



Austrian Energy Agency

SUMMERHEAT – Improving the load for CHP plants during summer

6th Euroheat & Power Utility and Industry Forum
Bled, November 9th, 2007

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Agenda



- In short: Austrian Energy Agency
- Project background
- Project idea
- Preliminary results

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In short: Austrian Energy Agency



- Austria's national energy agency (*1977)
 - independent non-profit scientific association
 - 51 members
 - 70 employees
- Responsibility
 - to develop, to support & to implement measures, that aim at a rational supply and use of energy
 - to support on a scientific basis
 - innovative technologies, energy efficient systems and renewable energy sources
- Services
 - Advice & studies for policy & companies
 - Programme management & monitoring
 - Cooperation & networking
 - Know-how transfer & communication
 - Information services (events, website, newsletter, ...)

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Project background - SUMMERHEAT



- SUMMERHEAT – Meet cooling demands in SUMMER by applying HEAT from cogeneration
- Funding
 - Supported by the EU through the Intelligent Energy Europe Programme (IEE Programme)
 - Co-financed through co-operation with local energy suppliers
- Idea of the IEE Programme
 - Help to produce and use energy in more intelligent ways and increase the use of renewables
 - Co-operate with different partners across Europe to develop and deploy appropriate solutions and technologies
- SUMMERHEAT Project Team:
 - 9 partners
 - 7 countries
 - namely ...

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Project background- SUMMERHEAT



- Berliner Energieagentur GmbH (DE)
- Österreichische Energieagentur (AT)
- Fernwärme Wien GmbH (AT)
- CityPlan spol. s.r.o.(CZ)
- Rhônealpenergie-Environnement (FR)
- Energy Consulting Network (DK)
- Københavns Energi (DK)
- National Energy Conservation Agency (PL)
- Euroheat & Power (BE)



Idea behind the project



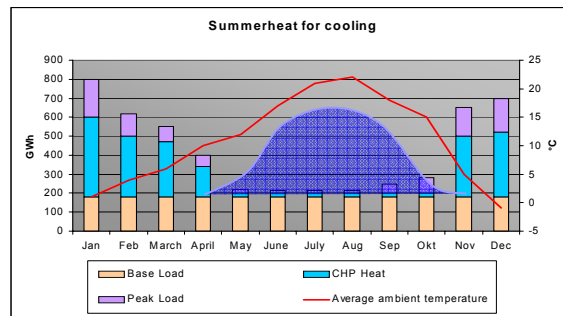
Issues	Improvement measures (EU level)	Cogeneration	SUMMERHEAT
Global warming	Renewable Energies	Energy efficient but costly	Make use of waste heat
Rising energy demand	Energy Efficiency	Needs a consistent heat demand to be cost efficient	Improve the economics of cogeneration
Rising cooling demand	Cogeneration	<i>Main problem:</i> low heat demand during summer	Reduce the primary energy demand for cooling
...	...		



Idea behind the project



- SUMMERHEAT – Meet cooling demands in SUMMER by applying HEAT from cogeneration
 - Increase the utilisation ratio of cogeneration plants and heating networks
 - In a broader approach – heat from waste incineration, free cooling sources



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Preliminary results - Steps



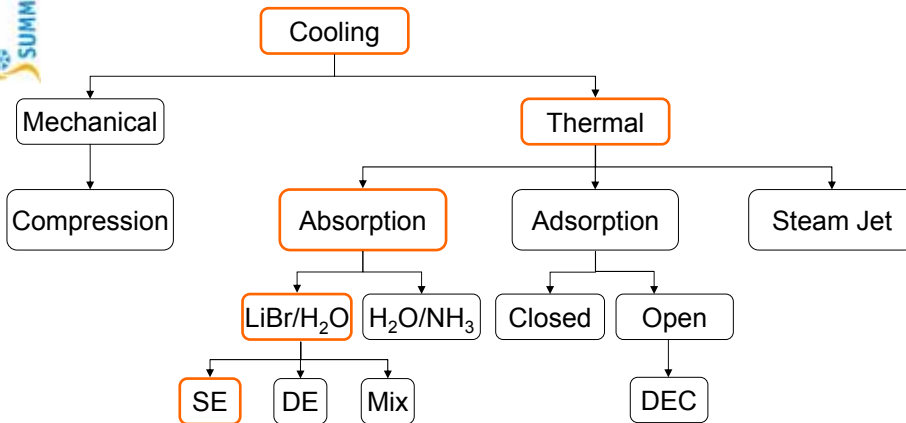
- Identify the relevant thermal **cooling technologies & systems** for each region
- Calculate the primary resource factor and the production costs
 - For the thermal cooling appliances
 - For reference cases using traditional appliances (compressor cooling)
- Identify the framework conditions for thermally driven chillers
- Identify the market demand for cooling
 - Hard factor – willingness to pay
 - Soft factor
 - Main customer base / market niche
- Develop a rollout strategy and give policy advice for the deployment of thermal cooling appliances and the use of SUMMERHEAT

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Preliminary results - Technology

■ Cooling Processes



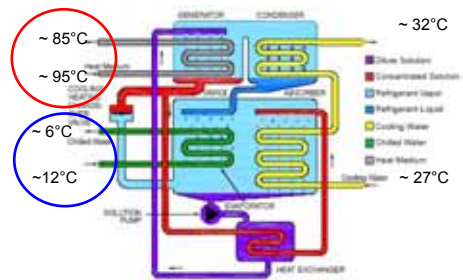
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Preliminary results - Technology

■ Absorption – working principle

- Evaporator
- Absorber
- Generator
- Condenser



■ Technical Data

- Working pair: LiBr (sorption solution) & water (refrigerant)
- Single-effect: 1x usage of inlet heat
- Inlet temperature: 75 – 110 °C
- COP: 0.6 – 0.8
- Performance range: 35 kW – 5 MW
- Operational weight: 5 – 41 t
- Size: 15 – 90 m³



Source: York, JCS

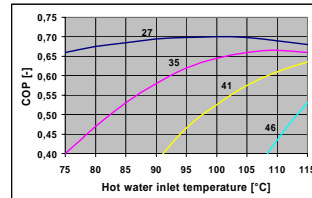
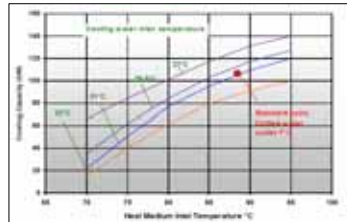
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Preliminary results - Absorption



- Main parameters
 - Required hot water inlet temperature $\geq 75 - 80 \text{ }^\circ\text{C}$
 - Hot water temperature difference - inlet/outlet: 5 – 15 K
- Cooling capacity
 - Rated for a standard point
 - Temperature dependency
 - Hot / chilled / cooling water
- Coefficient of Performance (COP)
 - COP = cold capacity/heat input
 - Temperature dependency
 - Hot / chilled /cooling water
 - Part load status



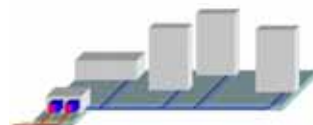
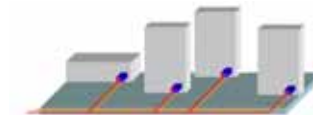
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Preliminary results - Absorption



- Interrelation of
 - thermally driven chillers / district heat networks / heat generation plants (cogeneration)
 - DH supply temperature
 - Hot water temperature difference – inlet/outlet
 - Upstream DH network and (co)generation plants
- Supply concepts
 - Model of operation
 - Valuation of heat input
- Decentral absorption chiller
- Central absorption chiller
 - Combination of different technologies (compressor, free cooling)



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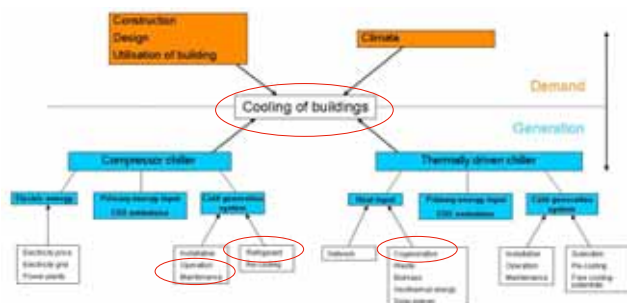
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Preliminary results

- Calculate the **primary resource factor** and the **production costs**
 - For the thermal cooling system
 - For reference cases using traditional system (compressor cooling)
- Conclusions
 - Primary resource factor for thermal cooling
 - Energy source input for district heat / electricity
 - Calculations show advantages for thermal cooling
 - Price calculation
 - Cost advantages for compressor cooling (HFC)
 - Challenge of competitive prices for district cooling
 - Cold supply as energy service → shift from investment to operational costs
 - Central vs. decentral
 - For newly built infrastructure, central cooling seems more favourable compared to decentral cooling

Preliminary results

- Identify the **framework conditions** for thermally driven chillers
 - Policies – European and national level
 - Legal framework - Examples



Preliminary results – Next steps



- Identify the relevant thermal cooling technologies & systems for each region
- Calculate the primary resource factor and the production costs
 - For the thermal cooling appliances
 - For reference cases using traditional appliances (compressor cooling)
- Identify the framework conditions for thermally driven chillers
- Identify the market demand for cooling
 - Hard factors – willingness to pay for cooling
 - Soft factors
 - Main customer base / market niche
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