



# COOL BUILDINGS

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# Overview

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- The challenge of comfortable homes and offices
- Cooling in buildings today
- Cooling in buildings tomorrow
- What solutions to decrease cooling demand?
- EU research on track
- Very cool buildings: it's all about design



# The challenge of comfortable homes and offices

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- We spent 90% of our time inside buildings
- Air conditioning is a comfort and productivity issue
- Keeping homes cool is a challenge even in cold climates: **19% EU population live in dwellings not comfortably cools in the summer (Eurostat)**



*La Défense district, Paris, France*

# Cooling in buildings today

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Heating & cooling in buildings represents 40% of the European global energy consumption

- ✓ 70% of building energy needs are dedicated to heating
- ✓ **2% of building energy needs are dedicated to cooling**

In residential and service sector buildings, most space cooling is produced from natural gas and oil



# Cooling in buildings tomorrow (by 2030)

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- ✓ Heating needs in building are expected to be **reduced by 30%**...
- ✓ ... **whereas cooling needs are still likely to increase by 72%**
- ✓ Worldwide energy demand for space cooling will overtake space heating by 2060
- ✓ Shift towards the use of renewable energy sources for cooling is needed



# What solutions to decrease cooling demand?

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- ✓ Reducing the needs with **innovative & sustainable technologies & materials**
  - better insulation
  - natural ventilation ducts,
  - reflective facades and pavements,
  - evaporating cooling walls and floors,
  - heat absorbing phase change materials,
  - green facades & green roofs,
  - cool roofing materials
- ✓ Increasing the share of **renewable energy sources** (solar thermal absorption cooling, cold heat exchanger in ventilation system...)





# EU research on track



EU research projects, co-funded within the EeB PPP, focus on sustainable and innovative cooling technologies

- ✓ **nanoCOOL**, energy efficient air conditioning system, combining a liquid desiccant cycle with an adapted conventional air cooling system
- ✓ **BuildHEAT**, cooling consumptions attenuation by developing standardized approaches and products for the systemic retrofit of residential building
- ✓ **CLEAR-UP**, 34 % cooling energy savings were achieved, whilst maintaining a high quality environment for building occupants
- ✓ **InDeWag**, façade system based on radiant heating and cooling glass surfaces made from water flow glazing



# Very cool buildings: it's all about design!



REH, Brussels



Bosco Verticale, Milan

Hikari Positive Energy Blocks, Lyon





# Thank you for your attention!

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