EPEE WHITE PAPER

COUNT ON COOLING: A 5 STEP APPROACH TO DELIVER SUSTAINABLE COOLING

EPEE 🗇 Photo: istockphoto.com Vasyl Dolmatov





Digitalisation

Population

Cooling

an intrinsic part of life with demand only set to rise

Photos: www.pixabay.com ; istockphoto.com: scanrail Antonio Diaz ; www.freestockphotos.biz

Where do we stand in the EU?





Heating & Cooling is the number 1 consumer of renewable energy in Europe, followed by electricity and transport.

Of the EU's final energy is used

for heating & cooling, of which

up to 6% is currently for cooling

Of the EU's final energy used

for heating & cooling is based

on renewables.



By 2030, the number of airconditioners and refrigerators is expected to double in Europe.



Of the EU's final energy consumption in the tertiary sector is already today used for space cooling.



By 2050, with business as usual, the cooling demand in the EU's residential sector is expected to be 4 x higher than in 2015

Share of renewable energy in gross final energy consumption, EEA 2017; Heating and cooling strategy, EC 2016; Renewable energy in Europe — 2018 Recent growth and knock-on effects, EEA 2018; Contribution of renewable cooling to the renewable energy target of the EU, Ökoinstitut 2018



Major consumers: Supermarkets & datacentres





on average of the energy consumed in supermarkets is for refrigeration



on average of the energy consumed in datacentres is for cooling





... we are at a crossroad:

Doing nothing is not an option if we want to continue counting on the benefits of cooling. Sustainable cooling must become mainstream!

Image par<u>Pixource</u> de <u>Pixabay</u>

We can do it!



In the EU, direct refrigerant emissions are decreasing and globally, the Kigali Amendment will drive the transition towards lower GWP refrigerants



HFC emissions have been decreasing since 2014

CO₂ is the main contributor to the EU's total greenhouse gas emissions

The crucial role of energy





CO₂ contributes 96% to the energy related greenhouse gas (GHG) emissions and 90% is from fuel combustion

- Fossil fuels in the primary energy mix must be reduced substantially
- The share of renewables in the electricity mix and in final energy consumption needs to further increase



Where to from here? 5 Steps towards sustainable cooling





Photos: istockphoto.com Vasyl Dolmatov scanrail Antonio Diaz shironosov wxin aimy27feb tonaquatic

Optimise the need for cooling

- Buildings: insulation, glazing, architecture ...
- Nature based solutions in built environement
- Behaviour: controls, temperature setting ...

Improve energy & resource efficiency

- Design
- Sizing
- Controls & Operation
- Service & Maintenance
- Monitoring
- End of life & Extended Producer Responsibility

Mitigate the climate impact of refrigerants

- No high GWP refrigerants
- Lower charge sizes
- Leakage control
- Qualified installers
- Recovery, recycling, reclaim of refrigerants

Shift to renewable energy sources

- Integrated approach to cooling & heating of buildings and cities
- District heating and cooling, heat pumps, heat recovery
- Sector coupling, demand response, thermal energy storage to provide flexibility to the grid





Address the investment cost of high efficiency solutions



Avoid high peak electrical demand, resulting in extra power stations, larger electricity transmission and distribution networks and increased cost for power providers and end-users

- Balance of capital investment between new cooling equipment and power generation
- Push and pull effect with high standards of efficiency (MEPS) and energy labelling
- Financing schemes to overcome higher initial investment cost
- Incentivizing power suppliers to support investment into high efficiency solutions
- Facilitating it for end users to sell waste heat from cooling equipment to other users
- Rewarding flexibility such as provided by demand response and thermal energy storage

What's standing in the way?

- Low political awareness
- Low market awareness
- A siloed approach
- Lack of skilled workforce

Many technology solutions exist, but market imperfections still lead to widespread inefficient use of cooling equipment and a lack of system integration.

Coordinated efforts between policy makers, end users, equipment producers, finance institutions and power providers are needed to ensure broad deployment of sustainable cooling EPEE 🌮

Overcoming the barriers













Implement & enforce EU Laws

- Consolidate dedicated heating and cooling plans
- National Energy & Climate Plans
- Long term strategies

Promote an integrated approach

- Heat recovery, Heat pumps , district H&C
- Demand side management and sector coupling

Thermal storage

Reward sustainable investments

- Sustainable public spending
- End fossil fuel subsidies
- Balance investments on demand and supply side

Inform, empower and motivate consumers

- Reward flexibility
- Raise awareness with dedicated tools such as labels for products and buildings, etc.

Upskill installers

- Lifelong learning
- Adaptation of curriculum
- Dedicated statisticial classification (NACE)

Photos: www.pixabay.com



Conclusions

Doing nothing is not an option !

• We are facing a triple challenge:

- Phasing-down HFCs
- Reducing energy consumption
- Shifting to renewable energies
- With an integrated approach, cooling can act as an enabler for carbon neutrality with many sustainable technologies and solutions readily available
- More efforts are urgently needed to bridge the gap between science, policy and people to ensure broad deployment of sustainable cooling solutions
- We cannot do it on our own: joining forces within and across industry sectors will be crucial for success

istockphoto.com monkeybusinessimages