

Priprema građevinskog sektora za nZEB

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Megatrends which create imperative for change



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.



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 dinamičnom od **3,5% godišnje**;
 - **Od 2030.-2039.** stopa obnove odvijat će se dinamičnom od **3,0% godišnje**;
 - **Od 2040.-2049.** dinamika obnove smanjit će se na **1,5% godišnje**;



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 zaposlena**
- Prema posebnom izvješčaju 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, rujn 2017.



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				
Novogradnja	3.944	3.960	4.287	108
Rekonstrukcije, adaptacije i veliki popravci	1.878	2.152	2.510	117
Održavanje i manji popravci	439	418	444	106

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 spontanim 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 zaradstvu.



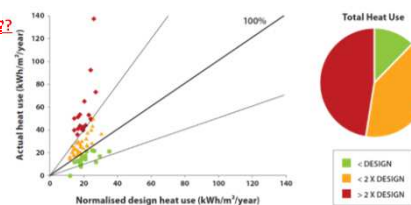
One of the most significant problems of the construction market in Croatia is the lack of competences on NZEB.
(all participants in construction projects)



Rezultat - Stvarna & projektirana potrošnja

- Usporedba projektirane potrošnje i stvarne potrošnje
- Uzroci:

- metoda proračuna
- korištenje
- **IZVOĐENJE???**



Source: Ghent University



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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.



Fit-to-NZEB
Innovative training schemes for retrofitting to nZEB-levels

www.fit-to-nzeb.com

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



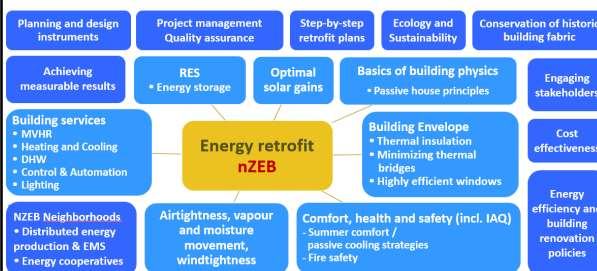
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WP4 - Training programmes for institutions of higher education

- 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**



F2NZEB: Learning Outcomes





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.
- Infractions lead to fines

Template

Address: _____ Company: _____

(Place, Date)

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

Building/structure no. of: _____

Dear Madam, dear Sir:

I hereby declare and 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

☐ Internal insulation layers removed

☐ Internal insulation layers installed

☐ Internal insulation layers removed

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

Signature of the company: _____

© Fraunhofer IBP



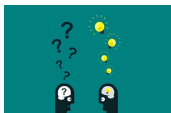
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100	Same schedule as ground	0.00	01/01/2019	01/01/2019
101	Floor - To be revised with	0.00	02/01/2019	02/01/2019
102	ME - Inspection 04	0.00	04/01/2019	04/01/2019
103	EXTERNAL WORKS	0.00	01/01/2019	01/01/2019
104	External insulation	304.00	21/01/2019	21/01/2019
105	External drainage	100.00	10/02/2019	10/02/2019
106	ME - Inspection 05	0.00	25/02/2019	25/02/2019
107	Aluminum works	160.00	11/03/2019	11/03/2019
108	External service ducts for	64.00	14/03/2019	14/03/2019
109	ME - Inspection 7	0.00	21/03/2019	21/03/2019
110	Railings	100.00	01/04/2019	01/04/2019
111	Hard landscaping	60.00	14/04/2019	14/04/2019
112	ME - Inspection 07	0.00	06/05/2019	06/05/2019
113	Soft landscaping	30.00	21/06/2019	21/06/2019
114	Power on	0.00	21/06/2019	21/06/2019
115	ME - Inspection 05	0.00	18/07/2019	18/07/2019
116	ME - Inspection 06	0.00	18/07/2019	18/07/2019
117	AIR TIGHTNESS BREAKDOWN	0.00	01/01/2019	01/01/2019
118	Flooring	0.00	01/01/2019	01/01/2019
119	Sealing ground floor services	0.00	01/01/2019	01/01/2019
120	Sealing ground floor to wall	0.00	01/01/2019	01/01/2019
121	Internal plastering for internal	0.00	01/01/2019	01/01/2019
122	Sealing walls and upper floors	0.00	01/01/2019	01/01/2019
123	Sealing around windows	0.00	01/01/2019	01/01/2019
124	Sealing wall services and pipes	0.00	01/01/2019	01/01/2019
125	Sealing around windows and	0.00	01/01/2019	01/01/2019
126	Sealing ceiling to walls	0.00	01/01/2019	01/01/2019
127	Sealing around services	0.00	01/01/2019	01/01/2019
128	ME - Inspection 06	0.00	01/01/2019	01/01/2019
129	ME - Inspection 07	0.00	01/01/2019	01/01/2019
130	ME - Inspection 08	0.00	01/01/2019	01/01/2019
131	ME - Inspection 09	0.00	01/01/2019	01/01/2019
132	ME - Inspection 10	0.00	01/01/2019	01/01/2019
133	ME - Inspection 11	0.00	01/01/2019	01/01/2019
134	ME - Inspection 12	0.00	01/01/2019	01/01/2019
135	ME - Inspection 13	0.00	01/01/2019	01/01/2019
136	ME - Inspection 14	0.00	01/01/2019	01/01/2019
137	ME - Inspection 15	0.00	01/01/2019	01/01/2019
138	ME - Inspection 16	0.00	01/01/2019	01/01/2019
139	ME - Inspection 17	0.00	01/01/2019	01/01/2019
140	ME - Inspection 18	0.00	01/01/2019	01/01/2019
141	ME - Inspection 19	0.00	01/01/2019	01/01/2019
142	ME - Inspection 20	0.00	01/01/2019	01/01/2019
143	ME - Inspection 21	0.00	01/01/2019	01/01/2019
144	ME - Inspection 22	0.00	01/01/2019	01/01/2019
145	ME - Inspection 23	0.00	01/01/2019	01/01/2019
146	ME - Inspection 24	0.00	01/01/2019	01/01/2019
147	ME - Inspection 25	0.00	01/01/2019	01/01/2019
148	ME - Inspection 26	0.00	01/01/2019	01/01/2019
149	ME - Inspection 27	0.00	01/01/2019	01/01/2019
150	ME - Inspection 28	0.00	01/01/2019	01/01/2019
151	ME - Inspection 29	0.00	01/01/2019	01/01/2019
152	ME - Inspection 30	0.00	01/01/2019	01/01/2019
153	ME - Inspection 31	0.00	01/01/2019	01/01/2019
154	ME - Inspection 32	0.00	01/01/2019	01/01/2019
155	ME - Inspection 33	0.00	01/01/2019	01/01/2019
156	ME - Inspection 34	0.00	01/01/2019	01/01/2019
157	ME - Inspection 35	0.00	01/01/2019	01/01/2019
158	ME - Inspection 36	0.00	01/01/2019	01/01/2019
159	ME - Inspection 37	0.00	01/01/2019	01/01/2019
160	ME - Inspection 38	0.00	01/01/2019	01/01/2019
161	ME - Inspection 39	0.00	01/01/2019	01/01/2019
162	ME - Inspection 40	0.00	01/01/2019	01/01/2019
163	ME - Inspection 41	0.00	01/01/2019	01/01/2019
164	ME - Inspection 42	0.00	01/01/2019	01/01/2019
165	ME - Inspection 43	0.00	01/01/2019	01/01/2019
166	ME - Inspection 44	0.00	01/01/2019	01/01/2019
167	ME - Inspection 45	0.00	01/01/2019	01/01/2019
168	ME - Inspection 46	0.00	01/01/2019	01/01/2019
169	ME - Inspection 47	0.00	01/01/2019	01/01/2019
170	ME - Inspection 48	0.00	01/01/2019	01/01/2019
171	ME - Inspection 49	0.00	01/01/2019	01/01/2019
172	ME - Inspection 50	0.00	01/01/2019	01/01/2019
173	ME - Inspection 51	0.00	01/01/2019	01/01/2019
174	ME - Inspection 52	0.00	01/01/2019	01/01/2019
175	ME - Inspection 53	0.00	01/01/2019	01/01/2019
176	ME - Inspection 54	0.00	01/01/2019	01/01/2019
177	ME - Inspection 55	0.00	01/01/2019	01/01/2019
178	ME - Inspection 56	0.00	01/01/2019	01/01/2019
179	ME - Inspection 57	0.00	01/01/2019	01/01/2019
180	ME - Inspection 58	0.00	01/01/2019	01/01/2019
181	ME - Inspection 59	0.00	01/01/2019	01/01/2019
182	ME - Inspection 60	0.00	01/01/2019	01/01/2019
183	ME - Inspection 61	0.00	01/01/2019	01/01/2019
184	ME - Inspection 62	0.00	01/01/2019	01/01/2019
185	ME - Inspection 63	0.00	01/01/2019	01/01/2019
186	ME - Inspection 64	0.00	01/01/2019	01/01/2019
187	ME - Inspection 65	0.00	01/01/2019	01/01/2019
188	ME - Inspection 66	0.00	01/01/2019	01/01/2019
189	ME - Inspection 67	0.00	01/01/2019	01/01/2019
190	ME - Inspection 68	0.00	01/01/2019	01/01/2019
191	ME - Inspection 69	0.00	01/01/2019	01/01/2019
192	ME - Inspection 70	0.00	01/01/2019	01/01/2019
193	ME - Inspection 71	0.00	01/01/2019	01/01/2019
194	ME - Inspection 72	0.00	01/01/2019	01/01/2019
195	ME - Inspection 73	0.00	01/01/2019	01/01/2019
196	ME - Inspection 74	0.00	01/01/2019	01/01/2019
197	ME - Inspection 75	0.00	01/01/2019	01/01/2019
198	ME - Inspection 76	0.00	01/01/2019	01/01/2019
199	ME - Inspection 77	0.00	01/01/2019	01/01/2019
200	ME - Inspection 78	0.00	01/01/2019	01/01/2019

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**.



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



Network for Using BIM
to Increase Energy Performance

www.net-ubiep.eu

Koordinator:



Agenzia 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.

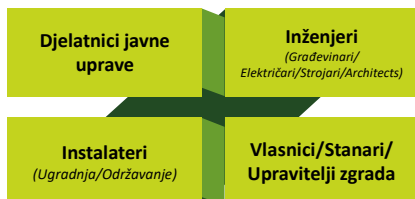


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Ciljane skupine



- 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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Net-UBIEP ciljevi

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



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

Provođenje



Validacijske radionice!

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



Pratite nas...

- Sveučilište u Zagrebu, Građevinski fakultet
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Hvala na pažnji!



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