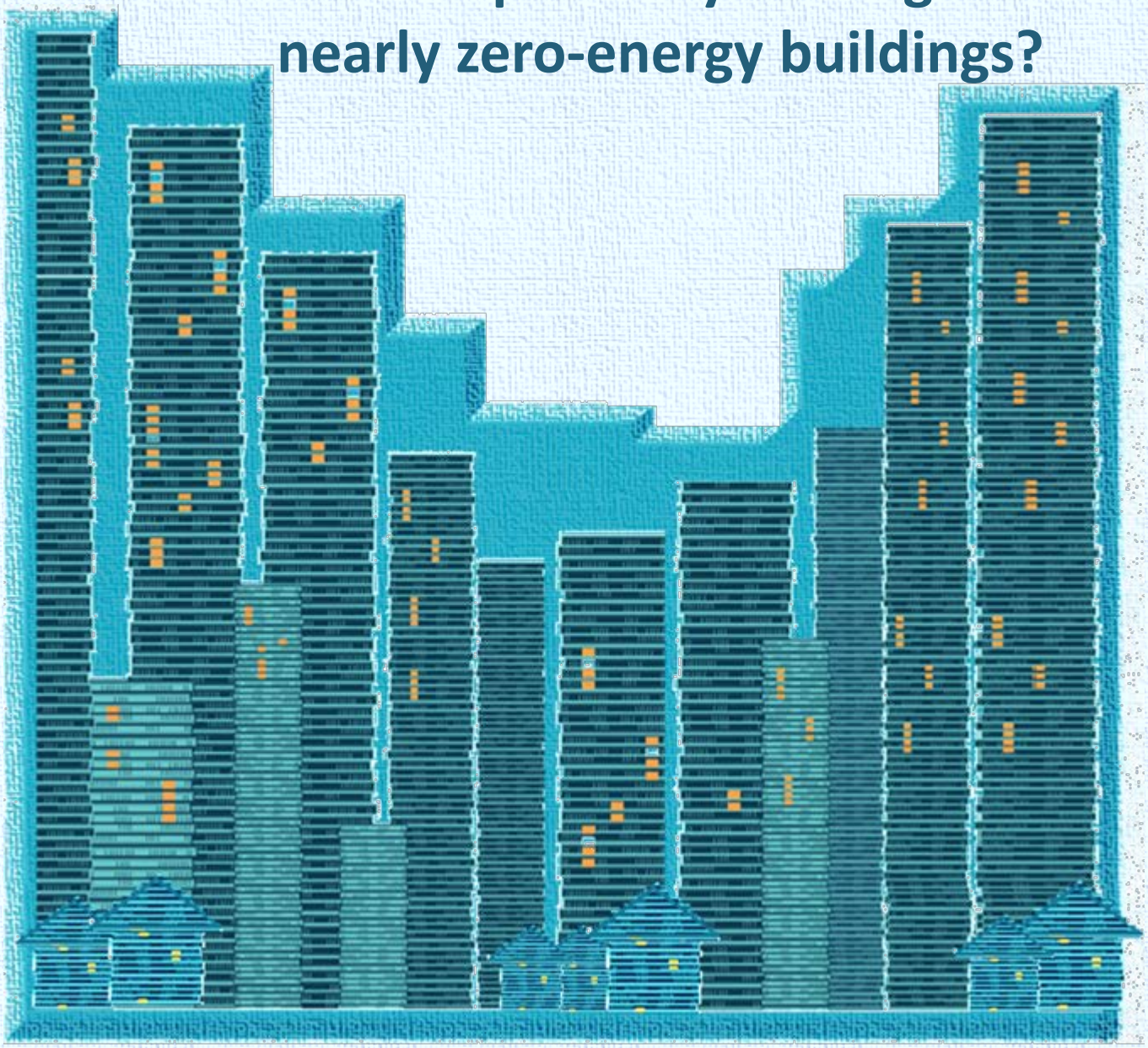
Wels, February 2014

Is cost-optimality leading to nearly zero-energy buildings?



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Cost-optimality in EPBD (Art. 5) and EC Reg. 244/2012

- **A methodology that EU MS have to use for the evaluation of buildings regulations**
- It is not a methodology for practitioners, nor imposing that every building should be 'cost-optimal'

Aim:

- **To set energy performance requirements** by considering the economic aspects as a driver for improving **technical building codes**
- **To shift focus from upfront investment costs to global life cycle costs** (including energy costs)

Cost optimality (C-O) steps:

1. **Select/define** reference buildings/systems
2. **Establish** sets of buildings measures (energy efficiency and RES, including 'nZEB')
3. **Calculate** the thermal performance of elements and the energy performance of the whole building (for both new and existing)
4. **Calculate** the life cycle costs using net present valuation for private and macroeconomic levels
5. **Identify cost optimal set of measures** for optimising energy performance of a reference building in a given MS, in kWh/m²/yr
6. **Compare** results with current building codes and if necessary **adjust them**!

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Cost-optimality and nearly zero-energy in recast EPBD

- **Both are requirements of recast EPBD** addressing new buildings
- **Both aim at improving** the buildings' **regulatory framework towards cost-optimal low-energy levels**
- **Their implementation have to be detailed by each EU Member State (MS)**

Cost-optimality / C-O (Art 5)

- Buildings as long-term investments: lifetime global costs to be considered
- Calculation methodology based on a comparative EU framework (Reg. 244/'12)
- EU MS to undertake calculations with national parameters
- EU MS to chose between private and macroeconomic calculations
- EU MS plans to fill potential gaps to c-o
- To be repeated and reported every 5 yrs

Nearly zero-energy buildings / nZEB (Art 9)

- new buildings: all - by Dec. 2020
  public - after Dec. 2018
- generic definition: 'high energy performance', 'RES onsite and nearby'
- EU MS national approaches for nZEB
- Potential opt-out for negative cost-benefit analysis
- EU MS plans for nZEB
- To be reported in 2013

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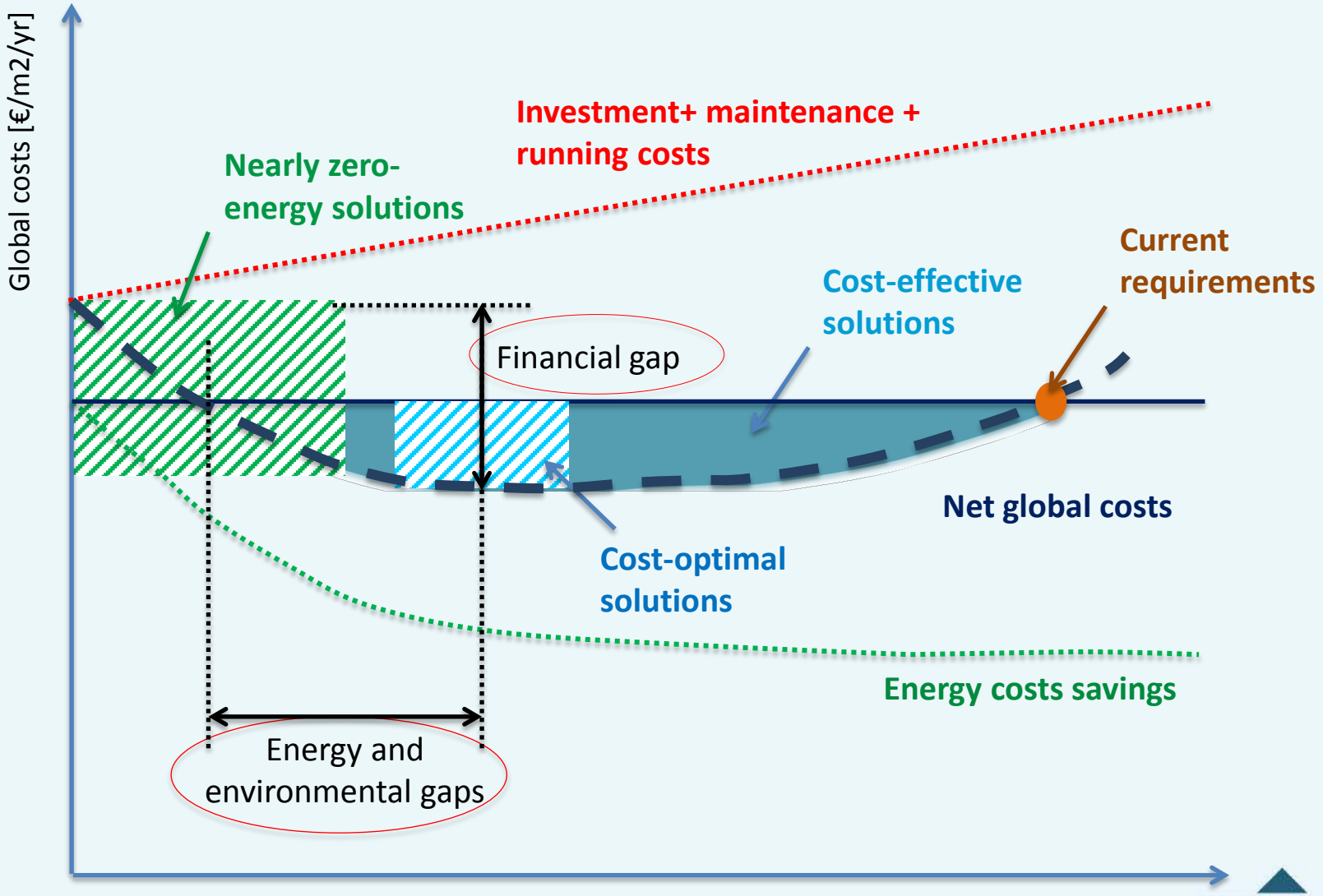
Cost-optimality as driver for nearly zero-energy



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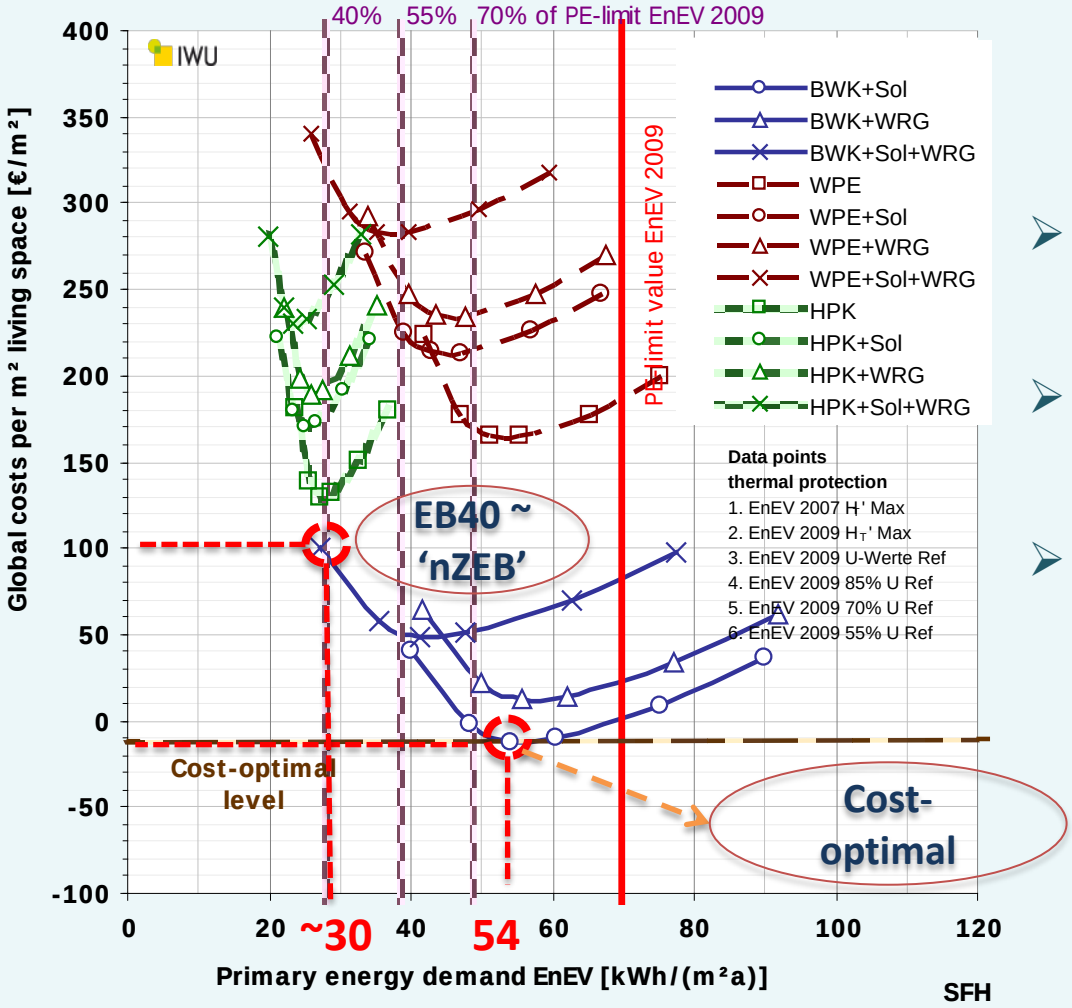
Ex. Germany: Global cost levels SFH

Financial perspective



- Cost-optimal level SFH: approx. **54 kWh/(m²a)**
- Potential gap of ~**25 %** in primary energy demand (SFH)
- Additional cost of 'nZEB' (EB40): up to **100 €/m²,** compared to EnEV09

(source: BPIE, IWU 2013)

Few examples so far – new buildings

Country	C-O as comparing to actual levels	C-O comments	nZEB 2020	Commitment to nZEB
Austria	No major gaps (done mainly for residential)	Actual EP requirements nearly C-O.	in line with C-O (incremental change)	No clear commitment
Cyprus	No major gaps	Actual EP requirements in C-O range. Improvements required for some building components.	Slightly stricter than C-O levels today	Assumed officially, not enforced
Denmark	No major gaps (only office buildings today)	EP requirements stricter than C-O.	B2020 much stricter than C-O	Assumed officially
France	No major gaps	Actual EP requirements RT2012 stricter than C-O	RT2012 (very strict, imp. RES)	commitment to RT 2012
Germany	No major gaps	In 2016: potential strengthening by 25% in primary and 20% heat loss	Under cost-effectiveness consideration.	No commitment, under debate EB40 (KfW)
Ireland	No major gaps	EP requirements in the C-O range	Stricter than today, C-O will be used for the nZEB	Identified, declared, but not yet enforced
UK	No major gaps	EP in C-O range or even stricter	Zero-carbon homes (2016)	Declared but not yet enforced, debates

Challenges in implementing C-O and nZEB

Factors influencing C-O

- ***Selection of reference buildings***: representative, reproducible in practice
- ***Selection of packages of measures***: sufficient no., based on existing standards, include very ambitious ones
- **Realistic primary energy factors, discount rates, energy prices developments**
- **Costs of materials, equipment and works (actual values, learning curves)**; databases are very useful
- **C-o rather a range than a point**

Factors influencing nZEB

- ***Large flexibility*** in defining nZEB according to national approaches
- ***No EU comparative methodology, nor common principles*** (except BPIE's proposal)
- ***No EU benchmark***, 'free style' at MS levels
- ***Not clear*** what happen if proposed ambitious ***nZEB definitions will not become cost-effective/affordable***

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Is C-O driving buildings to nearly zero-energy?

- C-O calculation may contribute to nZEB plans (filling financial and performance gaps to nZEB by additional measures)
- C-O facilitate the nZEB transition in countries with less historical experience in introducing energy requirements for buildings and harmonise approaches at EU level
- C-O offers a range of solutions and therefore the selected option may be less ambitious than existing regulations. C-O may be BaU (or less) especially for countries with vigurous historical development of EP requirements.
- Therefore nZEB should not be necessarily linked to C-O calculations
- On top of C-O, the other macro-economic benefits of ambitious nZEB should be considered when imposing energy performance requirements (e.g. local supply chain industries, reducing the need for additional energy generation and imports, increase quality of life and indoor comfort, less exposure of private budgets to energy prices fluctuations etc.)
- ***Policy will and additional market actions are necessary for reaching ambitious yet feasible nZEB levels and secure transition***

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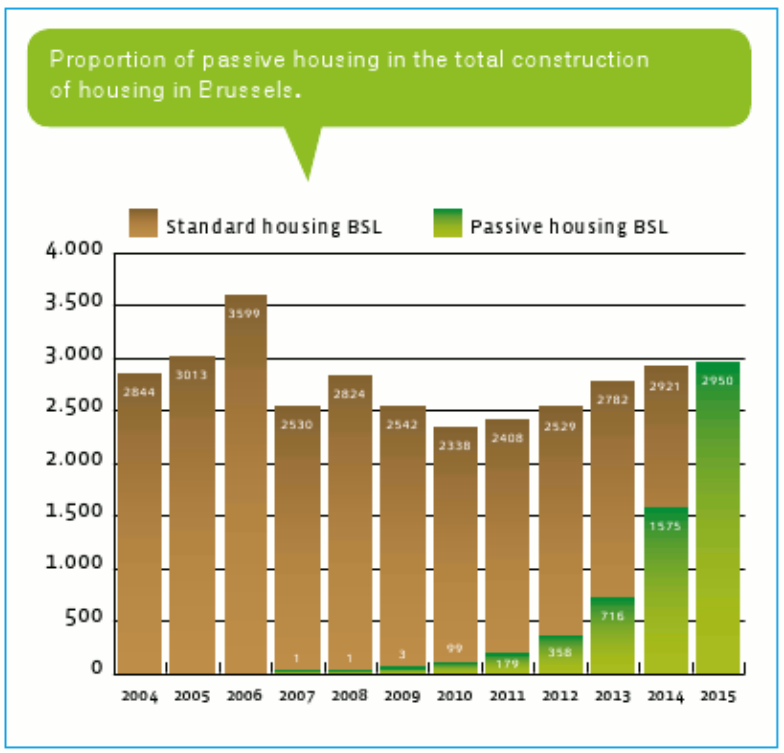
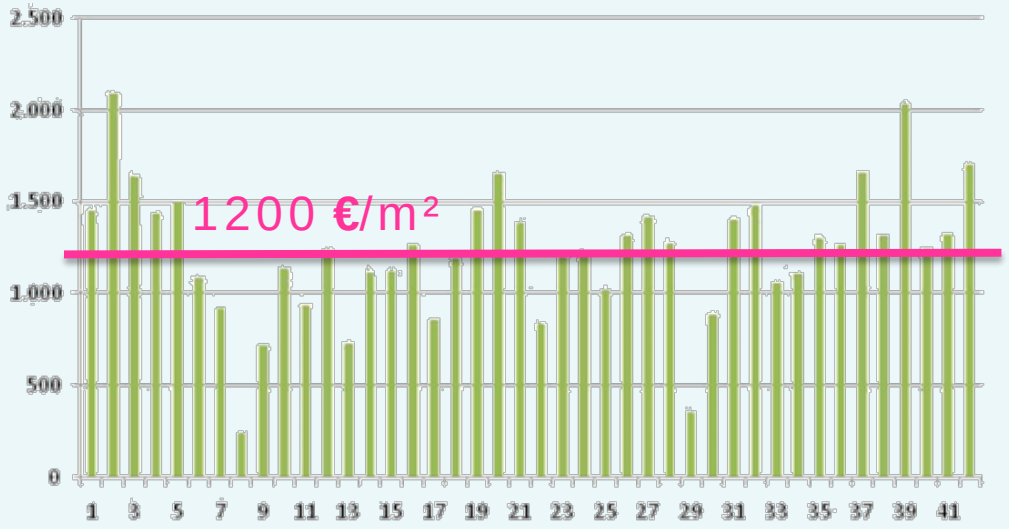
Brussels Region example: how to prepare nZEB

Coherent framework: regulations + info&awareness&training&advice + financing

- **Regulatory:** In 2011 a new law imposing passive house levels for new buildings as from 2015 .
- **Technical support & awareness:** Technical advice supported by Region (both for companies and owners) – flexible design, also including RES H/C
- **Incentives:** 125Euro/m2 grant for passive residential buildings and 100Euro/m2 if BATEX building.

Results so far:





Source: Plateforme Maisson Passive Belgique

Source: Bruxelles Enevironment

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For moving to ambitious nZEB…

There is a need for:

strong commitment,

strategic planning and implementation

innovation in all
policy making process,
market actions and
raising general interest
for better buildings

“You never change things by fighting the existing reality.

To change something, build a new model that makes the existing model obsolete.”

Richard Buckminster Fuller
(1895 – 1983)
American architect, system theorist, designer, inventor

Thank you!