

Fit-to-nZEB i kvaliteta izvođenja

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OPTIMIZACIJA...

- Je li povećanje debljine T.I. jedino rješenje?



One of the most significant problems of the construction market in Croatia is the lack of competences on NZEB.
(all participants in construction projects)



Nadopuna EPBD II

- (10) According to the Commission's impact assessment, renovation would be needed at an average rate of 3 % annually to accomplish the Union's energy efficiency ambitions in a cost-effective manner. Considering that every 1 % increase in energy savings reduces gas imports by 2.6 %, clear ambitions for renovation of the existing building stock are of great importance. Thus, efforts to increase the energy performance of buildings would contribute actively to the Union's energy independence and, furthermore, have great potential to create jobs in the Union, in particular in small and medium-sized enterprises. In that context, Member States should take into account the need for a clear link between their long-term renovation strategies and pertinent initiatives to promote skills development and education in the construction and energy efficiency sectors.

- (6) In Article 10, paragraph 6 is replaced by the following:

"6. Member States shall link their financial measures for energy efficiency improvements in the renovation of buildings to the targeted or achieved energy savings, as determined by one or more of the following criteria:

- (a) the energy performance of the equipment or material used for the renovation; in which case, the equipment or material used for the renovation is to be installed by an installer with the relevant level of certification or qualification.



Rezultat - Stvarna & projektirana potrošnja

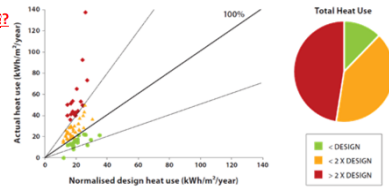
- Usporedba projektirane potrošnje i stvarne potrošnje

- Uzroci:

- metoda proračuna

- korištenje

- **IZVOĐENJE???**



Source: Ghent University



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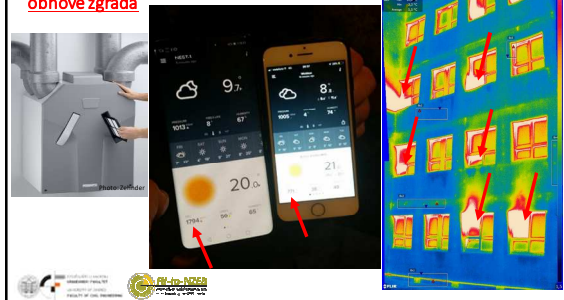


Split
23.2.2019.



Kvaliteta zraka u prostoru?

MVHR su „pluća“ visoko učinkovite energetske obnove zgrada





Fit-to-nZEB

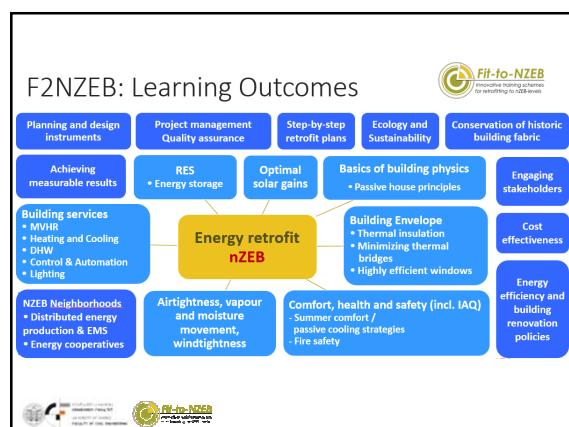
Innovative training schemes
for retrofitting to nZEB-levels

www.fit-to-nzeb.com

Koordinator: **EnEffect**
Center for Energy Efficiency EnEffect – Bulgaria



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ZRAKOPROPUSNOST ZGRADE - PROPISI

- Tehnički propis o racionalnoj uporabi energije i toplinskoj zaštiti u zgradama (NN 128/15, 70/18, 73/18, 86/18):

Članak 30.

- (1) Ispunjavanje zahtjeva o zrakopropusnosti iz odredbi članka 27. ovoga propisa dokazuje se ispitivanjem na izgrađenoj novoj ili rekonstruiranoj postojećoj zgradi prema HRN EN ISO 9972:2015, metoda određivanja A, prije tehničkog pregleda zgrade.
- (3) Obvezna primjena zahtjeva iz stavka 1. ovoga članka odnosi se na zgrade gotovo nulte energije i zgrade koje se projektiraju na:
 - $Q'_{H,0,0} \leq 50 \text{ kWh/(m}^2 \cdot \text{a)}$ kada srednja mjesečna temperatura vanjskog zraka najhladnijeg mjeseca na lokaciji zgrade jest $\leq 3^\circ \text{C}$ prema podacima iz Meteoroloških podataka, odnosno
 - $Q'_{H,0,0} \leq 25 \text{ kWh/(m}^2 \cdot \text{a)}$ kada srednja mjesečna temperatura vanjskog zraka najhladnijeg mjeseca na lokaciji zgrade jest $> 3^\circ \text{C}$ prema podacima iz Meteoroloških podataka.

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ZRAKOPROPUSNOST ZGRADE - PROPISI

Za razliku tlakova od 50 Pa, izmjereni protok zraka, sveden na obujam unutarnjeg zraka, ne smije biti veći od vrijednosti:

- $n_{50} = 3,0 \text{ h}^{-1}$ kod zgrada bez mehaničkog uređaja za ventilaciju, odnosno
- $n_{50} = 1,5 \text{ h}^{-1}$ kod zgrada s mehaničkim uređajem za ventilaciju.

n_{50} je broj izmjena zraka u jednom satu pri razlici tlakova od 50 Pa u odnosu na obujam unutarnjeg zraka.

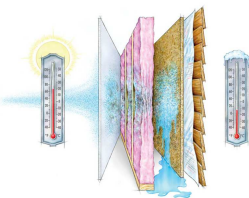
BUILD TIGHT VENTILATE RIGHT



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What's the
Big Deal
Anyway?

Smisao kontrole vodene pare



- Spriječiti izlazak vodene pare sadržane u zraku u vanjsku ovojnici
- Stvoriti paropropusnu vanjsku površinu kako bi se omogućilo da ovonica „diše“ prema van
- Smanjiti rizik od kondenzacije i rasta plijesni unutar ovojnice
- Zaštititi konstrukciju zgrade od propadanja
- Smanjiti rizik od štetnih učinaka plijesni na zdravlje

Posljedice (opasnosti) zrakopropusnih zgrada

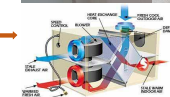
Povećani toplinski gubici



Kondenzacija vodene pare



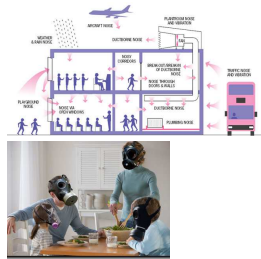
Manja učinkovitost mehaničkih sustava ventilacije (u odnosu na rekuperaciju topline)



Posljedice (opasnosti) zrakopropusnih zgrada

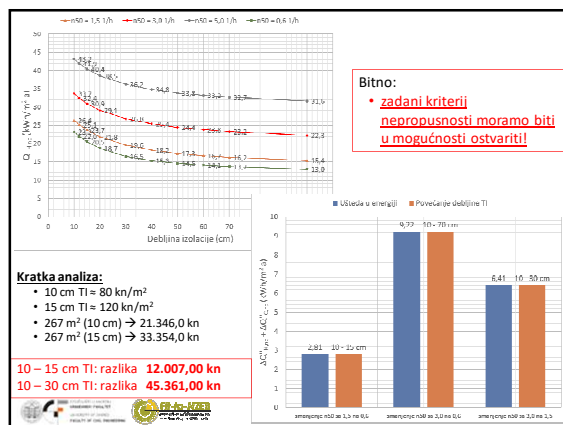
Smanjenje zvučne izolacije

Narušena kvaliteta unutarnjeg zraka



Primjer utjecaja zrakopropusnosti na toplinske gubitke kod NZEB

- Kuća je projektirana na **0,6 izmjena zraka u jednom satu**
- Ploština korisne površine $A_K = 175,34 \text{ m}^2$
- Lokacija Zagreb Maksimir



Kako je to u Njemačkoj, Irskoj,...?



The German Contractor's Declaration



- New obligatory scheme
- Requires contractors to confirm in writing that the specific minimum energy performance requirements
 - for building envelope components,
 - space heating and hot water generation and distribution systems and
 - newly installed cooling and ventilation systems
 are met during the realisation of a renovation measure.
- Infringements lead to fines

Contractor's Declaration according to § 26a of the German Energy Saving Ordinance (EnEV 2009)

Dear Masters, dear Sirs,

Herewith we confirm that the modifications or installations of building components performed by us are in accordance with the requirements of the German Energy Saving Ordinance (EnEV 2009).

☐ external insulation layers installed
☐ external insulation layers renewed
☐ internal insulation layers installed
☐ internal insulation layers renewed

This contractor's declaration has to be kept available by you, the building owner, for at least 3 years and has to be presented to the responsible authority on request.

Signature of the company

© Fraunhofer IBP

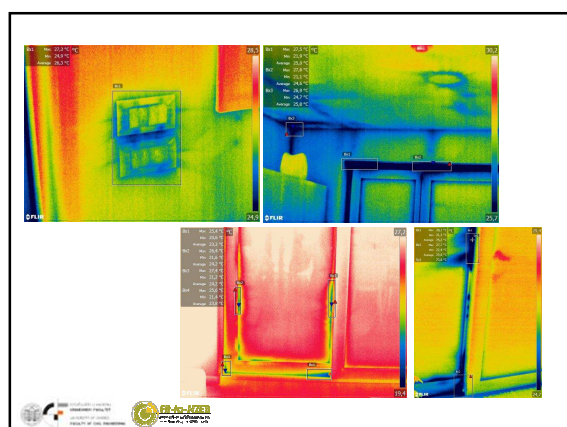
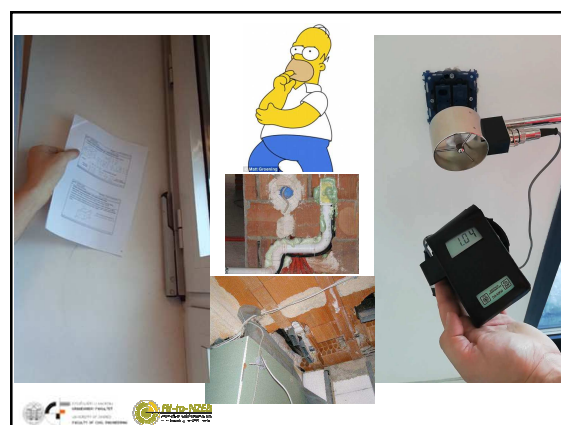
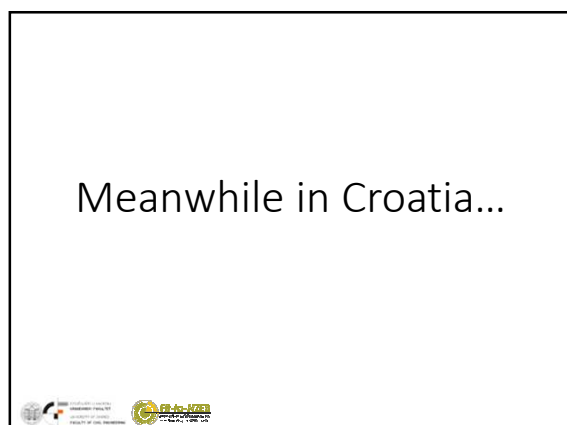
QUALICHECK

IEE/13/610/SIO2.675574

Fraunhofer IBP



Task	Start	End	Duration
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200	2019/02/19	2019/02/19	1



Potencijalni uzroci problema

- Uzroci problema su često:
 - veliki broj podizvođača i obrtnika kojima nedostaje znanja o usklađenosti poslova s drugim izvođačima (**cross-crafting**),
 - Nedostatak vremena za međusobnu komunikaciju i koordinaciju pri rješavanju problema koji su **novi i/ili drugačiji**,
 - nekoordiniranosti ili pak „pogrešnog” redoslijeda izvođenja radova uzrokuju štetu, pri čemu je često **vrlo teško odrediti odgovornost**.
- Zbog svega navedenog, kvaliteta izvedenih radova, pogotovo u dijelu energetske učinkovitosti, **može biti upitna**.

Zaključak!

- Pravovremeno savjetovanje i optimiranje
- Proces optimizacije za projektna rješenja
- Kvaliteta i sadržaj projekta za izvedbu radova
- Kompetentna izvedba radova u traženoj kvaliteti
- Nadzor procesa gradnje
- Provedba testiranja na završenoj novogradnji
- Informiranje korisnika zgrade
- Osnovni monitoring i eventualne korekcije



... na kraju krajeva, želimo osigurati **izgrađeni** **okoliš visoke kvalitete** korištenjem **učinkovitog projektiranja** u kombinaciji s **tehnološkim napretkom** na svim razinama.



Hvala na pažnji!



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