TRIPLEAQUA
Heat, cool and store in one go

EUROPE ATMOsphere

1st ZERO – CARBON TOWN HALL - VEERE (NL)

from burning natural gas… to natural gas in a heat pump

We have just one

with a world wide problem !

e

EUROPE ATMO sphere

Who is No.1 in CO_2 emissions ?

TRIPLEAQUA
Heat, cool and store in one go

HEATING & COOLING of BUILDINGS !

FOSSIL FUEL CAUSES 33% CO_2

TRIPLEAQUA
Heat, cool and store in one go

Stop fossil fuel

CO_2 emission




Opportunity for the

Heat Pump

Solar & Wind

Green Electricity


Since 1300

Where and what is…

CITY OF VEERE

Town Hall VEERE

- Built in 2001
- Volume 14270 m^3
- Surface heated 4060 m^2
- Surface cooled 3340 m^2

the old HVAC installation needed replacement

- Separate Air con System
- 117 water cooled HP- units
- 2 Dry Coolers
- > 100 kg R407C Refrigerant

- 400 kW gas
- Condensing boiler
- AHU + HR

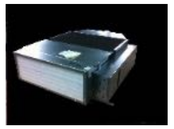
the new installation

TRIPLEAQUA

Heat, cool and store in one go

- 1 x Central Heat Pump with internal Energy Storage

- 3 Water pipes: **WARM** , **COLD**, **RETURN**



- 102x Ultra efficiënt indoor units

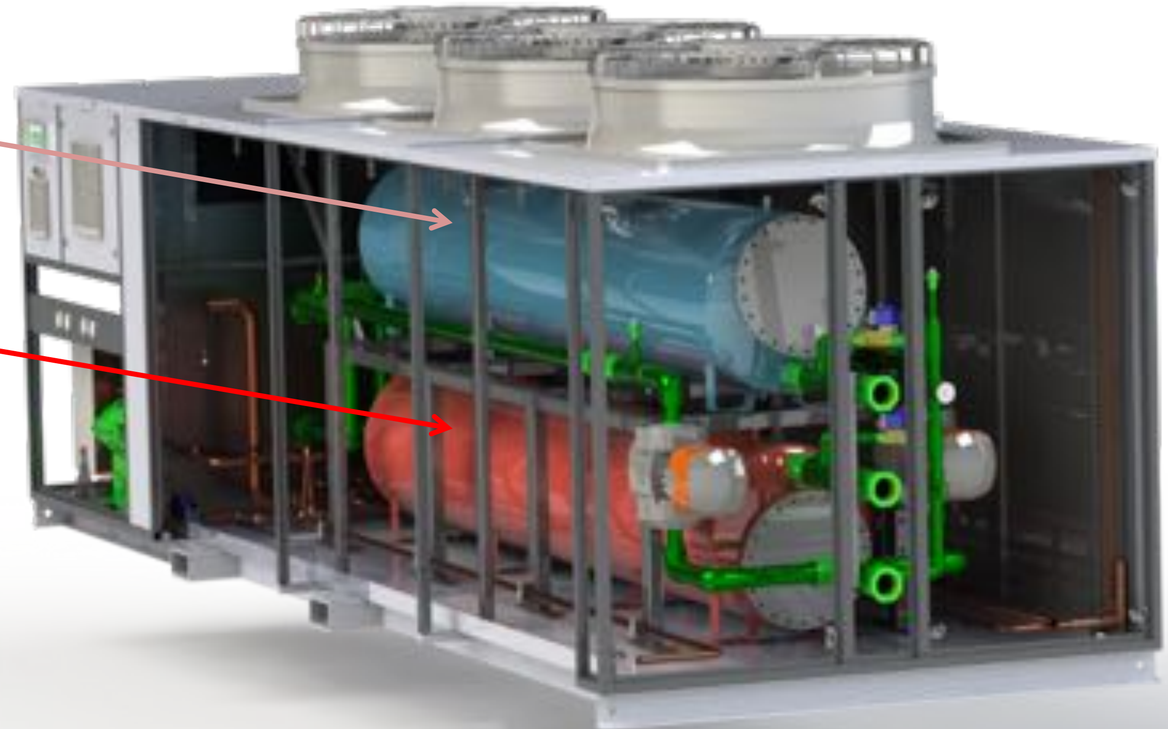
Internal energy storage COLD + WARM

The storage tanks store waste heat / cold for passive (= FREE) re-use at a delayed moment

PCM

13°C

32°C



Up to **245 MJ /day** (68 kWh) Th

Up to **50 % extra energy saving**

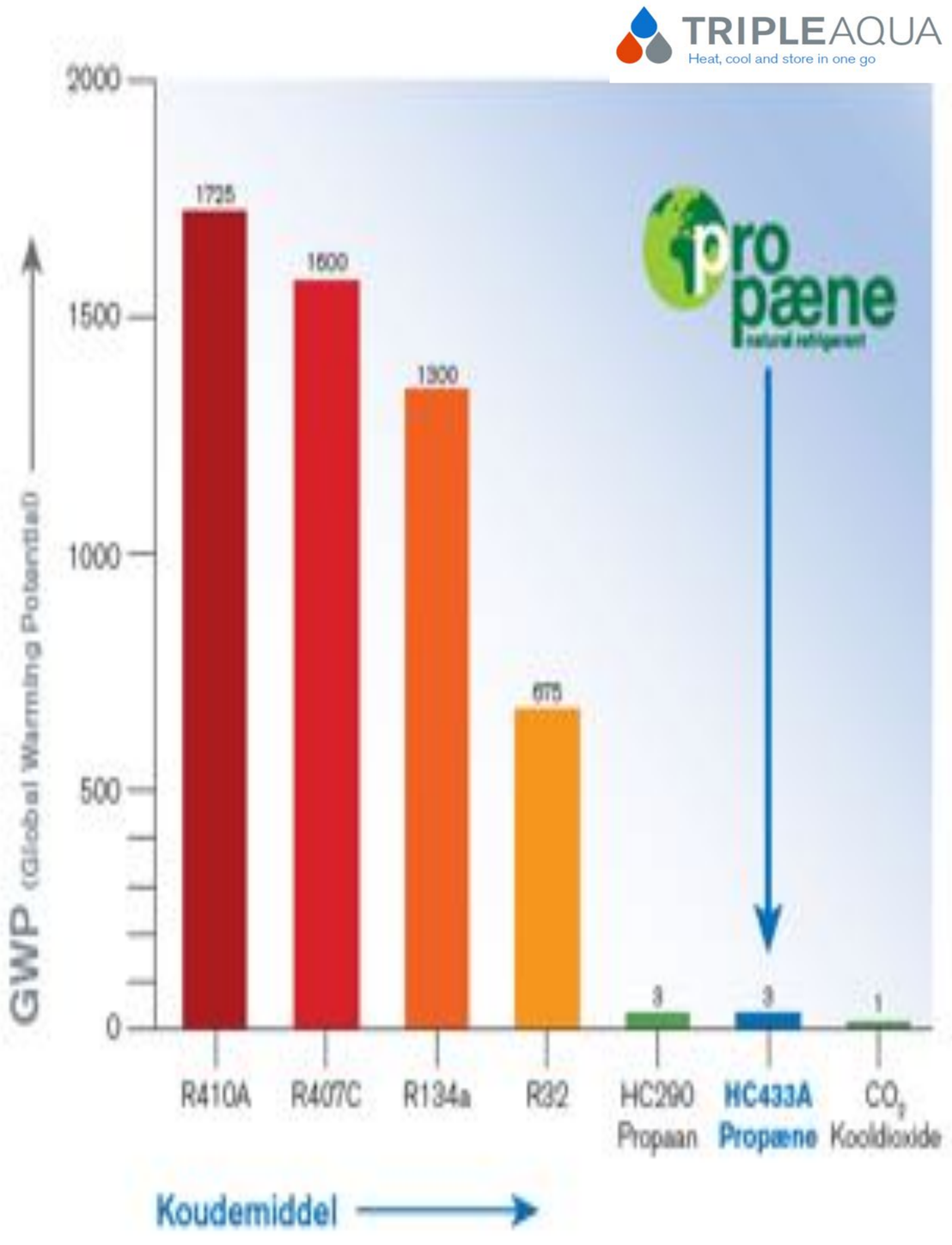
Natural refrigerant

Very low charge

± 150 gr / kW

Natural smell

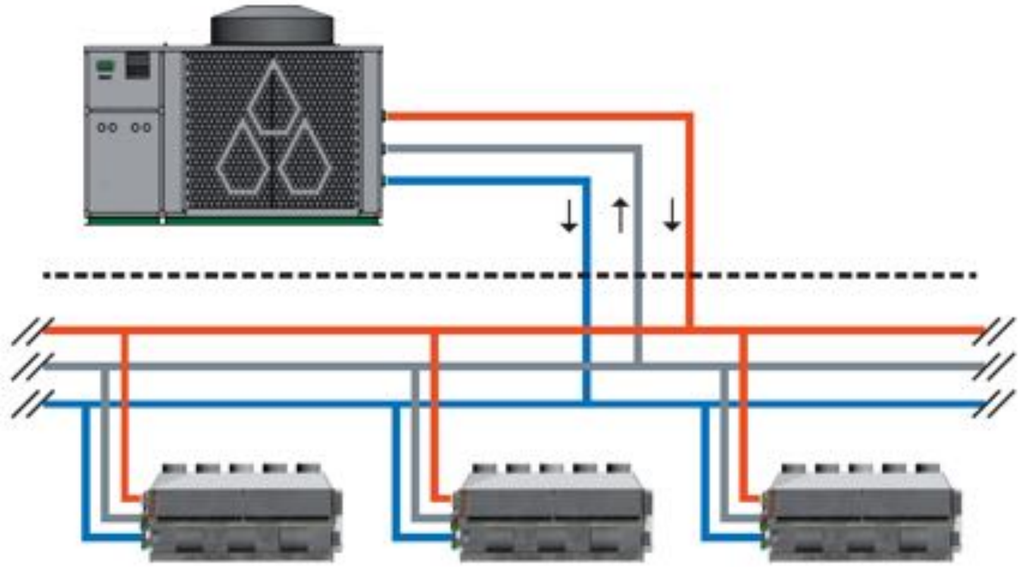
TRIPLEAQUA
Heat, cool and store in one go



INNOVATION : not 4 but 3 water Pipes

Traditional:

heating	45 to 70°C
cooling	6 to 12°C



TripleAqua:

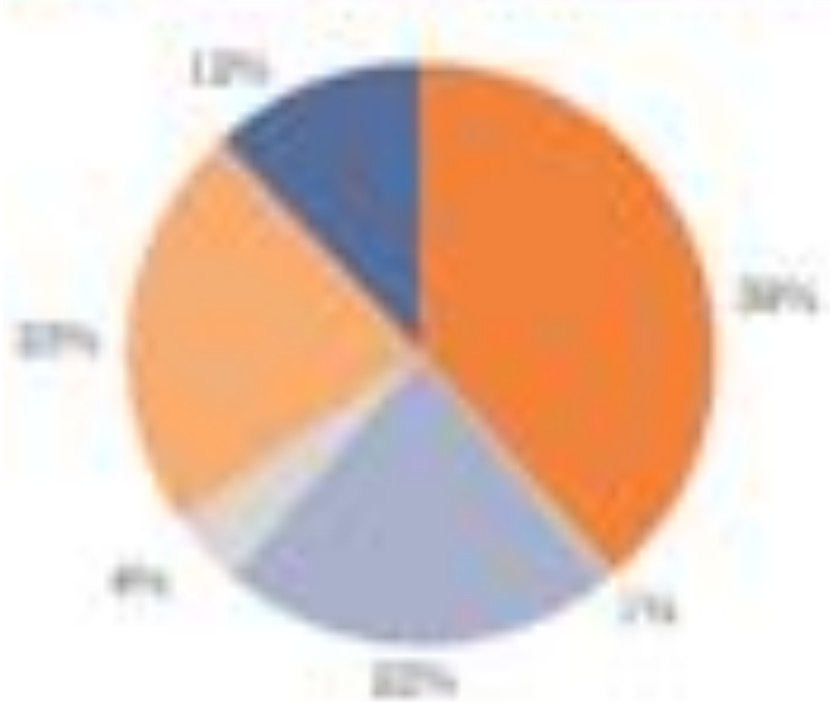
heating	28 to 36°C
cooling	12 to 18°C
return	around building temperature

25% less installation costs

3% COP improvement per °C

Energy profile office

EPBD Recast (Energy Performance of Buildings Directive)
2019 Goal = Near energy zero



OFFICE

HEATING	**39%**
TAP WATER	1 %
LIGHTS	22%
VENTILATION	3%
COOLING	**23%**
Miscell.	12%

dena Deutsche Energie-Agentur — German Energy Agency

Die äußerst heterogene Gebäudegruppe der Büroimmobilien ist die größte Untergruppe der Nichtwohngebäude (NWG) und besitzt somit ein großes Energiesparpotenzial. Laut dena-Studie existieren in Deutschland insgesamt 323.700 Büro- und Verwaltungsgebäude mit 382,4 Mio. m² Nutzfläche. Ihr Energieverbrauch entspricht rund 20 % aller NWG und rund 6 % des gesamten Gebäudesektors. Der durchschnittliche Energieverbrauch liegt bei 136 kWh pro m² und Jahr. Insbesondere bei älteren Gebäuden liegen die Verbrauchswerte über dem Durchschnitt, während bei Gebäuden, die seit 2009 errichtet worden sind, der Kennwert mit 111 kWh/(m²·a) deutlich unterdurchschnittlich ist

65% = HVAC / Climate : ± 70 ~ 90 kWh/m² yr

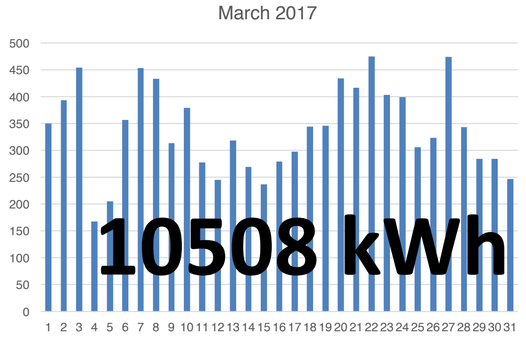
65%

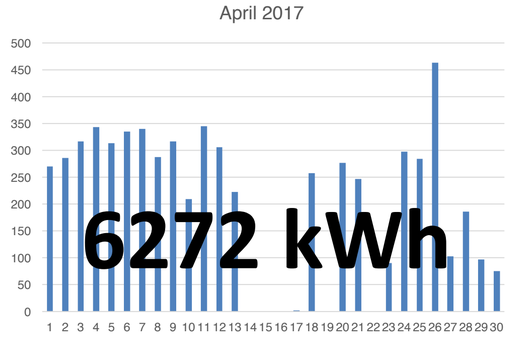
65%

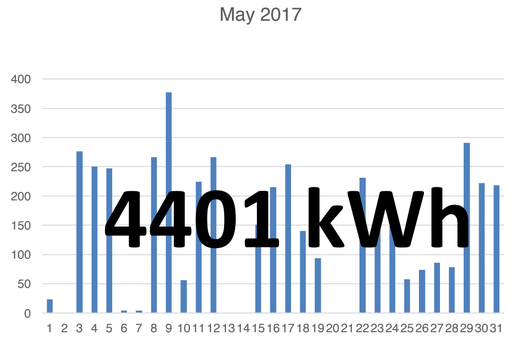
Source: ING Real Estate

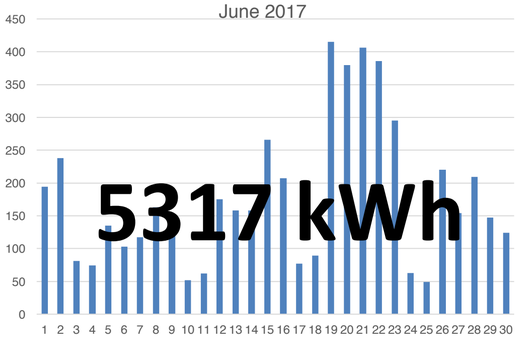
Source: dena.de
Publication 9196

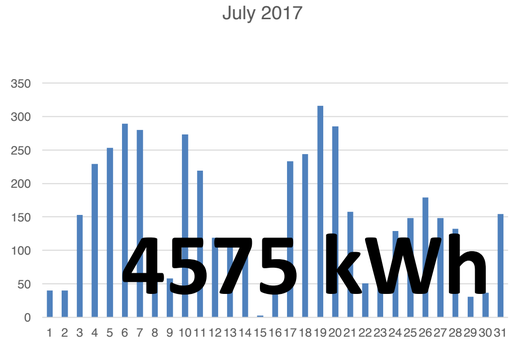
The new Propæne heat pump : 33800 kWh in ½ year

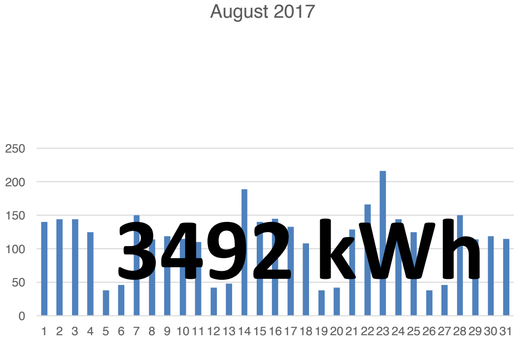












Let’s look at Energy Usage !

TRIPLEAQUA
Heat, cool and store in one go

OLD HVAC SYSTEM		TOTAL 2016		
GAS BOILER	24444 m3 gas	239551	(4)	kWh
Dry Cooler	(1.4% of 363961 kWh)	5082		kWh
Old Pumps	(4.7% of 363961 kWh)	17063		kWh
Local HVAC units		153233	(1)	kWh
Fans & Air Handling Unit		16583		kWh
		+		
TOTAL HVAC eq.		431512		kWh
HVAC Energy figure			107	kWh/m²yr
Office and Lights		172000		kWh
TOTAL BUILDING		603512		kWh
Total Energy figure			149	kWh/m²yr

The building has not changed at all

TRIPLEAQUA PROPAENE HEAT PUMP	SUMMER Mar ~ Aug 2017	WINTER (3) Sep ~ Feb 2018	TOTAL 2017		
	0	0			
	0	0			
	0	0			
	0	0			
TripleAqua Heat Pump	33843	72720	106563	kWh	
Fans & Air Handling Unit	8083	10000	18083	kWh	(2)
			+		
TOTAL HVAC	41926	82720	124646	kWh	
HVAC Energy figure			31	kWh/m²yr	
Office and Lights	82000	90000	172000	kWh	(2)
TOTAL BUILDING			296646	kWh	
Total Energy figure			73	kWh/m²yr	

(1) estimated value deducted from total recorded
(2) value deducted from present consumption data
(3) predicted based on 40 yrs weather data KNMI Vlissingen @ 1800 Heating Full Load Hours
(4) 1 m3 gas equals 9.8 kWh

TRIPLEAQUA
Heat, cool and store in one go

Energy Result :

Old system: 107 kWh/m²yr

Propæne heat pump 31 kWh/m²yr

Saving: 70% primairy energy
€ 16 000 / year

- From 43.5 to zero Tons CO_2
- NO F Gas R407C
- NO Gas boiler
- Only heat pumps & solar !
- Ultra silent operation & excellent comfort
- Future proof solution

TRIPLEAQUA
Heat, cool and store in one go

Highest comfort
Silent operation
Renovation EXAMPLE to other buildings

Added value to the property
Ultra low operational costs
Short R O I

pro pæne
natural refrigerant

100% natural refrigerant
Zero Carbon emission
Solar and Wind powered

TRIPLEAQUA

Heat, cool and store in one go

Menno van der Hoff

www.tripleaqua.com


EUROPE
ATMO
sphere
Thank you very much!