

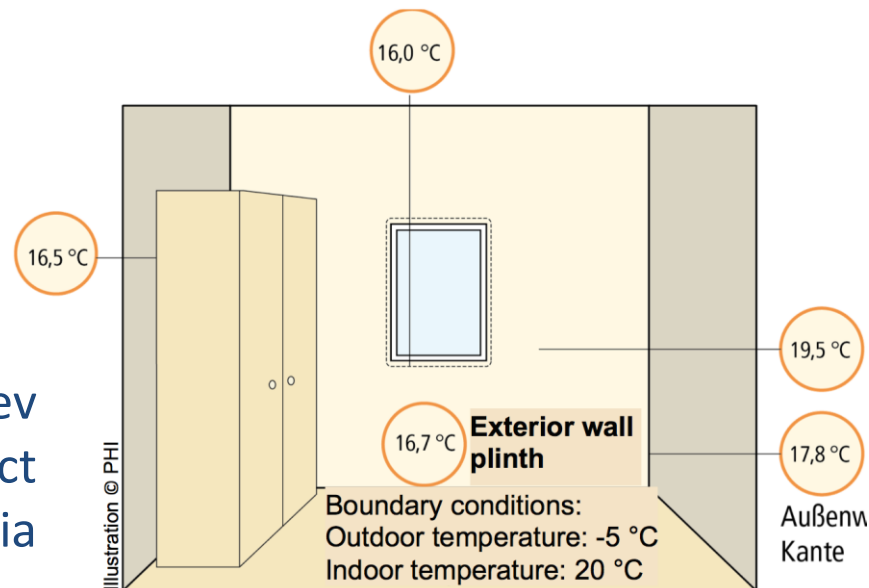


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# PASSIVE HOUSE - THE ROAD TO NZEB

## Ten messages



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EnEffect, Bulgaria



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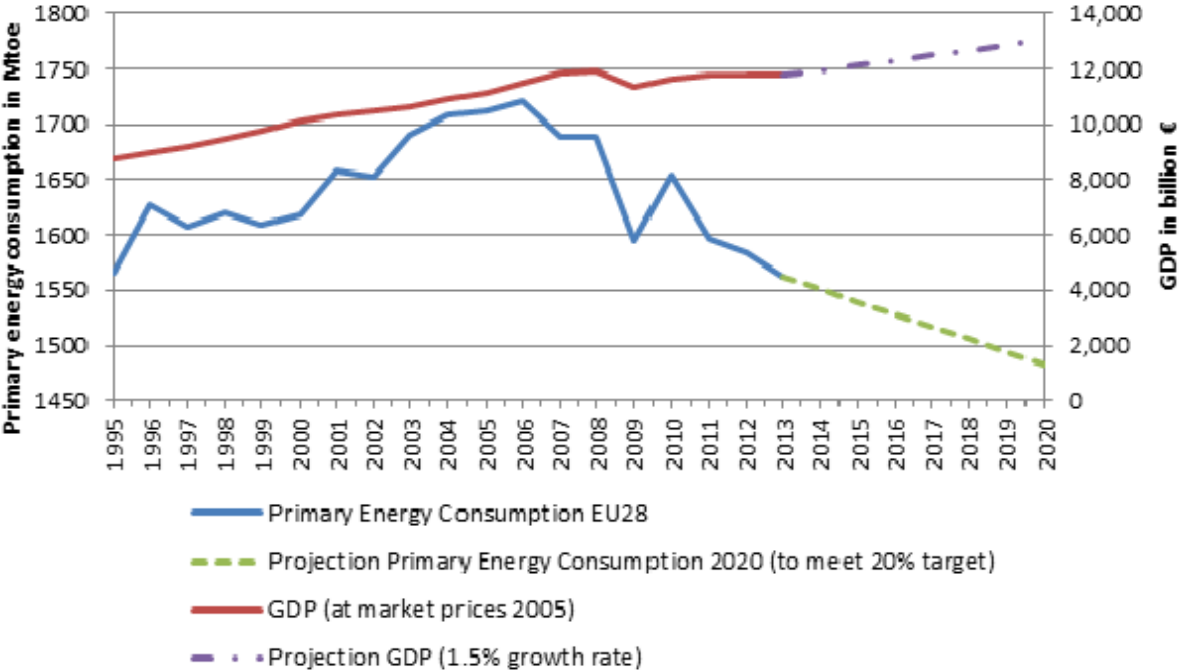


# THE GOALS

# CURRENT GOAL

**2020**    20% / 20% / 20%

**IMPLEMENTATION**  
(reduction of energy consumption)



# NEW GOAL

**2030** 40% / 27% / 30%

- GHG emission reduction **40%**
- Share of RES – at least **27%**
- Reduction of energy consumption **30%**  
(not binding target)



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# DEFINITIONS

# DEFINITION OF PASSIVE HOUSE



# DEFINITION

## OF PASSIVE HOUSE

### “Passive House” Concept

1. Optimal solar gains

2. Super insulation

3. High quality windows and doors

4. High air tightness

5. Minimal thermal bridges

6. Ventilation with recuperation

Physical  
characteristics  
of buildings



# DEFINITION

## ADDITIONAL REQUIREMENTS to Nearly Zero-Energy Building





# DEFINITION

## ADDITIONAL REQUIREMENTS to Nearly Zero-Energy Building

Socio-political  
requirements

7. Cost efficiency

8. High share of RES

9. Minimal emissions of CO<sub>2</sub>

- Socio-political aspects of «Passive House» concept
- EPBD requirements (recast of 2010)

# DEFINITION

## OF NEARLY ZERO-ENERGY BUILDING

- PH physical principles
- +
- 3 policy requirements



# DEFINITION

## OF NEARLY ZERO-ENERGY BUILDING

1. Optimal solar gains

2. Superinsulation

3. High quality windows and doors

4. High air tightness

5. Minimal thermal bridges

6. Ventilation with recuperation

7. Cost effectiveness

8. High share of RES

9. Minimal CO<sub>2</sub> emissions

Physical  
characteristics  
of buildings

+

Socio-political  
requirements

Applicability



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# MESSAGES

# MESSAGE 1

## APPLICABILITY

- different functions, climates, styles

- Passive House concept applied for various types of buildings
- Passive house concept applies in different climatic zones
- Passive house concept applies with different architectural styles



On building level  
PH Award 2014



Passive House  
Standard  
15 kWh/m<sup>2</sup>.a





Passive House  
Standard  
15 kWh/m<sup>2</sup>.a



On building level  
PassREG Beacons



Germany



Netherlands



Germany



Austria





On building level  
PASSIVE Beacons



Switzerland



Croatia



Italy



France



Belgium



Belgium



Spain



Belgium

# MESSAGE 2

## COST EFFECTIVENESS

- the leading role of integrated design



Social houses in Brussels

Why more expensive?



On building level

# MESSAGE 2

## COST EFFECTIVENESS - the leading role of integrated design



The first certified PH in Pennsylvania, USA  
Social houses  
6 months construction  
1400 USD / m<sup>2</sup>  
No appreciation



On building level

# MESSAGE 2

## COST EFFECTIVENESS

- the leading role of integrated design



The first certified Passive House in Bulgaria



Kindergarten in Gabrovo

# MESSAGE 2

## COST EFFECTIVENESS

### - the leading role of integrated design



INVESTMENT  
**370 €/m<sup>2</sup>**

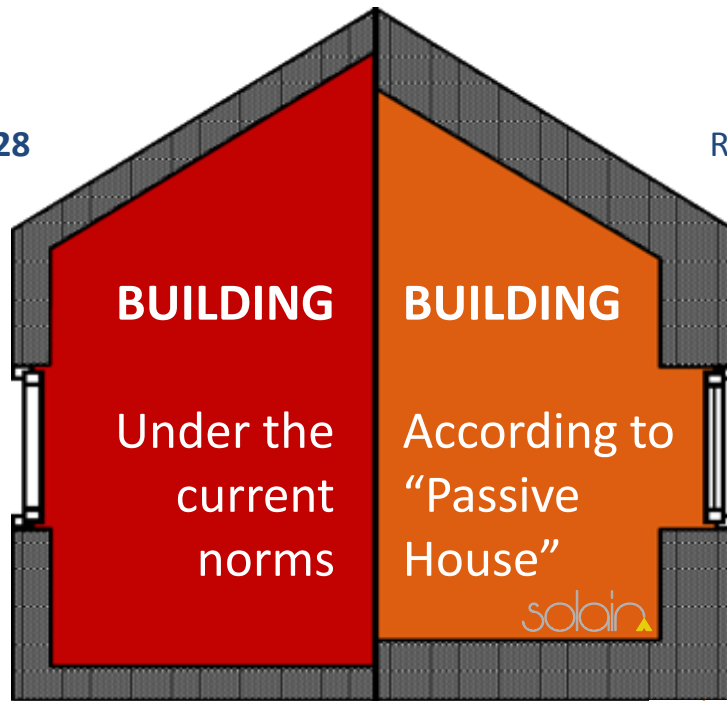
ROOF ≤ 0.28

AIRTIGHTNESS  
 $n_{50} \leq 3 \text{ 1/h}$

WALLS ≤ 0.35

WINDOWS ≤ 1.7

U-values in W/(m<sup>2</sup>K)



INVESTMENT  
**397 €/m<sup>2</sup>**

ROOF ≤ 0.15

AIRTIGHTNESS  
 $n_{50} \leq 0.6 \text{ 1/h}$

WALLS ≤ 0.15

WINDOWS ≤ 0.8

**BUILDING**

Under the  
current  
norms

**BUILDING**

According to  
"Passive  
House"

INVESTMENT

**397 €/m<sup>2</sup>**

APPRECIATION  
**7,2 %**  
PAYBACK:  
**7.5 years**

**Kindergarten in Gabrovo**

The first certified Passive House in Bulgaria

# MESSAGE 3

## RENEWABLES INTEGRATION - need of additional efforts

The leading role  
of integrated  
design





On building level  
PH Award 2014



Passive House Standard  
15 kWh/m<sup>2</sup>.a



# MESSAGE 4

## PASSIVE HOUSE CONCEPT & STANDARD - basis for cities / regions planning

Success models of  
frontrunners help  
aspiring cities

Aspiring cities have  
their own success  
models

Success Guide  
- on paper and  
online





# MESSAGE 4

## PASSIVE HOUSE CONCEPT & STANDARD - basis for cities / regions planning

Cezena, Italy



Cadix – Antwerp, Belgium

continuation of the  
first steps to passive  
city districts

Zagreb, Croatia



# MESSAGE 4

## PASSIVE HOUSE CONCEPT & STANDARD - basis for cities / regions planning



O-E Park, Hanover  
Germany



Stage 3, planned for 2019, already sold  
out by the end of summer 2014

# MESSAGE 5

## INTEGRATED INDICATOR - already in EU legislation

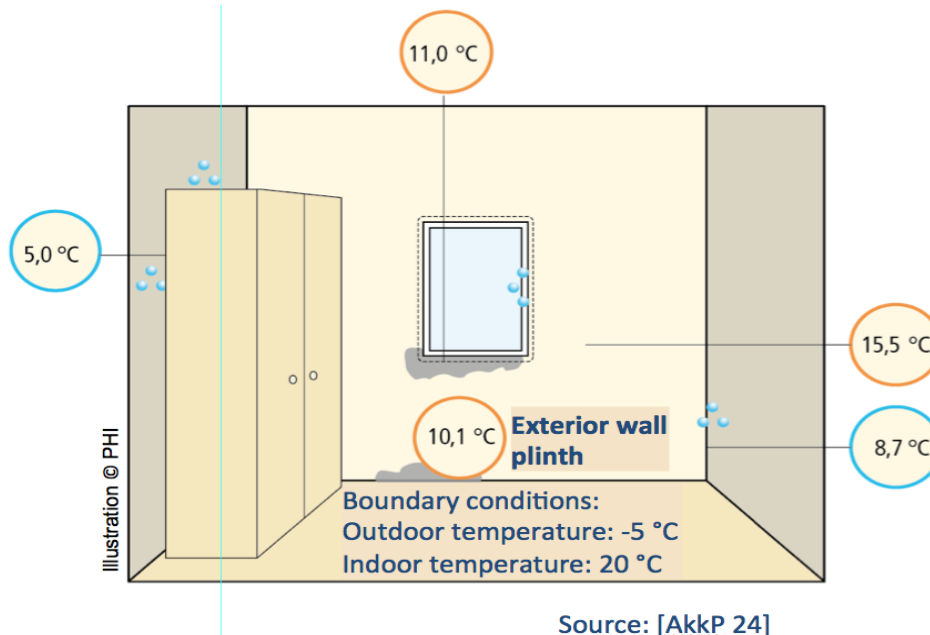
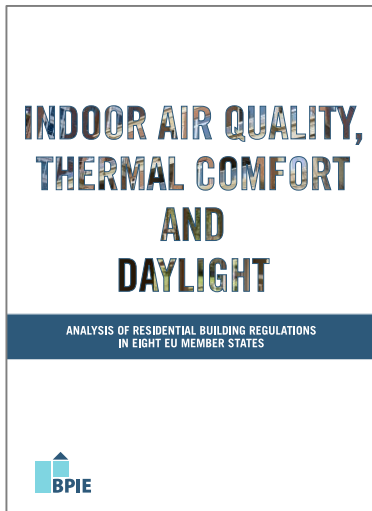
- Reference values vs integrated indicator
- Leading role of integrated indicator in national legislation (EPBD recast)
- Influence on the national definitions of “Nearly Zero Energy Building”

# MESSAGE 6

## EU LEGISLATION

- high standards for indoor comfort

- Hygienic indicators / indoor air quality
- Regulation for ventilation, day lighting

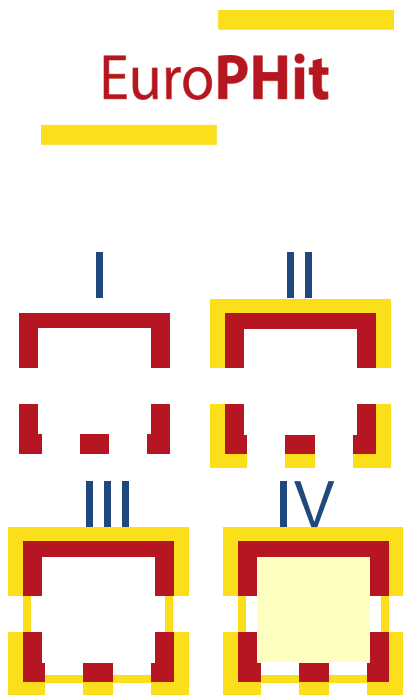


Source: [AkkP 24]

# MESSAGE 7

## EU LEGISLATION

### - step-by-step retrofit



- Necessary to fully utilize the energy efficiency potential of existing building, when renovate
- Need of regulation of partial (step-by-step) retrofit of existing buildings
- Need of appropriate financing of partial (step-by-step) retrofit
- **Stop compromise retrofit**

# MESSAGE 8

## FINANCING

### - for buildings of the future



- EU funds **only** for very high energy efficiency (NZEB)
- National public funds to foster **faster** penetration of NZEB in national policies and practices
- Public funds to raise increasing private investments (Hanover: 1:12.7)

# MESSAGE 9

## COMPETENT DESIGNERS - leading role of architects

Art Museum, Germany



Attract prominent architects to create leading examples



Social houses, Brussels

Family house, Finland



From leading examples to regular design practices, based on PH concept

School, Germany



# MESSAGE 10

## CAPACITY & AWARENESS

- need to accelerate the process

- **At EU level:** Continue Build Up Skills programme for wider scope of building specialists, incl. building **designers**
- **At national level:** Focus on BUS **Roadmaps** implementation
- **At all levels:** Communication campaigns to cover all stakeholders in building design and construction





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# THE PASSIVE HOUSE

## KEY INSTRUMENT FOR CLIMATE PROTECTION

# THE PASSIVE HOUSE

## BUILDING OF A NEW PEACEFUL WORLD



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# THANK YOU