Solar cooling news from Europe: Post-Palermo wrap-up

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ausSCIG Solar Cooling conference
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Participation

Participants by country:

- Germany: 36%
- Italy: 18%
- Spain: 11%
- Austria: 5%
- USA: 5%
- Australia: 6%
- Other: 19%

Total of 198 participants from 35 different countries

116 first-time participants

Source: OTTI 2009
Participants by affiliation:

- Universities: 36%
- Companies: 30%
- Research Institutes: 15%
- Public organisations: 5%
- Associations: 4%
- Consultants: 9%
- Energy Suppliers: 1%

Source: OTTI 2009
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Small solar cooling applications (<5 kW)

5 kW absorption chiller (EAW, Germany)

- Downscaled version of EAW 15 kW chiller
- LiBr/water

Source: Ajib et al 2009
Small solar cooling applications (<5 kW)

Steam ejector system (Fraunhofer UMSICHT, Germany)

- 5kW\textsubscript{th} steam ejector system
- 6 bar operating pressure
- 20 m\textsuperscript{2} parabolic trough collectors

Source: Pollerberg et al 2009
Small solar cooling applications (<5 kW)

2.5 kW adsorption chiller (ECN, Netherlands)

- Silica gel based
- 60x60cm footprint, height ~100cm
- Residential application

Source: Bakker, de Boer 2009
Small solar cooling applications (<5 kW)

2 kW mobile (car) air-conditioning (Uni Warwick, UK)

- 2 kW Adsorption chiller, active carbon/NH3
- Engine coolant driven, 90 degC
- COP ~ 0.3
- 0.09 m3 in volume (45l/kW cooling) – very compact

Source: Critoph 2009
New developments solar cooling applications

Latent heat storage and night time heat rejection (ZAE Bayern Germany)

- Latent heat storage (paraffin)
- Condenser+absorber heat stored during the day
- Released at night time to lower ambient temperatures
- COPel ~ 6

Reject heat from chiller

Source: Helm et al 2009
New developments solar cooling applications

Liquid desiccant chiller (AIL, USA)

- 10,200 m³/h
- 115 kg/hr water removal
- Fresh air to a 2,500 m² machine shop
- 70 to 95 °C hot water
- Heat rejected to cooling tower
- COP = 0.74 with 85 °C hot water
- Gas fired

Source: Lowenstein 2009
New developments solar cooling applications

New vacuum ice storage system (ILK, Germany)

- Centrifugal compressor system
- Absorption chiller cools condenser
- Ice slurry -1 degC
- Pumpable up to 60% ice content

Source: Safarik, Albring 2009
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New collector developments

New reflective flat plate collector (Fraunhofer ISE, Germany)

- Mirror reflector on either side of collector
- Transparent cover over flat plate
- Design temperature 120 degC
- Increase in solar gain ~35%

Source: Hess et al 2009
New collector developments

Fresnel collector (Mirroxx, Germany)

- 5.5m aperture
- Weight 25 kg/m²
- Peak power 500 W/m²
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Policy developments

New french solar heating and cooling development program

- Performance based !!!
- 20 – 200 kW range
- Minimum yield 450 kWh/m²/a (both cooling and heating)
- Minimum annual COP = 5
- 50% funding at contract, 30% at commissioning
- **20% funding after 2 years** of successful plant operation (monitoring)
- 5x installations in 2010, 10x in 2011 and 10x in 2012

Source: Mugnier, le Denn 2009
Policy developments

Green Chiller Association (Germany)

- Founded March 2009
- Represents 60% of all EU manufacturers of small and medium scale thermally driven chillers
- Lobbying/technology promotion

Source: Jakob 2009
Poster price for Australia – Edward Halawa

Source: OTTI 2009
Presentations for download

http://energie.otti.de/cooling/
References
