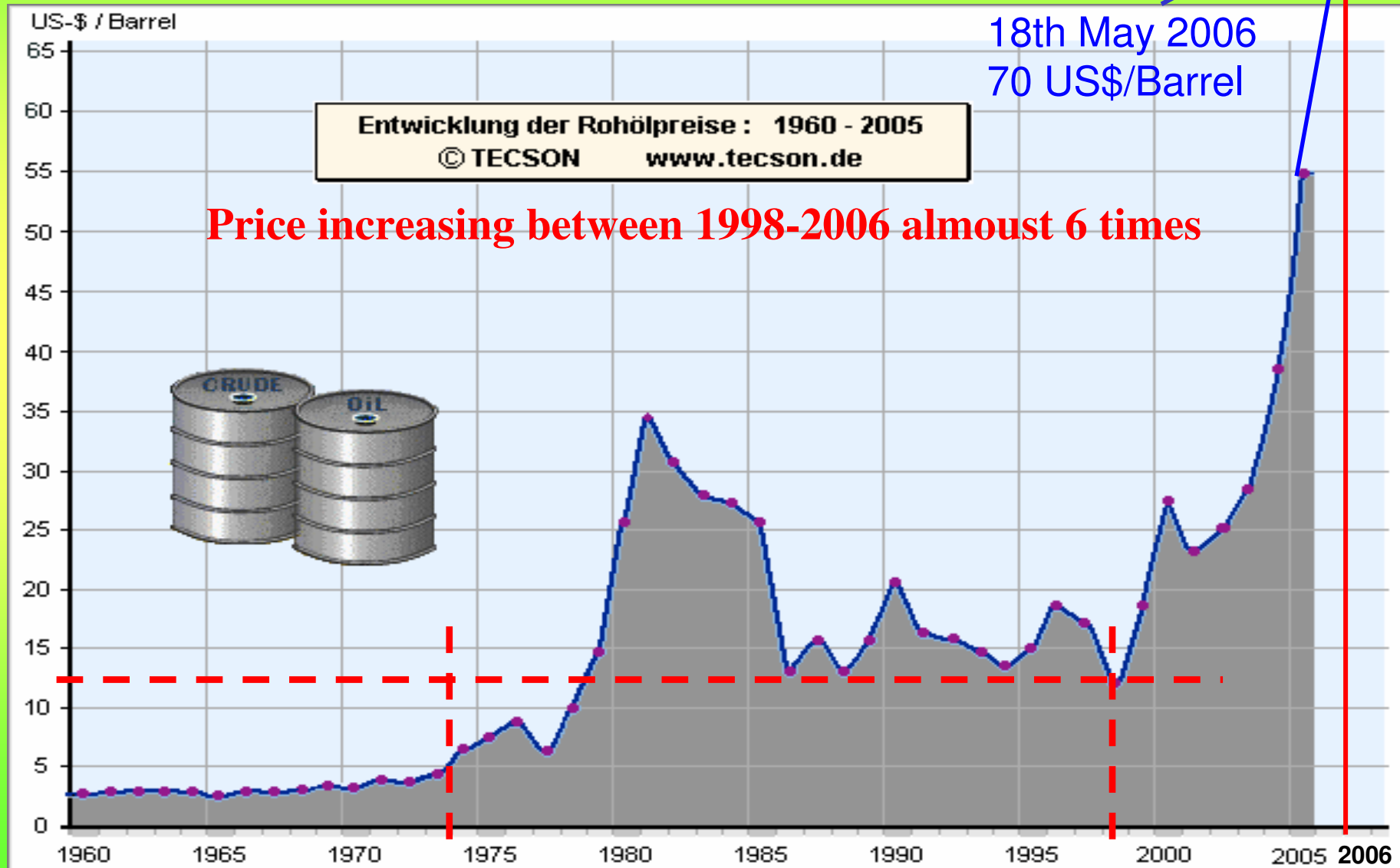
Natural gas demand will rise more strongly than for any other fossil fuel. 60% of the increase will be used for power stations especially GTCC

Coal consumption will also grow, but more slowly than that of oil and gas. China and India together will account for two thirds of the increase in world coal demand up to 2030 increasingly concentrated in power generation.

Nuclear Power will decline markedly, because few new reactors will be built and some will be retired. New Development (China, Turkey, etc.)

Renewable energy will play a growing role in the world's primary energy mix but still make a small dent in global energy demand in 2030.

Development of crude oil prices 1960 – 2006



SOLITEM GmbH

Objective of the Company

Energy and Environmental Technologies

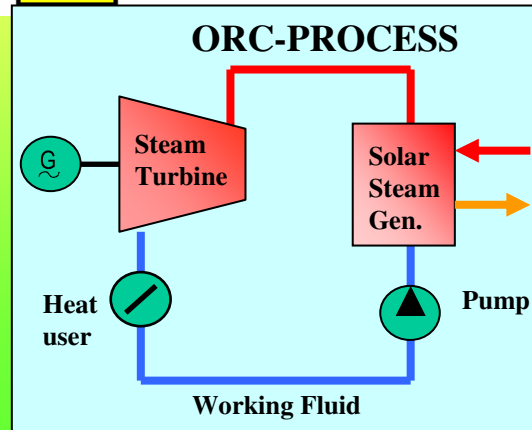
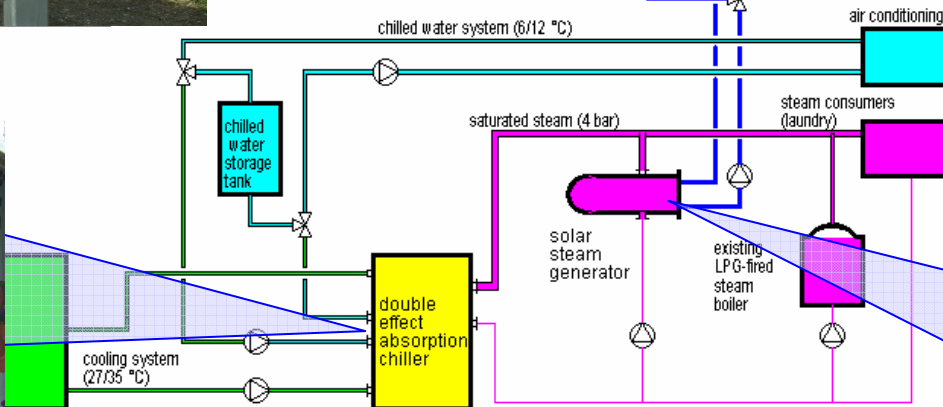
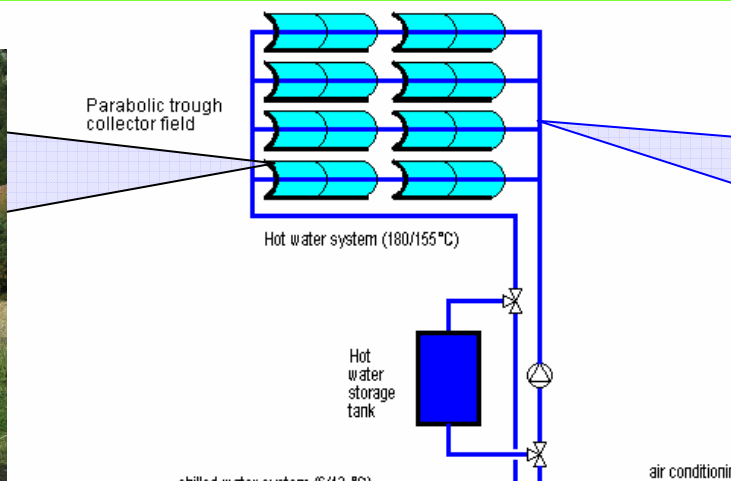
Long standing Experience with

Environmental-, heat- and process-technology, decentralized regenerative energy technology, bio-energy

Main Emphasis

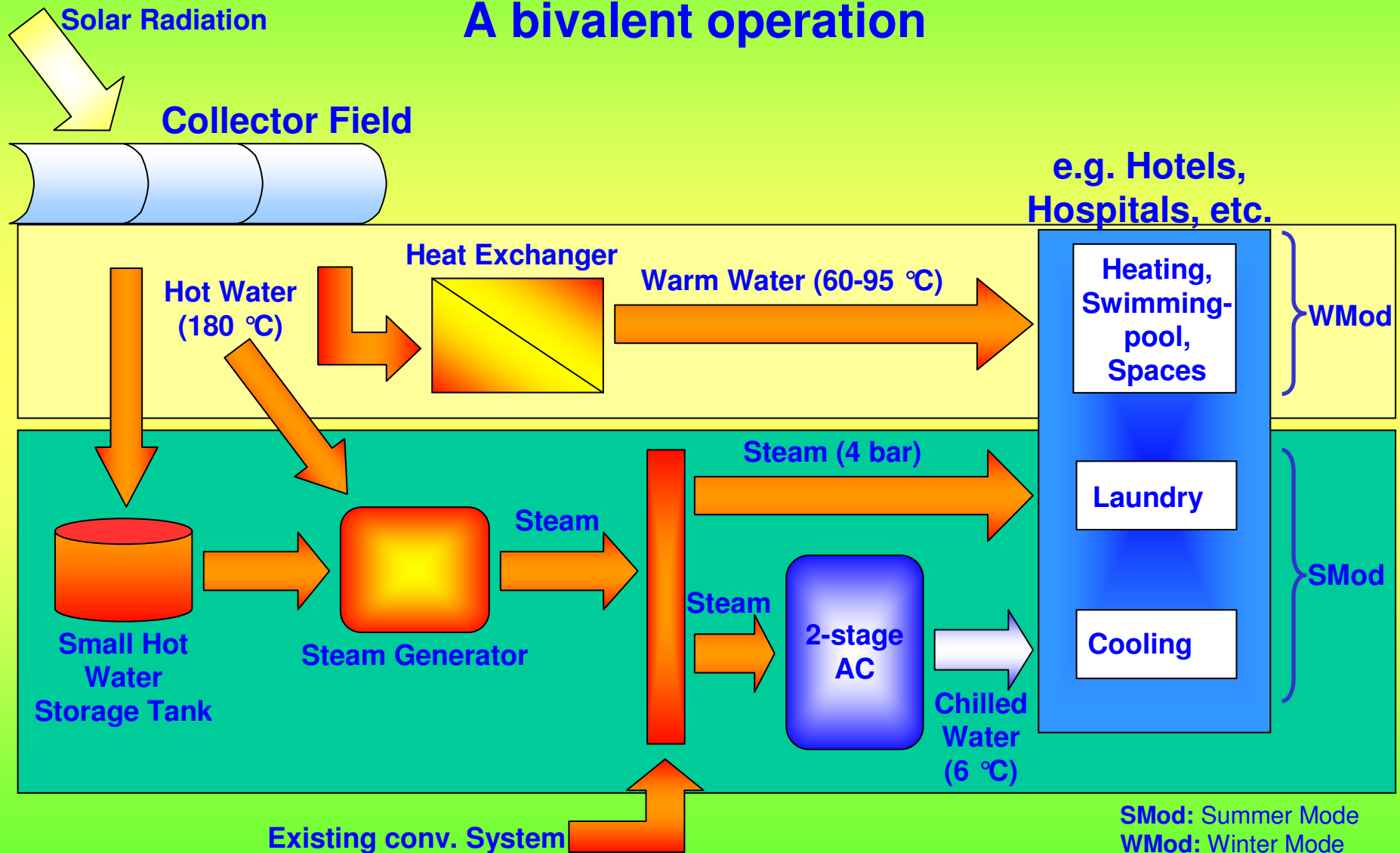
Integration of Renewable Energies, in particular solar high temperature technologies, into the existing energy infrastructure of buildings and plants

Implementation of modern energy conversion and application processes for solar air conditioning, CHCP process heat generation and use as well as the operation of micro turbines



SOLITEM's System Idea

A bivalent operation



WORLDWIDE

- **Unique system for solar air conditioning**
- **3 times more Efficiency**
- **Marketable and fully developed product**
- **Profitable Air Conditioning and
Steam production with 100% solar energy**

Several Patents are pending.

Our Product

**Parabolic Through Collectors combined
with double effect Absorption Chiller**

What delivers the SOLITEM System?

- **Solar Cooling and Heating**
- **Process Steam Production**
- **Solar thermal Electric Power Production**

Or with a combined system:

- **Combined Heat, Cooling and Power (CHCP)**
- **Solar-Hybrid Systems**
- **Desalination Plants**

Our Customers

- **Hotels**
 - Summer mode: process steam and cooling
 - Winter mode: process steam and heating
- **Hospitals and Clinics**
- **Industries**
 - Food processing
 - Textiles
 - Chemical industry
- **Supermarkets and cold storage buildings**
- **Apartment buildings**
- **Seawater desalination plants**

Reasons for energy problems in the area of international tourism

By means of the international tourism I would like to show you why we have energy problems there and how this problems can be solved:

- As a consequence of raised comfort requirements, in many hot climate countries hotels need air conditioning in summer time.
- To give you an idea, approx. 40% of the energy consumption of a hotel in the summer is needed for air conditioning, approx. 30% for the laundry.
- To provide this, conventional compression chillers are used. There high electricity demand leads to high load of grid and high emissions of carbon dioxide.

Hotels need an energy mix

- Cooling
- Process steam for laundry
- Warm water supply
- Electricity conversion (stand alone application)

This energy mix can be supplied by a single system, the SOLITEM High Temperature Solar System.

With the utilisation of solar energy by parabolic trough collectors for heating, cooling and process steam generation, the demand of fossil energy resources and the emission of climate depending harmful substances can be reduced and through this the increasing costs of these shrinking resources.

Requirements of the tourism industry

- Customers demand more and more comfort.
- Hotel operators are forced to air-condition day and night, otherwise they are not competitive anymore.
- The laundry has to handle more and more of fresh washing, tablecloth etc., the demand is tremendous.
- Also the swimmingpool should be always tempered around 21 °C – 23 °C.

The market demands intelligent solutions

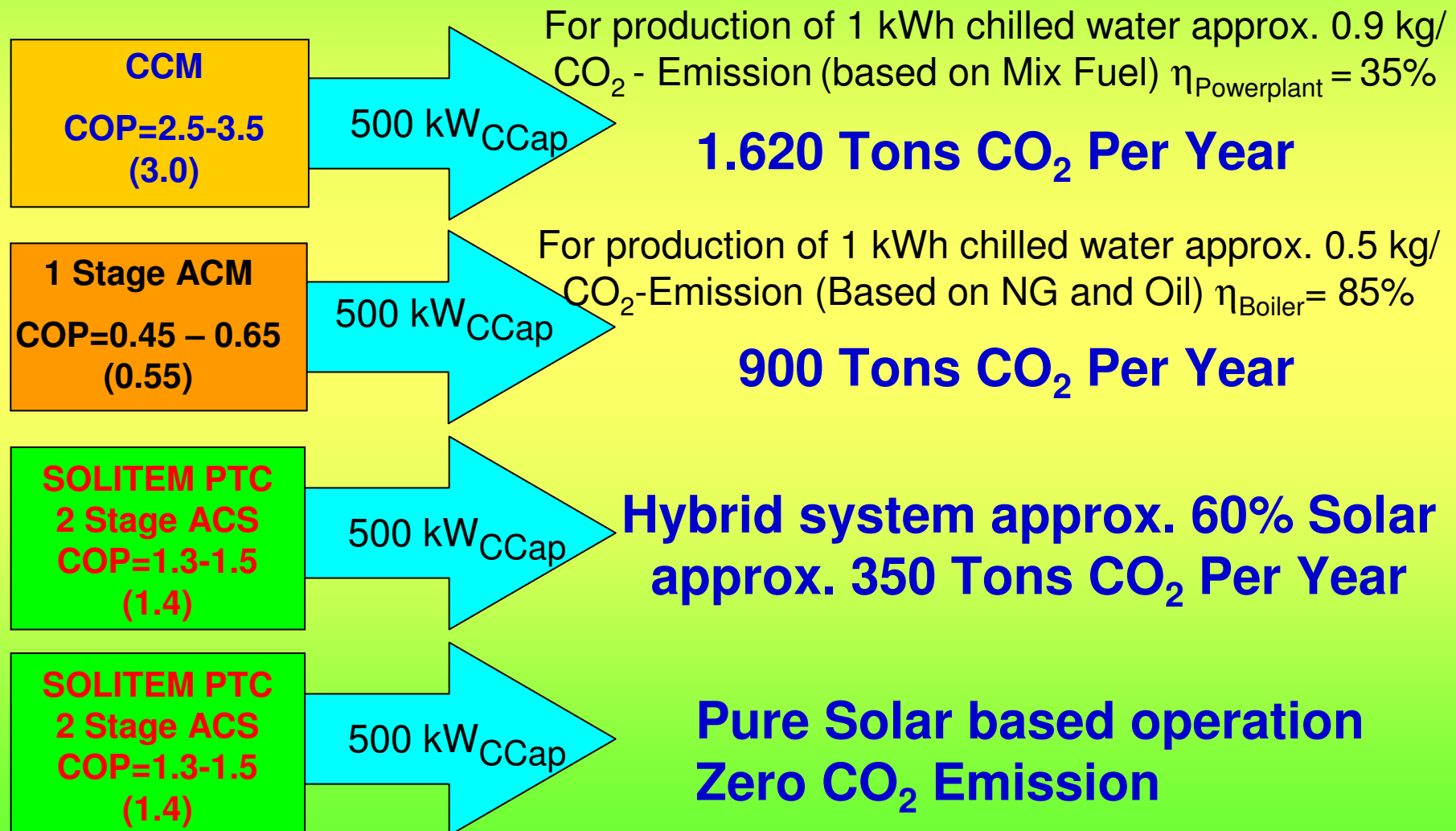
The SOLITEM energy system combines solar thermal with conventional systems into so called hybrid systems for heating and cooling supply at low cost conditions.

Admittedly with the restriction that enough solar irradiation is available and the energy costs are not subsidised, like for example in the Emirates.

The subsidies of renewable energy has a positive effect and in the long run more intelligent than to subsidise conventional energy.

CO₂-Emission for an Hotel in Mediterranean

500 kW Cooling Capacity, Cooling period 6 Months = 1,800,000 kWh chilled water/a



Influencing factors (1)

1. Creditworthiness, often not given at private operated hotels
2. Hotel chains: operator and owner not identical
3. Payback time of systems has to be within for example max. 8 years at a operating contract period of 10 years
4. Possible business interruptions during system installation

Influencing factors (2)

5. Specific problems

a.) Missing adequate collector installation surfaces
(for

example shady areas, inapplicable surface
segmentations, etc.)

b.) Nature conditions (frequent rain, storms, etc.)

c.) Country specific terms

- Custom- and import regulations
- Conventional energy subsidisation
- Renewable energy subsidisation
 - Depreciation modalities
 - EE-law
 - Investment aid at a specific percentage
 - “Kyoto Protocol” with its Clean Development Mechanism and Joint Implementation

SOLITEM PTC 1800 Parabolic Trough Collectors, Germany / Turkey



SOLITEM solar systems with parabolic trough collectors PTC 1800 make an important contribution to reduce fossil energy consumption and to avoid CO₂- emissions.

The investment for the systems will return within few years by saving costs of fossil fuels. So the systems have not only excellent ecologic but also high efficient economic qualities.

