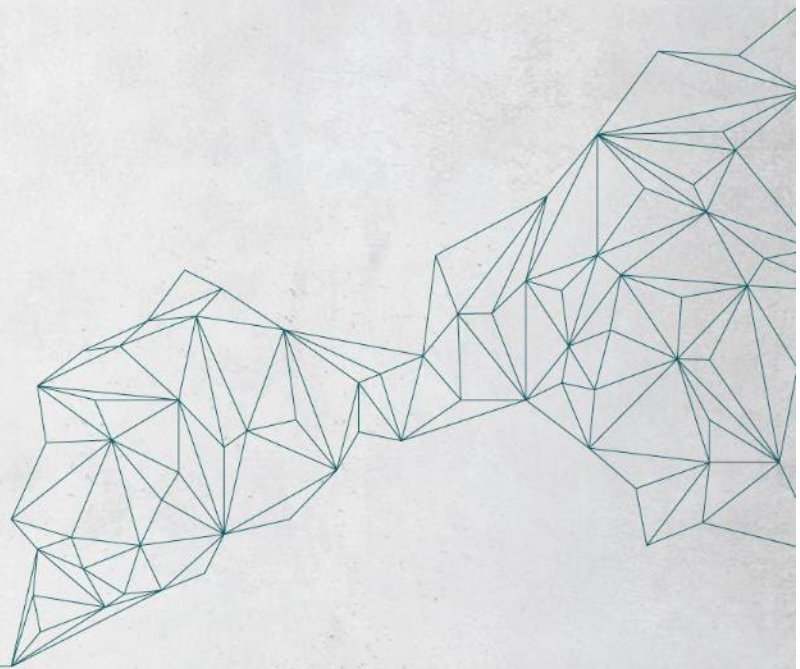
CHILLVENTA

Chillventa Specialist Forums 2022
Chillventa Fachforen 2022

CONNECTING EXPERTS.



ADVANSOR

CLIMATE SOLUTIONS

Kristian Breitenbauch, 11. October 2022

Welcome

Kristian Breitenbauch
CEO

krb@advansor.com

Agenda

1. Why do we need a climate solution
2. What is a climate solution
3. What are the benefits
4. Refrigerants and effects
5. Advansor´s role
6. Cases
7. Questions

Energy Consumption

- Cooling and heating demand represents 50% of energy consumption
- Combined cooling and heating solutions reduce overall loss
- Reduced loss gives a high energy efficiency overall

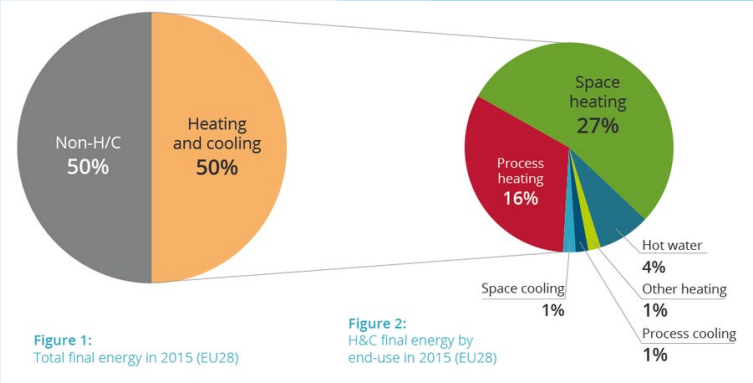


Figure 1:
Total final energy in 2015 (EU28)

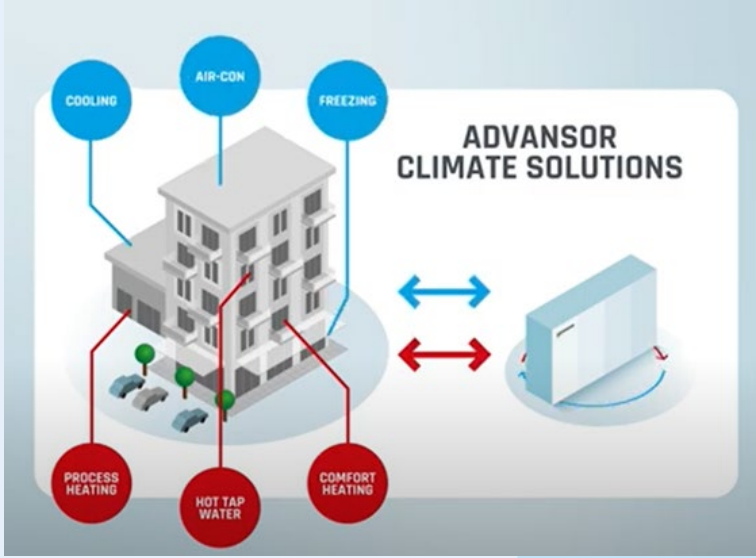
Figure 2:
H&C final energy by end-use in 2015 (EU28)

Source: Heat Road Map Europe 2050 https://heatroadmap.eu/wp-content/uploads/2019/03/Brochure_Heating-and-Cooling_web.pdf

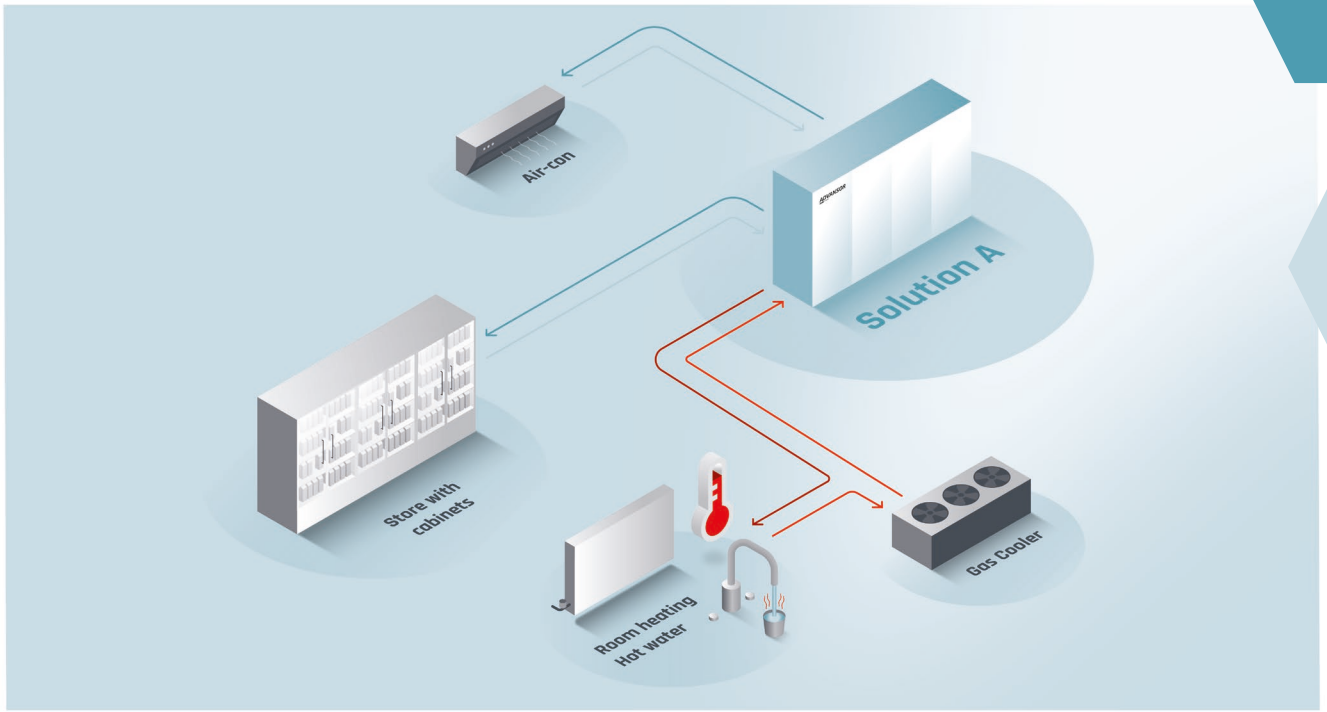
Climate Solutions

Combining cooling, freezing, air-conditioning and heating in one system:

- Increases energy efficiency
  - No energy is wasted
- Helps to phase out fossil fuels
  - No oil or gas boiler needed
- Ensures lower total cost of ownership
  - One solution requires less installation and maintenance costs



Climate Solution: Food Retail



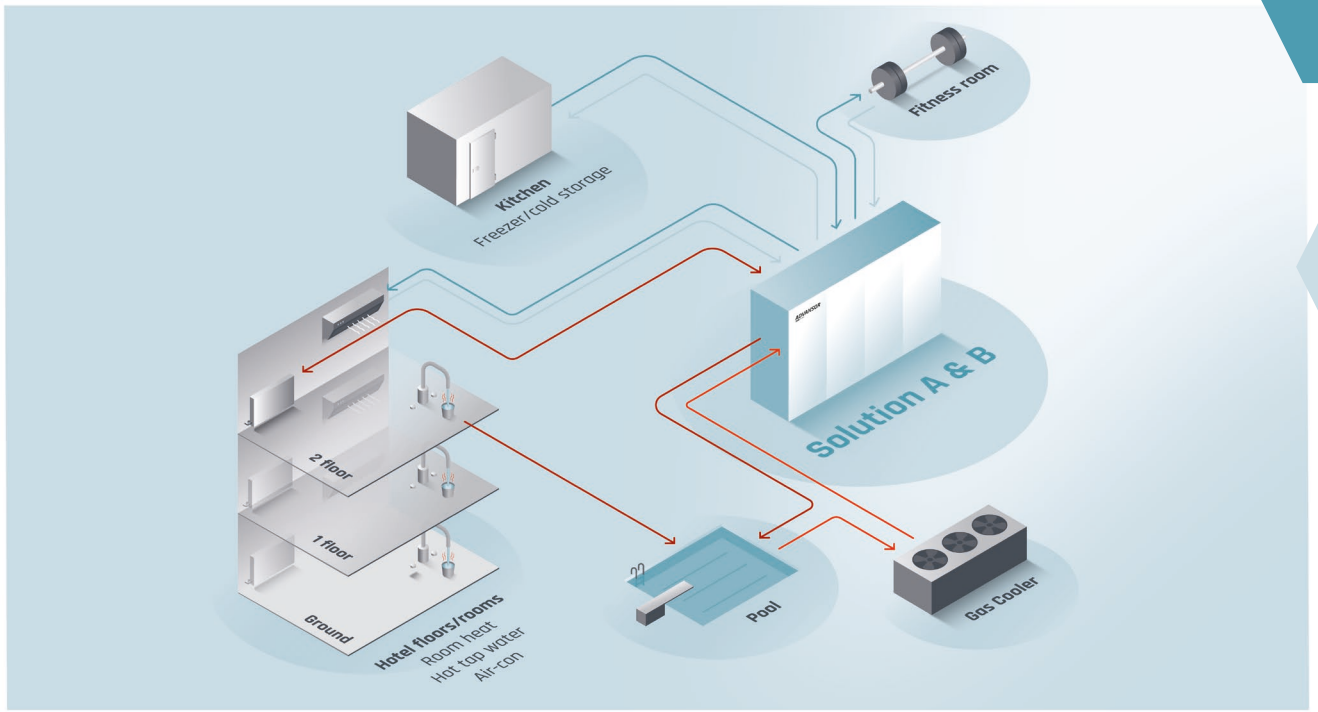
Cooling

Freezing

Air-con

Heating

Climate Solution: Hotel



Cooling

Freezing

Air-con

Heating

ADVANSOR

ADVANSOR CLIMATE SOLUTIONS

ADVANSOR

Refrigerants and effects

To run a climate system with cooling and heating, we need a refrigerant.

Refrigerants

1) CFC - Ozone depletion
2) HFC - Global warming
3) HFO - Environmental effect
4) Natural refrigerants like CO_2 and ammonia

Climate systems will leak =>
refrigerants end up in the atmosphere

Refrigerants

Refrigerant	Type	Composition	GWP 100 years	"Real" GWP 20 years	ODP	Toxity / Flammable
R404A	HFC	44% R125 / 4% R134a / 52% R143a	4,200	6,600	0	A3 Highly flammable
R22	HFC	100% R22	1,780	5,310	0.05	A3 Highly flammable
R407A	HFC	20% R32 / 40% R125 / 50% R134a	2,100	4,500	0	A3 Highly flammable
R410A	HFC	50% R125 / 50% R32	2,100	4,500	0	A3 Highly flammable
R407C	HFC	23% R32 / 25% R125 / 52% R134a	1,700	4,100	0	A3 Highly flammable
R134a	HFC	100% R134a	1.360	3,810	0	A3 Highly flammable
R448A (Solstice N40)	HFC/ HFO	26% R32 / 26% R125 / 21% R134a / 7% R1234ze / 20% R1234yf	1,400	3,100	0	A3 Highly flammable
R32	HFC	100% R32	704	2,530	0	A2L Mildly flammable
R452B (Opteon XL55)	HFC/ HFO	67% R32 / 7% R125 / 26% R1234yf	710	2,100	0	A3 Highly flammable
R513A (Opteon XP10)	HFC/ HFO	44% R134a / 56% R1234yf	600	1,700	0	A3 Highly flammable
R454B	HFC/ HFO	68.9% R32 / 31.1% R1234yf	490	1,700	0	A2L Mildly flammable
R744	Natural	CO_2	1	1	0	A1 Non-flammable
R600a	Natural	Isobutane	< 1	< 1	0	A3 Highly flammable
R290	Natural	Propane	< 1	< 1	0	A3 Highly flammable
R1270	Natural	Propylene	< 1	< 1	0	A3 Highly flammable
R717	Natural	NH_3	0	0	0	B2L Toxic less flammable
R718	Natural	H_2O	0	0	0	A1 Non-flammable
R729	Natural	Air	0	0	0	A1 Non-flammable

Source: https://atmosphere.cool/fact_sheets/impact-of-refrigerants-fact-sheet-1-v-1-1/

Refrigerants total effect – Green House gases

- Refrigeration ranked as number 1 solution (Project Drawdown, 2017)
- Refrigerant management
  - Phase out HCFCs
  - Introduce low-GWP and energy efficient alternatives
  - Control leaks of refrigerants
  - Ensure recovery/recycling and destruction of refrigerants at end of life
- Natural refrigerants
  - Safe for environment
  - Low GWP and low ODP

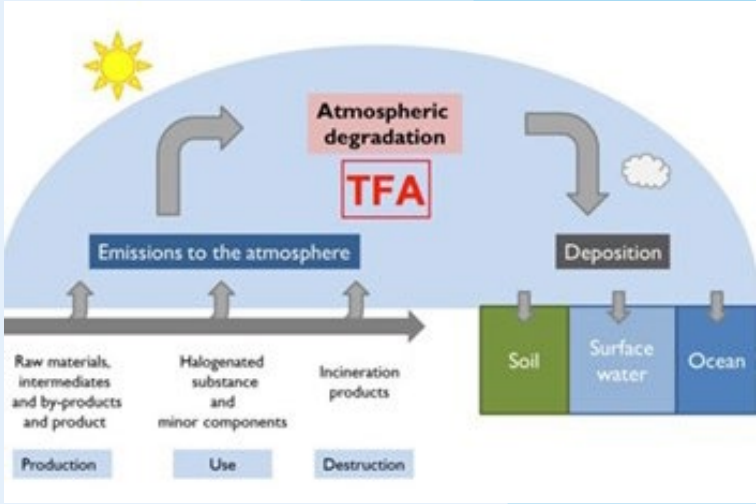
Refrigeration is ranked number 1 when it comes to greenhouse emissions reduction potential.

SOLUTION	SECTOR(S)
Reduced Food Waste	Food, Agriculture, and Land Use / Land Sinks
Health and Education	Health and Education
Plant-Rich Diets	Food, Agriculture, and Land Use / Land Sinks
Refrigerant Management	Industry / Buildings
Tropical Forest Restoration	Land Sinks
Onshore Wind Turbines	Electricity
Alternative Refrigerants	Industry / Buildings
Utility-Scale Solar Photovoltaics	Electricity
Improved Clean Cookstoves	Buildings
Distributed Solar Photovoltaics	Electricity
Silvopasture	Land Sinks
Peatland Protection and Rewetting	Food, Agriculture, and Land Use / Land Sinks
Tree Plantations (on Degraded Land)	Land Sinks
Temperate Forest Restoration	Land Sinks
Concentrated Solar Power	Electricity
Insulation	Electricity / Buildings
Managed Grazing	Land Sinks
LED Lighting	Electricity

Source: https://drawdown.org/solutions/table-of-solutions

PFAS – or Forever Chemicals

- Synthetic chemicals
- Contains carbon-fluoride bonds
- Persist in the environment longer than any other man-made substance
- Absorbed in humans and plants
- Contaminates groundwater and drinking water



Source: https://r744.com/experts-sound-the-alarm-about-rising-tfa-levels/


WE DESIGN AND PRODUCE
THE WORLD´S BEST SUSTAINABLE
CO_2 CLIMATE SOLUTIONS
ADVANSOR

Status Advansor

- Over 12,000 systems with CO_2 manufactured and installed
- For commercial and industrial customers all over the world
- From 10 kw to 6 MW systems
- Fully factory tested and CE marked
- 18 of Europe's top 20 retailers install CO_2 systems from Advansor

WE'RE COOL WITH CO_2

Many people associate CO_2 with global warming. We're cool with that. Literally. Because CO_2 is the most climate-friendly refrigerant:

- It doesn't contribute to global warming
- It doesn't affect the ozone layer
- It's non-toxic
- It´s non-flammable
- It doesn't harm our drinking water
- It's very energy efficient

That's why we are 'cool with CO_2'.

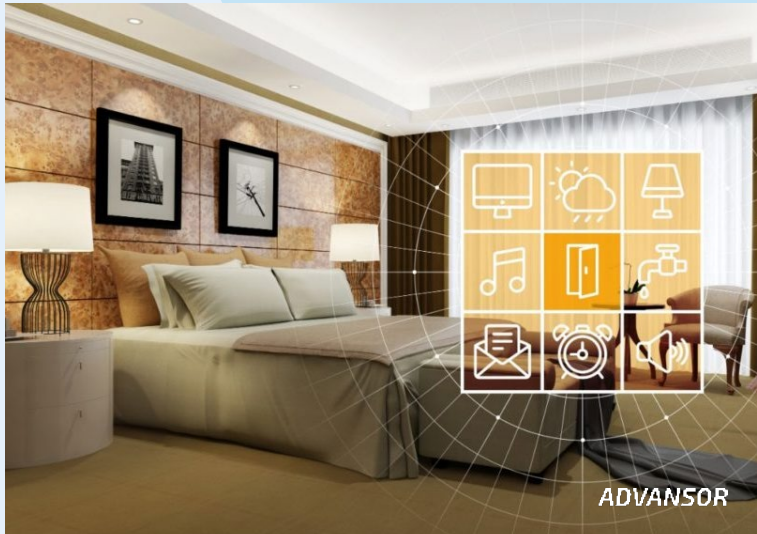
Hotel Norway

- Buildings with complex system for hot water, heating and cooling.
- Hot water accounts for 40-70 % of a typical hotel's total energy usage, in two peaks during the early morning and late evening.

Solution

- Combined cooling, heating and air-con solution
  - Heat Recovery
  - Chiller Module
  - Water cooled gas cooler
- Heat storage provides a buffer to cover excess demand during peak times.
- CO_2 is an ideal natural working fluid for heat pump systems and commercial refrigeration.
- Lower energy usage, lower costs, and less impact.

63% reduction in the use of electricity for heating and cooling the first two years. For an average hotel, this represents a 44% reduction in total electricity usage.



Danish Fish Auction

- Needed a full climate solution for cooling, freezing and heating.
- Was using R404 (GWP 3922) and R22 (GWP 1810).
- Wanted to shift to natural refrigerants to become more sustainable.

Solution

- Combined cooling, freezing and heating solution
  - 385 kW cooling capacity
  - 40 kW freezing capacity
  - 450 kW heat recovery
- Selling heat to the district heating grid.
  - On average 600 kWh a day – 219 t/year
  - Peaks up to 2.15 MWh
- Using natural refrigerant CO_2
- Lower energy usage, lower costs, and less impact

The project has won the Sustainability Award 2022 from Danish Harbour.

QUESTIONS

Stay in touch

Visit us at our stand
Hall 9 at booth 9-548

Visit advansor.com

Follow us on LinkedIn

CHILLVENTA

Chillventa Specialist Forums 2022
Chillventa Fachforen 2022

CONNECTING EXPERTS.