



The European Union – Tajikistan Sustainable Energy Days 2024

Institute of Energy of Tajikistan Kushoniyon, 28 May 2024

Improving Energy Efficiency and Decarbonizing EU Buildings

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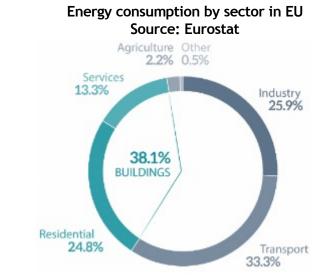


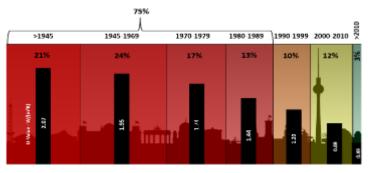




Building sector in EU

- Buildings are the single largest energy consumer in Europe, they are responsible for approximately 40% of EU energy consumption and 36% of CO₂ emissions
- At present, about 35% of the EU's buildings are over 50 years old and almost 75% of the building stock is energy inefficient.
 At the same time, only about 1% of the building stock is renovated each year
- Renovation of existing buildings can lead to significant energy savings as it could reduce the EU's total energy consumption by 5-6% and lower CO₂ emissions by about 5%
- Investments in energy efficiency stimulates the economy, especially the construction industry, which generates about 9% of Europe's GDP and directly accounts for 25 million direct jobs



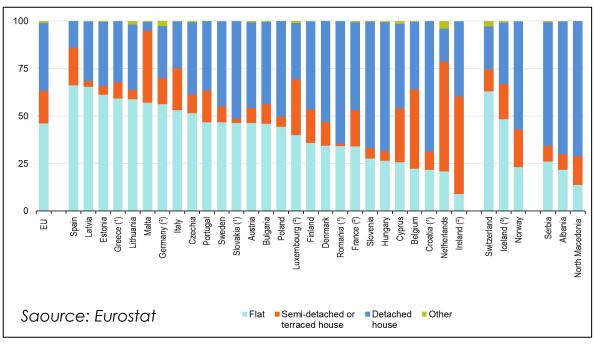


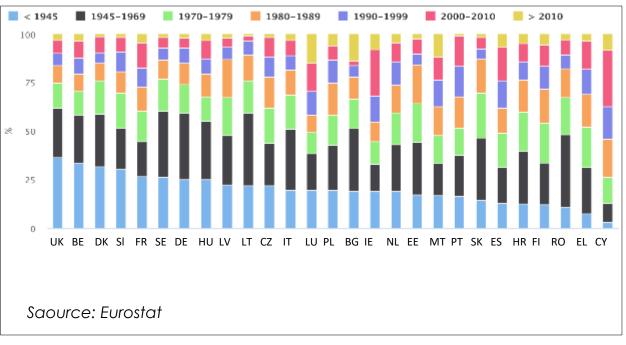
Age of the EU building stock and corresponding average U-value for building envelopes.





Residential sector building stock





Distribution of the population by type of dwelling in %

Breakdown of residential building by construction year

- 46.2 % of the EU population lived in flats, more than one third (35.8 %) lived in detached houses and close to one fifth (17.0 %) lived in semi-detached;
- In n 2020 almost half of the buildings were built before 1970;
- High energy costs





Key requirements



Energy Efficiency Directive

- A binding energy efficiency target of reducing final energy consumption by at least 11.7% compared to projections of the expected energy use for 2030
- Extending existing energy savings obligations (1.5%/y)
- Empower consumers by granting access to information on their energy consumption
- Introducing an annual energy consumption reduction target of 1.9% for the public sector as a whole and extending the annual 3% buildings renovation obligation to all the levels of public administration



Energy Performance of Buildings

- Covers a broad range of policies and support measures helping EU countries to boost the energy performance of their buildings
- Clear vision for a decarbonized building stock by 2050;
- Smart & Efficient buildings through use of Information and Communication Technologies and Smart Technologies;

4



Industry

- Expanded Audit Requirements for SME companies if they are large energy consumers
- Large industrial energy consumers required to implement systems to monitor and optimize energy efficiency
- EUTaxonomy and EU directive on corporate sustainability
- List of new product groups;
- Bringing in a new obligation to monitor the energy performance of data centres
- Promoting local heating & cooling plans in larger municipalities





Driving forces - REPowerEU Plan

- Reduced its dependency on Russian fossil fuels
- Saved almost 20% of its energy consumption
- Introduced the gas price cap and the global oil price cap
- Doubled the additional deployment of renewables
- Since September 2022, Russian gas accounts for only 8% of all pipeline gas imported into the EU, compared to 41% of EU imports from Russia in August 2021





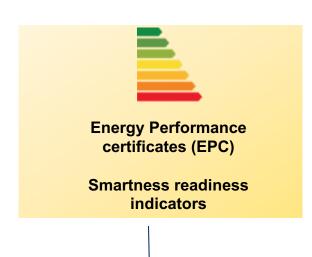


Energy Performance of Buildings Directive

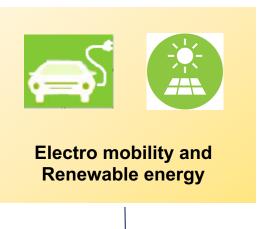


- Vision of a decarbonised building stock by 2050
- One-stop-shops for the energy renovations of buildings and Smart Finance
- Definition of deep renovation and the introduction of building renovation passports





- Long-term renovation strategies
- Minimum energy performance requirements
- Smart technologies
- Health and well being sustainable buildings
- National finance measures



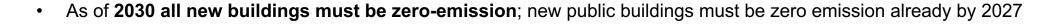
- Ensuring new buildings are solar-ready
- Recharging points in commercial buildings
- A gradual phase-out of stand-alone boilers powered by fossil fuels, starting with the end of subsidies to such boilers from 1 January 2025



- Standard for new buildings, including a more ambitious vision for buildings to be zeroemission buildings
- Better energy system integration (for heating, cooling, ventilation, charging of electric vehicles and renewable energy)

The Reviced Energy Performance of Buildings Directive







• The worst-performing 15% of the EU building stock will have to be upgraded from Energy Performance Certificate (EPC) label G to at least label F by 2030, public and non-residential buildings leading the way by 2027. Residential buildings should be renovated from G to at least F by 2030, and to at least E by 2033



• The obligation to have an energy performance certificate is extended to buildings undergoing major renovation, buildings for which a rental contract is renewed and all public buildings



 Requirement to roll out charging infrastructure for electric vehicles in residential and commercial buildings and to promote dedicated parking space for bicycles



Buildings or building units which are offered for sale or rent must have an energy performance certificate, and the
energy performance class and indicator should be stated in all advertisements



 National Building Renovation Plans will be fully integrated into National Energy and Climate Plans to ensure comparability and tracking of progress – they will need to include roadmaps for phasing out fossil fuels in heating and cooling by 2040 at the latest

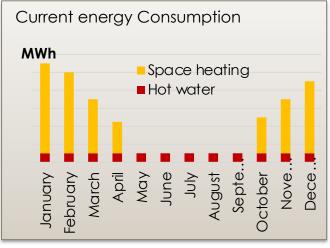


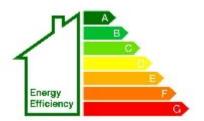


Energy Performance certificates in buildings

Energy Audit







EPC - Energy Audit Report



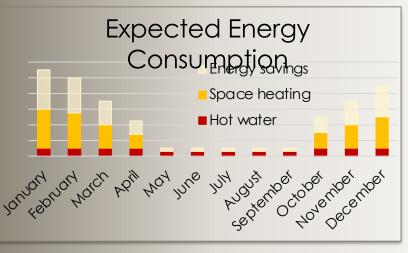




Identify and quantify measures











Energy performance certification of buildings

- All public buildings above 250 m²
- All apartment buildings have to be certified by 2040
- All single family buildings have to be certified by 2050
- If apartment building uses more than 150 kWh/m² per year for space heating it has to plan energy efficiency measures

Increased reliability, quality and digitalisation of Energy Performance Certificates with energy performance classes to be based on common criteria:

- Quality
- Harmonisation (based on a harmonised scale using only letters from A to G and a template)
- Accessibility of Energy Performance Certificates

Inspection of heating and air-conditioning systems

Foreseen calculation life-cycle Global Warming Potential (GWP) and its disclosure through the energy performance certificate of the building



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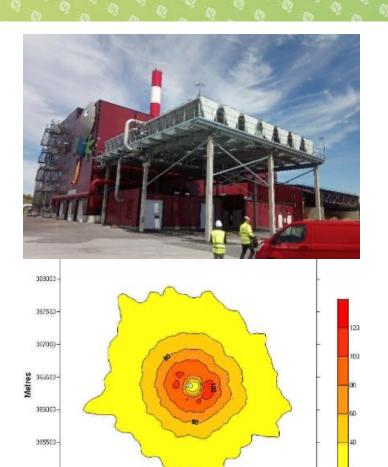
HVAC system energy audit

 Under the Energy Performance of Buildings Directive (2010/31/EU), all EU countries have established independent control systems for energy performance certificates and inspection reports for heating and cooling systems





Flue gas analysis (CO, NOx, t, O₂), fuel analysis (moisture %, Qzd), heat carrier flows (m^3/s)



Metres

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385003

354000 354500 355000





Requirements for energy auditors in buildings

- Higher professional or academic education, if the relevant educational program provides knowledge of thermal engineering of building envolope, building engineering systems (heating, cooling, ventilation, air conditioning, water supply, lighting), building climatology and indoor microclimate, energy efficiency assessment and calculation methods;
- Has gained at least two years of practical experience in assessing the energy efficiency of buildings, working under the supervision of an independent expert, whose competence has been proven for assessing the energy efficiency of an operational building or its part and issuing a building energy certificate, as well as for assessing the energy efficiency of planned new constructions, reconstructed or renovated buildings or their parts and issuing a temporary building energy certificate;
- Passed the exam at the certification institution (LSGUTIS)







Nearly Zero Energy buildings

Transforms a building or building:

- before 1 January 2030, into a nearly zero-energy building (starting from 2021)
- as of 1 January 2030, into a zero-emission buildings (as of 1 January 2028, new buildings owned by public bodies)





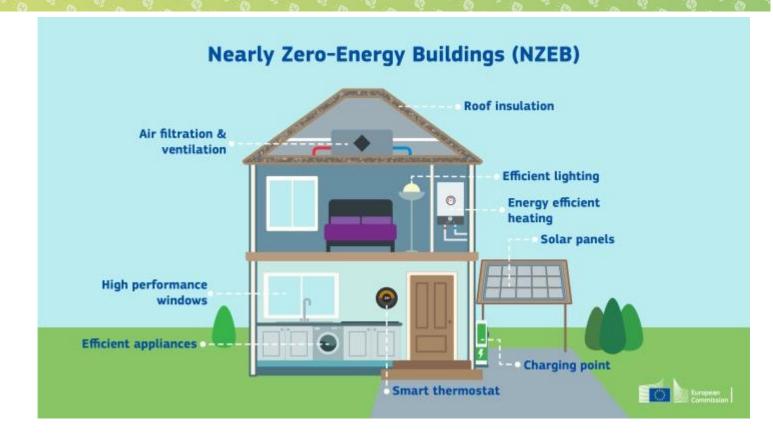
Bosco Verticale, Milan





Zero-emission buildings

- Nearly zero-emission building (NZEB)
 means a building that has a very high
 energy performance, while the nearly
 zero or very low amount of energy
 required should be covered to a very
 significant extent by energy from
 renewable source
- and without on-site carbon emissions from fossil fuels
- Focus of the proposal is the reduction of operational greenhouse gas emissions,
 ZEB definition further include the calculation life-cycle Global Warming
 Potential (GWP) and its disclosure through the energy performance certificate of the building







Most popular sustainable building certification systems

Voluntary sustainable building certification shames:

- BREEAM Building Research Establishment's Environmental Assessment Method
- LEED Leadership in Energy and Environmental Design
- DGNB German Sustainable Building Council
- PH passive house
- CASBEE Comprehensive Assessment System for Built Environment Efficiency
- .

EU legislative requirements:

- Energy Performance certificates and minimum energy efficiency requirements
- CO₂ life cycle perspective and Level(s) framework
- SRI Smart Readiness Indicators











EU initiative that joins up sustainable building thinking across the EU

- Sustainable building certifications, also known as green building rating tools, evaluate and acknowledge buildings meeting specific sustainability criteria
- These certifications serve to reward companies and organizations for constructing and operating environmentally friendly buildings

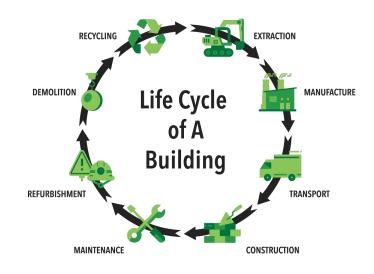
















Energy management systems

- EE directive makes energy management systems a mandatory requirement for large industrial energy consumers to monitor and optimize their energy efficiency
- EPBD directive introduce Smart Readiness Indicators for buildings and use of BMS
- EPBD requires the mandatory **installation of building automation and control systems** for **non-residential buildings**. Whereas the threshold is currently set at an effective rated output >290 kW (large buildings), from 2030 this would be lowered to >70 kW (medium and large buildings)
- EU countries will also have to **promote local heating and cooling plans in large municipalities** having populations above 45 000







