Annexe 43
« Fuel Driven Sorption Heat Pumps »

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ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie

CETIAT
ensemble, innover et valider

IEA HPT

IEA HPT Annex 43:
Fuel Driven Sorption Heat Pumps

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Cetiat Workshop
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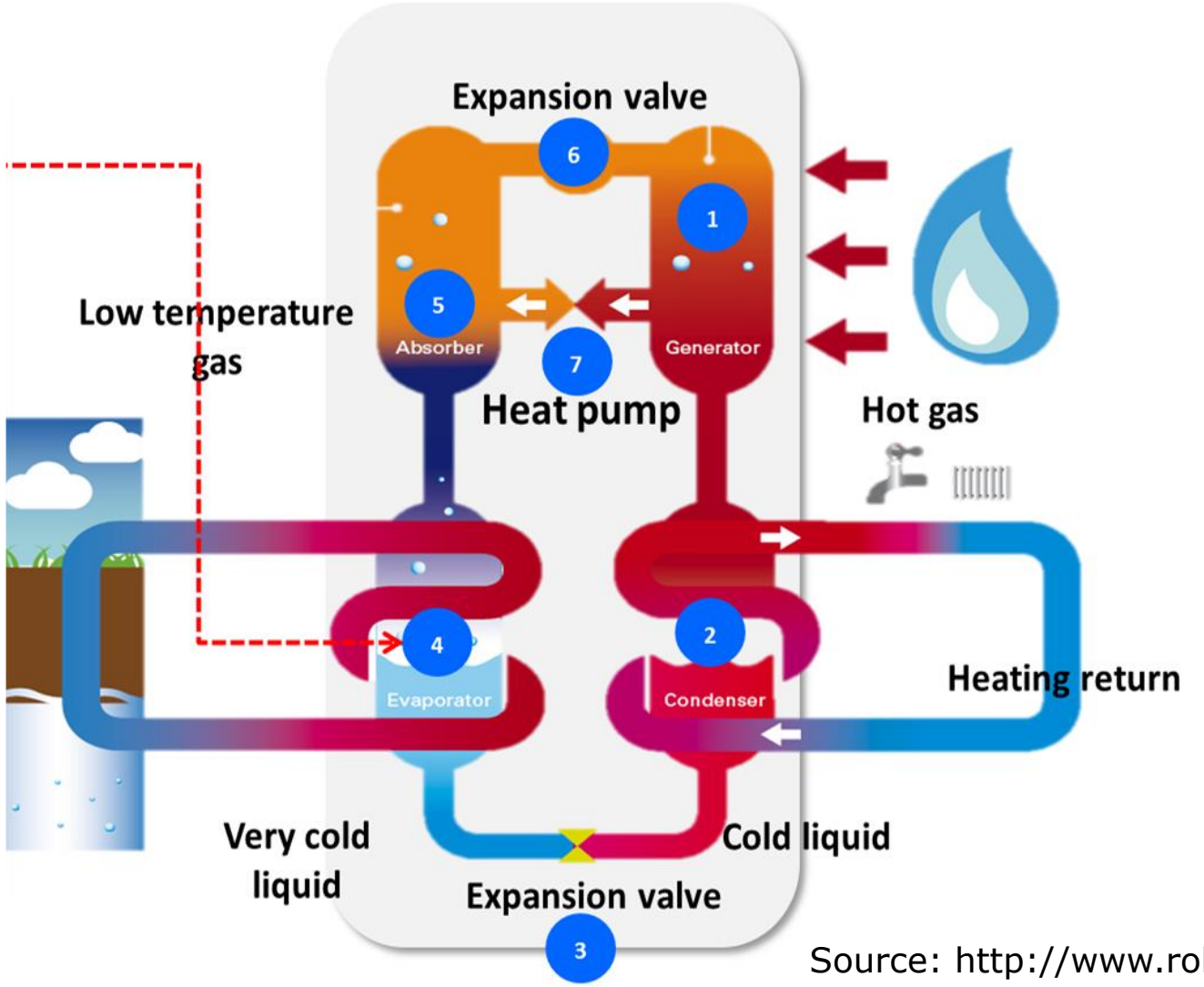
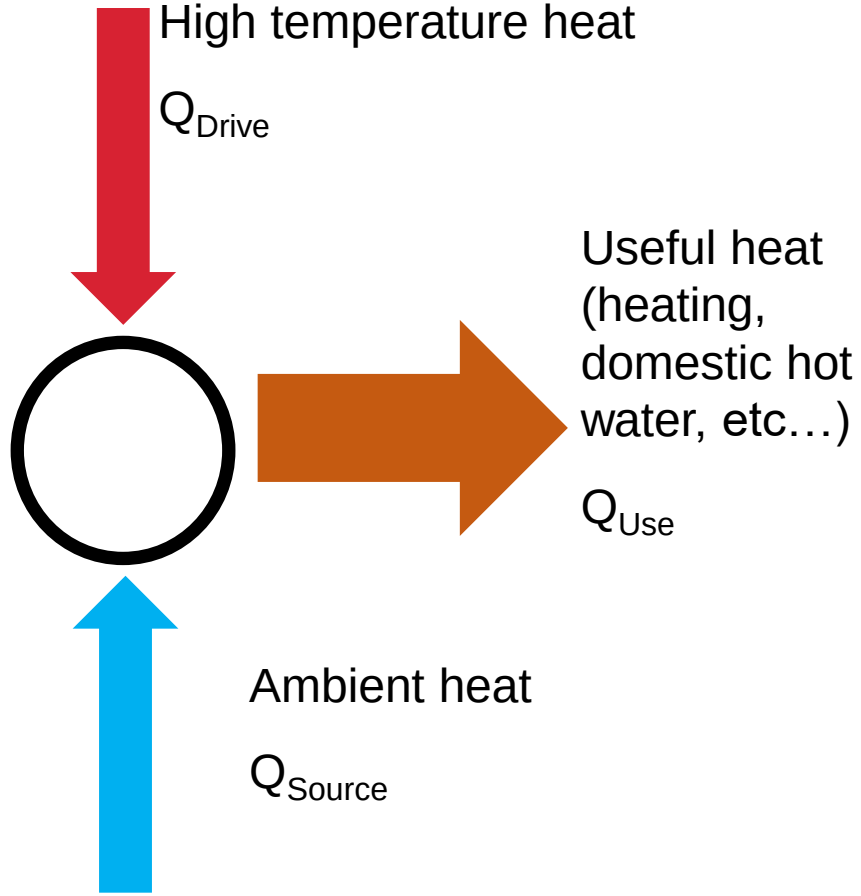
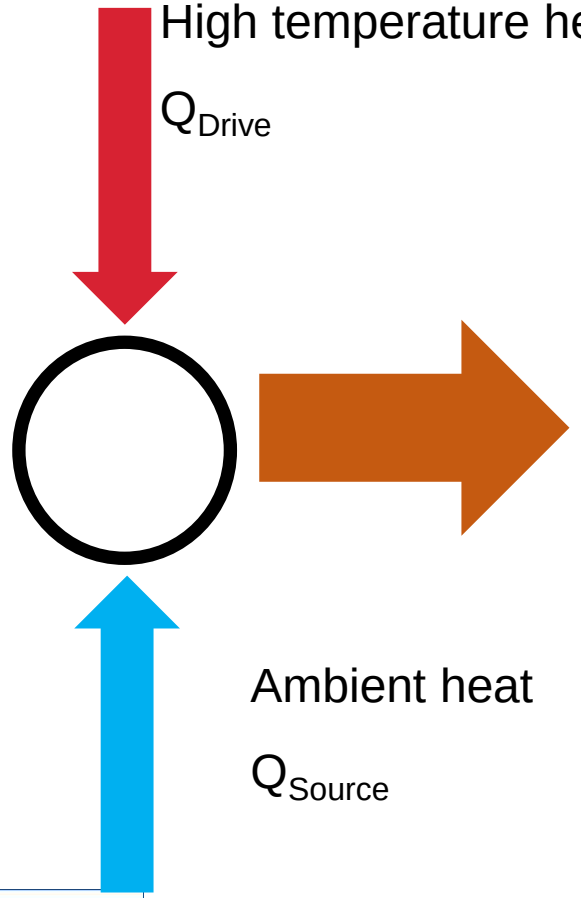
Fuel Driven (Sorption) Heat Pumps





Source: http://www.roburheatpumps.co.uk/what-is-gas-absorption/

Fuel Driven (Sorption) Heat Pumps Definitions



- Gas Utilization Efficiency $GUE = \frac{\text{effective heating capacity}}{\text{heating input}}$
- Seasonal Gas Utilization Efficiency $SGUE = \frac{\sum \text{number of hours x heatingload}}{\sum \text{number of hours x } \frac{\text{heating load}}{GUE}}$

Annex 43: “Fuel driven sorption heat pumps”

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Scope

- Fuel driven sorption heat pumps for residential and light commercial
- Focus on heating mode, reversible allowed

Goals

- Identification of market opportunities and barriers
- Identification of the potential applications and importance in future energy systems
- Identification of market supporting measures
- Easy and sustainable market entrance and development

Participants

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- Germany (OA)
- Italy
- UK
- France
- Austria
- USA
- Korea
- Sweden

Institutions

- ISE, Bosch, Viessmann, Vaillant, Stiebel, Fahrenheit
- Politechnico di Milano, CNR-ITAE, Ariston
- University of Warwick, Delta EE
- Engie, GRDF, Boostheat
- AIT, University of Graz
- ORNL, SMTI
- Korea Institute of Energy Research
- SaltX, Alfa Laval, KTH

Final report will be published this summer/fall

https://annex43.org/

https://heatpumpingtechnologies.org/annex43/

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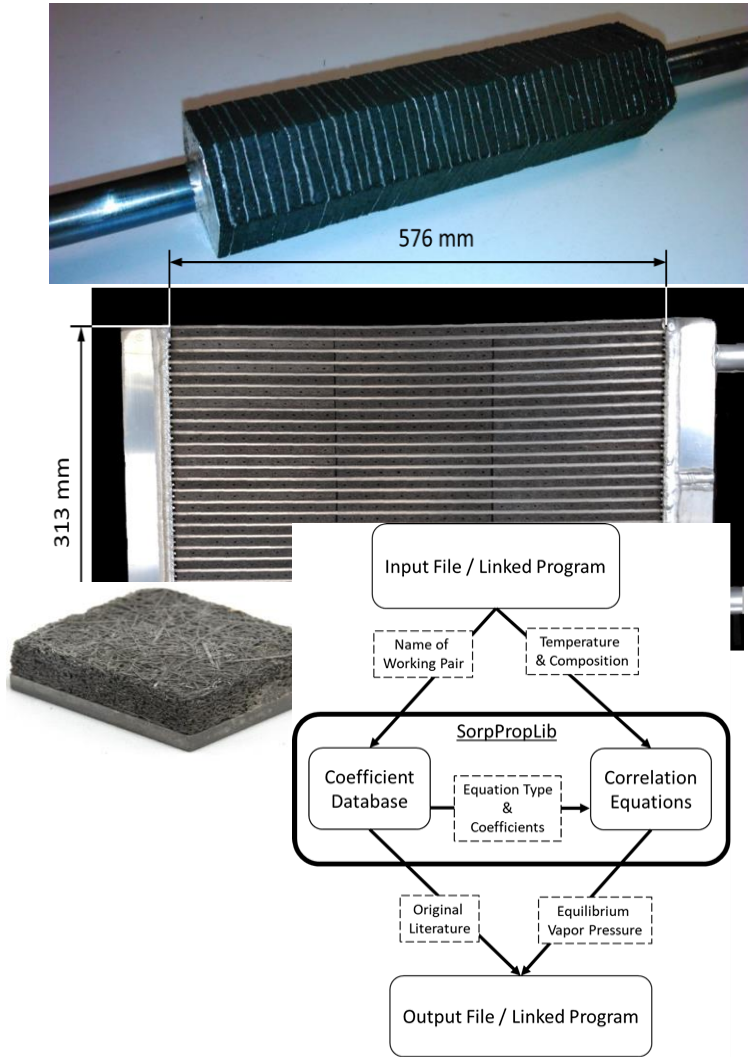
Outcomes

- Market report per country
- Database sorption working pairs, open source software
- Development projects components and apparatus (ab- and adsorption)
- Simulation studies
- Monitoring recommendations, field tests (less than expected)
- Dissemination, generate awareness and trust
- Prenormative work, recommendations to normative bodies e.g. EN 12309



Highlights

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- Very good networking between academia and industry
- Several good workshops, with science but also installers/planners..

- Several very interesting international meetings, e.g. “Sorption Friends in Sicily 2015” with > 120 participants

- Special issue “Sorption for heating and cooling” in Renewable Energy Reviews
- Round robin test among 4 labs and pre-normative work
- Material database in SorpSim: SorpPropLib

➢ Highly interactive Annex between academia and industry

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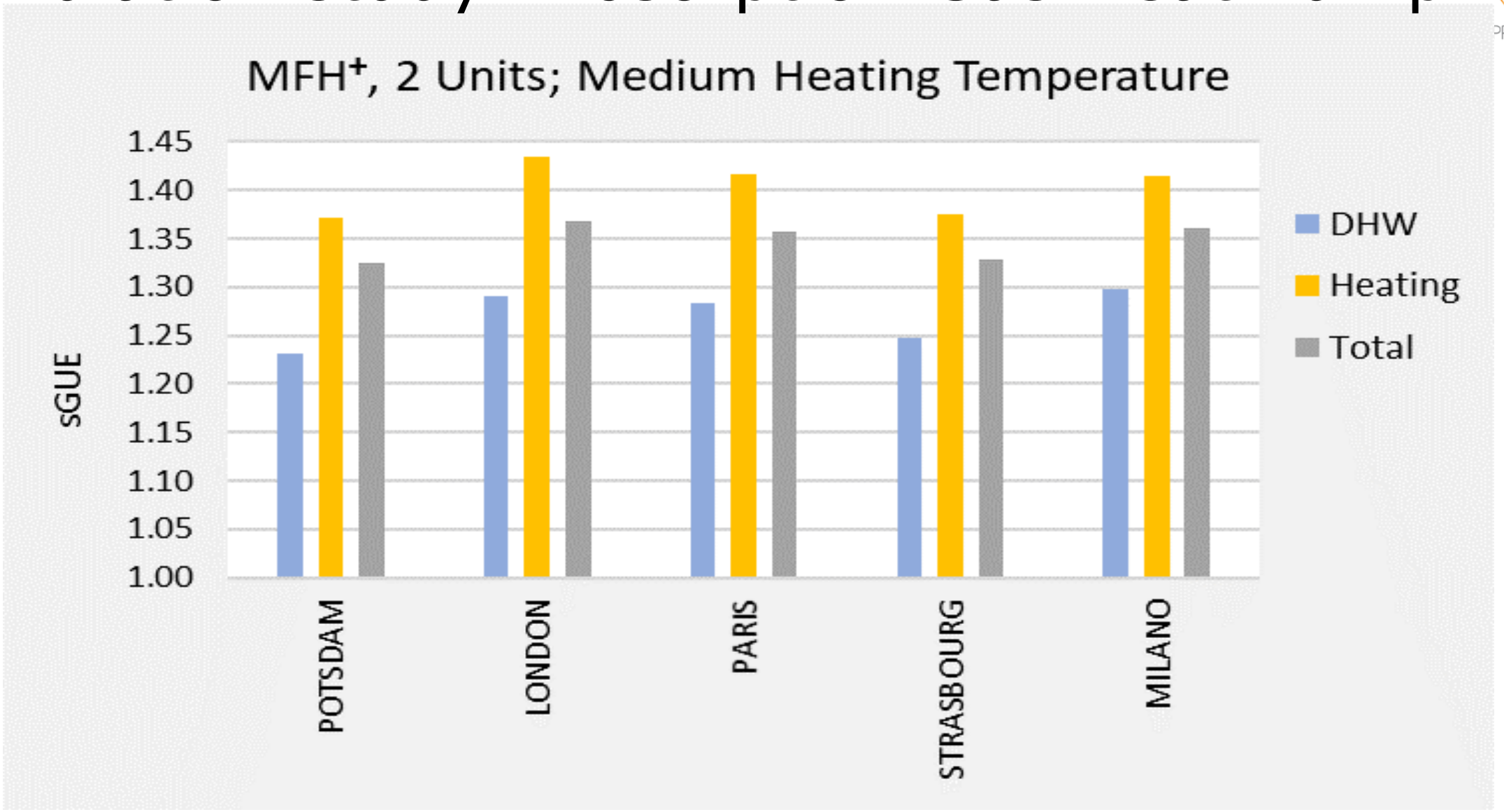
Simulation study: Absorption Gas Heat Pump



Practical experience of commercial GAHP

Targets of demonstration object:

- Illustration of outdoor installation in residential area
- Proof of significant energy and CO_2 savings

Demonstration object

- Primary school, build 1927, energy demand 150kW (~200.000 kWh/a)
- Original heating system:

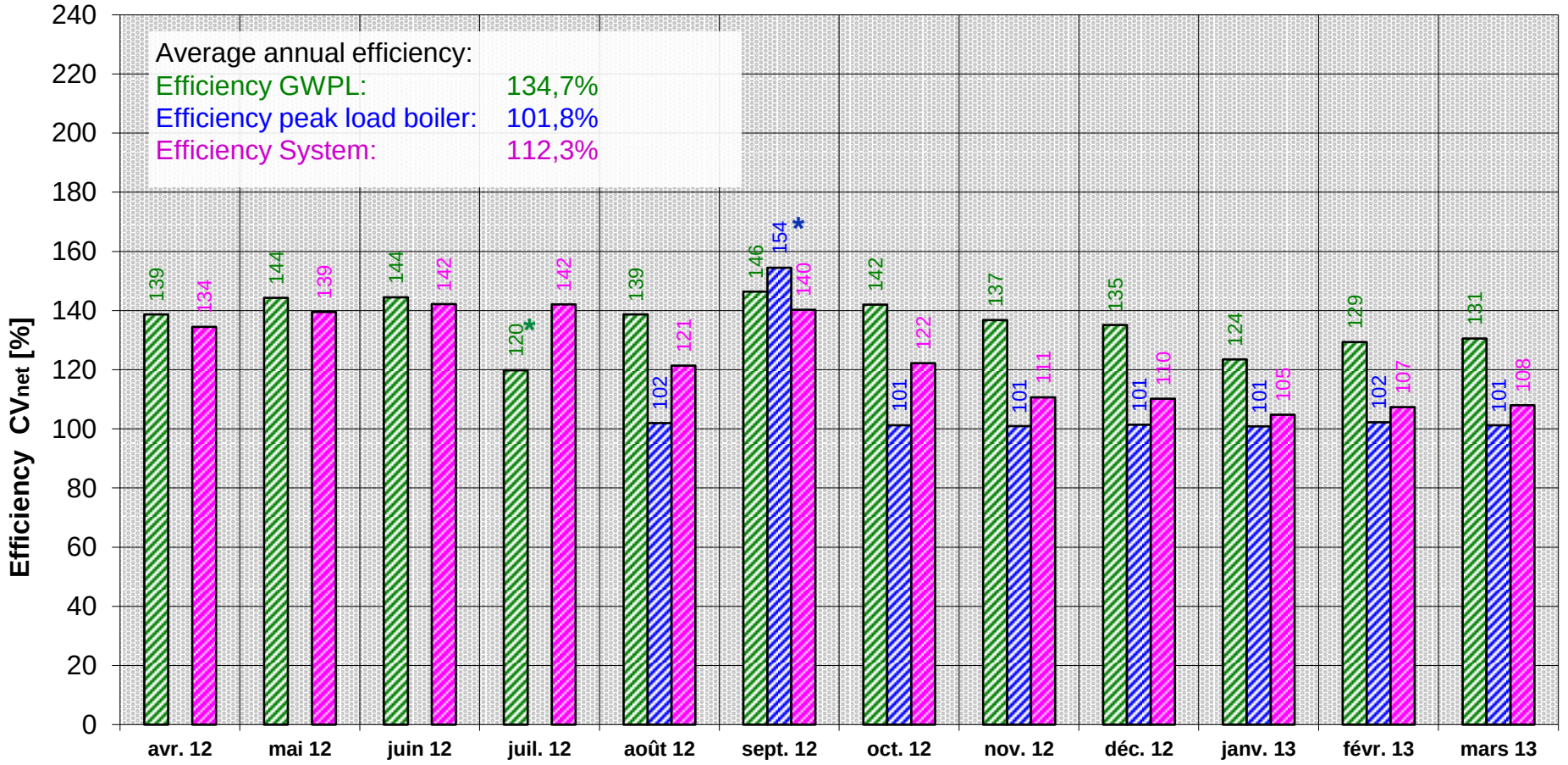
  low temperature gas boiler
- New heating system:

  Gas heat pump (40kW) for basic load

  Gas condensing boiler for peak load
- Target: energy reduction of 30%

Demonstration object

Monthly efficiencies (Net calorific value)



*some problems with recording of data led to unrealistic value

Conclusions

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Gas driven sorption heat pumps might offer solutions for

- Retrofit
- Places with limited electric power plus existing gas grid
- Optimizing the running cost depending on the gas/electricity price
- Load balancing

- few existing products, but more to come

Questions / Réponses