



Technological solutions and advantages of combining sorption cooling with a district heating network or cogeneration units

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Green Chiller – Association for Sorption Cooling e.V.

- Formed in March 2009 as Industry Association (today 10 Companies, 10 Institutes)



- Located in Berlin, Germany
- Representing around 60% of all European manufacturers of thermally driven sorption chillers in the small and medium-scale cooling capacity range (7- 200 kW)
- Lobbying of Sorption Cooling Technologies in general but especially in the Politics (Small and Medium Cooling Capacity Range)
- Promoting and Developing of the Solar and Thermal Cooling Market on European Level

Green Chiller – Association for Sorption Cooling



Solar



Source: Tsinghua



Source: Citrin Solar

District Heating



Source: wikipedia

Cogeneration Units, Biomass, Process Heat etc.



Source: EC-Power



Source: GE Jenbacher

Heat sources for sorption cooling

**InvenSor
LTC10 & HTC18
Water / Zeolithe**



Source: InvenSor

**SorTech
ASC08 & ASC15
Water / Silica Gel**



Source: SorTech

**SolarNext
chillii® PSC19
Ammonia / Water**



Source: Pink

**Pink
PC14 & PC19
Ammonia / Water**



Source: Pink

Adsorption and absorption chillers (small-scale capacity)

EAW
Wegracal SE 15 - 200
Water / Lithium Bromide



Source: EAW

AGO
congelato 50 - 500
Ammonia / Water



Source: AGO

Absorption chillers (small to medium-scale capacity)



chillii® Cooling Kit ISC11



Source: SolarNext

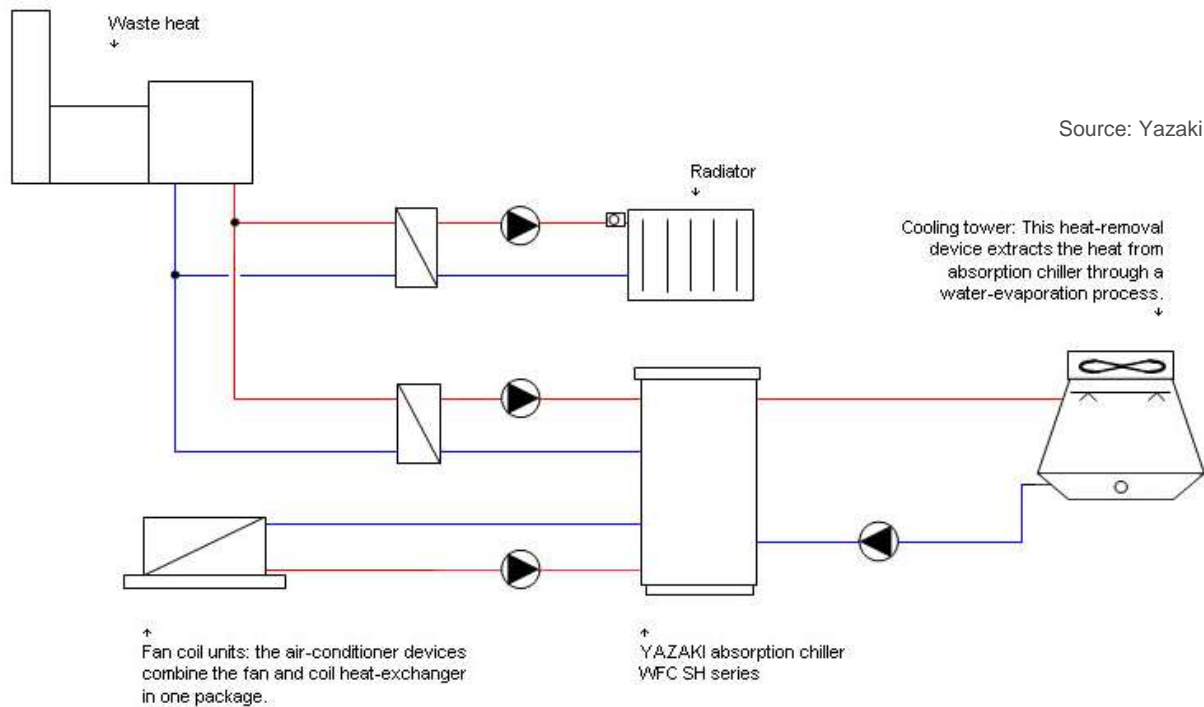


chillii® Cooling Kit WFC105



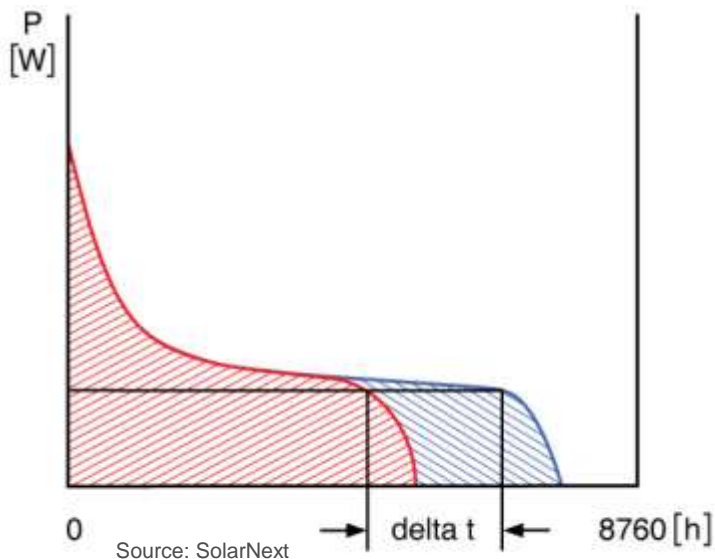
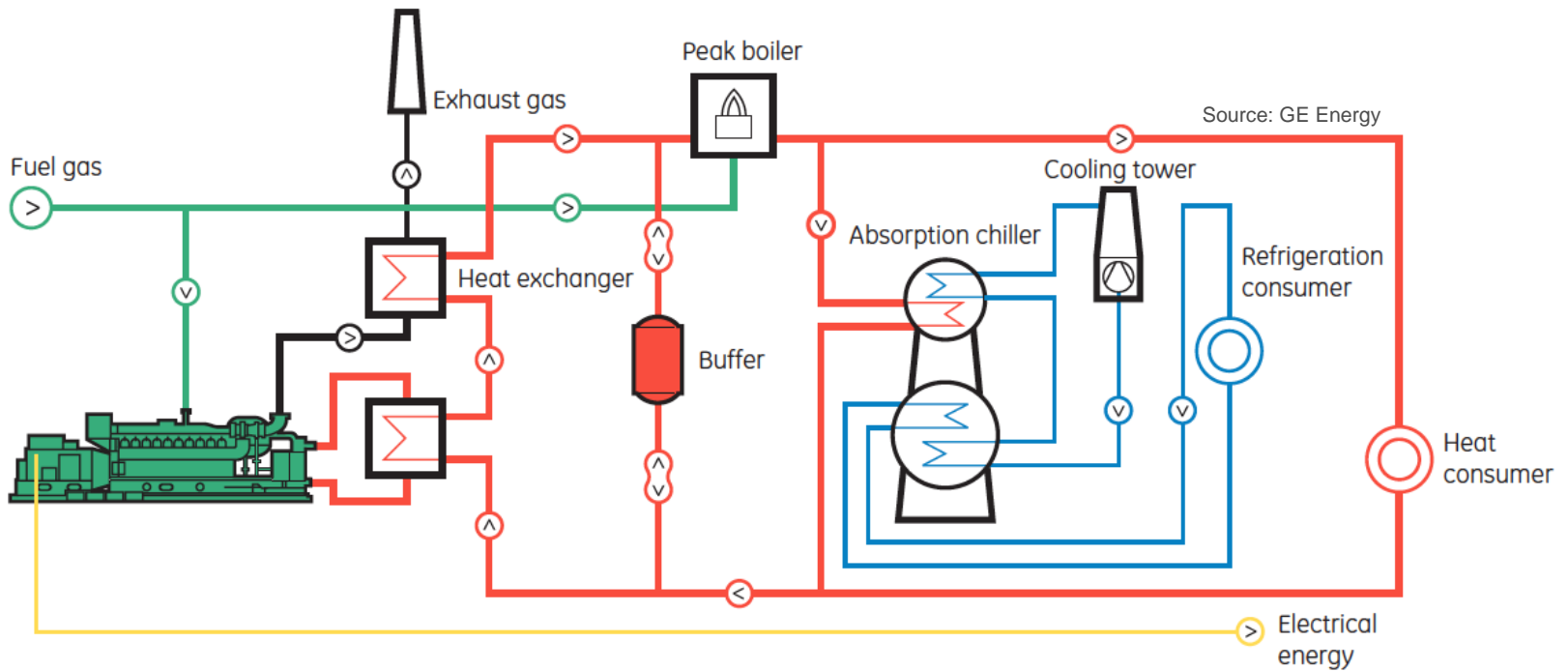
Source: SolarNext

Thermal cooling kits (small and medium-scale capacity)



- Waste heat of power plants is used by district heating networks to increase the efficiency of the whole system and to sell the heat as an additional product
- In summer time often heat is not needed, but cooling demand exists!
- Use of district heat for sorption cooling to increase the sales of heat for the network operators (either decentralized chillers for contracting models or centralized chillers with additional cooling networks)

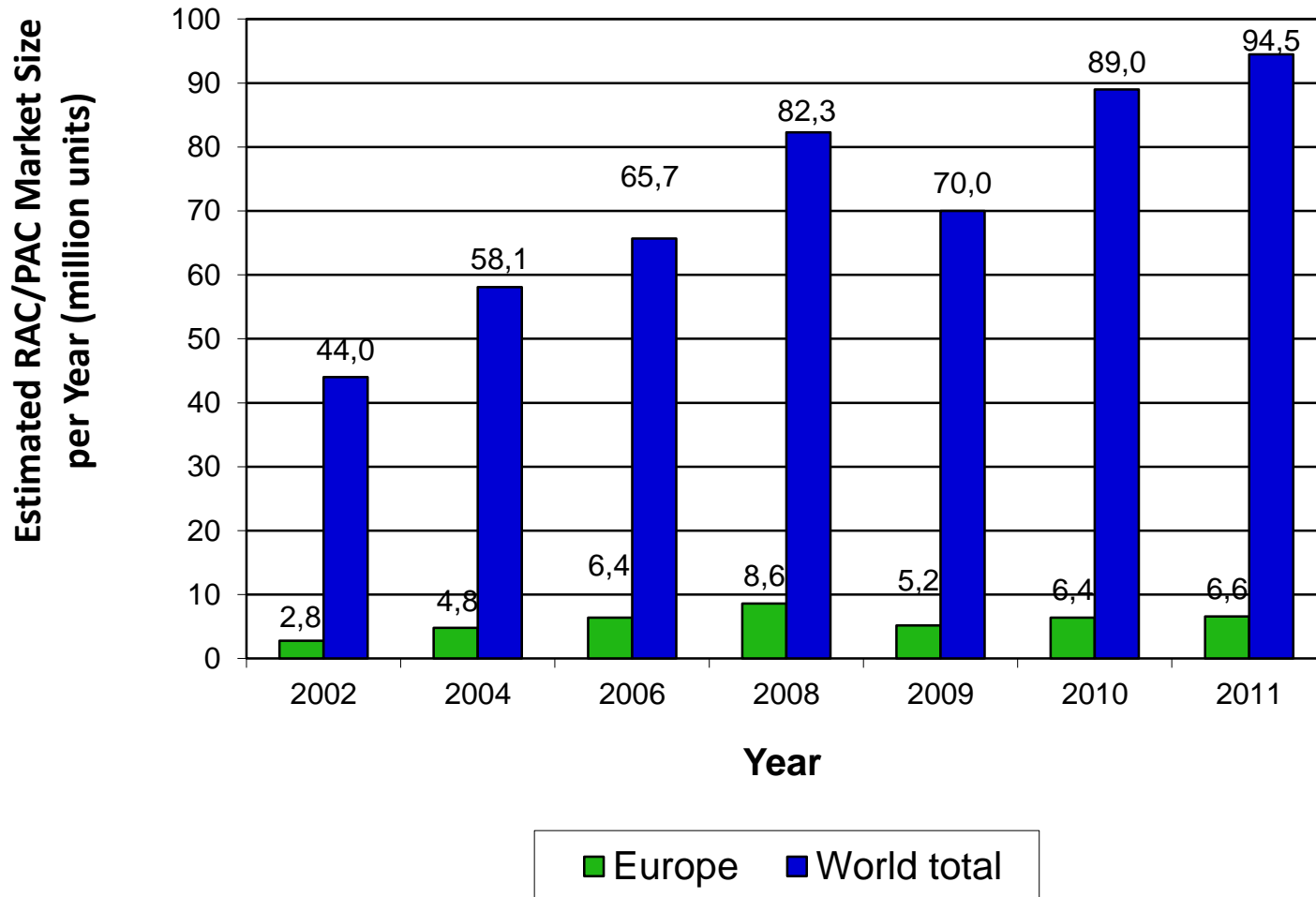
Advantages of combining with district heating networks



Operation time extension
to produce more electricity

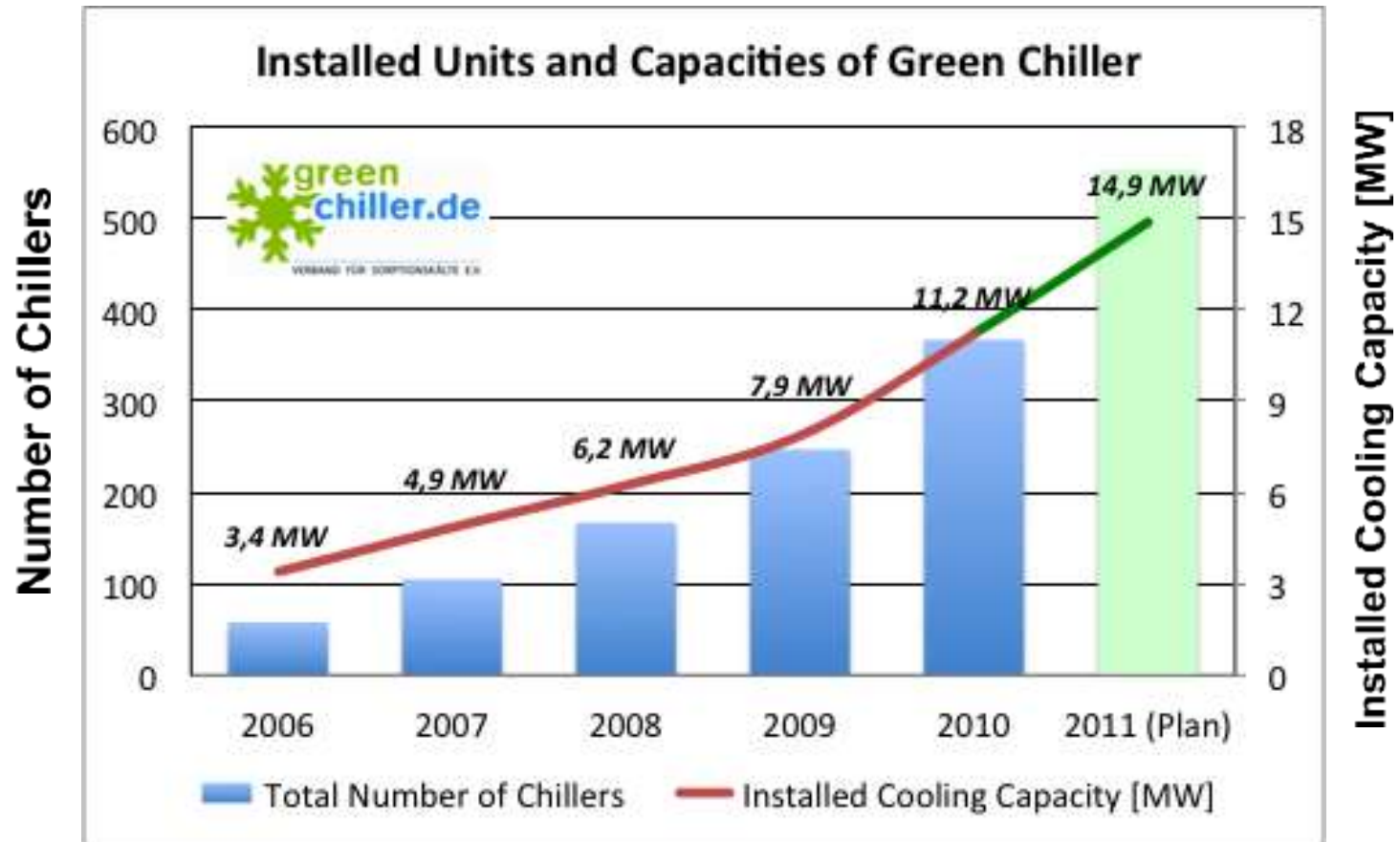
- Heating energy demand
- Cooling energy demand

Advantages in combining with cogeneration units (Tri-Generation)



- Refrigerants (HCFC and HFC) with global warming potential (GWP)
- Leakage rate approx. 5 – 15 % per year!

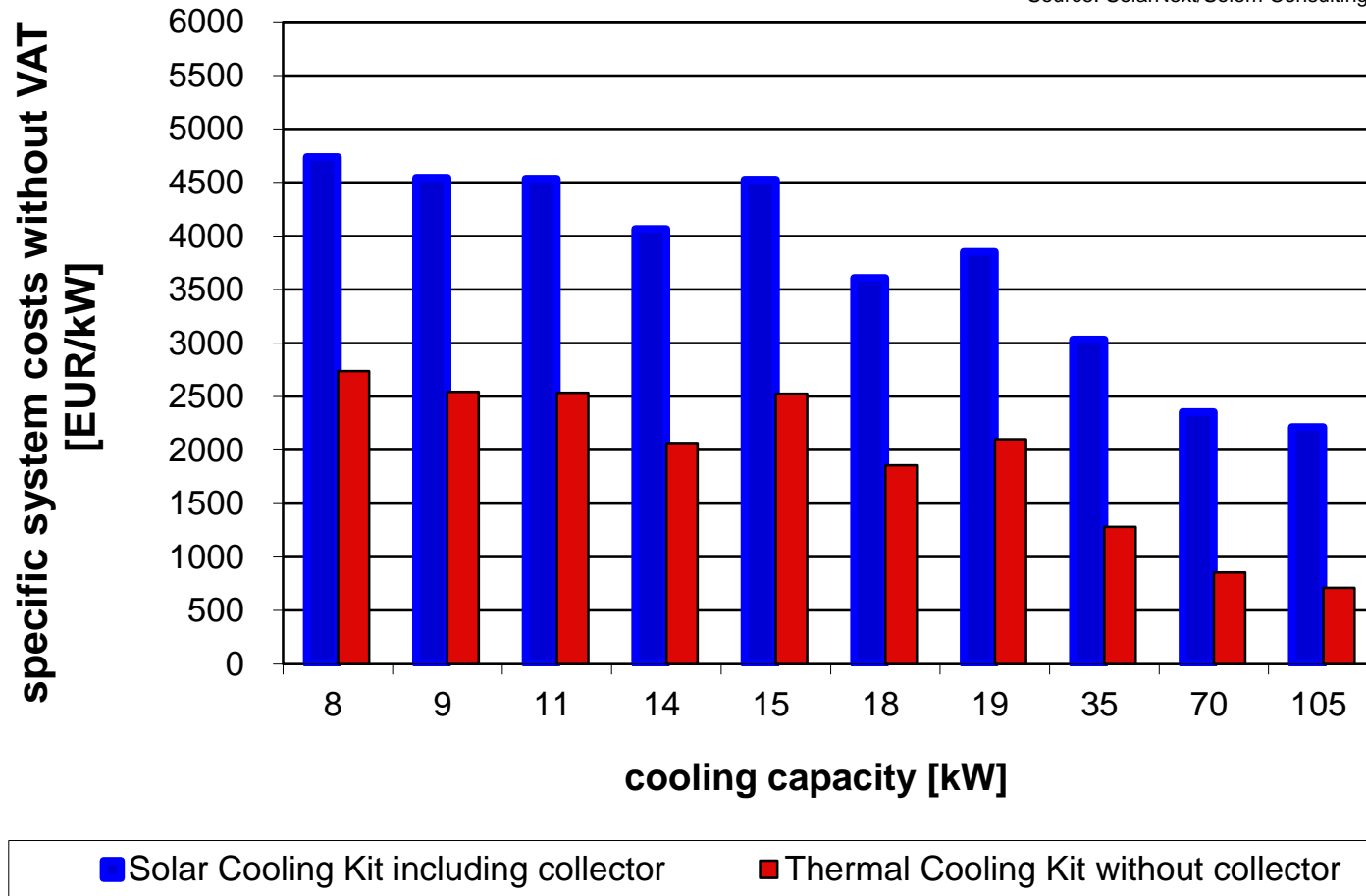
Market situation of conventional air-conditioning up to 5 kW (1.4 RT)



- approx. 10% district heating installations
- approx. 50-55% cogeneration installations
- approx. 35-40% solar cooling installations

Sales numbers of Green Chiller manufacturer (2006-2010)

Source: SolarNext/Solem Consulting



Specific total costs of cooling kits (2011)

- Thermally driven chillers can often provide an environmentally sound alternative to electricity driven technologies
- Sorption chillers use environmentally friendly refrigerants (water or ammonia) and have a very low electricity demand
- District heat is particularly of interest if cheap excess heat in summertime is used for decentralized thermal cooling systems
- Waste heat from a cogeneration unit for sorption cooling could lead to longer operating times and increased electricity production of the cogeneration unit itself

Outlook



Thank you.

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www.greenchiller.eu