

Gradimo pametno

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Megatrends which create imperative for change



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Michael Burke,
Chairman and CEO of AECOM



"Current business models, strategies and capabilities will not be sufficient in any of these future worlds", says Michael Burke, Chairman and CEO of AECOM and Co-Chair of the World Economic Forum Infrastructure and Urban Development community.

"Players along the construction value chain need to prepare strategically to thrive in the face of anticipated disruption."

To keep up, attracting new talent and improving the skills of the existing workforce were deemed priorities by 74% of industry CEOs at the 2018 World Economic Forum in Davos. Improving integration and collaboration along the value chain (65%) and adopting advanced technologies at scale (61%) were other key actions they considered.



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Smartness matters!

RATIONALE



Acknowledging and leveraging building smartness in the Energy Performance of Buildings Directive

- ✓ Modern nearly zero-energy buildings are in essence smart, flexible buildings.
- ✓ Building smartness is beneficial:
 - Leads in itself to significant energy savings in a cost-effective way.
 - Improves comfort.
- ✓ Smart buildings are key enablers of our future energy system
 - Larger share of renewables,
 - Distributed supply,
 - Adaptive demand-side.



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10 principles for smart buildings in a decarbonised energy system



- All principles important separately, but most effectively considered together
- Apart from principle 1, the sequence is not in order of importance



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OPTIMIZACIJA...

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



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OPTIMIZACIJA!

- 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



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Dinamika realizacije obnove nacionalnog fonda zgrada

- izrađena je kako bi se zadovoljili ciljevi energetske uštede zadani
 - Nacrtom Četvrtog Nacionalnog akcijskog plana energetske učinkovitosti Republike Hrvatske i
 - Energetskog putokaza Europske unije do 2050. godine (engl. Energy Roadmap 2050).
- Dinamika obnove je okvirno pretpostavljena te se odvija u nekoliko različitih faza:
 - Od 2017.-2029. obnova će se odvijati dinamikom od **3,5% godišnje**;
 - Od 2030.-2039. stopa obnove odvijat će se dinamikom od **3,0% godišnje**;
 - Od 2040.-2049. dinamika obnove smanjit će se na **1,5% godišnje**;



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Izravan učinak programa obnove nacionalnog fonda zgrada na zapošljavanje u građevinarstvu

- do (uključivo i) 2020. mogao bi iznositi i do **26 000 novih radnih mjesta**.
 - veliko povećanje u odnosu na trenutni broj zaposlenih.
 - Tvrtke registrirane u građevinarstvu potkraj 2016. imaju **68 653 zaposlenih**
- Prema posebnom izvještaju DZS-a o građevinarstvu,
 - prosječni broj radnika na gradilištima u 2015. godini iznosio je **41 037** i još uvijek se nalazio u padu u odnosu na ranije godine.
 - Program obnove nacionalnog fonda mobilizira i projektante, inženjere, menadžere i administrativno osoblje,
- jasno je da se radi o velikoj mobilizaciji resursa, osobito rada u graditeljstvu.
 - Potencijal mobilizacije može se grubo procijeniti na **40-50% trenutnog angažmana resursa u građevinarstvu**.

IZVOR: Nacrt Dugoročne strategije za poticanje ulaganja u obnovu nacionalnog fonda zgrada Republike Hrvatske, MGIPU, rujan 2017.



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Izravan učinak programa obnove nacionalnog fonda zgrada na zapošljavanje u građevinarstvu

Tablica 6.9 Vrijednost izvršenih građevinskih radova na zgradama 2013.-2015., pravne osobe s više od pet zaposlenih

mil HRK	2013.	2014.	2015.	2015./2014. (indeks)
Vrijednost građevinskih radova	3.944	3.960	4.287	108
Novogradnja	1.878	2.152	2.510	117
Rekonstrukcije, adaptacije i veliki popravci	439	418	444	106
Čišćenje i manji popravci				

Izvor: DZS, SI 1563, Građevinarstvo u 2015.

IZVOR: Nacrt Dugoročne strategije za poticanje ulaganja u obnovu nacionalnog fonda zgrada Republike Hrvatske, MGIPU, rujan 2017.

- gotovo cjelokupan iznos novih ulaganja predviđen programom obnove nacionalnog fonda stambenih zgrada **odnosi na rekonstrukcije, adaptacije i velike popravke**,
 - u ovom segmentu treba doći do **približno 500 % povećanja aktivnosti u dugom roku**.
- Vrlo velika mobilizacija resursa koja se **neće dogoditi ako bude prepuštena spontanom tržišnim procesima**.
- Neophodne su koordinirane mjere koje će na strani potražnje stvoriti poticaje za ulaganja u obnovu zgrada, a na strani ponude **poticaje za premještanje resursa u građevinske aktivnosti u zgradarstvu**.



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



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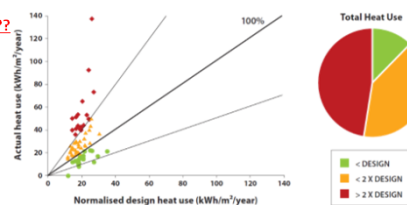
Rezultat - Stvarna & projektirana potrošnja

- Usporedba projektirane potrošnje i stvarne potrošnje

- Uzroci:

- metoda proračuna
- korištenje

- **IZVOĐENJE???**



Source: Ghent University



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Split 23.2.2019.



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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.



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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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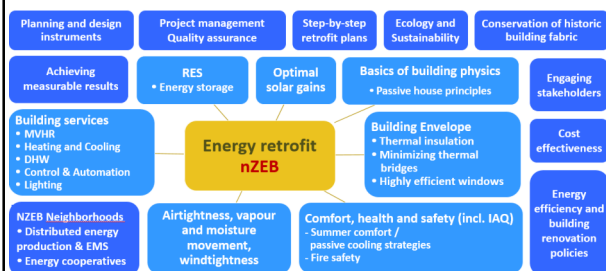
WP4 - Training programmes for institutions of higher education

- Razvoj novih programa edukacije koji su u skladu s EQF razinama 6 i 7
- Razvoj potrebnog **nastavnog sadržaja** (learning content):
 - Definirati programsku povezanost,
 - Nastavni materijali
 - Prezentacije,
 - Praktične vježbe
 - 3D vizualizacije
 - Video materijali
 - E-learning
 - Način provođenja ispita
- Provesti **barem 3 pilot edukacije**



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F2NZEB: Learning Outcomes



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Kako je to u Njemačkoj,
Irskoj,...?



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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

Template

Address: _____ Company: _____ (Place, Date)

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

Building/invoice no. of: _____

Dear Madam, dear Sir,

I hereby 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 improved

☐ internal insulation layers installed

☐ internal insulation layers improved

This contractor's declaration has to be kept available by you, the building owner, for at least 5 years and has to be provided to the responsible authority on request.

Signature of the company: _____



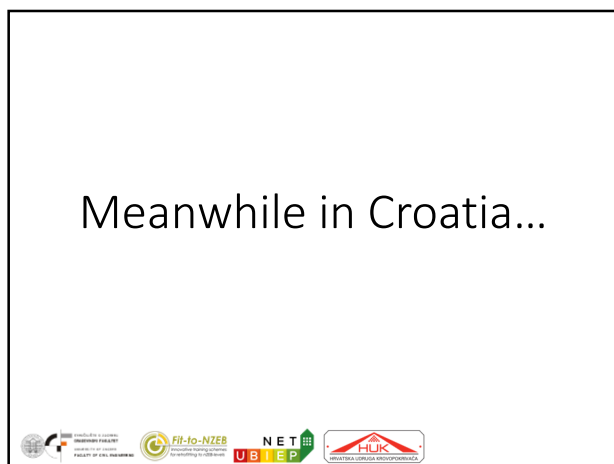
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Task ID	Task Name	Start Date	End Date
180	Same schedule as GROUND Floor - To be revised with previous drawings	01/01/2019	01/01/2019
181	FS - Inspection 04	01/01/2019	01/01/2019
182	ME - Inspection 05	01/01/2019	01/01/2019
183	EXTERNAL WORKS	01/01/2019	01/01/2019
184	External insulation	01/01/2019	01/01/2019
185	External drainage	01/01/2019	01/01/2019
186	EE - Inspection 06	01/01/2019	01/01/2019
187	Aluminum works	01/01/2019	01/01/2019
188	External service ducts for a.s./electr./cable/telephone etc.	01/01/2019	01/01/2019
189	EE - Inspection 7	01/01/2019	01/01/2019
190	Railings	01/01/2019	01/01/2019
191	Hard landscaping	01/01/2019	01/01/2019
192	Soft landscaping	01/01/2019	01/01/2019
193	Power on	01/01/2019	01/01/2019
194	FS - Inspection 05	01/01/2019	01/01/2019
195	AIR TIGHTNESS BREAKDOWN	01/01/2019	01/01/2019
196	Flooring	01/01/2019	01/01/2019
197	Sealing ground floor services	01/01/2019	01/01/2019
198	Sealing ground floor to wall	01/01/2019	01/01/2019
199	Internal plastering for internal work	01/01/2019	01/01/2019
200	Sealing walls and upper floors	01/01/2019	01/01/2019
201	Sealing around windows	01/01/2019	01/01/2019
202	Sealing wall services and pipes	01/01/2019	01/01/2019
203	Sealing around windows and doors	01/01/2019	01/01/2019
204	Sealing ceiling to walls	01/01/2019	01/01/2019
205	Sealing around services	01/01/2019	01/01/2019
206	Sealing around windows and doors	01/01/2019	01/01/2019
207	Sealing around windows and doors	01/01/2019	01/01/2019
208	Sealing around windows and doors	01/01/2019	01/01/2019
209	Sealing around windows and doors	01/01/2019	01/01/2019
210	Sealing around windows and doors	01/01/2019	01/01/2019
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217	Sealing around windows and doors	01/01/2019	01/01/2019
218	Sealing around windows and doors	01/01/2019	01/01/2019
219	Sealing around windows and doors	01/01/2019	01/01/2019
220	Sealing around windows and doors	01/01/2019	01/01/2019

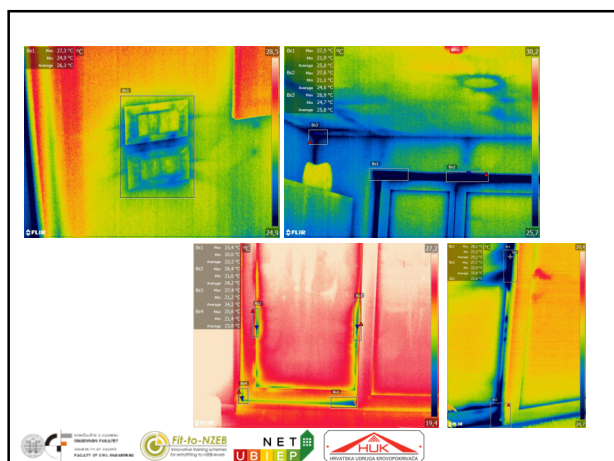
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Potencijalni uzroci problema

- 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**.

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- **Može li** nam BIM pomoći u rješavanju nekih od prikazanih problema?




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Network for Using BIM
to Increase Energy Performance

www.net-ubiep.eu

Koordinator: 

Agencia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile



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Ciljevi projekta Net-UBIEP



- Net-UBIEP nastoji doprinijeti povećanju energetske učinkovitosti u zgradama promoviranjem korištenja BIM-a tijekom cjelokupnog životnog ciklusa zgrade.
- BIM – building information management



Better management of the information during the whole life cycle of the building is absolutely necessary in order to avoid mistakes and have trustful information at any time / when an intervention is necessary.

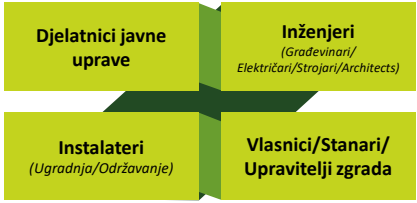


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Ciljane skupine

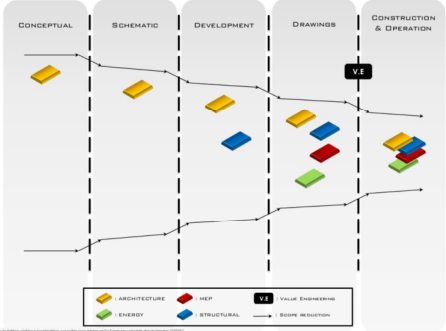


- **Tehnologija, ali i ljudi!**
- Svi sudionici u gradnji i korištenju zgrada moraju biti svjesni svoje uloge u prikupljanju, upravljanju i čuvanju potrebnih informacija vezanih uz energetska učinkovitost




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Tradicionalni proces

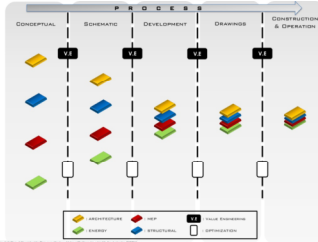




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Integrirana provedba projekata



- Što prije donesemo odluku, to ćemo imati manje popravaka, veću kvalitetu izvedbe zgrada i niže troškove
- BIM može predstavljati faktor "promjene igre"
- Brži i pouzdaniji način donošenja odluka u fazi projektiranja, pa time i tijekom izgradnje
- Kvalitetniji prijelaz na više energetska i troškovno učinkovite prakse




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Net-UBIEP ciljevi

- Projekt je usredotočen na
 - Procese
 - Ne na specifične alate
- Razumijevanje BIM-a



Predstaviti prednosti korištenja BIM-a, ali i probleme koji još uvijek postoje i rješavaju se.



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Nedostatak znanja i standarda o procesima poduprtima BIM-om



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Provođenje



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Validacijske radionice!

- Validirajte naše trening materijale!
- Pomozite nam da ih poboljšamo!
- Naučite o BIM-u



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Pratite nas...

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- Pratite web stranicu www.net-ubiep.eu

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



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Da bi imali više ovoga...



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... a manje ovoga



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" We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because *that goal will serve to organize and measure the best of our energies and skills*, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win."



September 12, 1962;
Rice University, Houston, Texas

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SVEUČILIŠTE U ZAGREBU
GRAĐEVINSKI FAKULTET
UNIVERSITY OF ZAGREB
FACULTY OF CIVIL ENGINEERING

Hvala na pažnji!



Bojan Milovanović
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