ON ENERGY TRANSITIONS, CLEAN COOLING, AND SOCIETAL NEEDS AND IMPLICATIONS. A European overview.

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European Strategic Energy Technology Plan (SET Plan)

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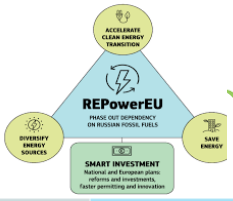
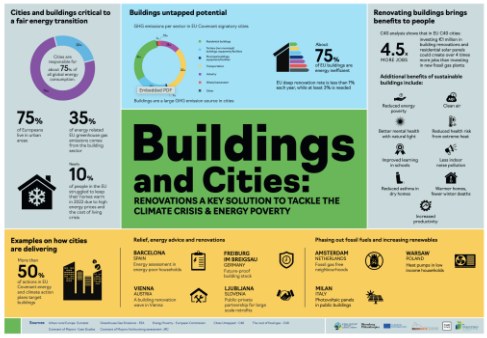
21-22 April 2026, Workshop, Madrid: "Climate Change, Ventilation and Resilience"

EU Policy:

- ✅ Reduce greenhouse gas emissions
- ✅ Expand renewable energy adoption
- ✅ Electrify for climate neutrality
- ✅ Improve dwellings' energy efficiency





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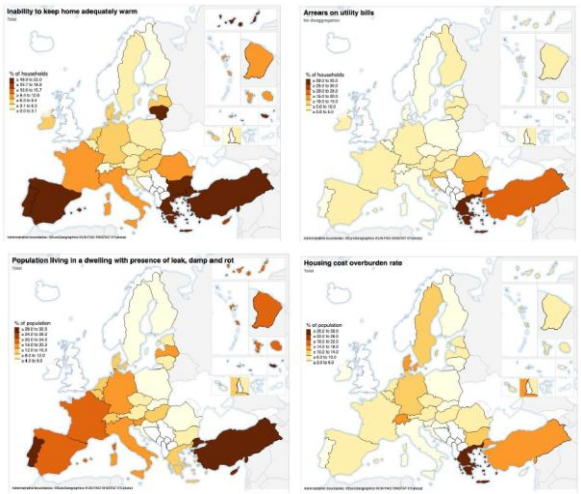
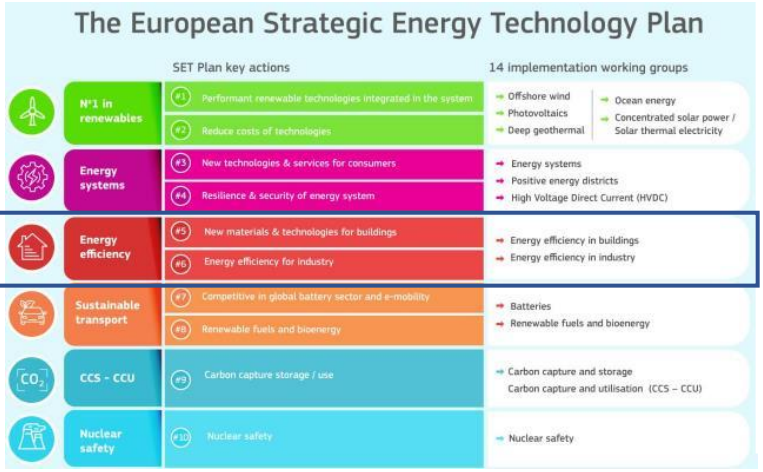
Challenges in the Energy Transition:

- ⚠ Energy poverty & vulnerable, hard to reach energy users
- ⚠ Renovating aging buildings for efficiency & affordability
- ⚠ Balancing electrification costs & biomass dependency





- Aims to align **R&I programs** targeting **energy,** to accelerate **green technologies deployment**
- Governance by the SET Plan Steering Group, MMSS and EU-COM (DG ENER+R&I, JRC)
- 14 **Implementation Working Groups**; **each group has an Implementation Plan (IP)**
- All IPs updated by the end of 2024
- **IWG5 on Energy Efficiency in Buildings**

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SET PLAN
Strategic Energy Technology Plan was launched in 2007

IWG5
One of the 14 Implementation Working Groups of the SET-Plan

IWG5-CSA
CSA project supporting the IWG5

8 Task forces of IWG5
2023: T1/T2
2023/2024: T3/T4
2024/2025: T5/T6/T7

Chaired by a board, Link

T1: Active Modules
T2: Sustainable Materials
T3: Clean Heating and Cooling Technologies and TES
T4: Digitalization of Buildings
T5: Just transition: affordable, sustainable renovation
T6: Energy-efficient buildings as job-creation motor (skills)
T7: Industrialisation for the clean energy transition
T8: Update the Implementation Plan

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- **Created** in 2016 by the SET Plan.
- **Synergies** and Links to B4P, DUT, CET partnership
- **Mission** of IWG5 is to unlock energy savings potential in building sector
- **Supported** by two coordination and support actions (CSA) under Horizon Europe project (Sep. 22-Aug. 25 // Jun. 26-May 28)
- **Main Objective** of IWG5 (and its supporting CSA) is to deliver/ to monitor the **Implementation Plan** (IP) on energy-efficient solutions for buildings. The Implementation Plan (IP) sets out actions required to achieve the challenging targets for energy efficiency in buildings.

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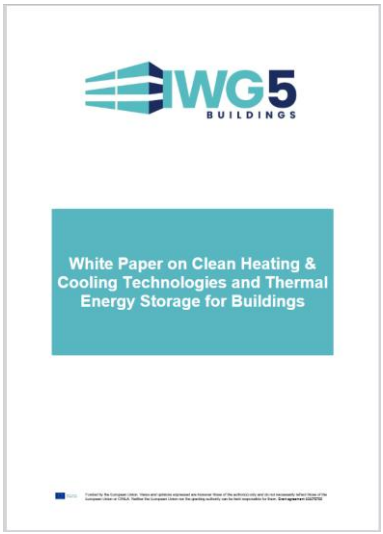
IWG5 is divided into 2 subgroups:

Sustainable materials and technologies for energy efficient solutions for buildings (5.1)

Cross-cutting heating and cooling technologies for buildings (5.2)



Content

- Executive Summary
- Introduction
- Description of topic
  Scope of the white paper
- **Implementation**
  - Gaps and barriers
  - Alignment with existing targets and activities
- Synergies with topics, objectives, flagship projects
- Conclusion

Technologies included:

- **Heat Pumps**
- **Micro CHP and CCHP**
- **Thermal Energy Storage**
- **Solar Thermal and PVT**
- **Technology combination and integration**
- **District heating and Cooling**

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Action 5.2 CROSS CUTTING HEATING AND COOLING TECHNOLOGIES FOR BUILDINGS

Target 5.2-T1	Heat Pump Systems: Cost reduction for small and large size heat pumps by 50% (compared to 2015 market price); Development of prefabricated, fully-integrated 'plug in and play' hybrid/multisource heat pump systems and integrated compact heating/cooling plants based on modular heat pumps.
Target 5.2-T2	District heating and cooling: Increase amount of renewable heat by 25% (compared to 2015), cost effectively and without decreasing the service provided to consumer; Decrease of the DHC substations reference costs for residential buildings by 20% (compared to 2015 prices).
Target 5.2-T3	Micro CHP/CCHP: Cost reduction for equipment and installation by 50% (compared to 2015 market price); Increase of the energy efficiency of Micro CHP/CCHP by 20% (compared to 2015 levels) by increasing operational electrical efficiency and maintaining thermal efficiency.
Target 5.2-T4	Thermal Energy Storage: Improve the performance of above ground and underground energy storages (Energy efficiency, system lifetime, O&M) by 25% (compared to 2015 levels): Increase of 200% of storage density at the system level (including pumps, valves, pipes, short term buffer) from the current state of the art 60 kWh/m³.

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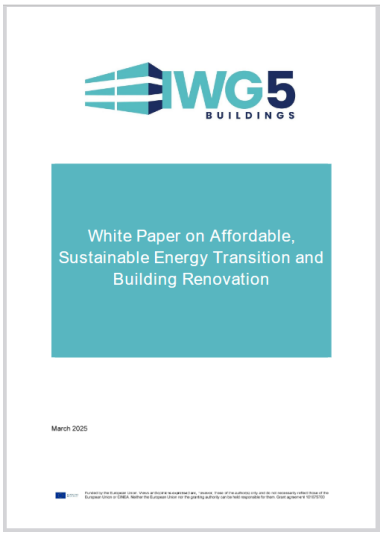

The International Labour Organization (ILO) defines Just Transition as: "Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind". Moreover, Eurofound describes it as "the transition to a climate-neutral economy while securing the future and livelihoods of workers and their communities". Thus, a just transition to a climate-neutral economy

Energy poverty consists of "a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes".

In addition, vulnerable households comprise households in energy poverty or households, including low-income and lower middle-income ones, that are significantly affected by the price impacts of the inclusion of greenhouse gas emissions from buildings within the scope of Directive 2003/87/EC and lack the means to renovate the building they occupy[1]. In this

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So, to defend the "Right to Energy"[3] and ensure a proper, safe, stable and permanent home energy supply, not only energy access has to be guaranteed, but also the affordability, in terms of the cost of energy services and the ability of consumers to pay for them, without compromising other essential needs. Solutions have to facilitate support mechanisms to enable access to a renovated housing stock and to more efficient energy services, appliances, and devices while promoting social knowledge on energy efficiency (energy-conscious behaviour) for living.

STAKEHOLDERS

Public Sector

Private Sector

Academy and Researchers

Civil Population

CSIC Consejo Superior de Investigaciones Científicas
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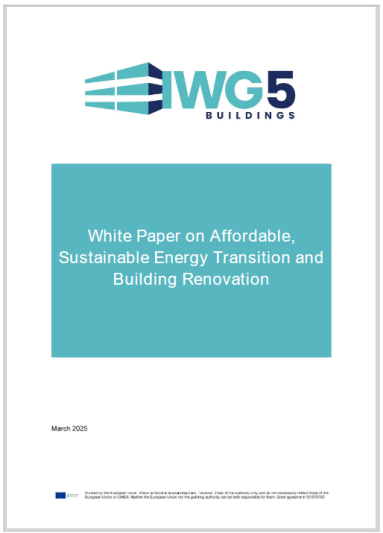
Solutions & Strategies:

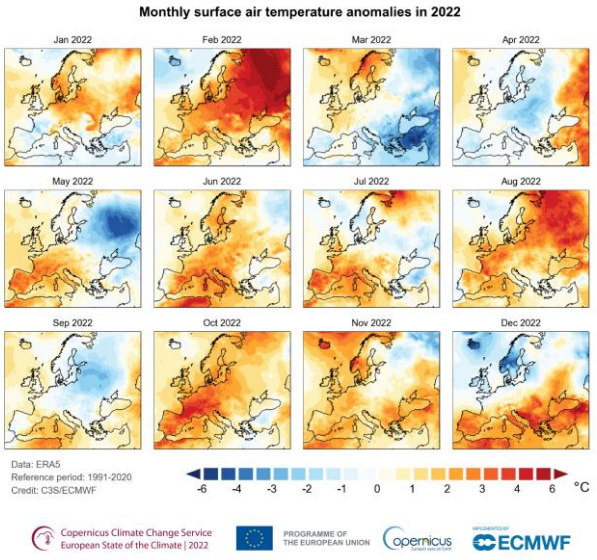
- **Comprehensive Building Renovation** – Enhancing efficiency & affordability
- **Clean Heating & Cooling** – Heat pumps & renewable district systems
- **Renewable Energy Communities** – Local production & citizen empowerment
- **Integrated Advisory Services** – One-stop shops & energy coaching
- **Building Renovation Passports** – Long-term energy planning

A fair and inclusive energy transition requires coordinated policies, social engagement, and sustainable solutions. !



SET Plan promotes:

- ✅ Governance and MMSS engagement
- ✅ Top-down / bottom-up financing and technology support (local, regional, national, EU levels)
- ✅ Implementation Plans, for strategic alignment within EU
- ✅ to reach the goals for climate neutrality and energy independence



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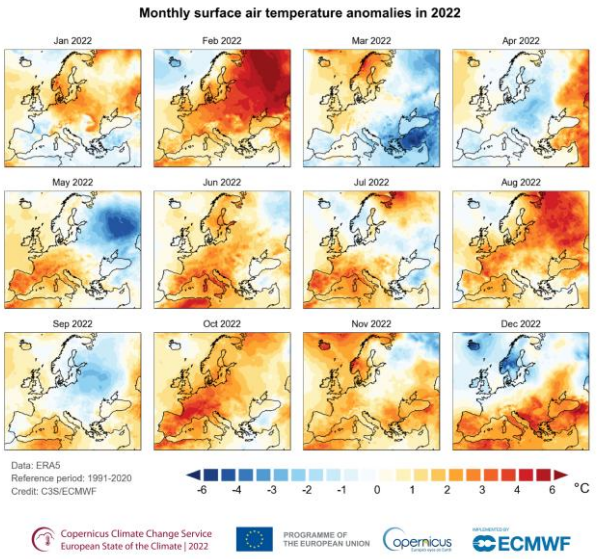
But we are hallenges on Extreme Heat:

- ⚠ Inefficient buildings
- ⚠ Energy dependence for cooling (¿?)
- ⚠ Technical constraints to extreme heat
- ⚠ Barriers to market and civil trust
- ⚠ Energy costs associated



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Review and outcomes:

- **Culture of Heat**
- **Barriers and gaps**
- **Solutions, also considering passive measures and combined**
- **Pilots, prototypes and flagship EU/ national projects**
- **Finance and social support for market deployment (IP)**

THANK YOU!

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