



IEA-EEA Workshop

CAPTURING THE MULTIPLE BENEFITS OF ENERGY EFFICIENCY

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**The need for a framework and tools for
aligning EU policies related to
indoor environment and energy efficiency**

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Policies, regulations and standards related to sustainable buildings

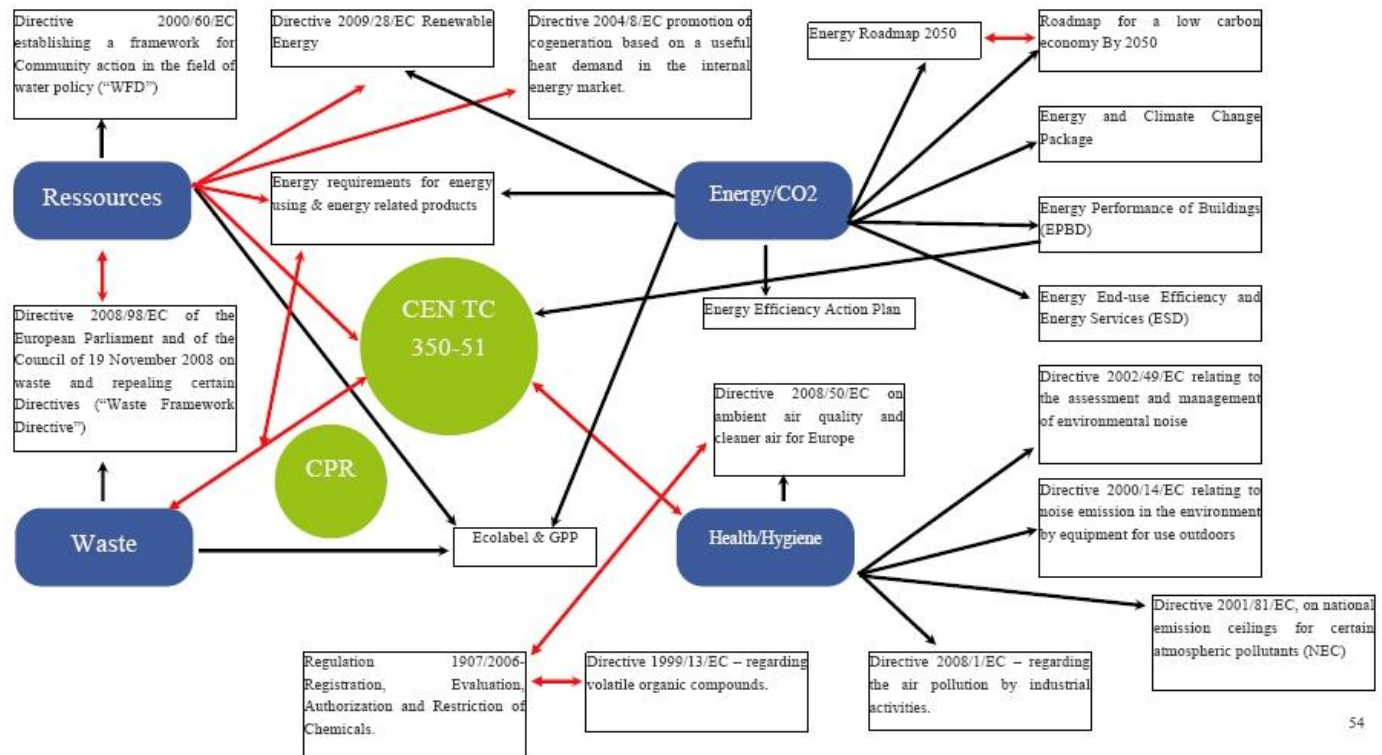
- Sustainable buildings is a multi-objective issue that needs an integrated approach
- There is plethora and mismatch of building regulations at EU and national levels that leads to considerable administrative burdens and a fragmented sustainable construction market.
- The Action Plan for sustainable construction of the Lead Market Initiative provides a list of measures to build a coherent basis for progressive changes to regulation, standardisation and public procurement practices fostering innovations and sustainability in construction.

Map with Clusters of Interest for Europe GBC Network and how they connect with existing EU legislation

A lead Market Initiative for Europe

Eco-Innovation Observatory

Direct connections between clusters or between regulations are marked by arrows (black).
Indirect links to other clusters or regulations are marked by red arrows.
Ongoing standardization as well as the CPR are marked in green.
Cross sectional initiatives Lead Market Initiative and the Eco-Innovation Observatory are marked in blue.

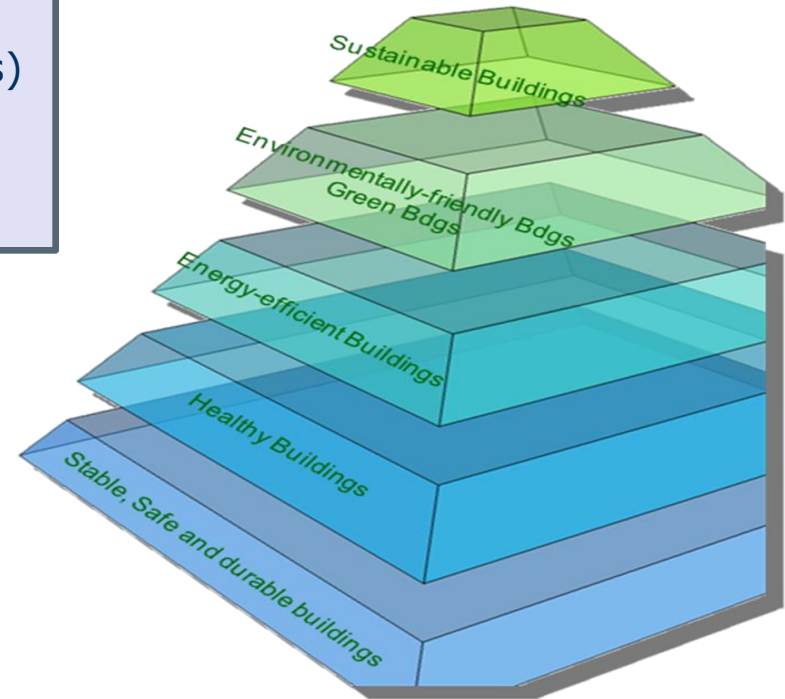


There is a clear need for a **holistic approach** for better **aligning and integrating cross-sectoral policies**, regulations and standards related to the built environment

Buildings = architecture
+ construction(materials+components)
+ systems
+ operation and maintenance

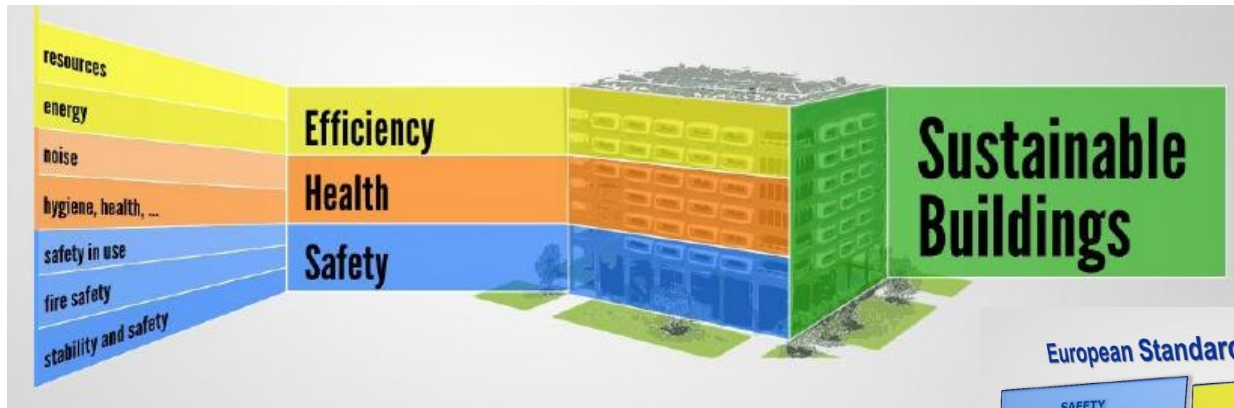
Cross-cutting Directives & Related Standards

- **EPBD Recast (2010/31/EC)**
Energy Performance of Buildings Directive
- **CPR (2011/305/EC)**
Construction Products Regulation
- **Eco-design Directive**
- **Energy Labelling Directive, Ecolabel**
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Construction Products Regulation (2011/305/EC)

Basic Requirements for Buildings (BRs)



SUSTAINABLE BUILDINGS

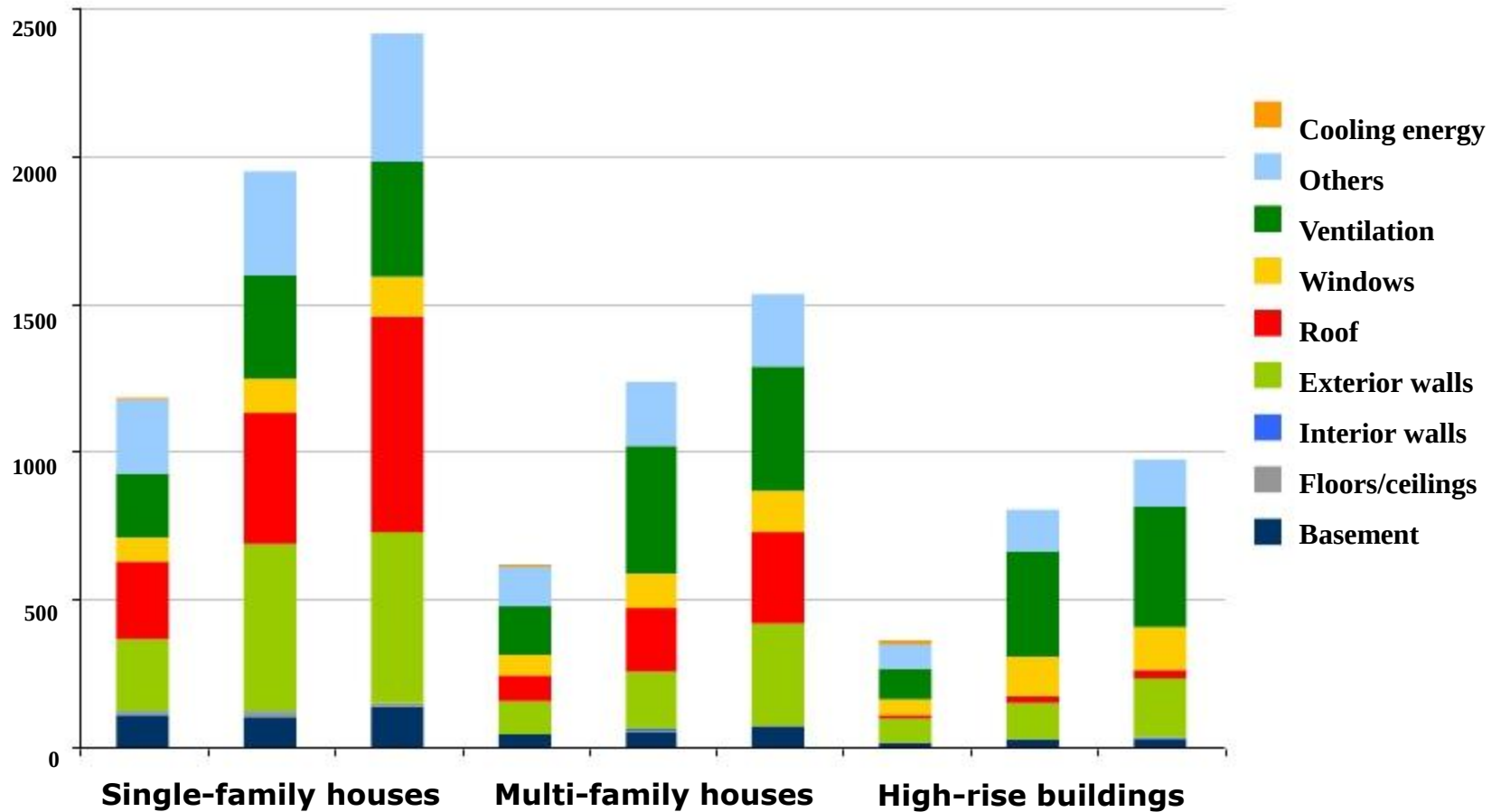
A set of European Standards for
all Basic Requirements (BRs)

- Need to link EPBD standards and product standards together in a systematic way



Source: JRC Conference on "Scientific Support to EU Growth and Jobs: Efficient buildings, vehicles and equipment", 26/3/2013, Bruxelles

Primary Energy consumption weighted according to building area



Source: JRC-IPTS report "Environmental Improvement Potentials of Residential Buildings (IMPRO-Building)", 2008

DG JRC's European Collaborative Action “Urban Air, Indoor Environment and Human Exposure”



28 state of the art reports since 1986

Main goal:

Provision of healthy and environmentally sustainable buildings by minimising exposure and associated risks to physical, chemical and biological pollutants related to the built environment

Focal activities:

- Health and comfort of EU citizens
- Building technologies and source control
- Requirements of sustainability, energy efficiency and conservation of natural resources

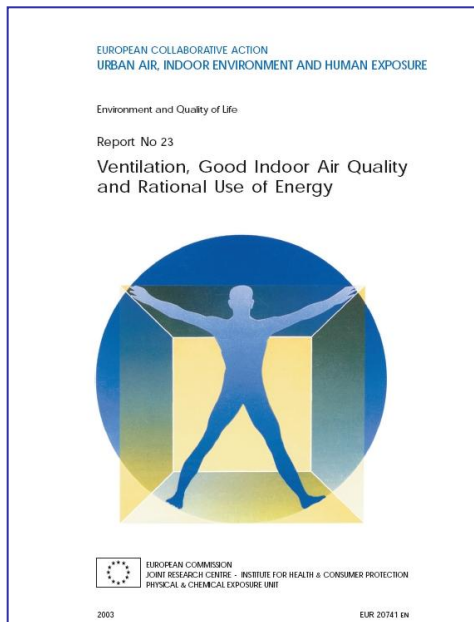
Indoor air quality, ventilation, energy efficiency

ECA report no. 23 (2003):

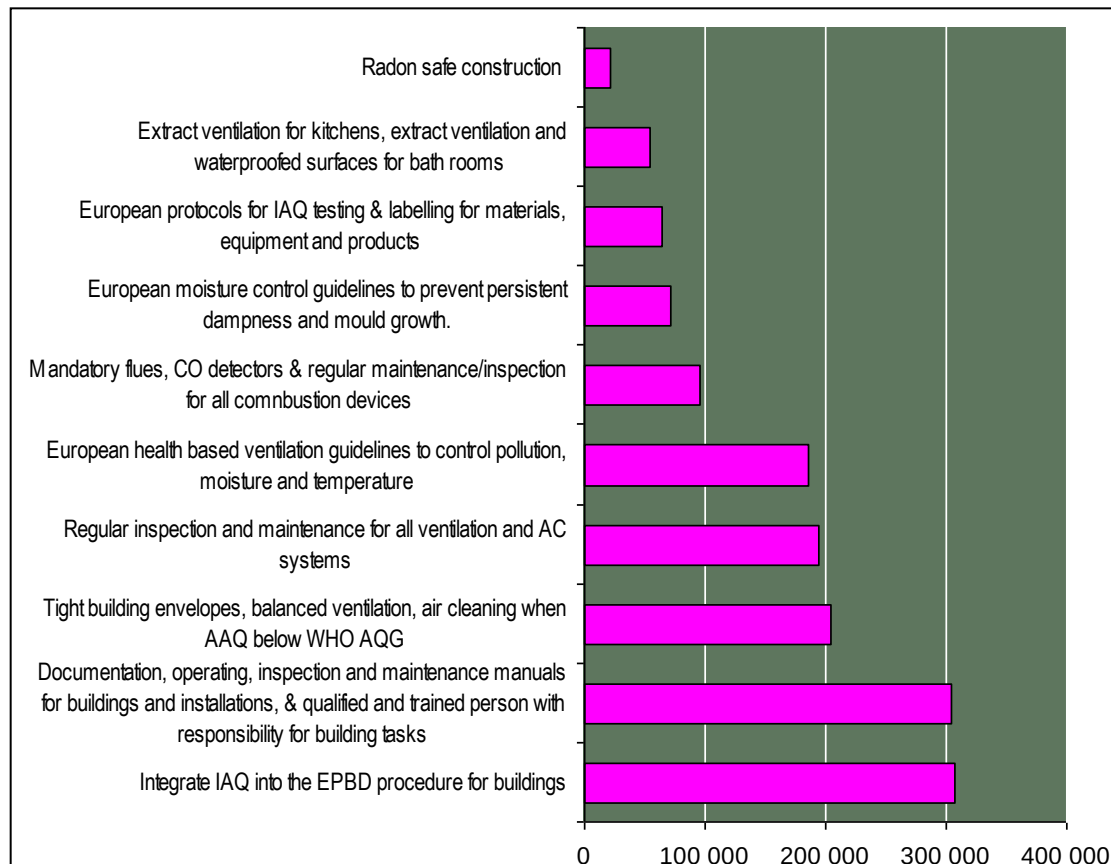
“Ventilation, Good Indoor Air Quality and Rational Use of Energy”



- Strategies for achieving a good balance between good indoor air quality and the rational use of energy in buildings
- Available guidelines and assessment techniques on energy and IAQ
- Future trends with implications for IAQ and use of energy in buildings



Health benefits (DALYs/yr) in EU-26 in the 10th year of implementation of ten policies



DG SANCO's IAIAQ project:

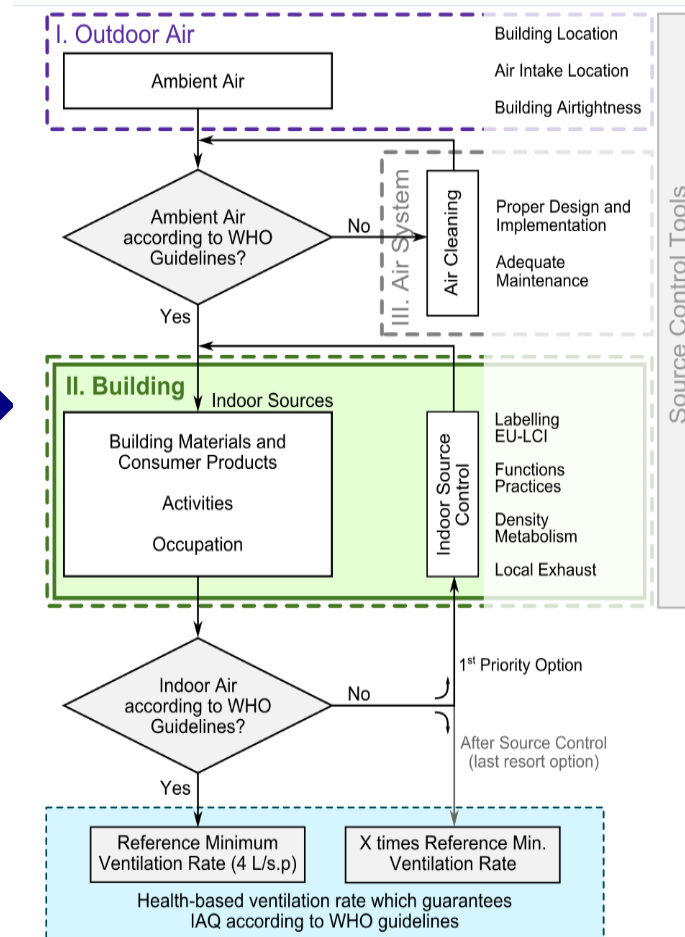
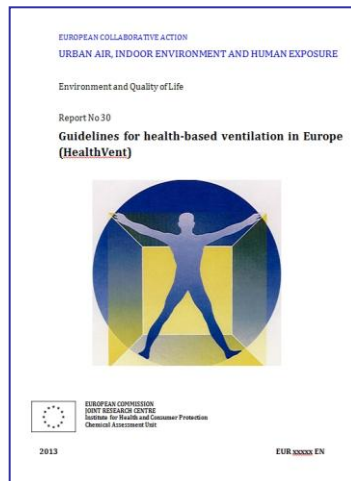
Impact Assessment of IAQ related policies, actions and projects (2010-2011)

Performance-based requirements in building codes

- Following the Energy Performance Building Directive (EPBD) in 2002, requirements have gradually started shifting from prescriptive to a performance based approach which is regarded as a major change in the building code trends.
- Most countries have introduced requirements to ensure minimum levels of ventilation within buildings. These are generally based upon metabolic rates and activity within the building. These requirements related principally to comfort and productivity but not health and also they have direct impact on energy requirements.

ECA report n. 30 (2013)

Guidelines for health-based ventilation in Europe (HEALTHVENT)



Change of paradigm!

- An integrative approach combining source control measures and health-based ventilation practices that guarantee the protection of health (i.e. IAQ according to WHO guidelines) while rationalizing over economic and energy expenditure
- Towards performance based ventilation strategies on a set of common indicators (humidity, CO₂, few specific pollutants, energy consumption, comfort conditions, ...)

ECA report n. 30 (2013)

Implications of a health-based ventilation in Europe (HEALTHVENT)

- Changing the ventilation rate by, for instance, 2 L/s per person from a base of 4 L/s per person, would have an impact on final energy needs of about 13% to 25% on final energy use for heating, cooling and ventilating when using a *current practice* system.
- If an *advanced* system is in place (i.e. better construction quality in terms on building airtightness and air flow control strategies), however, the impact is significantly smaller and the results show a variation of lower than 10% on final energy needs for such an action.

Needs, priorities for action & challenges (1/3)

- A holistic approach is needed, defining the building and urban and indoor air quality role for the global sustainability.
- Development of a common regulation in Europe on ventilation rates, which would harmonize calculation practice among countries and take care that required ventilation rates are health based and are implemented in connection with appropriate source control strategies to guarantee health protection while rationalizing economic and energy expenditure.
- Inclusion of requirements for indoor air quality in the national regulations of all European countries, including a harmonized minimum number of pollutants and associated limit levels according to the WHO guidelines.

Needs, priorities for action & challenges (2/3)

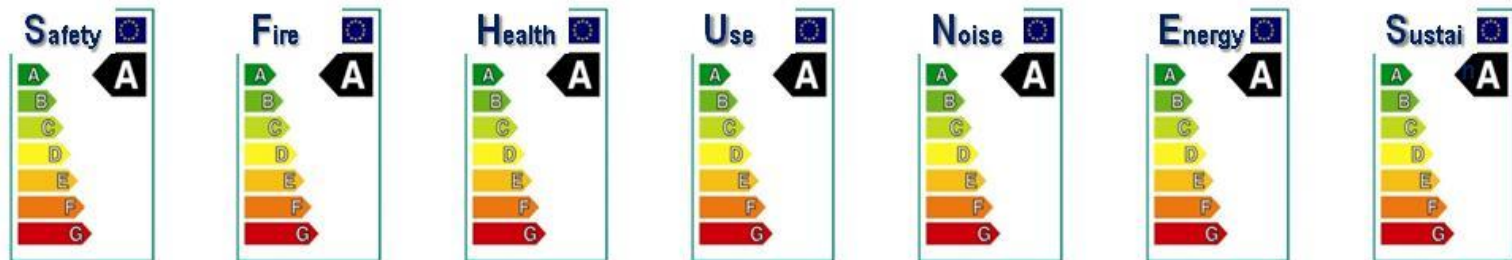
- Future recast of the Energy Performance Buildings Directive (EPBD) and revision of ventilation regulation should include IAQ aspects and auditing (source and emission control of indoor/outdoor sources). This can be greatly facilitated by and took advantage of the harmonisation framework for indoor air monitoring which was recently developed by the European Commission (DG JRC and DG SANCO) in the context of the PILOT INDOOR AIR MONIT project (2010-2012).
- Cross-cutting criteria for energy requirements, ventilation and indoor air quality should be developed and aligned across various legislative instruments (e.g. EPBD, Eco-design Directive, Energy label, Ecolabel, CEN/TC 350/WG 5 prEN 16309 “Sustainability of construction works”, etc).
- Development of a harmonized product labelling criteria to be used as a part of ventilation rate design specification aligned with the two harmonization frameworks for indoor products labelling and health-based evaluation which were developed by DG Joint Research Centre (ECA Reports n° 27, 2012 and n° 29, 2013 respectively).

Needs, priorities for action & challenges (3/3)

- Development of a new European guideline regulation providing guidance on proper scope, design, construction, maintenance and inspections of ventilation systems. It can be considered to enforce the maintenance and inspection of ventilation systems if possible in parallel with inspections of air-conditioning systems and energy auditing under EPBD.
- Ensuring sufficient ventilation and energy efficiency requires optimisation and adaptability of ventilation levels according to the materials used, the type and level of occupancy and activities taken place in buildings (following the HEALTHVENT health based ventilation guidelines concept, ECA Report 30, 2013).
- Development of new EU policies promoting sustainable buildings that adapt to variations in indoor and outdoor sources and featuring passive/active control for moisture/dampness and avoidance of particles.
- Need for a Green Paper on the built environment cross-cutting health, environment, energy, climate change, research and single market issues.

.....the challenging way forward (4/4)

- ❖ Development of a multi-performance labelling of buildings in terms of safety, health, energy efficiency and sustainability ("Building Efficiency Index") with minimum mandatory requirements for EU MS



Thank you for your attention

The JRC: The European Commission's in-house science service

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