

Breathing Life into Efficiency: Indoor Environmental Quality (IEQ) as a Cornerstone in Building Policy

Sustainable Energy Day
10 June 2024
14h00-18h00 CEST
@Comet Louis (Brussels)
& livestreamed

11-13 JUNE 2024

EUROPEAN SUSTAINABLE ENERGY WEEK

Net-zero energy solutions
for a competitive Europe



POLICY CONFERENCE



BREATHING LIFE INTO EFFICIENCY: INDOOR ENVIRONMENTAL QUALITY AS A CORNERSTONE IN BUILDING POLICY



Welcome & introduction

← Pawel WARGOCKI

Professor, Indoor Environment



Keynote “The Dutch IEQ approach
and implementation of
the EPBD's IEQ provisions”

Atze BOERSTRA →

*Professor of Building Services Innovation,
TU Delft*



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Keynote “The French IEQ approach
and implementation of
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Valérie LEPRINCE 

Project Director IEQ



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BREATHING LIFE INTO EFFICIENCY: INDOOR ENVIRONMENTAL QUALITY AS A CORNERSTONE IN BUILDING POLICY



Moderated panel discussion



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**Closing remarks and link networking
drinks & finger foods**





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REHVA



Federation of
European Heating,
Ventilation and
Air Conditioning
Associations



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Breathing live into efficiency, REHVA event 10-06-24

The Dutch IEQ approach & Implementation of the EPBD's IEQ provisions

prof. dr. ir. Atze Boerstra

Chair Building Services Innovation

Faculty of Architecture and the Built Environment

HVAC technology & building energy performance



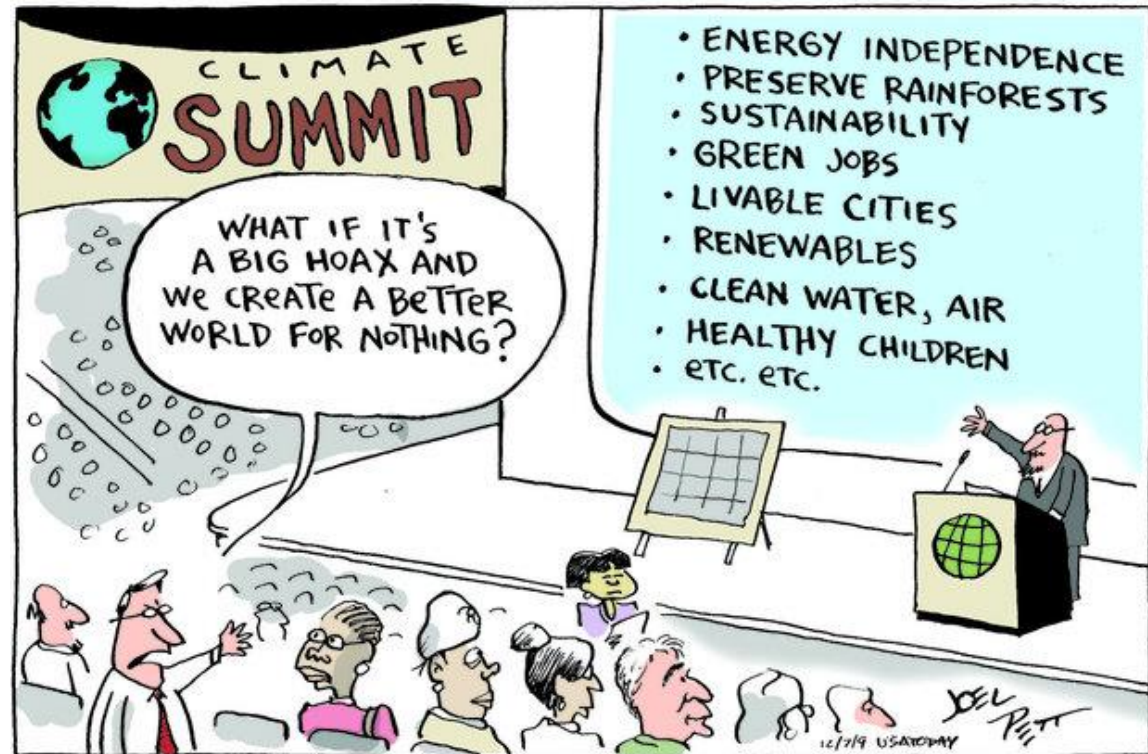
VS



Buildings do not use energy, building systems do!

EPBD - IEQ issues in NL (selection)

- installation noise
- overheating
- ventilation
- personal control
- (env. impact materials)
- (aesthetics)



Installation noise 1

- EU EPBD recast directive 2023/1791: *'Improving energy efficiency (...) should benefit the environment, improve air quality, improve **public health** and **quality of life** (...).'*
- How about the introduction of heat pumps, mechanical ventilation systems with heat recovery etc and:
 - noise inside (building occupants)?
 - noise outside (neighbours)?



Heat pumps create rows

Installation noise 2

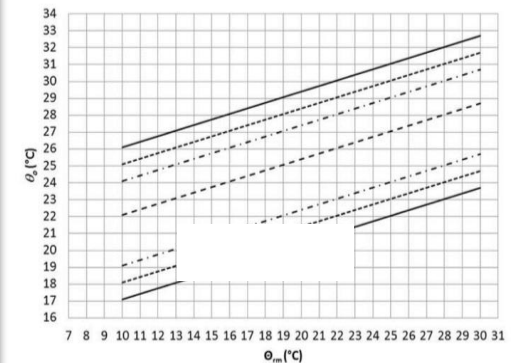
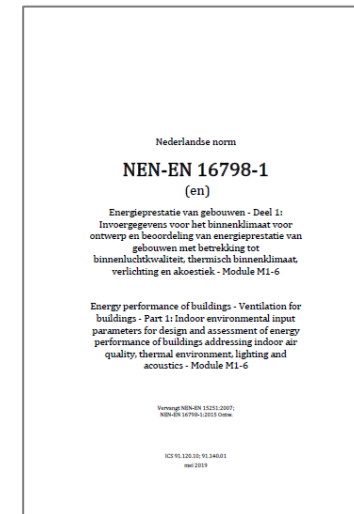
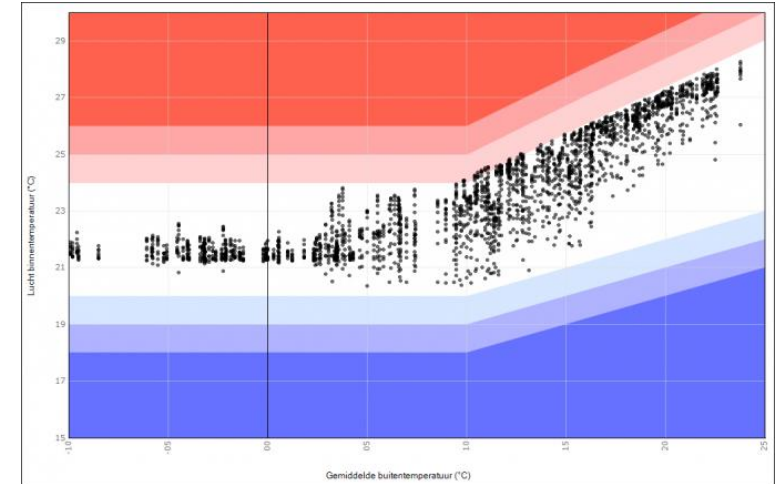
- EU directive 2002/49/EC on assessment and management of environmental noise (caused e.g. by “=outdoor equipment’)
- In NL dealt with e.g. in the Bbl / Environment Buildings Decree
- Reference target values indoors eg in dwellings and schools in NL: mostly 30 or 35 dB(A) max
- Class A PvE Gezonde Woningen > 25 dB(A)



Overheating



- Long history in NL use of **adaptive** thermal comfort criteria (e.g. as described in ISSO 74)
- From comfort studies we know that it is nonsense to keep indoor temperatures below 24-25 °C no matter what e.g. with heat waves
- Use of the more relaxed adaptive comfort criteria result in *substantial* limitation of energy use for cooling in buildings with active cooling systems
- Next version of EN 16798-1 (the ‘EPBD IEQ standard’) will again allow for ‘relaxed’ summer requirements’



Ventilation

- COVID pandemic taught us that it is important that classrooms, restaurants, communal rooms in nursing homes, meetings rooms etc are **well ventilated**
- WHO ventilation roadmap (2021): ‘fresh air supply should be minimum of **10 l/s** per person’
- Nevertheless still quite low fresh air supply values in Bbl: range **2,1 l/s** till 8,5 l/s per person
- Anonymous: ‘*Energy use is important so let’s not talk too much about ventilation*’ REALLY!?



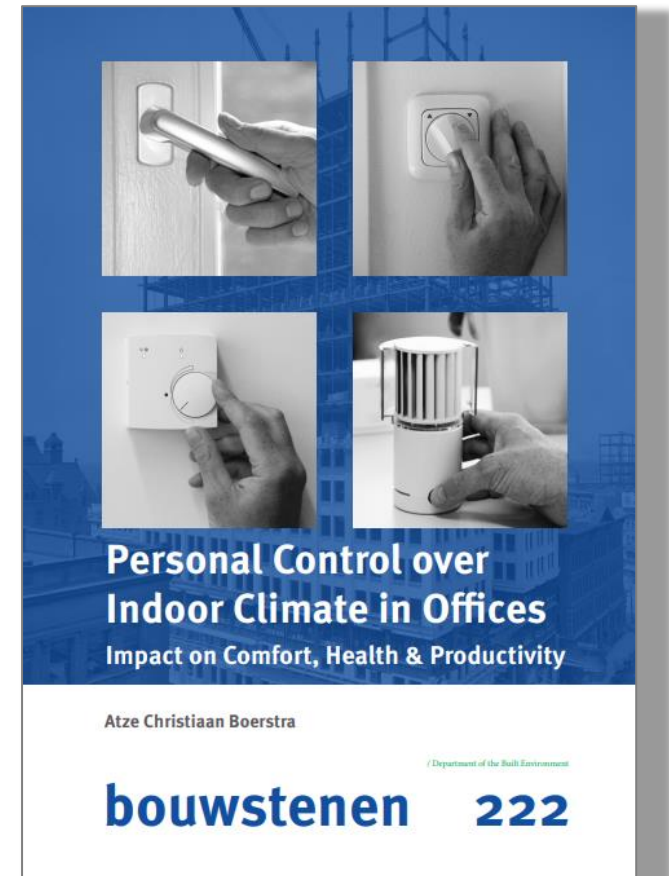
Category	Airflow per non-adapted person l/(s per person)
I	10
II	7
III	4
IV	2,5

(fresh air supply table from EN 16798-1)

Personal control

- Lots of 'BACS*' worries' in NL > many interpret the new BACS text as 'personal control over room temperature e.g. via wall thermostats is no longer allowed'
- Big problem! We know (see e.g. Boerstra, 2016 and Paciuk, 1990) that allowing for personal control over temperature increases occupant comfort, perceived health and productivity
- It also saves energy (see e.g. eu.bac (2021))

* BACS = Building Automation and Control Systems; refers to new EPBD obligation to monitor energy use and IEQ in (larger) buildings



Environmental impact bss* materials

MENU De Telegraaf Abonneer

Warmtepomp blijkt enorme vervuiler, noodmaatregel in de bouw

Door PIETER VAN ERVEN DORENS
20 feb. 2023 in GELD



Installateurs installeren een warmtepomp, die veel vervuilerder is dan werd gedacht.

‘Heat pump is enormous polluter’

- NL study Metabolic, 2020: ‘when renovating existing buildings >25% of environmental impact of materials is related to electrical & mechanical installations’

Energiezuinig bouwen botst met milieuvriendelijk bouwen

Juni 2021

De Milieu Prestatie Gebouwen toegelicht in 6 vragen

De Milieu Prestatie Gebouwen-berekening is verplicht bij het aanvragen van een omgevingsvergunning voor nieuwbouw. Het aandeel van de installaties in een gebouw weegt daarbij zwaar mee; steeds zwaarder naarmate de overheid de maximaal toegestane MPG-score verder verlaagt. Ook blijken milieuprestaties en energieprestaties elkaar bij sommige ontwerpen in de weg te kunnen zitten. Voor fabrikanten en installateurs is er werk aan de winkel.

Het Bouwbesluit 2012 stelt 'm verplicht bij de vergunningaanvraag voor alle nieuwbouw: de MPG-berekening. MPG staat voor Milieu Prestatie Gebouwen. De



‘Energy-efficient construction ≠ low-environmental-impact construction’

(* bss = building service systems)

Aesthetics of bss & the energy transition



This is in NL, country with quite strict building inspectorates ('Welstand commissies'); curious to see how other countries deal with 'energy transition ugliness'....

Take home message from NL to EU:

(Further) implement the EPBD but make sure to address issues with:

- installation noise (inside and outside)
- overheating / too strict summer requirements
- ventilation / adequate fresh air supply
- personal control over temperature
- environmental impact installation-materials
- aesthetics of energy systems

Europe,
let's come
together!





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Cerema
CLIMATE & REGIONS, THE FUTURE



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THE FRENCH IEQ APPROACH AND IMPLEMENTATION OF THE EPBD'S IEQ PROVISIONS

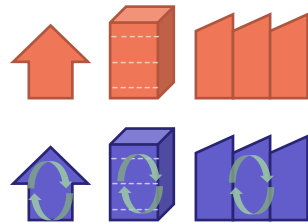
Valérie Leprince

REHVA, Sustainable Energy Day, June 10th, 2024



IEQ: A NEW FOCUS FOR THE EPBD DIRECTIVE

Temperature, humidity, ventilation rates and presence of contaminants to be taken into account together with EP of buildings!



Article 1

Subject matter

1. This Directive promotes the improvement of the energy performance of buildings and the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050, taking into account the outdoor climatic conditions, the local conditions, the requirements for indoor environmental quality, and cost-effectiveness.
2. This Directive lays down requirements as regards:
 - (l) regular inspection of heating systems, ventilation systems and air-conditioning systems in buildings;
 - (m) independent control systems for energy performance certificates, renovation passports, smart readiness indicators and inspection reports;
 - (n) the indoor environmental quality performance of buildings.

(66) 'indoor environmental quality' means the result of an assessment of the conditions inside a building that influence the health and wellbeing of its occupants, based upon parameters such as those relating to the temperature, humidity, ventilation rate and presence of contaminants.

ELI: <http://data.europa.eu/eli/dir/2024/1275/oj>

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REQUIREMENTS TO ENSURE GOOD IEQ



Article 5

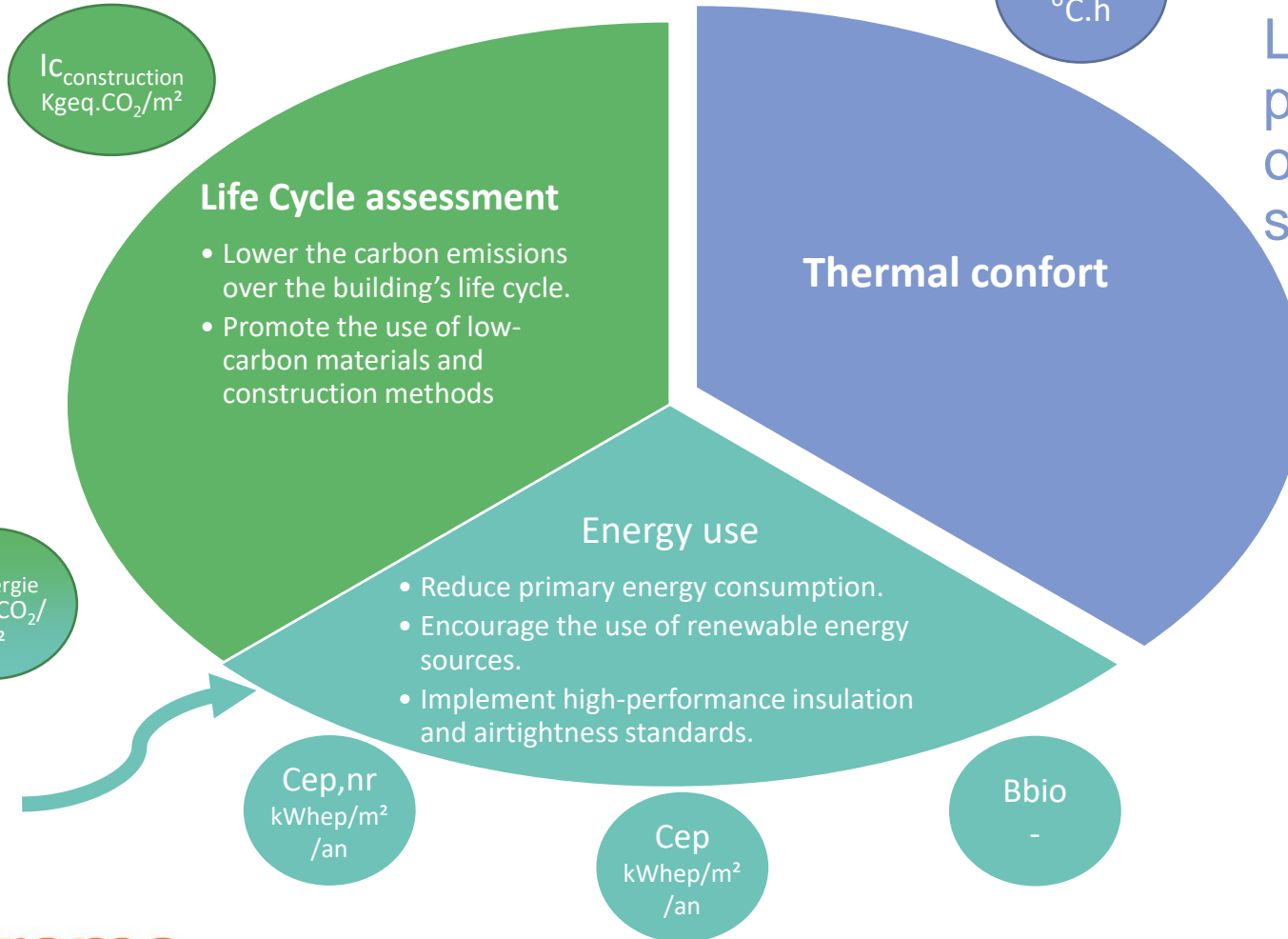
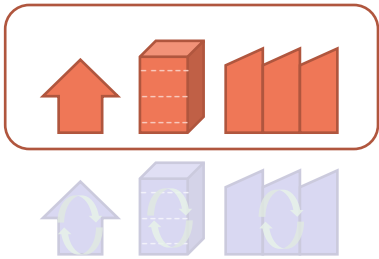
Setting of minimum energy performance requirements

1. Member States shall take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to at least achieving cost-optimal levels and, where relevant, more stringent reference values such as nearly zero-energy building requirements and zero-emission buildings requirements. The energy performance shall be calculated in accordance with the methodology referred to in Article 4. Cost-optimal levels shall be calculated in accordance with the comparative methodology framework referred to in Article 6.

Those requirements shall take account of optimal indoor environmental quality, in order to avoid possible negative effects such as inadequate ventilation, as well as local conditions and the designated function and the age of the building.

2. The energy needs and energy use for space heating, space cooling, domestic hot water, ventilation, lighting and other technical building systems shall be calculated using monthly, hourly or sub-hourly time calculation intervals in order to account for varying conditions that significantly affect the operation and performance of the system and the indoor conditions, and to optimise health, indoor air quality, including comfort levels, defined by Member States at national or regional level.

THE FRENCH EP-REGULATION RE2020



Degree-hour of discomfort
Level of discomfort perceived by occupants over the entire hot season.

$$\sum \Delta(T_{\text{actual}} - T_{\text{comfort}})$$

T_{comfort} adapted to previous days

- ⇒ Hourly calculation
- ⇒ Performance based, very few prescriptive requirements

Heating, Cooling, Lighting, DHW, Ventilation, Other appliances

REQUIREMENTS FOR EXISTING BUILDINGS

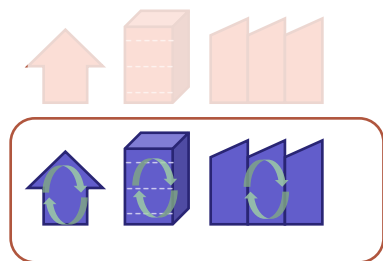


Article 8

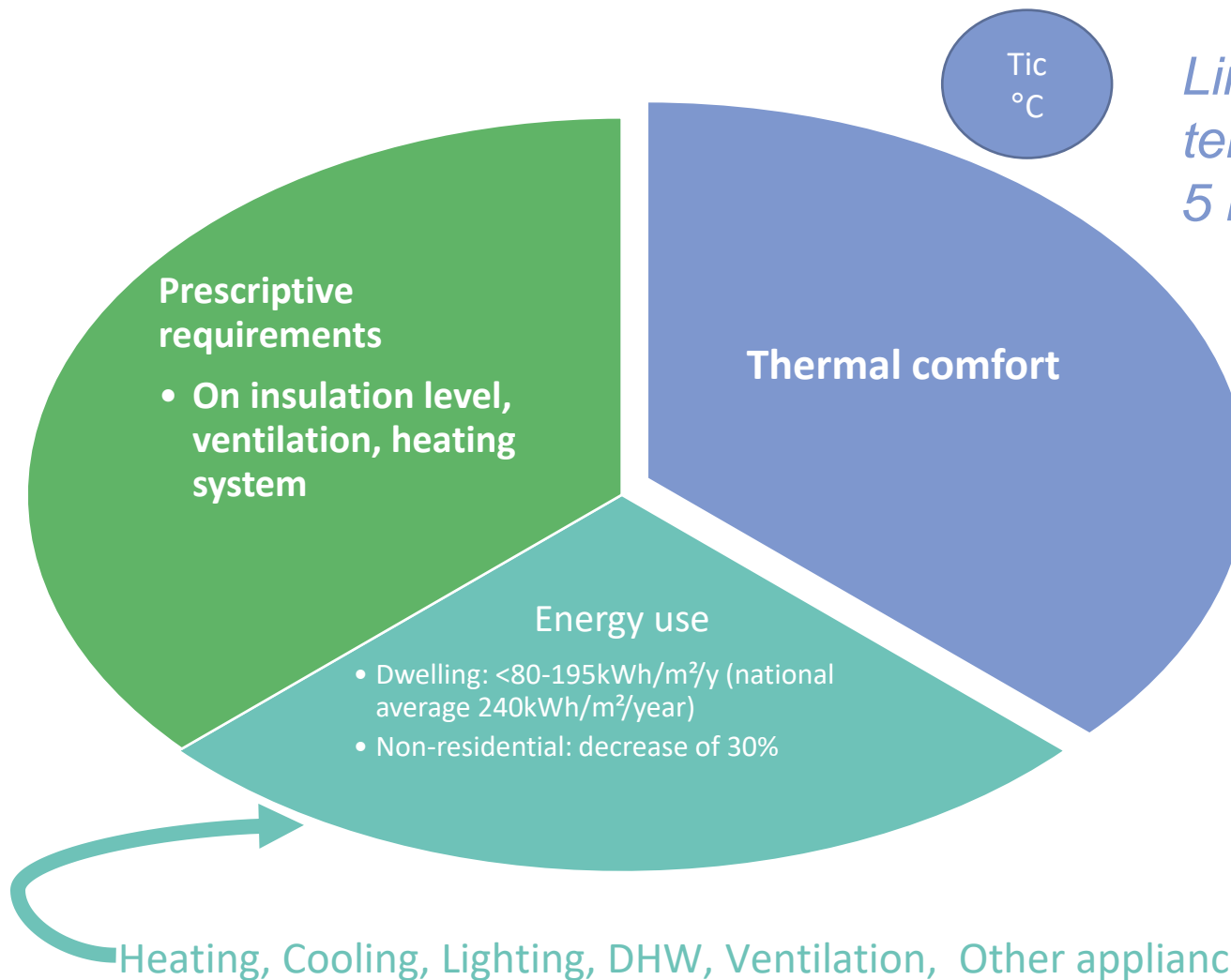
Existing buildings

1. Member States shall take the necessary measures to ensure that, when buildings undergo major renovation, the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance
3. Member States shall, in relation to buildings undergoing major renovation, encourage high-efficiency alternative systems, in so far as technically, functionally and economically feasible. Member States shall address, in relation to buildings undergoing major renovation, the issues of indoor environmental quality, adaptation to climate change, fire safety, risks related to intense seismic activity, the removal of hazardous substances including asbestos and accessibility for persons with disabilities.

THE FRENCH EP-REGULATION: RT-EXISTANT GLOBAL



- > 1000m²
- After 1948
- Refurbishment cost >322€/m² (dwellings) or 275€/m² (commercial)



T_{ic}
°C

Limitation on the maximal temperature reached after 5 hot days

$$T_{ic} < T_{ic_ref}$$

Depending on building characteristics

⇒ Hourly calculation

REQUIREMENTS TO ENSURE GOOD IEQ

Article 13

Technical building systems

1. Member States shall, for the purpose of optimising the energy use of technical building systems, set system requirements using energy-saving technologies in respect of the overall energy performance, the proper installation, the

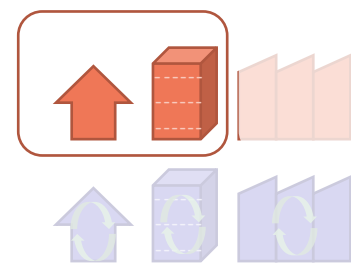
4. Member States shall set requirements for the implementation of adequate indoor environmental quality standards in buildings in order to maintain a healthy indoor climate.

5. Member States shall require non-residential zero-emission buildings to be equipped with measuring and control devices for the monitoring and regulation of indoor air quality. In existing non-residential buildings, the installation of such devices shall be required, where technically and economically feasible, when a building undergoes a major renovation. Member States may require the installation of such devices in residential buildings.

10. The building automation and control systems shall be capable of:

(d) by 29 May 2026 monitoring of indoor environmental quality.

NEW REGULATION FOR IAQ IN FRANCE



The new construction code states that :

“Air renewal, shall be such as, in normal condition of use, the **indoor air pollution does not endanger health and security of occupants** and that **condensation is avoided, except temporarily**”.

This is respected if the system:

Respects

Arrete de 82 requirements

Art.1 _____

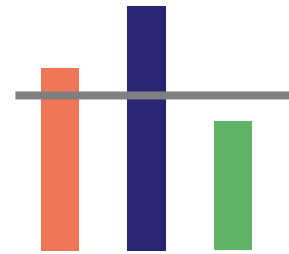
Art.2 _____

Art.3 _____

Art.4 _____

Art.5 _____

Or



Fulfills

Key Performance Indicators levels*

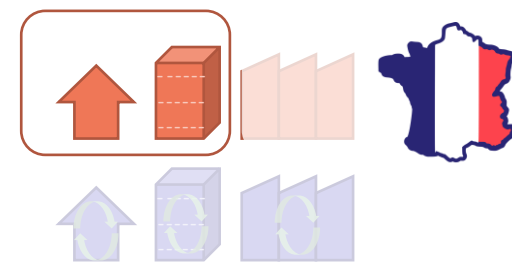
New

*(named Résultats minimaux – Minimal results) as defined in a Regulatory text to be published by January 2025.



*Ambitious because **defining KPI for ventilation with minimum is still a matter of research**, this is worked on in IEA-EBC Annex 86*

CONTEXTE: PRESCRIPTIVE REGULATION « ARRÊTÉ DE 1982 »



Art. 1: The air renewal in dwelling is general and permanent at least during the heating season.

Art2: The air renewal system shall include natural or mechanical inlet in main rooms and outlet in utility rooms. The air shall circulate between main and utility rooms

Art 3: The ventilation system shall be able to reach, simultaneously or not the following values:

Number of main rooms in the dwelling	Extract flowrate in m ³ /h				
	Kitchen	Bathroom	Other room with water source	Toilet	
				Only one	Multiple ones
1	75	15	15	15	15
2	90	15	15	15	15
3	105	30	15	15	15
4	120	30	15	30	15
5 or more	135	30	15	30	15

Additional requirements are set for fire safety and interaction with combustion appliance.

Art. 4: The total extract flowrate can be reduced as follow :

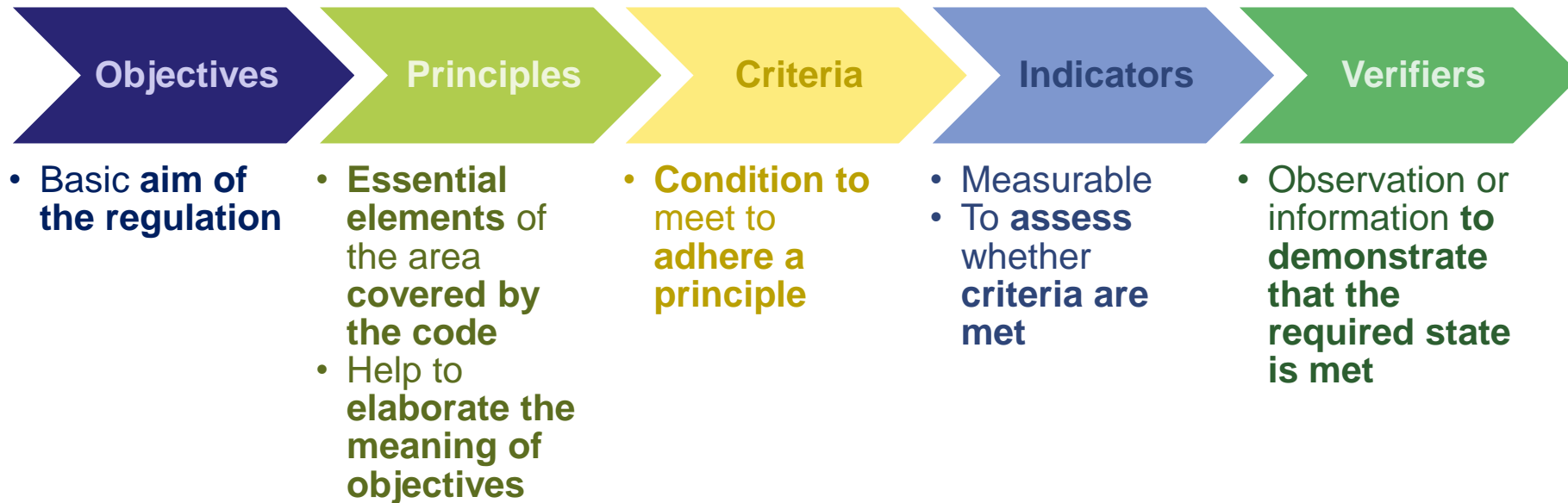
	Number of main rooms						
	1	2	3	4	5	6	7
Total minimal flowrate in m ³ /h	35	60	75	90	105	120	135
Minimal flowrate in the kitchen m ³ /h	20	30	45	45	45	45	45

If the ventilation system **automatically control flowrate** to maintain an indoor air quality that is not dangerous for occupant and avoid condensation (except temporarily) the flowrate can be reduced. Provided that the **system has been validated by the ministry** in charge of construction and health. In any case the total extracted flowrate shall at least be:

	Number of main rooms						
	1	2	3	4	5	6	7
Total minimal flowrate in m ³ /h	10	10	15	20	25	30	35

Art.5: air inlet shall be designed to reach extracted flowrates defined at article 3.

GENERAL APPROACH TO ESTABLISH PERFORMANCE BASED REQUIREMENTS



OBJECTIVES OF THE AIR RENEWAL SYSTEM IN THE FRENCH CONTEXT

The regulation deal with IAQ aspect that can be improved by an increase of the flowrate of air renewal

✓ Removal of pollutant produced indoor (inc. Humidity/CO₂, etc.)

✗ But **no requirement on air treatment**, ex: Increase of humidity level, temperature Quality of supply air, etc.

- **Exposure (long term and acute) to pollutants emitted by**
 - buildings components
 - and by human

Health



- **The impact of systems on the sleep quality and the stuffiness in room.**
- **The level of perceived air quality in the toilets**

Wellbeing



- **The risk of condensation that may lead to mould development**

Building durability



PRINCIPLES OF THE FRENCH IAQ REGULATION

- > The Performance indicator should be suitable for



validation through
preliminary
simulations



not through on-site
measurements






Nevertheless, the ability of indicators to be compared to on-site measurement is a criterion to define them

- > **Threshold values** for those indicators should be **consistent with** performance of systems that respect the prescriptive regulation of “**Arrêté de 82**”



- > Some prescriptive requirements can be kept as safe-guards

TARGET VALUES FOR INDICATORS

Param.	Indicator	Location	Suggested values
	The CO ₂ concentration (in ppm) below which it remains 67% of occupied time	Maximum of occupied rooms	~1900 ppm [1800-2000]
	The CO ₂ concentration (in ppm) below which it remains 95% of occupied time	Maximum of occupied rooms	~2700 ppm [2500-2900]
	Percentage of time over 75% of relative humidity during the heating period	Bathroom	~14% [12-16]
		Kitchen	~6% [5-8]
		Other rooms	~1% [1-3]
	The mean exposure	Most exposed person	~2300 P1/m ³ [2100-2500]
	Maximum exposure over one hour	Most exposed person	~7000 P1/m ³ [7000-9000]
	Maximum exposure over one hour	Kitchen	~1800 P2/m ³ [1700-2000]
	The concentration below which it remains 95% time	Maximum of main rooms	~100 P2/m ³ [50-200]
	Extracted Air Flow rate above which it is 95% of time	Toilets	~5m ³ /h
	E.A.F.R. above which it is 95% of occupied time	Toilets	~15m ³ /h
	Air replacement above which it is 95% of time	Full dwelling	0,38 m ³ /h/m ² [0,36-0,54]

THRESHOLD VALUES

Through simulations of each project with a software called “MATHIS” (⇔COMTAM) :

- **Fixed parameters:**

- Occupation/emission scenarios

- **Project parameters**

- Meteo (8 climatic zones, various wind exposure)
- Ventilation system
- Architecture (kind of dwelling, room volume, interconnexion, etc.)
- Building exposure
- Building airtightness
- ...



To define threshold values

- More than **2000 simulations performed**
- **2 systems:** extract only with fixed air flow rate and extract-only with HR-based demand control system.
- **Statistically consistent** with the French housing stock

Objective: around 75% of simulations should comply with threshold values.

TO SUM UP: IEQ IN THE FRENCH REGULATION

French regulation rates IEQ of building through simulations

It has requirements on

- Thermal comfort for
 - every new building
 - Some refurbished building
- IAQ
 - New residential buildings (soon)

⇒ There is still a need to developpe

⇒ IAQ performance indicator for on-site rating (measurement, monitoring)

⇒ IAQ criteria for non-residential buildings

⇒ Monitoring requirements

REQUIREMENTS FOR THE INSPECTION OF VENTILATION SYSTEM



(71) Regular maintenance and inspection of heating systems, ventilation systems and air-conditioning systems by qualified personnel contributes to maintaining their correct adjustment in accordance with the product specification and in that way ensures optimal performance from an environmental, safety and energy point of view. An independent assessment of the entire heating system, ventilation system and air-conditioning system should occur at regular intervals during its lifecycle in particular before its replacement or upgrading. Inspections should address the parts of the systems that are accessible either directly or indirectly through available non-destructive methods. In order to minimise the administrative burden on building owners and tenants, Member States should endeavour to combine inspections and certifications as far as possible. Where a ventilation system is installed, its sizing and its capabilities to optimise its performance under typical or average operating conditions relevant for the specific and current use of the building should also be assessed.

Article 23

Inspections

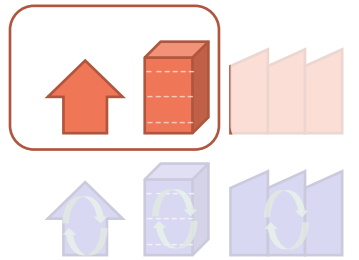
1. Member States shall lay down the necessary measures to establish regular inspections of the accessible parts of heating systems, ventilation systems and air-conditioning systems, including any combination thereof, with an effective rated output of over 70 kW. The effective rating of the system shall be based on the sum of the rated output of the heat generators and cooling generators.
2. Member States may establish separate inspection schemes for the inspections of residential and non-residential systems.
3. Member States may set different inspection frequencies depending on the type and effective rated output of the system whilst taking into account the costs of the inspection of the system and the estimated energy cost savings that may result from the inspection. Systems shall be inspected at least every five years. Systems with generators of an effective rated output of more than 290 kW shall be inspected at least every three years.
4. The inspection shall include the assessment of the generator or generators, circulation pumps and, where appropriate, components of ventilation systems, air and water distribution systems, hydronic balancing systems and control systems. Member States may include in the inspection schemes any additional building systems identified under Annex I.

Where a ventilation system is installed, its sizing and its capabilities to optimise its performance under typical or average operating conditions relevant for the specific and current use of the building shall also be assessed.

Article 24: Inspection is carried out in an **independent manner by qualified or certified experts**, whether operating in a self-employed capacity or employed by public bodies or private enterprises.

Article 27: Inspection also in case of refurbishment

INSPECTION OF VENTILATION SYSTEM FOR EVERY NEW RESIDENTIAL BUILDING



- *Inspection of ventilation system is mandatory for:*
 - *New residential buildings:*
 - *Single family dwellings*
 - *Multi family dwellings,*
 - *With mechanical ventilation system:*
 - *Either single exhaust ventilation system*
 - *Or balanced ventilation system.*

Since January, 1st 2022



INSPECTION BY QUALIFIED INSPECTOR



Mandatory
Training

Validation
by training
center

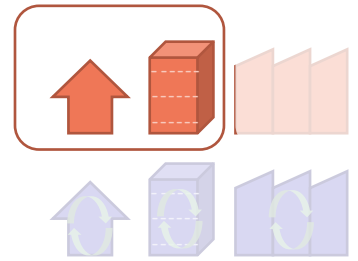
Qualibat
examination

Annual
check



- Administrative requirements
- Reports validation

INSPECTION REPORT AND DATABASE

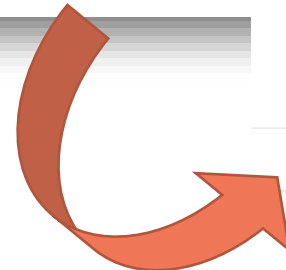


Article 24

Reports on the inspection of heating systems, ventilation systems and air-conditioning systems

1. An inspection report shall be issued after each inspection of a heating system, ventilation system or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 23 and include recommendations for the cost-effective improvement of the energy performance of the inspected system.
3. The inspection report shall be uploaded into the national database for the energy performance of buildings pursuant to Article 22.

National database gathering every inspection performed
⇒ Public statistics (soon)

A screenshot of the website for the Observatoire National Ventilation. The header includes the French Republic logo, the RE2020 logo, and the site title 'Observatoire National Ventilation'. Below the header is a navigation menu with 'Accueil', 'Statistiques', 'Documentation', and 'Liens Utiles'. The main content area features four images: a modern apartment building, a close-up of a ventilation duct in a ceiling, a close-up of a circular ventilation grille, and a modern house at night.

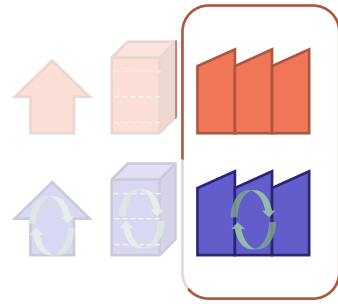
Observatoire National Ventilation
Observatoire des contrôles des systèmes de ventilation réalisés dans le cadre de la RE2020 - Résidentiel neuf.

Accueil Statistiques Documentation Liens Utiles

Bienvenue sur l'Observatoire National Ventilation

L'Observatoire National Ventilation (ONV) a pour mission d'améliorer la connaissance sur les systèmes de ventilation installés dans les bâtiments résidentiels neufs soumis à la RE2020.

INSPECTION OF NON-RESIDENTIAL BUILDINGS?



A protocol exist:

www.promevent.fr

But not mandatory yet



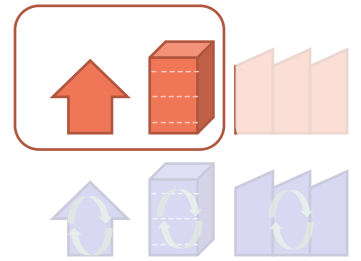
Protocole de Diagnostic
des installations de ventilation mécanique en tertiaire



Novembre 2022



CHALLENGES FOR THE COMING YEARS



Non-residential buildings



- IAQ requirements
- Mandatory inspection protocol
- Every 3-5 years....

Smart-readiness of buildings

Article 15

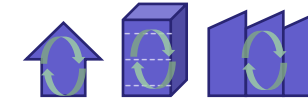
Smart readiness of buildings

1. The Commission shall adopt delegated acts in accordance with Article 32 to supplement this Directive concerning an optional common Union scheme for rating the smart readiness of buildings. The rating shall be based on an assessment of the capabilities of a building or building unit to adapt its operation to the needs of the occupant, in particular concerning indoor environmental quality and the grid and to improve its energy efficiency and overall performance.

In accordance with Annex IV, the optional common Union scheme for rating the smart readiness of buildings shall lay down:

- (a) the definition of the smart readiness indicator;
- (b) a methodology by which it is to be calculated.

Renovation



- National renovation plane that should include:
 - IEQ requirements
 - Inspection protocol

Article 3

National building renovation plan

1. Each Member State shall establish a national building renovation plan to ensure the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy-efficient and decarbonised building stock by 2050, with the objective to transform existing buildings into zero-emission buildings.

(h) an evidence-based estimate of expected energy savings and wider benefits, including those related to indoor environmental quality.

Building automation control



THE IMPORTANCE OF EPBD STANDARDS

EN 16798-17 : Inspection of ventilation system need to better tackle:

- Inspection of demand-control ventilation system
- Inspection of IEQ
- Regular inspection

EN 16798-1

- Development of key Performance Indicator for IEQ



**THANK YOU
FOR YOUR ATTENTION**



BREATHING LIFE INTO EFFICIENCY: INDOOR ENVIRONMENTAL QUALITY AS A CORNERSTONE IN BUILDING POLICY



REHVA
3E Federation of
European Heating,
Ventilation and
Air Conditioning
Associations

Moderated panel discussion



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BREATHING LIFE INTO EFFICIENCY: INDOOR ENVIRONMENTAL QUALITY AS A CORNERSTONE IN BUILDING POLICY

Introductory statement

Tyler SMITH

*Vice-President, Healthy Buildings
HVAC, and Controls
Johnson Controls,*



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OPTIMIZING ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY (IEQ)

1 How does IEQ impact building stakeholders?

Leveraging **smart building technologies** to drive improved IEQ **delivers many benefits** to occupants, visitors, FMs, and owners.

These benefits result in real, quantifiable value¹. On average, a smart building with good IEQ can experience:

Improved student test scores
3-7% increase

Increased retention
Employees 35% less likely to leave

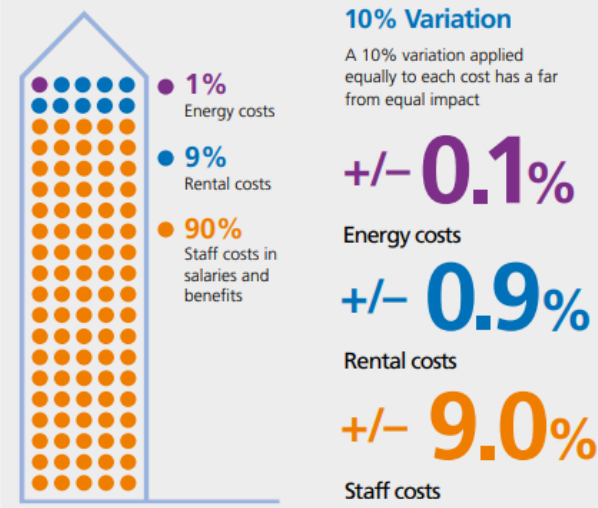
Better performance
60-100% increase in occupant cognition

Higher building valuation
10-20% premium

2 What is the financial justification of improved IEQ?

Improved IEQ can result in up to **€800/employee/year in increased profitability¹.**

Typical business operating costs ²



Proof point: 1% improvement in productivity ≈ 90% improvement in energy costs

3 Can we improve both energy efficiency and IEQ?

Given fluctuations in post-pandemic occupancy buildings **could be wasting up to 25% in HVAC-related energy⁴.**

European average daily office occupancy rates
(Sept 2023)³

62%
midweek

45%
Fridays

As we address energy efficiency, it's critical to measure IEQ and leverage smart building technologies to **ensure energy efficiency measures don't result in "sick" buildings.**

IEQ is a key performance indicator (KPI) to define the appropriate amount of energy to use to control indoor environments.

¹Value supported by multiple, well-established studies, including those cited in this Johnson Controls white paper: <https://www.johnsoncontrols.com/insights/2022/white-paper/measuring-the-return-on-indoor-air-quality-investment> (2022)

²World Green Building Council report, "Health, Wellbeing & Productivity in Offices: The Next Chapter for Green Building" (2014)

³Savills report, "Spotlight: European Office Occupancy Rates" (2023)

⁴Johnson Controls analysis based on data from CBECS



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Pierre CRUVEILLÉ

Chairperson



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IEQ transposition & implementation of the EBPD

EUSEW, Monday 10 June 2024

EUSEW



secretariat@evia.eu

Avenue des Arts, 46, 1000 Brussels | Belgium

Introductory slide

IEQ/IAQ in the revised EPBD

- **A great leap forward and the right text to deal with the health dimension of buildings.**
- **Following the COVID crisis, more than ever compulsory to deal with the quality of indoor air.**
- **Essential to guarantee a certain air renewal level within buildings at all times when occupied and lower it in the absence of people. Mechanical ventilation is very instrumental in this regard.**
- **These systems have to be well-dimensioned, implemented and maintained. Their regular inspection in the frame of the EPBD will play a key role in this regard.**
- **Member States have also to make sure that the EPBD provisions are effectively enforced.**



Thank you



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Introductory statement

Thomas SCHIELKE

Architect &

Lighting Design Trainer

ERCO



LIGHTINGEUROPE

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Lighting is more than energy efficiency. Lighting is a vital quality for wellbeing, health, safety and productivity.

Therefore, lighting is essential for the indoor environmental quality and should be part of the implementation of the EPBD.





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Adam TAYLOR

IAQ Chairperson



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ADAM TAYLOR B.ENG I.ENG MCIBSE
IAQ CHAIRPERSON FOR BESA & GCP EUROPE

- Indoor Air Quality, ventilation and thermal comfort specialist
- Day Job -
- Assessment
- Remediation
- Maintenance
- Healthy Buildings Healthy Building Standards - development & deployment
- Balancing the needs of IAQ and Energy – “Buildings are built for people, not just for saving energy”



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Closing remarks and link
networking
drinks & finger foods

Paweł WARGOCKI

Professor, Indoor Environment



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Blгодарjá!
Hvala!
Děkuji!
Tak!
Dank je!
Thank you!

Aitäh!
Kiitos!
Merci!
Danke!
Efcharisto!
Köszönöm!

Go raibh maith agat!

Grazie!
Paldies!
Ačiū!
Grazzi!
Dziękuję!

Obrigado!
Mulțumesc!
Ďakujem!
Hvala!
Gracias!
Tack!

