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# Proposal for a new Annex Fuel driven heat pumps

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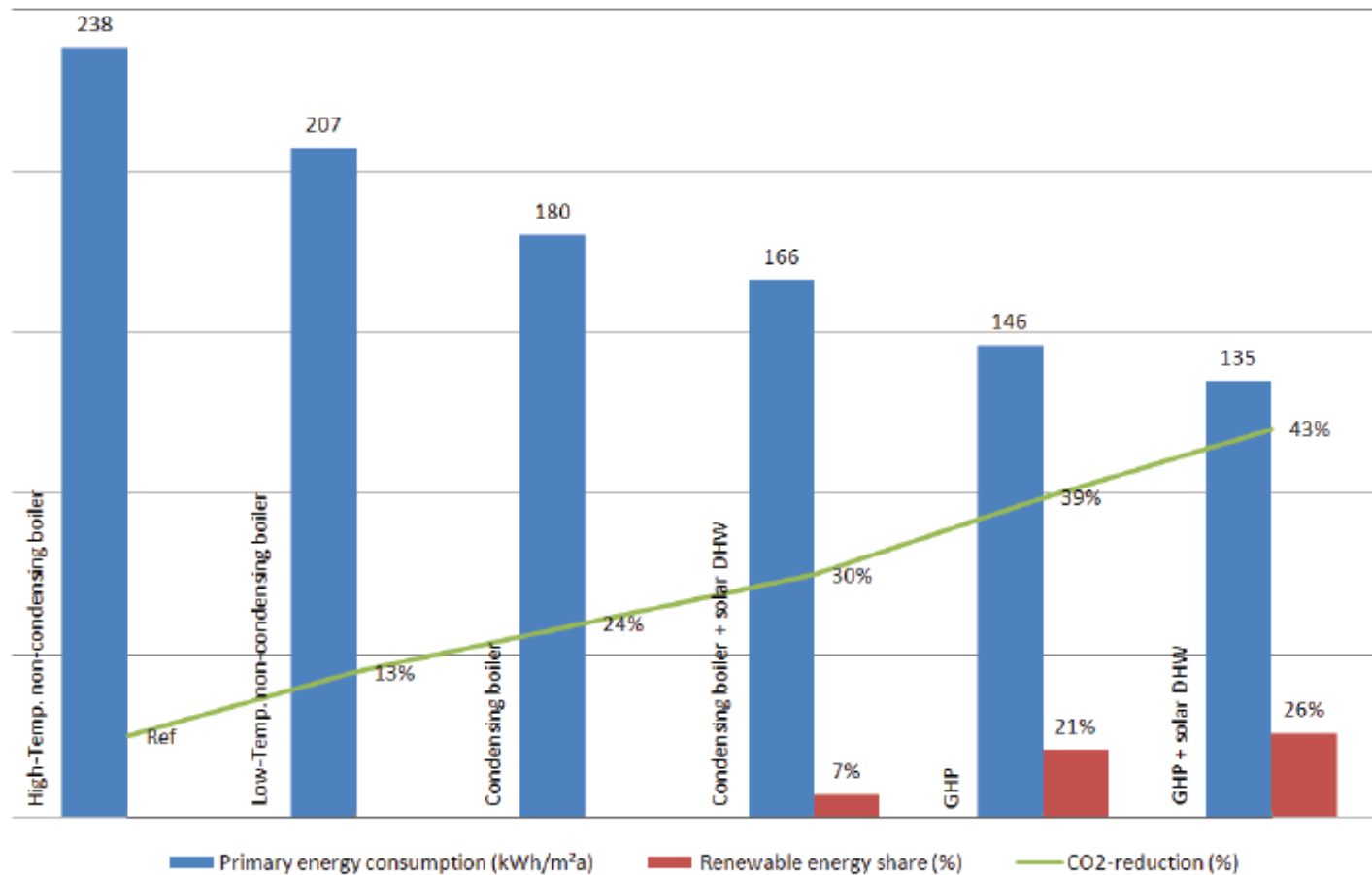
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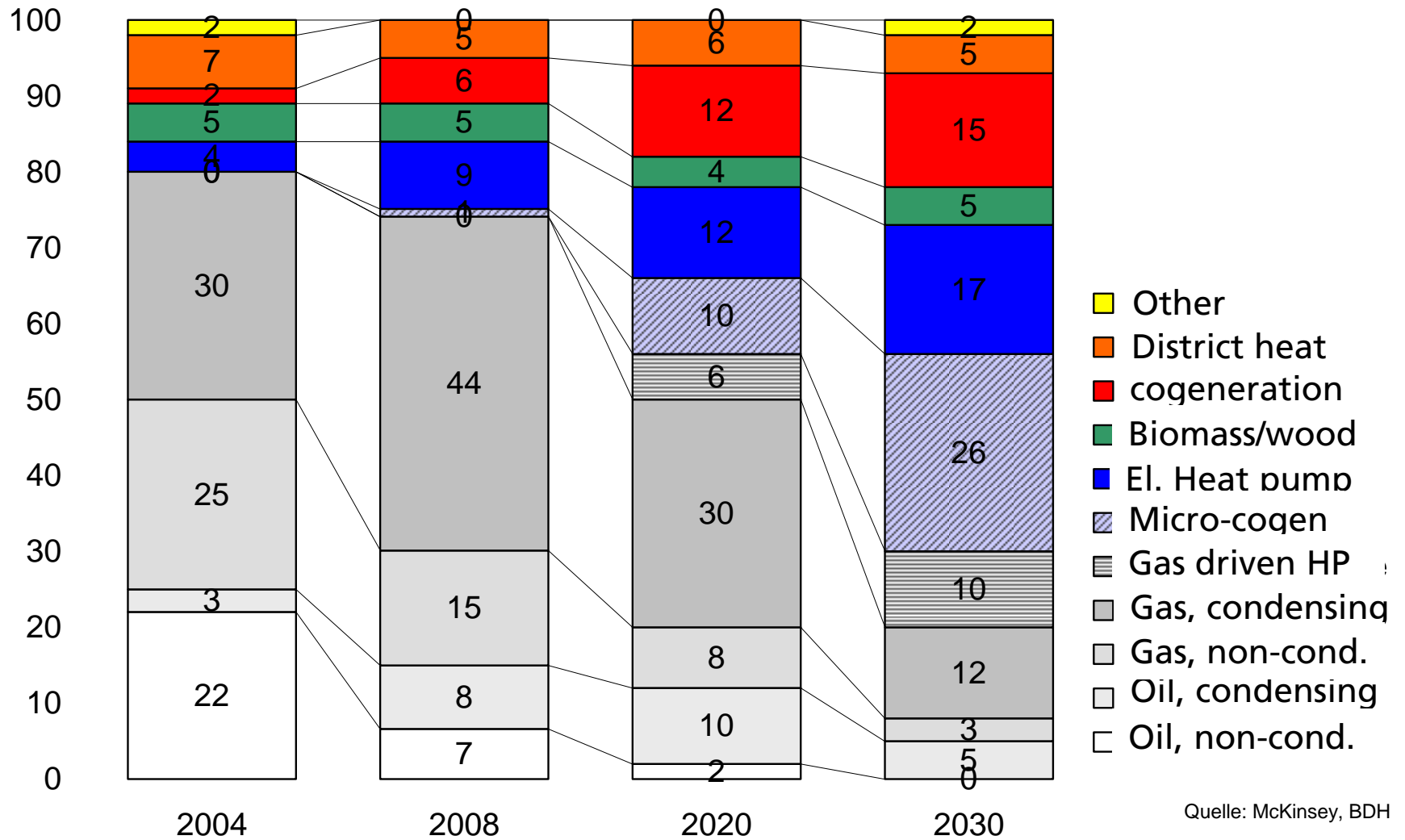
Nuremberg, 26. September 2011

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# Market for fuel/gas driven heat pumps is rising



Source: HPC newsletter 01/2011, Viessmann



# Market overview – status 11.02.11 – Absorption

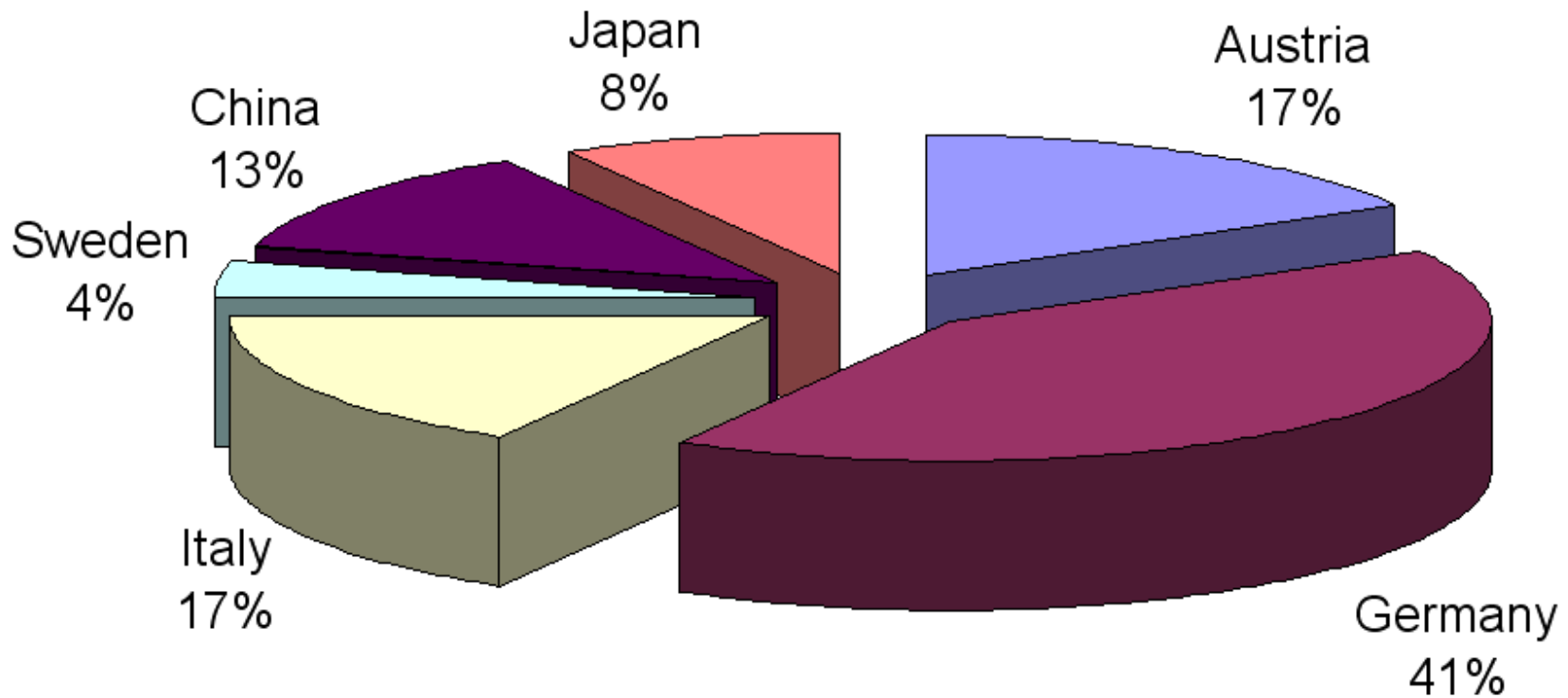
Manufacturer	Country	Product name	Working pair	cooling/heating mode	cooling / heating output (nominal)		
					kW	T_med_out / °C	T_high_In / °C
Absorption technology							
<b>Pink</b>	AT	PinkChiller PC19	Ammonia/Water	yes/yes (in theory)	38-49 / --	19.7-30.8 up to 28.1 - 38.8	85 - 105, 75 - 95
<b>Tranter Solarice</b>	DE	Type XS 30	Ammonia/Water	yes/yes (in theory)	40 / (121)	25 - 33	85 - 95
<b>AGO</b>	DE	Ago congelato ACC 50	Ammonia/Water	yes/no (in theory)	41- 50 / (145)	30 (40 for hp-example)	115
<b>Robur</b>	IT	ACF60-00HR (air-water)	Ammonia/Water	yes/yes (simultaneously)	17.93 / 25.3	10 - 70 (up to 80°C for DHW)	gas fired
		GAHP-AR (air-water)	Ammonia/Water	yes/yes (either or)	16.9 / 35.3	30 - 60	gas fired
		GAHP-GS <sup>II</sup> (brine-water), types LT and HT	Ammonia/Water	yes/yes (simultaneously)	7.9 - 17 / 31.5 - 42.6	35 - 55 (LT) 45 - 65 (HT)	gas fired
		GAHP-WS (water-water)	Ammonia/Water	yes/yes (simultaneously)	11.5 - 16.6 / 35.8 - 41.6	35 to 65 (70°C for DHW)	gas fired
<b>ECOPLUS Energy Systems</b>	AT	Helioplus LR (air-water)	Ammonia/Water	yes/yes (either or)	16.9 / 37.4	30 - 60	gas fired
	AT	Helioplus W (water-water)	Ammonia/Water	yes/yes (simultaneously)	18.4 / 40.9	25 - 65	gas fired
	AT	Helioplus S (brine-water)	Ammonia/Water	yes/yes (simultaneously)	16.9 / 37.1	25 - 60	gas fired
<b>Climatewell AB</b>	SE	ClimateWell SolarChiller 10	Water/Lithium chloride	yes/yes	7.5 / 20	30 - 45	85 - 110
<b>AbKM Klimatechnik</b>	DE	Suninverse 10	Water/Lithium bromide	yes/no (in theory)	10 / (24.3)	27-39	75 - 95
<b>Jiangsu Huineng New Energy Technology</b>	CN	RXZ-11	Water/Lithium bromide	yes/no (in theory)	11 / (27.9)	35	75 - 95
<b>Energieanlagenbau Westenfeld</b>	DE	WEGRACAL SE 15	Water/Lithium bromide	yes/no (in theory)	15 / (35)	27 - 36	80 - 95
<b>Yazaki Group</b>	JP	WFC-SC5	Water/Lithium bromide	yes/no (in theory)	17.6 / (42.7)	29.1 - 36.2	70 - 95
<b>Jiangsu Huineng New Energy Technology</b>	CN	RXZ-23	Water/Lithium bromide	yes/no (in theory)	23 / (56.8)	35	75 - 95
<b>Energieanlagenbau Westenfeld</b>	DE	WEGRACAL SE 30	Water/Lithium bromide	yes/no (in theory)	30 / (70)	35	80 - 90
<b>Jiangsu Huineng New Energy Technology</b>	CN	RXZ-35	Water/Lithium bromide	yes/no (in theory)	35 / (85)	35	75 - 95
<b>Yazaki Group</b>	JP	WFC-SC(H)10	Water/Lithium bromide	yes/no (in theory) heating mode for DHW production	35.2 / (85.4 and 48.7DHW)	29.3 - 36.5 55 in heating mode	70 - 95

# Market overview – status 11.02.11 – Adsorption – Ammonia/water

Manufacturer	Country	Product name	Working pair	cooling/heating mode	cooling / heating output (nominal)		
					kW	T_med_out / °C	T_high_In / °C
<b>Adsorption technology</b>							
<b>Vaillant Deutschland</b>	DE	zeoTHERM 10 kW	Water/Zeolite	no/yes	-- / 1.5 - 10	20 - 75	gas fired
<b>Sorption Energy</b>	UK	GFHP (no name yet)	Ammonia/Active carbon	no (in theory)/yes	-- / 7	15 - 80	gas fired
<b>SorTech</b>	DE	ACS 08	Water/Silica gel	yes/primed	8 / 21.5	22 - 37 (cooling) 33 - 45 (heating)	55 - 95
<b>Invensor</b>	DE	InvenSor LTC 09 (old: LTC 07)	Water/Zeolite	yes/yes	9 / 23.8	30.2 - 42.7	45 - 75
<b>Invensor</b>	DE	InvenSor HTC 11 (old: HTC 10)	Water/Zeolite	yes/yes	11 / 31.8	33 - 48	65 - 95
<b>SorTech</b>	DE	ACS 15	Water/Silica gel	yes/primed	15 / 40.3	22 - 37 (cooling) 33 - 45 (heating)	55 - 95

# Manufactures of thermally driven heat pumps world wide

(only number of companies claiming a product, no market volume)



Total numbers: 25

# Reasons for a new annex “Fuel driven heat pumps”

- market for fuel driven heat pumps is rising
- emerging technology just starting to enter market
- big need for quality insurance measures
- big need to optimize best system configurations for different applications
- need for standards on test procedures
- need for common understanding of field tests.

# focus

- fuel driven heat pumps < 50 kW  
(or better focus on market e.g. residential and light commercial ?)
- focus on heating mode, reversible allowed

# goals

- easy and sustainable market entrance and deployment
- identify market barriers and opportunities
- identify the potential markets and importance in future energy systems
- identify market supporting measures

# means

- Field test of different fuel driven heat pumps
- compare different system configurations e.g. different sources
- evaluate different technologies for different applications  
e.g. retrofit versus new buildings
- classification of system schemes → generic system layout
- potential study, roadmap

# Potential work structure

## A: Generic systems and system classification

- Available sources and heating systems
- Control strategies
- Evaluate different fuels (oil, gas, wood, no hot water)

## B: Technology transfer

- Link research to industrial development for faster market penetration of new technologies
- Novel materials, components and system designs (e.g. facade collector as heat source)

## C: Market potential study and technology roadmap

- Simulation study to evaluate different technologies in different climate zones, different building types and standards
- Combine with market data and actual building stock for technology roadmap

# Potential work structure

## D: Field test and performance evaluation

- Measurement/monitoring procedures standardization (e.g. how to cope with different fuel quality, system boundaries, aux. energy etc.)
- Continue work from Annex 34 and Task 44 and extend standards to seasonal performance factors on system level
- Develop quality ensurance procedures

## E: Policy measures and recommendations, information

- dissemination
- workshops for planners, installers and decision makers
- technology roadshow
- develop recommendations for policies e.g. building codes and funding schemes

# Interest expressed from

- Austria
- France
- Germany
- Italy
- UK
- Netherlands

# Related work:

- Control strategies for gas heat pumps
  - Field and lab test of gas heat pumps in Berlin
- Heat4You EU-FP7 european field test and simulations
  
- Field test of several companies in several countries
- Several building codes and funding schemes discussing GDHP
- New standards in discussion