DELIVERABLE: D40 - D6.7

International Net-UBIEP events

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WP Leader: CSA – CENTRO SERVIZI AZIENDALE
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Network for Using BIM to Increase the Energy Performance

Grant Agreement Number: 754016
Net-UBIEP H2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement *No.754016*

A. Deliverable Details	
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Work Package	6 – DISSEMINATION, EXPLOITATION AND CAPITALIZATION OF BIM QUALIFICATION MODEL
Type of deliverable	Report
Format	PDF
Dissemination Level:	Public

B. Short Description

The activity performed during two European events and one international event, are described. All the three events have promoted the qualification schemes in connection with the partnership with other three European projects related to the use of BIM for improving energy performance: BIMCERT, BIMPLEMENT, BIMEET. The events occurred in Dusseldorf in March 2019, in Barcelona in May 2019 and in Brussels in June 2019.

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SUMMARY

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1. OTMC – Poreč 27-30 September 2017

1.1 Conference program

CONFERENCE PROGRAM

OTMC 2017 Conference
27-30 September 2017, Poreč, Croatia
www.otmc2017.com

Conference venue: Hotel Parentium

Wednesday 27 Sep

	Afternoon arrivals
From 17:00	**Registration at the Conference lobby**
20:30	**Welcome drink at the Conference Lobby**

Thursday 28 Sep

Conference Room	**Plenary hall: Laguna**
09:00 – 09:30	**Opening ceremony** **Anita Cerić, Head of Department of Construction Management and Economics, University of Zagreb, Faculty of Civil Engineering** **Jesus Martinez Almela, IPMA President-elect for years 2018-2020** **Maja Marija Nahod, Assistant Minister for Construction and Energy Efficiency in Buildings Sector at Ministry of Construction and Physical Planning** **Ivica Završki, Chairman of OTMC2017 Conference, Croatian Association for Construction Management**
09:30 – 10:15	**Keynote 1: Project management: Get ready for the digital age** **MARTINA HUEMANN** **WU Vienna University of Economics and Business**
10:15 – 11:00	**Keynote 2: Applying Policy-led Multi-Criteria Analysis to the Appraisal of Mega Infrastructure Projects** **HARRY T. DIMITROU** **University College London (UCL)** **OMEGA Research Centre and OMEGA Centre Consultants (UCLC Ltd.)** **BRIAN FIELD** **Urban Planning and Development at the European Investment Bank (EIB)**
11:00 – 11:30	**Coffee break at the hotel lobby**

Conference Room	**Laguna 1**	**Laguna 2**	**Laguna 3**	**Zelena laguna**
Track 11:30 – 13:00	**Construction and Project Management Issues**	**General Management and Economics in Construction**	**IPMA Megaprojects SIG**	
Facilitator	**Ivica Završki**	**Anita Cerić**	**Mladen Radujković**	
11:30 – 11:45	***Project Implementation Units of EU co-financed Water Projects*** *Robert Kartelo, Mariela Sjekavica, Mladen Radujković*	***World Quality Management Trends Implemented into Construction Company*** *Jozef Gasparik, Marian Gasparik*	***Rail Baltica – Project of the Century*** *Baiba Rubesa*	
11:45 – 12:00	***The Impact of Risk on Bid Price and Project Budget for Contractors*** *Ladislav Bevanda, Marin Nikolic*	***Value Engineering in Construction Projects – a Challenge to Contractor*** *Ksenija Čulo, Vladimir Skendrović*		
12:00 – 12:15	***Cost Optimal Time Scheduling Integrating Spreadsheet and Project Management Software*** *Tadej Valenko, Uroš Klanšek*	***Effect of MMC Selection on Construction Costs*** *Alena Tazikova, Maria Kozlovska, Zuzana Strukova*		
12:15 – 12:30	***Application of ERP Systems within Construction Industry and Probable Directions of Further Research*** *Sonja Kolarić, Mladen Vukomanović*	***Mass Evaluation Pilot Study as Investment Courage*** *Maja-Marija Nahod, Željko Uhlir*	***Human Factors–a Key Success Factor*** *Peter Jedelhauser*	
12:30 – 12:45	***Unit Price Ranges in Building Construction*** *Vincent Wapelhorst, Ivan Cadez*	***Private Public Partnerships on Local Community Level in Slovenia*** *Valentina Kuzma, Jana Šelih, Aleksander Srdić*		

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12:45 – 13:00	***Risk Management of the Complex Construction Project – The New Cruise and Ferry Port of Zadar*** *Igor Pukec, Diego Chersi, Tomislav Rastovski*	***Life-Cycle Costs in Economic Analysis of Road Infrastructure Projects*** *Vit Hromadka, Eva Vitkova*		
13:00 – 14:00	**Lunch at the hotel restaurant**			
Conference Room	**Laguna 1**	**Laguna 2**	**Laguna 3**	**Zelena Laguna**
Track **14:00 – 15:30**	**Construction and Project Management Issues**	**General Management and Economics in Construction**	**IPMA Megaprojects SIG**	**OTMC Croatian Session**
Facilitator	**Diana Car-Pušić**	**Zlata Dolaček-Alduk**	**Mladen Radujković**	**Ivana Burcar Dunović**
14:00 – 14:15	***Role of Management Performance Feedback on Performance*** *Ossi Pesämaa, Johan Larsson, Per-Erik Eriksson*	***Economic Comparison of Construction Costs of Buildings from Renewable Materials and Traditional Materials in the Czech Republic*** *Lukáš Labudek, Alena Tichá, Prak Michal, Veronika Roudná*	***Comparing Complexity across Different Industry Sectors*** *Marcel Hertogh*	***Primjena PUG i FIDIC-a u građevinskim sporovima*** *Mićo Ljubenko*
14:15 – 14:30	***Application of S-curve in EVA method*** *Ksenija Tijanić, Diana Car-Pušić*	***Capability Strings – Building Relational Capabilities through Set of Cross-Organizational Threads in Industrial Construction*** *Josip Sertic, Ivica Završki*		***Impact of the Project Management Process on the Quality of The Final Product in the Definition and Planning Phase*** *Žanesa Ljevo, Mladen Vukomanović, Nerman Rustempašić*
14:30 – 14:45	***Challenges in Implementing Systemic Innovation in Transport Infrastructure Projects*** *Johan Larsson, Per-Erik Eriksson, Andreas Udén*	***Mapping the Issue of Water Supply Network and Sewerage Systems in the Czech Republic*** *Alena Tichá, Gabriela Kocourková, Dagmar Hrabincová, Dana Linkeschová,*	***On the Success of Megaprojects*** *Rodney Turner*	***Model procjene tržišne vrijednosti stanova nakon energetske obnove*** *Ratko Matotek*
14:45 – 15:00	***Organizational Improvisation in Contracting Firms: A Capability for Overcoming the Project Complexities*** *Ibrahim Yitmen, Gozde Basak Ozturk*	***Is Ethical Behavior Profitable in Construction? A Theroretical Framework*** *Miljenko Antić*		***Podizanje razine znanja o kulturi građenja kroz e-učenje*** *Borka Bobovec*
15:00 – 15:15	***Re-investigating Approaches on Defining Stakeholder Characteristics*** *Kristijan Robert Prebanić, Ivana Burcar Dunović*	***Impact of ERP Systems on Cost Reducing in Construction Project Management in Slovakia*** *Peter Mesároš, Tomáš Mandičák*	***Impacts of Oil & Gas Mega Projects on the Society around Them*** *Gholamreza Safakish*	***Risks in ihe Construction of Highways in the Republic of Croatia in the Context of Research Cost Overruns*** *Marijo Lovrinčević, Mladen Radujković, Mladen Vukomanović*

15:15 – 15:30	***A Comparison between Early Contractor Involvement (ECI) and Project Alliancing Delivery Systems*** *Farshid Rahmani*	***The Application of Design Science Approach to AEC Research*** *Jose Oliveros*		***Odabir optimalnog strojnog sustava na projektima s izraženim zemljanim radovima*** *Luka Štritof, Zvonko Sigmund, Mladen Vukomanović*
15:30 – 16:00	**Coffee break at the hotel lobby**			
Conference Room	**Laguna 1**	**Laguna 2**	**Laguna 3**	**Zelena Laguna**
Track **16:00 – 17:00**	**Building Information Modeling**	**General Management and Economics in Construction**	**IPMA Megaprojects SIG**	
Facilitator	**Iva Kovačić**	**Uroš Klanšek**	**Mladen Radujković**	
16:00 – 16:15	***BIM Educational Activities on Civil Engineering Faculty Technical University of Košice*** *Renata Baskova, Maria Kozlovska, Alena Tazikova, Andrej Narjas*	***Mediation as a Tool for Conflict Management and Extrajudicial Dispute Resolution in Construction*** *Srđan Šimac*	***Round table:*** ***Megaprojects Success***	
16:15 – 16:30	***Applicability of BIM Kiosk on Construction Sites*** *Martina Pavlović, Mladen Vukomanović*	***A Comparative Analysis of the Croatian System of Energy Efficiency Measures*** *Ivana Šandrk Nukić, Ivana Čandrlić Dankoš, Mihaela Teni*		
16:30 – 16:45	***Use of Building Information Modelling and Other Advanced Technologies for Monitoring Construction Progress*** *Matej Mihić, Ivica Završki, Karlo Barulek*	***International Performance of Croatian Construction Companies*** *Lana Lovrencic Butkovic, Mariza Katavić*		
16:45 – 17:00	***The Vico Office Software for the 4D and 5D Information Modelling for Building External Walls of the Residential Block in Ljutomer*** *Anja Pavličić, Nataša Šuman, Zoran Pučko*	***Improving Performance of Building Construction Projects: A New Approach of Labor Productivity Benchmarks*** *Odysseas Manoliadis, Alexandros Hatzigeorgiou*		
17:00	**End of day**			
20:00	**OTMC dinner – restaurant Bacchus / hotel Parentium**			

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Friday 29 Sep

Conference Room	Laguna 1	Laguna 2	Laguna 3	Zelena Laguna
Track **09:00 – 10:30**	**Building Information Modeling**	**Sustainability in the Built Environment** **Construction Design and Technology** **Research and Education in Construction**	**IPMA Megaprojects SIG**	**Research Workshop** *Presentation of the selected papers*
Facilitators	**Nives Ostojić Škomrlj**	**Nataša Šuman**	**Mladen Radujković**	**Anita Ceric & Martina Huemann**
09:00 – 09:15	***Review of BIM's Implementation in European AEC Industries*** *Mario Galić, Vaclav Venkrbec, Franziska Chmelik, Immo Feine, Zoran Pučko, Uroš Klanšek*	***Comparison of Sustainability Reporting in Construction Industries of Slovenia and Croatia*** *Laura Fink, Judita Peterlin*	*09:00 – 09:20* ***Megaprojects in the Postal Sector: Deutsche Post / DHL and South African Post*** *Amin Saidoun*	*09:00 – 09:25* ***Potential of BIM and ERP Integration in Contractor Construction Companies*** *Sonja Kolarić, Mladen Vukomanović*
09:15 – 09:30	***Recent Works and Activities on BIM Conducted at FCETEA in Maribor, Slovenia*** *Zoran Pučko, Nataša Šuman, Uroš Klanšek, Andrej Štrukelj,*	***Historical Town Centres - Challenges and Opportunities of Renewal*** *Martina Milat, Maja-Marija Nahod, Anita Ceric*	*09:20 - 09:40* ***Megaproject in Oil & Gas Sector: State of Art and Future Trends*** *Mauro Mancini*	*09:25 – 09:50* ***Ex-post Impact Evaluation Tool for Public Private Partnership Projects*** *Jose Oliveros*
09:30 – 09:45	***BIM based Material Passport*** *Iva Kovacic, Meliha Honic, Helmut Rechberger*	***Analysis Capital Expenditures of the Modern Methods for the Foundating of Family Houses*** *Tomáš Mandičák, Peter Mesároš, Juraj Talian*		
09:45 – 10:00	***Preliminary Results of BIM Awareness and Education among Students of Graduate Study Program in Construction Industry*** *Bernard Rajić, Gabrijel Peroli, Marija Cindrić, Diana Car-Pušić, Ivan Marović*	***Planning and Control of Productivity of Construction Machinery through Use of Wireless Technology*** *Martina Šopić, Mladen Vukomanović, Diana Car - Pušić*	*09:40 - 10:00* ***Sejong Administrative City Construction and Project Management of the City*** *Eunsang Yoon*	*09:50 – 10:15* *Impact of Project Complexity on* ***Rewarding Project Teams for Construction Projects Execution*** *Marin Nikolic, Ivana Burcar Dunović*
10:00 – 10:15	***Academic Teaching of BIM in Germany*** *Stefanie Brokbals, Ivan Čadež*	***Evaluation of Learning Outcomes at Civil Engineering Studies*** *Ivana Domljan, Aleksandra Deluka Tibljaš, Zlata Dolaček Alduk*	*10:00 - 10:10* ***Discussion***	
10:15 – 10:30			*10:10 - 10:20* ***Governing Mega-Projects Using Special Purpose Entities (SPE)*** *Tristano Sainati*	*10:15 – 10:40* ***Alone or in Pairs: Agile Approach Improves Organizational Project Management Competences*** *Dragan Bjelica, Marko Mihić, Vladimir Obradović*
			10:20 - 10:30 ***Influence of Megaprojects on Community Development*** *Sandra Mišić*	
10:30 – 11:00	**Coffee break at the hotel lobby**			
Conference Room	**Laguna 1**		**Laguna 3**	**Zelena Laguna**
Track **11:00 – 12:15**	**Round table 1** ***in Croatian language**		**IPMA Megaprojects SIG**	**Research Workshop**
Facilitators	**Mladen Vukomanović**		**Mladen Radujković**	**Anita Cerić & Martina Huemann**
	Razvoj nacionalnih smjernica za primjenu Building Information Modeling (BIM) ***(Development of the National Guidelines for Implementing Building Information Modeling (BIM))*** *Govornici - Speakers:* Ginanmarco Baldini, *Baldinistudio d.o.o.* Željka Jurković, *Croatian Chamber of Architects* Iva Kovačić, *Faculty for Civil Engineering, Vienna University of Technology* Maja Marija Nahod, *Ministry of Construction and Physical Planning* Martina Pavlović, *Intelika d.o.o.* Zvonimir Sever, *Croatian Chamber of Civil Engineers* Hrvoje Šolman, *Arctis d.o.o.* Matija Vinski, *Arhitektura Vinski d.o.o.*		***Round table:*** ***Megaprojects Serving the Needs of Community Development (Discussion & Development of Communique)***	***Workshop on Writing for Top Research Journals***
12:15 – 13:30	**Lunch at the hotel restaurant**			

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2. BIM 2017 – Zagreb 02 December 2017

2.1 Flyer

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BIM 2017 ZAGREB

Program

9:30 – 10:00 | PRIJAVA SUDIONIKA

10:00 – 10:15 | POZDRAVNI GOVORI

10:15 – 11:00 | **ĐORĐE GRUJIĆ** M Arch Eng, Design Manager, Dubai, PREDAVANJE : ***BIM u Ujedinjenim Arapskim Emiratima*** |
11:00 – 11:15 | PITANJA I DISKUSIJA

11:15 – 12:00 | **MARTIN LAH** univ.dipl.inž.grad., Elea, Slovenija PREDAVANJE : ***BIM menedžment i koordinacija - primjeri iz prakse*** |
12:00 – 12:15 | PITANJA I DISKUSIJA

12:15 – 13:00 | PAUZA ZA ZAKUSKU

13:00 -13:45 | **JORMA EHRNROOTH** Global Sales Director, Solibri Inc., Finland : ***Osiguranje i kontrola kvalitete BIM projekata***
13:45 – 14:00 | PITANJA I DISKUSIJA

14:00 – 14:15 | doc. dr. sc. **IVANA BURCAR DUNOVIĆ** : ***Korištenje BIM pristupa za povećanje energetske učinkovitosti u zgradama - projekt NET-UBIEP***

14:15 – 14:30 | **HRVOJE ŠOLMAN** dipl. ing. građ. : ***Hrvatska komora inženjera u graditeljstvu: Prve hrvatske opće smjernice za BIM pristup u graditeljstvu***

14:30 – 14:45 | **MATIJA VINSKI**, dipl. ing. arh. : ***BIM smjernice Hrvatske komore arhitekata***

14:45 – 15:15 | OKRUGLI STOL

15:15 – 15:30 | ZAKLJUČCI KONFERENCIJE

Kotizacija za sudjelovanje na Konferenciji iznosi **150,00 kn (120,00 kn + PDV)**, a potrebno ju je uplatiti prema sljedećoj uputi:

HKA Okvir d.o.o.
Ulica grada Vukovara 271/2
10 000 Zagreb
IBAN: HR2723600001102517404
OIB: 44469728480
MODEL: 00
POZIV NA BROJ ODOBRENJA: 02122017
SVRHA UPLATE: BIM 2017, ime i prezime polaznika koji se prijavljuje

Nakon prijave, molimo pošaljite ispis naloga o uplaćenoj kotizaciji na **ssu@arhitekti-hka.hr**.

Konferencija je uvrštena u Program stručnog usavršavanja HKA-a, sa šest (6) sati HKA SU standarda.

SPONZORI PRVE KATEGORIJE

SPONZORI DRUGE KATEGORIJE

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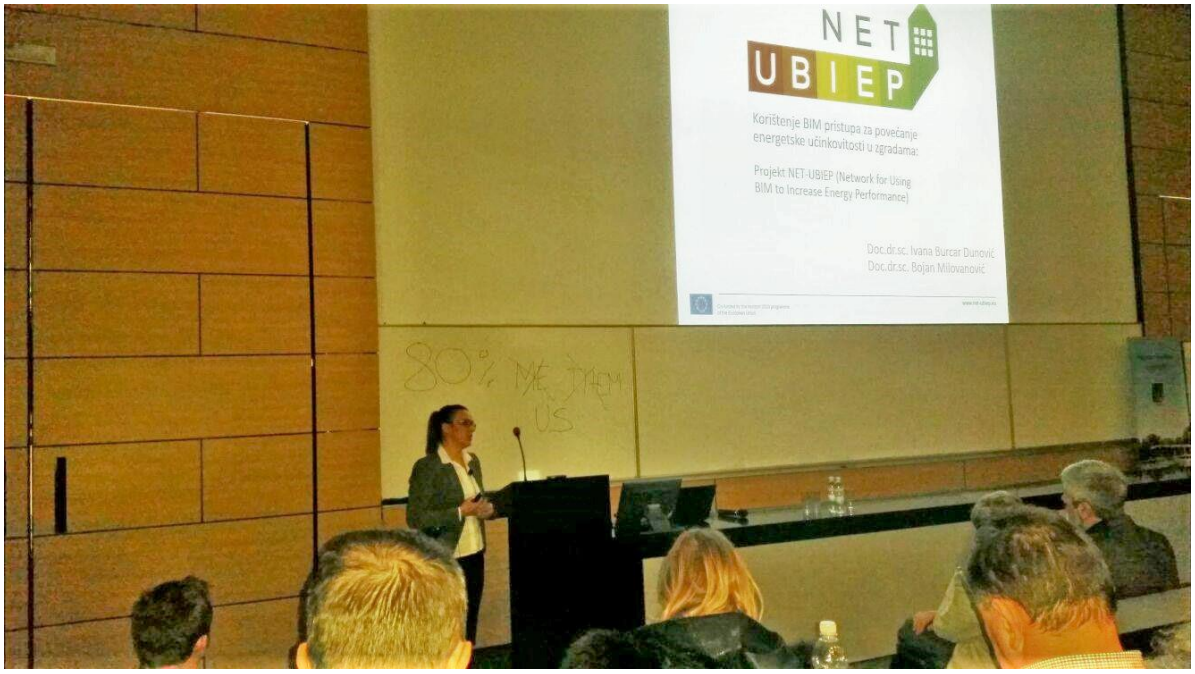
2.2 Photos



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3. EnEff Workshop – 02 May 2018

3.1 Agenda

POZIV
za informativnu radionicu za predstavnike javnog sektora
Zgrade gotovo nulte energije (ZG0E)

Od 2019. godine sve zgrade javne namjene moraju biti izgrađene po principu zgrada gotovo nulte energije koji nameće nove standarde gradnje i nove zahtjeve pred investitore.

Zadovoljstvo nam je pozvati Vas na radionicu koja će se **22. svibnja 2018. godine održati u HGK-Županijskoj komori Varaždin (Petra Preradovića 17, 3. kat)** na kojoj ćemo predstavnicima javnog sektora prezentirati zahtjeve gradnje i obnove zgrada javnih namjena prema novom zakonodavstvu.

Prijavu molimo izvršiti do 21. svibnja 2018 na adresu e-pošte rpapec@hgk.hr .

Program

9:30 - 10:00	Registracija i kava
10:00 - 10:15	**Pozdravni govor i prezentacija projekta EN-EFF** HGK-Županijska komora Varaždin
10:15 - 10:30	**nZEB u Hrvatskoj** Damir Mandić, Regionalna Energetska Agencija Sjever, Koprivnica
10:30 - 11:00	**Kako graditi i obnavljati zgrade do ZG0E? Zašto BIM?** doc.dr.sc. Bojan Milovanović, Građevinski fakultet Zagreb
11:00 - 11:30	**Case study - Tehnološki park Varaždin II** Zdenka Šarolić, Studio Nexar d.o.o. Ivanec
11:30 - 12:00	**Termografsko snimanje** doc. dr. sc. Bojan Milovanović, Građevinski fakultet Zagreb
12:00 - 12:15	**Pitanja**
12:15 – 14:00	**Ručak za sudionike**

Radionica je aktivnost projekta EN-EFF- Novi koncept treninga za energetsku učinkovitost, sufinanciranog iz programa Interreg Mađarska-Hrvatska.

Radujemo se Vašem dolasku!

A cross-border region where rivers connect, not divide

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3.2 Photos

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4. EURO 2018 conference – Dusseldorf 8-11 July 2018

4.1 Extract from full program

City performance assessment methods are beneficial to provide support for decision making in urban development. The fast growth of urbanisation creates concerns about the sustainability of cities. The smart city frameworks are mainly focusing on modern technologies and smartness in the smart city rather than urban sustainability. Moreover, the urban sustainability frameworks focus environmental sustainability. Therefore, smart city frameworks are lack of environmental indicators while focusing on mainly economic and social aspects. However, the focus of smart cities is to improve sustainability with the support of technology. Hence there is a gap between smart city and sustainable city frameworks. To overcome this gap, we propose a framework which can explain smart sustainable city from three main perspectives: economic, social and environmental. To assess the efficiency of urban sustainability and smart city efficiencies the traditional Data Envelopment Analysis (DEA) used. However, the traditional DEA treats Decision Making Units (DMUs) as a black box by only considering initial inputs consumed and final outputs produced by them. Therefore, the traditional DEA models cannot sufficiently characterize the performance of cities. Apart from the need for a new framework, there is also a lack of understanding of how cities main three sub-systems: environment, economy, resources, and energy should be assessed, considered and their impact on the efficiency of urban sustainability.

■ MB-51

Monday, 10:30-12:00 - 4D UPV 1.2

OR for Sustainable Built Environment

Stream: OR for Sustainable Development
Chair: *Tatjana Vilutiene*

1 - Optimum design of bridges considering long-term criteria
Tatiana Garcia-segura, Víctor Yepes, Eugenio Pellicer, Laura María Montalbán Domingo

Multi-objective optimization is a commonly used tool to find multiple trade-off solutions. However, a large computational time is needed to check the solutions to certain structural problem. This communication presents a meta-model assisted multi-objective optimization to optimize bridges under multiple objectives. Artificial neural networks (ANNs) are integrated in the multi-objective optimization to reduce the high computational cost required to evaluate the constraints of a real bridge optimization problem. ANNs are trained to predict the structural response in terms of the limit states based on the design variables, without analyzing the bridge response. This methodology is applied to a continuous post-tensioned concrete box-girder road bridges formed by 34 variables regarding the geometry, the concrete grade and the reinforcing and prestressing steel. The objective is to find the optimal bridge design so that the cost of the deck is minimized and the overall safety factor with respect to the ultimate limit states and the corrosion initiation time due to chloride is maximized. The corrosion initiation time and safety criteria are included as objective functions for further deepening in the durability and safety requirements with the aim of designing for longevity and reduced long-term impacts.

2 - Integrated advanced technologies for sustainable BIM-based building refurbishment
Jovita Starynina, Leonas Ustinovichius, Mantas Vaisnoras

Building Information Modelling (BIM) is a collaborative way of working, supported by digital technologies. Computer model that has several 'dimensions' can be used for effective management of information throughout a project lifecycle - from the earliest concept of operation. BIM-based processes are 'mainstream' for new buildings and infrastructure and have potential in sustainable refurbishment projects when complementary workflows such as building scanning. Despite the fast development and spreading standards, challenging research opportunities arise from process automation and BIM adaptation for existing buildings' requirements. To aid decision-making, building simulation is widely used in the late design stages, but its application is still limited in the early stages in which design decisions have a major impact on final building performance. Using building scanning visualization in early design stage helps fully assess the environment of the future, accept design solutions, prevent mistakes and provides rapid changes of the design. 3D scanning technology is simply an incremental technological advancement of surveying, providing a safer, richer and more rapid method of spatial data acquisition for surveying applications. 3D laser scanning or 3D reality meshes from photographs data brings myriad opportunities to project managers, and engineers to monitor, assess, and analyse physical data captured from the existing environment.

3 - Empirical study of BIM-based building life cycle: case of Net-UBIEP project
Tatjana Vilutiene, Arvydas Kiaulakis

The building sector is the largest consumer of energy in Europe, accounting for nearly 40% of the total consumption (EPBD 2010/31/EU). 2030 European Energy [COM(2014)16Final] and Energy Roadmap 2050 [COM(2011) 885 final], strongly requires more focus on the energy efficiency on housing sector. The Directive 2014/24/EU on public procurement, requires that all member states introduce electronic means to exchange information and communication in procurement procedures. The integrated approach of the Net-UBIEP project, based on BIM, integrated with energy performance requirements, will be key to solve all the problems in a more effective and efficient manner. The project proposes BIM Qualification Models integrated with energy competences, to widespread a better comprehension of energy issues along all the value chain of building industry so that both existing and new building will have better energy performances. Article presents the process of identification of specific energy BIM competences for each target group needed to implement BIM models during the whole building life cycle. Data for analysis was gathered by use of direct and indirect observation and experiences of construction sector experts. During the project the "integrated" BIM Qualification Models will be validated by stakeholders and proposed for standardization to find a broader acceptance at European and international level through regulatory organizations (CEN/ISO).

■ MB-52

Monday, 10:30-12:00 - 4D UPV 1.3

Health Care Modelling (ORAHS) I

Stream: OR for Health and Care I
Chair: *Sally Brailsford*

1 - Patient flow model for the EMS in the Netherlands
Geert-Jan Kommer

The provision of emergency medical services (EMS) is an important health care activity and should be available and accessible at all times. Recent trends in the Netherlands show bottlenecks in health care provision are increasing and result in decreasing performance of health care suppliers. Longer waiting times and blocking at emergency departments (ED's), increasing ambulance response times and, in the Netherlands, long waiting times for out-of-office GP-services are typical. The bottlenecks have a regional character. In urban areas, demand for EMS per capita is higher than in rural areas, despite the high number of elderly in many rural areas. Organizational aspects also play a role in performance. EMS-providers show differences in patient flows, in terms of input, throughput and output of the (sub-)system. In our study, we developed a SD patient flow model for the EMS in the Netherlands. We used patient data of health care use over the years 2012-2015 to describe patient flows in the acute care network in time and construct a baseline scenario that shows future developments based on demographic developments and recent trends in EMS. This baseline simulation shows expected development of the current bottlenecks. Alternative scenarios in which we search for a more balanced supply of EMS are examined. The results provide policy makers insight in possible future developments and alternatives to manage the increasing bottlenecks in EMS.

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5. BhENEFIT – Karlovac 11 September 2018

5.1 Agenda

Interreg CENTRAL EUROPE BhENEFIT

Karlovac, Croatia 11.09.2018

MID-TERM DISSEMINATION CONFERENCE
CENTRAL EUROPE GOVERNANCE OF HISTORIC BUILT AREAS

Page 1

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11.09.2018 Public Programme

BHENEFIT MID-TERM DISSEMINATION CONFERENCE
CENTRAL EUROPE GOVERNANCE OF HISTORIC BUILT AREAS

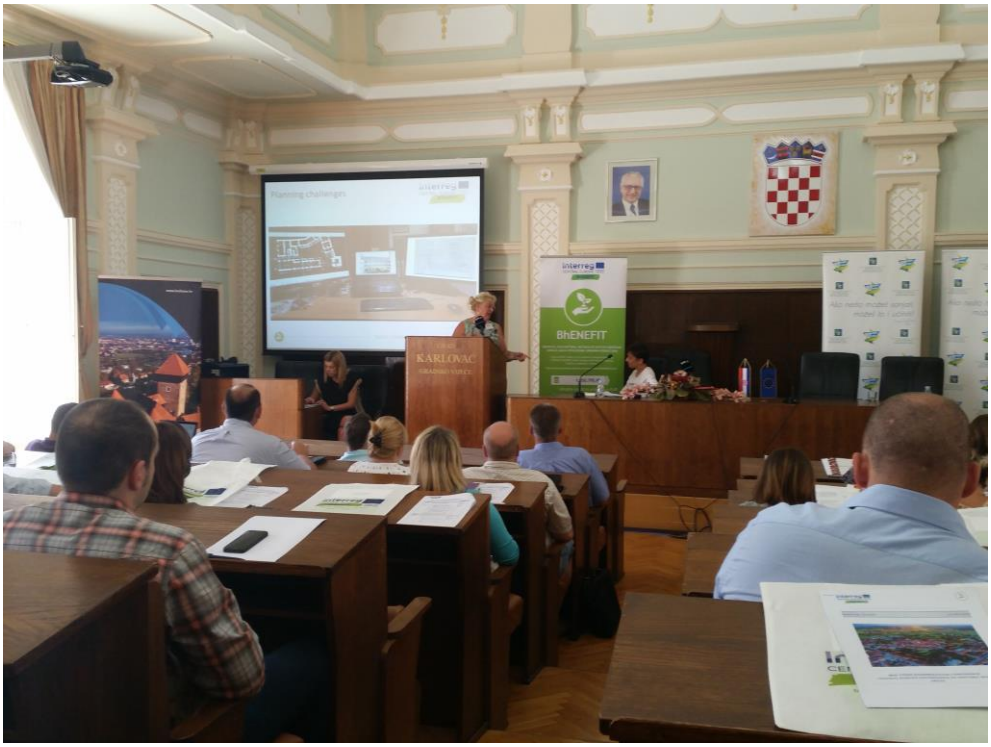
Time	What/Who	Practical's
8:30 am	**Registration at City hall**	Karlovac City building, Banjavčićeva 9 47000 Karlovac
9:00 am – 11:00 am	**Welcome address and presentation** • **Municipality of KARLOVAC officials (09:00 – 09:10)** • **Managing Director of REGEA (09:10 – 09:15)** • **Ministry - introduction speech (9:15 – 9:40)** ***Part 1. The BhENEFIT Governance Model for Historic built Areas in Central Europe*** **Sustainable Management of HBA in CE Region** **- From Analysis to Strategy** **- Challenges and Priorities** • Dr. Emanuela Medeghini and Arch. Michela Mauriello Municipality of Mantova ***(9.45 – 10.30)*** **Sustainable Management of HBA in CE Region Open questions and perspectives** • Prof. Maros Finka, SPECTRA (***10.30 -11.00)***	City hall ***Moderator: REGEA***
11:00 am - 11:30 am	**Coffee break**	City hall
11:30 am – 02:00 pm	***Part 2. From Modelling to Practice: THE BhENEFIT TOOLS*** Introduction on the purpose and the platform • MANTOVA PILOT MONITORING TBD - ***Arch Francesca Paini or expert (11.45 – 12:05)*** • POPRAD PILOT MONITORING TBD ***(12.05 – 12:25)*** • DST FOR THE HBA BAD RADKERSBURG: TAILOR - made for active stakeholder involvement	City hall ***Moderator: Arch. Cristina Fregni, Politecnica***

research and innovation programme
under grant agreement No.754016

	Univ.Prof. Dipl. Ing. Dr. Ulrike Pröbstl-Haider, BOKU (12.25 – 12:45) • KARLOVAC EXPERIENCE - Pilot project in Karlovac and implementation of BIM technology in Karlovac City - ***Srećko Vrček (12.45 – 13.00)*** • BIM technology – presentation ***Faculty of Civil Engineering Croatia (13.00-13.15)*** • Conclusions / Q&A (13.15…	
02:00 pm – 03:30 pm	**NETWORKING LUNCH (END OF PUBLIC PROGRAMME)**	**City Library for youth** (paid by host)

Official conference language is English
Addres: Karlovac City building, Banjavčićeva 9 47000 Karlovac, City hall

5.2 Photos



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

6. InDIS – 21 November 2018

6.1 Flyer

Interreg - IPA CBC
Croatia - Serbia
Eco build

UNIVERSITY OF NOVI SAD
FACULTY OF TECHNICAL SCIENCES
Department of Civil Engineering and Geodesy

iNDiS 2018

Planning, design, construction and building renewal

14TH INTERNATIONAL SCIENTIFIC CONFERENCE
Novi Sad, November 21-23, 2018

1st Announcement

Call for papers

Department of Civil Engineering and Geodesy, Faculty of Technical Sciences in Novi Sad, invites you to take part in conference

iNDiS 2018

planning, design, construction and building renewal

that is going to be held on November 21-23, 2018.

iNDiS 2018 is 14th International Conference on planning, design, construction and building renewal that has been organizing in Novi Sad since 1976.

The aim of the Conference is to assemble an international forum of experts from the country and abroad on theoretical and experimental research in design process, building maintenance and project and construction management.

At the same time, this will be a place to exchange experiences and information about latest achievements in planning, design, new materials and technologies for construction, restoration and renewal of buildings.

Organizing committee

- Vlastimir Radonjanin, chairman
- Radomir Folić
- Đorđe Lađinović
- Milan Trivunić
- Mirjana Malešev
- Srđan Kolaković
- Milinko Vasić
- Darko Reba
- Jelena Atanacković-Jeličić
- Milena Krklješ

Topics

- Experimental and theoretical analysis of structures.
- Contemporary construction materials.
- Assessment, renewal and maintenance of buildings.
- Design and construction of bridges and roads.
- Design and construction of hydrotechnical structures.
- Aseismic design of structures.
- Geotechnical problems.
- Management in design methods and construction.
- Architectural and urban planning and design.
- Sustainable development and energy efficiency in construction.
- Disaster Risk Management and Fire Safety.
- European standards in the design and construction of structures.

Important dates

abstract submission	**August 20, 2018**
notification of abstract acceptance	**September 10, 2018**
final manuscript submission	**October 20, 2018**
scientific conference	**November 21-23, 2018**

Instructions

Abstracts and final manuscripts have to be prepared in informatics' form, as MSWord files. Templates for abstract and final manuscript submission will be available for downloading on the iNDiS 2018 web site.

Abstracts, with max 300 words, should be submitted to Organizing committee until the 20th August. Abstracts have to contain the title of the paper, full names of all authors, their positions and titles, contact addresses, e-mails, phone and fax numbers.

The length of final paper is up to 8 pages including figures, tables, references and appendices. Detailed writing instructions will be sent to the authors enclosed with notification of abstract acceptance and will be available on Conference website.

The Proceedings of iNDiS 2018 will be published. International scientific committee will review all papers. For text originality, quality and accuracy of data and results responsibility lies solely on authors. It is implied that paper has not been previously published.

Programme

November 21th, Novi Sad
09:00 Registration
10:00 Opening ceremony
10:30 Introductory presentations
12:00 Cocktail
16:00 - 19:00 Presentations

November 22th, Novi Sad
09:00 - 13:00 Presentations
16:00 -19:00 Presentations
20:00 Formal dinner

November 23th, Novi Sad
09:00 - 13:00 Presentations
13:00 Closing ceremony
Social programme (excursion)

Language

The official languages of the scientific conference are Serbian and English. Papers should be written in english language.

Date and place

The Conference will be held in Novi Sad, the second largest city in Serbia, in November 21-23, 2018. More precise information about meeting location will be given in the next announcement.

Registration fee

The registration fee for the conference is 12,000.00 RSD (tax included) or 100 € for participants from abroad.

iNDiS 2018
FACULTY OF TECHNICAL SCIENCES
Department of Civil Engineering and Geodesy
21000 Novi Sad
Trg Dositeja Obradovića 6

Aleksandra Dmitrović
tel. 021 459-347
tel/fax. 021 459-798
e-mail: indis@uns.ac.rs
www.indis.gradjevinans.net

The registration form, banking information required for your money transfer and accommodation details will be available in the next announcement.

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6.2 Paper

SCIENTIFIC CONFERENCE
PLANNING, DESIGN, CONSTRUCTION
AND BUILDING RENEWAL

iNDiS 2018
NOVI SAD, 21-23 NOVEMBER, 2018

Mihaela ZAMOLO[1]
Ivana BANJAD PEČUR [2]
Bojan MILOVANOVIĆ [3]

NEW LEARNING METHODOLOGIES ON SUSTAINABLE CONSTRUCTION

Abstract: Today's education programs do not sufficiently include topics of energy efficiency and sustainable construction. These deficiencies were recognized by the Faculty of Civil Engineering in Zagreb and the Croatian Engineering Association, and within the framework of several EU projects they developed a training system on energy efficiency and sustainable construction. The paper will showcase projects CROSKILLS, FIT-to-nZEB, Net-UBIEP, which are oriented towards educating construction workers, architects, designers, contractors and supervisors in the area of energy efficiency and BIM technology. The CPD4GB project will also be presented. The mission of the project is to encourage the development of sustainable partnerships of higher education institutions, professional associations and volunteers in the development and implementation of the socially useful learning for sustainable/green construction. The overall goal of the project is developed of methodology and simultaneous application through which students acquire practical knowledge and skills and use that to solve local community projects, with mentoring, which enables them to gain competences. It is a pilot project that should be the basis for new approaches to interdisciplinary formal and non-formal learning.

Key words: education, energy efficiency in buildings, sustainable construction, volunteers

NOVE METODE EDUKACIJA ZA ODRŽIVU GRADNJU

Rezime: Današnji programi obrazovanja ne uključuju u dovoljnoj mjeri teme energetske učinkovitosti i održive gradnje. Na Građevinskom fakultetu u Zagrebu (GF) i u Hrvatskom inženjerskom savezu (HIS) prepoznali su te nedostatke, te su u okviru nekoliko EU projekata razvili sustav obrazovanja na temu energetske učinkovitost i održive gradnje. U članku će biti prikazani projekti CROSKILLS, FIT-to-nZEB, Net-UBIEP koji su orijentirani na edukaciju radnika, projektanata, izvođača i nadzornih inženjera u području energetske učinkovitosti i BIM tehnologije. Također je prikazan projekt CPD4GB. Namjera projekta je poticanje razvoja održivog partnerstva visokoobrazovnih ustanova, profesionalnih udruga i volontera u razvoju i provedbi društveno korisnog učenja za održivu/zelenu gradnju. Cjelokupni cilj projekta je razvijanje metodologije i istodobna primjena kroz koju studenti stječu praktična znanja i vještina koja koriste za rješavanje projekata lokalne zajednice. uz mentorstvo, što im omogućava stjecanje kompetencija. To je pilot projekt koji bi trebao biti temelj za nove pristupe interdisciplinarnom formalnom i neformalnom učenju.

Ključne reči: obrazovanje, energetska učinkovitost u zgradarstvu, održiva gradnja, volonteri

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[2] prof.dr.sc, Građevinski fakultet Sveučilišta u Zagrebu, banjadi@grad.hr
[3] prof.dr.sc, Građevinski fakultet Sveučilišta u Zagrebu, bmilovanovic@grad.hr

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

7. Building SMART International summit – Dusseldorf March 2019

7.1 Description of the event

The buildingSMART International Standards Summit took place in Düsseldorf, Germany 25-29th March 2019. The summit brings together all the international stakeholder of the building industry, to develop standards for any building domain.
The Professional Certification Program is one of the activities of the summit and is created to support training organization to deliver internationally standardized and recognized training content. buildingSMART is not delivering training itself, but defines learning outcomes and manages the approval of training providers and the testing and qualification of individuals.

The Program goals are:

- To standardize and promote openBIM training content
- To support and accredit training organizations
- To test and certify individuals

7.2 Achievements

During the summit a meeting with the person in charge of the qualification program, Mark Baldwin, allow to define the procedure to use the buildingSMART platform to introduce the learning outcomes produced for the use of BIM to improve energy performance of the buildings.
Guidelines and a draft of MoU was produced and distributed also to the other three projects coordinators: BIMCERT, BIMIMPLEMENT, BIMEET.
During the meeting we agreed that the "BIM alliance" of the European project would produce, for the Energy Analysis module, the following:

- 25-30 Learning Outcomes
- Question Database with at leas 200 questions and answers
- Body of Knowledge

In the following the presentation of the qualification program presented by the coordinator Mark Baldwin.

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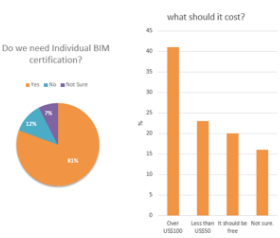
Market Need

81% - 'BIM competence certification is necessary'.

79% - 'based on openBIM principles'
(12% said it not openBIM)

68% - 'buildingSMART should be involved'
(16% felt buildingSMART should not be involved)

64% of respondents felt that certification should involve a fee
- 41% more than US$ 100
- 23% less than US$ 50.
- 20% believed certification should be free



Professional Certification

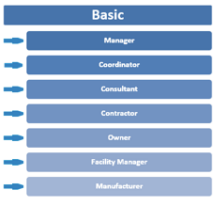
Scope

Professional Certification

Phase 1: Individual Qualification

3 components:

1. **Learning Outcome Frameworks** (LOF's) - which describe the content of each of the eight modules
2. **Course approval** – the procedure to review and approve candidate trainings.
3. **Individual qualification** – the testing and qualification of individuals who have undertaken an approved training.



Professional Certification

LOF Overview

buildingSMART International home of openBIM

BASIC - Learning Outcome Framework Overview

Below is a preview of the LOF for the Basic module. Please note, this is not a complete LOF, but rather a listing of the items to be covered, for preliminary chapter review and comment.

To be Comfortable with what BIM is, why it is needed, and its specific Terminology.
Delegates on completion should be able to:
- Define the drivers that have led to BIM;
- Define BIM;
- Identify & Define key BIM terminology;
- Define BIM maturity levels; and
- Define what constitutes an Information Model.

To appreciate the advantages that BIM can bring compared to a traditional project, the historical issues within the industry and its role BIM has in satisfying government targets.
Delegates on completion should be able to:
- Know why collaborative and new ways of working are required;
- Identify the effects of poor information management on projects;
- Identify the standards developed to mitigate poor information;
- Identify the benefits of BIM to construction professionals; and
- Identify the benefits of BIM adoption to clients, and facility management.

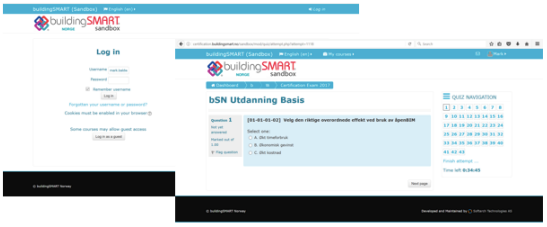
Professional Certification

Example LOF (bS Norway)

No.	Learning target
Project Examples	
01-01-01	Know the effect of up to three projects that use openBIM and which demonstrate - increased multidisciplinary collaboration - economic benefits - improved quality
01-01-02	Know the benefits of openBIM for clients: - More streamlined process - Increased consistency between order and result (quality) - Improved time and financial management - Improved profitability
01-01-03	Know the benefits of openBIM for consultants: - Improved quality of collaboration - Increased consistency in multidisciplinary coordinated production documentation - Competitive advantage because openBIM experience is requested for more and more projects
01-01-04	Know the benefits of openBIM for contractors: - Competitive advantage by being able to submit quotes and tenders with less uncertainty with regard to cost and time - Better management of time and finances - Improved profitability
01-01-05	Know the benefits of openBIM for management and operations: - Improved functionality in the building - Lower operating expenses *The following point assumes FM & Operation documentation is available from openBIM:* - Improved access to and maintenance of FM & Operation documentation

Professional Certification

Testing Platform Prototype



Professional Certification

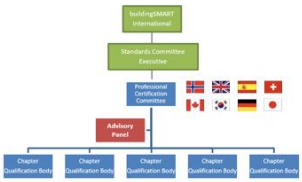
Logos & Branding

- Page on buildingSMART.org
  - www.buildingsmart.org/professional-certification/
- New Domain: buildingSMART.education
- Logos

buildingSMART Professional Certification
buildingSMART Individual Qualification

Professional Certification

Programme Structure



Gold Sponsors:

Professional Certification

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

8. RILEM SMSS – 20-22 March 2019

8.1 Flyer

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

8.2 Paper

International Conference on Sustainable Materials, Systems and Structures (SMSS 2019)
Energy Efficient Building Design and Legislation
20-22 March 2019 – Rovinj, Croatia

POSSIBILITIES OF USING BIM FOR DEEP ENERGY RENOVATION ANALYSES

Sanjin Gumbarević (1), Bojan Milovanović (1), Marina Bagarić (1) and Mergim Gaši (1)

(1) Faculty of Civil Engineering, University of Zagreb, Croatia

Abstract

With unsustainable greenhouse gas emission and irrational energy consumption, building sector have big impact on environment pollution and climate change. In order to reduce the building sector impact, the majority of current buildings need to be renovated and new buildings built as Nearly Zero-Energy Buildings (NZEB). Since for building renovation and new NZEB, together with integrated design, management of relevant information is crucial, the use of Building Information Modelling (BIM) becomes evident. BIM is a concept which promotes integrated design process in a way that connects all key stakeholders by collaborating on the same information model. In order to assess energy demands of renovated building and therefore perform an optimization process, BIM must be transformed in Building Energy Model (BEM). Today, BIM-to-BEM Information Process (BBIP) is still not fully developed which results with some information being lost during BBIP. Those lost information must be re-entered to create correct BEM. This paper proposes a procedure for tackling this BBIP information loss. This procedure is summarized in the workflow steps needed to acquire correct information about the building as an input for optimization of envelope design in deep energy renovations and exploitation of the building during its lifecycle by using BIM tools and processes. Moreover, to increase the use of BIM for energy efficiency purposes, competences of all building stakeholders must be enhanced.

Keywords: BIM, Deep Energy Renovation, Building Performance Simulation, Envelope Design, Net-UBIEP, BIMzeED

1. INTRODUCTION

Contribution of building sector in the energy consumption and greenhouse gases emission is unsustainably large. Energy consumption in the building sector mostly manifests through energy demands for heating and cooling, so the influence of the building envelope cannot be underestimated [1]. Therefore, European Union made political decision (with Directive 2010/31/EU) to increase the number of Nearly Zero-Energy Buildings (NZEB), but society in general should also recognize the impact of each and every individua as well. As large portion

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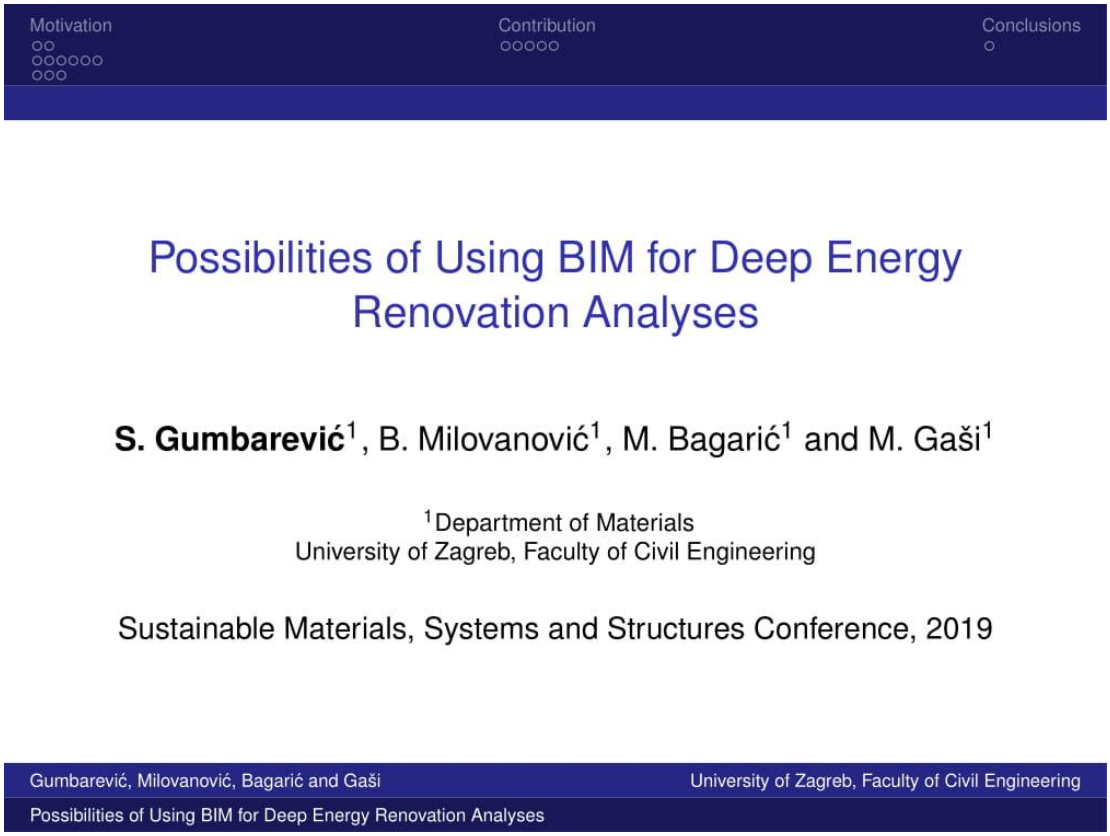
8.3 Presentation



8.4 Photos

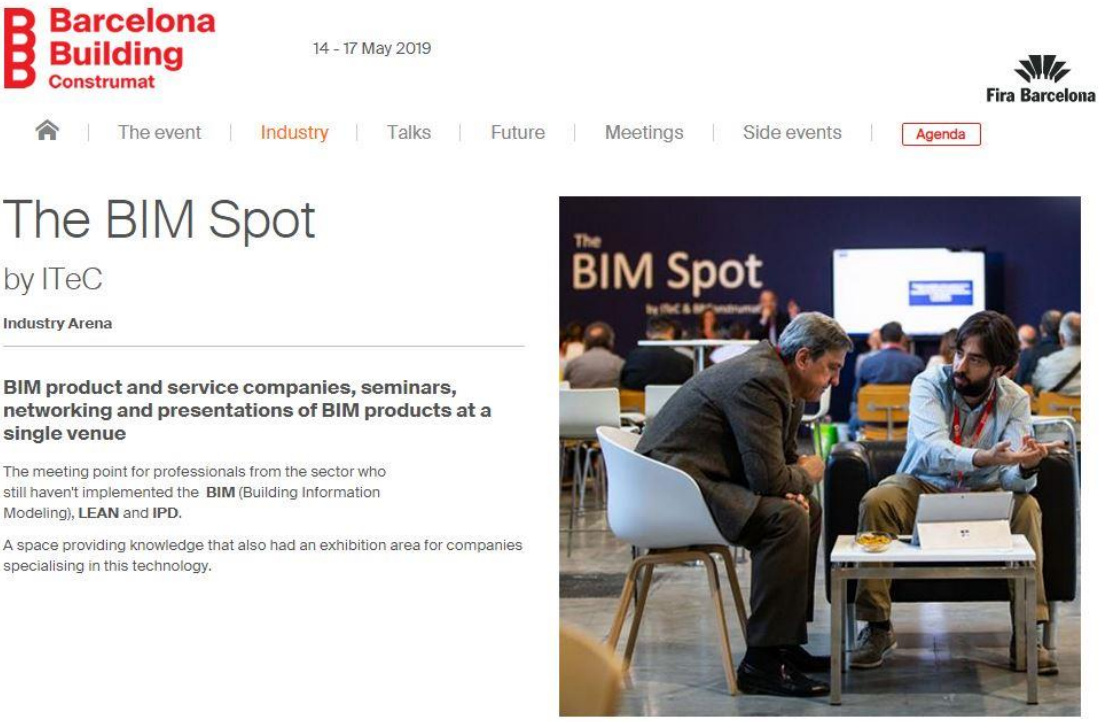
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

9. BIMalliance conference - Barcelona 16 may 2019

9.1 Description of the event

The Building Barcelona Construmat is home to an array of products and services such as construction machineries, construction equipment and accessories, construction technologies, products and materials and all construction related goods and services. The event is known to offer great networking and contacts with industry people. The event also presented the latest news and development that is taking place within the industry. A corner was reserved to Building Information Modelling.



[Link to the event in Barcelona]

The event was considered a good opportunity to meet among different European projects dealing with the use of BIM to improving energy performance during the life cycle of a building. The following was the agenda co-organized with EASME.

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9.2 Agenda

1. **Introduction** BIMalliance

   Introducing the 4 BIM projects and the collaboration. Detailing BIM as a skills enabler

2. **Plan – BIMmplement**

   Energy savings targeted? Energy savings targeted during the design phase. Utilising BIM tools to proactively reduce the gap between predicted and actual building performance. Utilising BIM as an enabler of effective collaboration between design disciplines Reducing performance disparity form conception -***Potential Energy***

3. **Design –BIMEET**

   Energy savings designed into the build -BIM utilised to achieve energy optimization in operation phase. BIM as a tool to support the visualisation of a building's energy performance; Design- operation transition – identifying the obstacles ***Embedded Energy***

4. **Build –BIMcert**

   Energy savings achieved through the building operation stage – monitored and managed continually with lessons learned fed back to design teams for future projects. The practicality of implementing BIM assists performance management through effective data management in building operations by support interlinking of data environments (BIM supported Energy Management System of Buildings). Effective energy management reducing energy consumed whilst maintaining occupants ' health, safety and comfort conditions. BIM utilised to improve existing processes aimed towards sustainable usage of energy – ***Operational Energy***

5. **Operate –net-UBIEP**

   Energy savings through the lifetime of the building- energy performance during the life cycle of a building BIM as a tool to support energy management of a building's performance; Overcoming the barriers to using BIM with in-use building performance management. ***Sustainable Energy***

   Discussion in subgroups:

   1. certification and accreditation of BIM related skills,
   2. BIM for blue-collar workers,
   3. how to use BIM models as training tools,
   4. how to use BIM to upskill building professionals towards higher level of energy efficiency etc.
   5. Reducing the carbon footprint of construction utilising BIM

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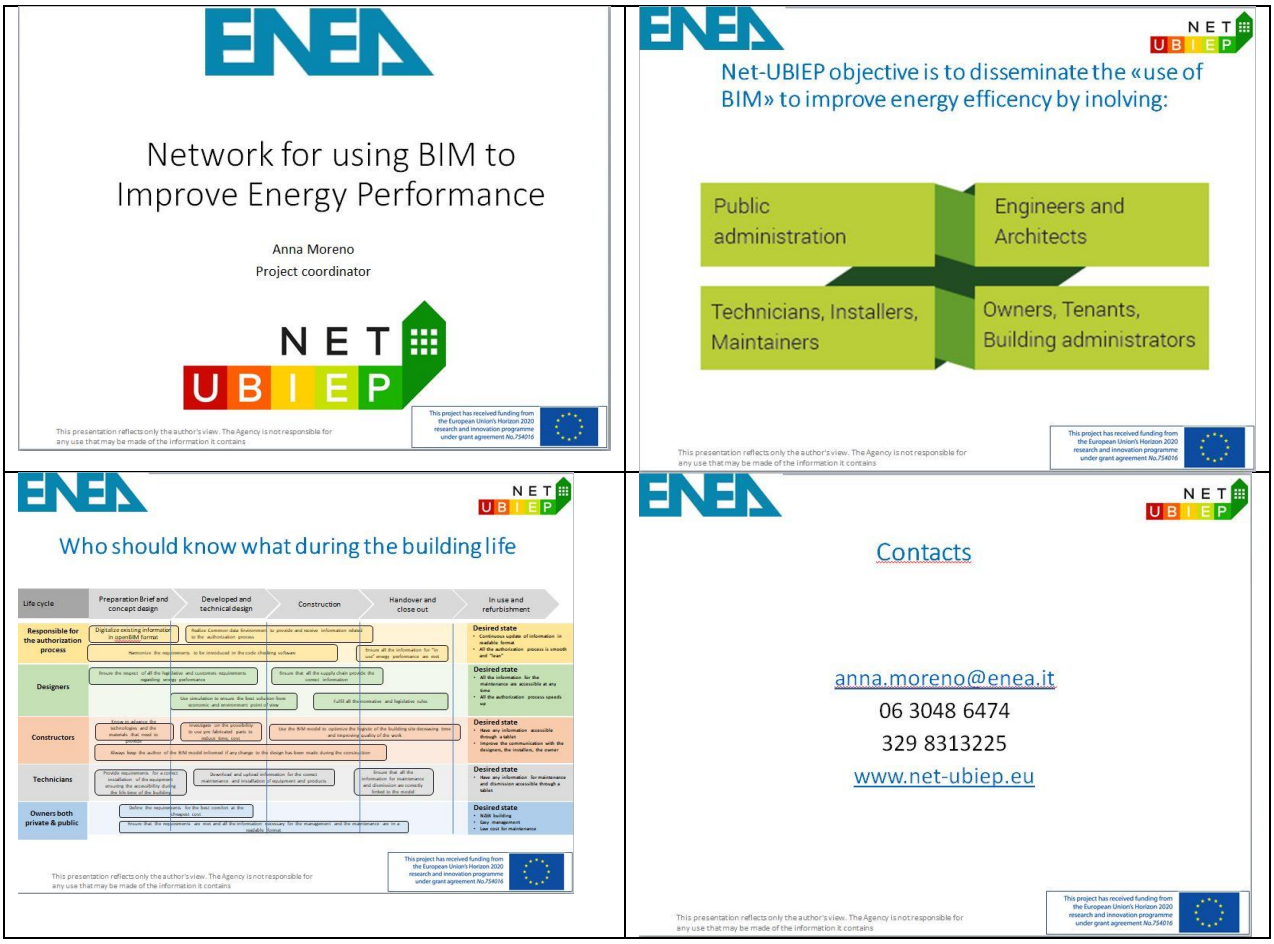
9.3 Presentation by ENEA

Net-UBIEP was presented through the following slides:



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

9.4 Photos

A photo of the panel publicizing the event was taken and here attached.

Poster of the Net UBIEP project prepared by Slovakia

After the event, during an informal meeting of the four project leader, it was decided to carry on common dissemination and exploitation strategies and a first draft of the future common activities was drafted. These the points that were agreed:

- Identify the same qualification framework for all the four projects based on learning outcomes
- Propose the learning outcome framework (LOF) to buildingSMART international in order to include the LOF in their qualification platform.
- Find other funding opportunities within the following H2020 calls.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

10. Cr-Soc-Qual – 17 May 2019

10.1 Paper

SANJIN GUMBAREVIĆ, mag. ing. aedif.; doc. dr. sc. BOJAN MILOVANOVIĆ, dipl. ing. građ.; MARINA BAGARIĆ, mag. ing. aedif.; MERGIM GAŠI, mag. ing. aedif.
Zavod za materijale, Građevinski fakultet Sveučilišta u Zagrebu, Zagreb
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COMPETENCES OF ENGINEERS AND WORKERS IN THE ARCHITECTURE, ENGINEERING & CONSTRUCTION INDUSTRY FOR DELIVERING NEARLY ZERO-ENERGY BUILDINGS

Stručni rad / Professional paper

Summary

By 31 December 2020, all new buildings in the European Union, and therefore in Croatia, should be Nearly Zero-Energy Buildings (NZEB). A question which arises is: are the engineers and workers in the Architecture, Engineering & Construction (AEC) industry well prepared for delivering such a solution? Information loss and lack of collaboration bring potential problems in the construction phase, so quality of final product (NZEB) drops drastically. Building Information Modeling (BIM) is a good solution for the problems described, since it reduces information loss in the building life cycle (design, construction, operation & maintenance, demolition) and increases collaboration between stakeholders, as they need to work with the same information model. The building should also be a good representative of the design itself, so it should be built as correctly as possible. The article shows in what way the Horizon 2020 Fit-to-NZEB and Net-UBIEP projects can be used to solve lack of competences for building NZEB and problems of BIM implementation in the AEC industry in Croatia. The Net-UBIEP project aims to develop schemes for BIM usage in increasing building energy performance (validation through surveys), while project Fit-to-NZEB aims to develop competences for deep energy retrofit through education at EQF levels 3-7.

Keywords: *competences, Nearly Zero-Energy Buildings, Fit-to-NZEB, BIM, Net-UBIEP*

[Publisher's note: The body of the work, below, has not been revised or proofread by the Croatian Society for Quality (HDK)]

1. INTRODUCTION

Improving the energy efficiency of European building stock is a key step in achieving 2020, 2030 and 2050 EU energy and CO_2 emission targets. European Directives, in particular, the EED [1], EPBD [2] as well as amended EPBD and EED [3] and related national regulations, set very strict energy-efficiency targets on European building stock, with the aim to generalize nZEB by 2021. Panev et al. [4] see energy renovation as a stabiliser for the building sector and consequently the overall EU economy while technological aspects whose improvement is necessary and innovations needed to push forward the market uptake of Nearly Zero-Energy Buildings (nZEB) will foster economic growth. The construction industry presents a major opportunity to not only reduce energy demand but also to improve process efficiency and reduce carbon emissions. Original culture and practices of the construction sector are widely perceived as a "low-tech" area with a significant proportion of "blue collar" workers but the construction industry is experiencing its digital revolution, with an intensification of digital

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

10.2 Photos

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

11. MBMST conference - Bruxelles 18-20 May 2019

11.1 Program

30

Techniques – Poster Session

Techniques – Poster Session

A. Kiaulakis, T. Vilutienė, V. Šarka, E. Šarkienė
Construction project stakeholders' perceptions and expectations of their roles in BIM-based collaboration

L. Tupėnaitė, T. Gečys, L. Kanapeckienė, S. M. Sajjadian, J. Naimavičienė
Selection of structural system for mid-rise wooden public building: multiple criteria approach

J. Tamošaitienė, T. Starta
A new model for the selection of effective dwelling house walls

M. Pavlovskis, D. Migilinskas, V. Kutut, J. Antuchevičienė
Initial data preparation for 3D modelling of heritage building

R. Kuznecov, J. Šaparauskas
Multi-criteria assessment of pitched roof reconstruction technologies

S. M. Sajjadian, L. Tupėnaitė, L. Kanapeckienė, J. Naimavičienė, S. Radif
High-rise buildings in Europe from energy performance perspective

B. Ksit, A. Szymczak-Graczyk
Thermal analysis of structural nodes – as locations of difficult geometry, using computational methods

R. Szelag
Initial assessment of the construction status using BIM technology for existing buildings

J. Gałaj, T. Drzymała, A. Pełech, R. Šukys
Analysis of the impact of water flow rate of selected Turbo type nozzle on the distribution of sprinkling intensity

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement *No.754016*

11.2 conference paper

"Modern Building Materials, Structures and Techniques"
13th International Conference
Vilnius Gediminas Technical University
Lithuania, 16–17 May 2019

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Article ID: mbmst.2019.XXX
DOI: http://doi.org/XXXXXX/mbmst.2019.XXX

Construction project stakeholders' perceptions and expectations of their roles in BIM-based collaboration

Arvydas Kiaulakis[1*], Tatjana Vilutienė[2], Vaidotas Šarka[3], Edita Šarkienė[4]

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Abstract. The article presents the results of the survey aimed to analyze the attitude and perceptions regarding the use of BIM for data handling and analysis. Two target groups were researched, according to the role they play in building processes, namely public administrations (including tenants, owners, and building administrators) and Professionals (engineers / architects). The study conducted during the Net-UBIEP (Network for Using BIM to Increase the Energy Performance) project. The purpose of this study was to assess the implementation of building information modeling (BIM) as a tool and a process among key stakeholders in order to understand the current use of BIM, benefits of using BIM, obstacles of using BIM as well as possible future use. This study can be used as a pre-analysis of feedback from building users and construction professionals and can contribute to the co-adaptation process between BIM knowledge providers and BIM users.

Keywords: building information modelling, construction projects, collaboration.

Introduction

Building information modeling (BIM) refers to a set of technologies and organizational solutions that are expected to increase inter-disciplinary collaboration in the construction industry and to improve the productivity and quality of the design, construction, and maintenance of buildings (Miettinen & Paavola, 2014). Although some criticism regarding the promises of building information modeling exists, BIM tools continue to proliferate within the construction industry and becoming more sophisticated. Therefore, the construction industry needs professionals who are not only skilled in their domain but are also good team members, communicators and lifelong learners (Dym, Agogino, Eris, Frey, & Leifer, 2006). The identification of the competencies that need to be taught to ensure the collaborative workflows and integrated project deliverables is becoming increasingly important (Succar & Sher, 2014).

Technology alone does not ensure that collaboration, communication and conflict management are efficient. Soft skills are essential in construction, as in many other industries. Negotiation, teamwork, and leadership are needed in the BIM project team. Davies, McMeel, and Wilkinson (2015) have revealed that a better definition of the expectations and activities of professionals and teams in a BIM project can help better understand the importance of soft skills in BIM-based collaboration. They form an important part of BIM roles applicable to projects implemented in the BIM environment.

The methodology of the research includes "focus groups" to provide insights into how experts think and provide a deeper understanding of the BIM competencies and BIM-related learning outcomes. Based on the results obtained in the "focus groups" the initial material for further analysis was gathered. Latter was used to prepare the questionnaires for the survey of targeted groups: professionals (engineers/architects) and public administrations (including tenants, owners and building administrators). The paper presents the summarized results of this survey. Although the survey is a valuable research tool, it normally asks closed-ended questions that limit the feedback that can be gained from a respondent. Therefore, the interviews with some representatives of targeted groups were conducted to gain more in-depth information to supplement surveys.

At the first stage in a number of discussions, the experts selected the specific sets of social, personal and managerial skills as well as professional competencies and learning outcomes related to BIM application in construction projects. Those sets were included in the survey and distributed to the representatives of target groups. The article

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

12. OTMC – 04-07 September 2019

12.1 Agenda

DATE	TIME	CRYSTAL BALLROOM - Ground floor
Wednesday, September 04		OPENING CEREMONY Facilitator: Anita Ceric, Program Chair Jesus Martinez Almela, President of IPMA Ding Ronggui, Research Coordinator of IPMA Stjepan Lakušić, Dean of Faculty of Civil Engineering, University of Zagreb Željko Uhlir, State Secretary, Ministry of Construction and Physical Planning Ivica Završki, Chair of the OTMC&IPMA Conference
	15:00	KEYNOTE PRESENTATIONS
	15:00 - 17:30	Facilitator: Mladen Vukomanović, Scientific Chair and Ding Ronggui, Scientific Co-Chair Peter Jedlehauser, Swiss Federal Railways, Director of the programme "Léman 2030", Switzerland Creating Trust in Mega Projects – Experiences from Two Railway Mega Projects in Switzerland Johnson Yi, Director of Project Management Center of Excellence, HUAWEI, China Building Customer Trust in Mega Projects – Experiences from 5G Projects at HUAWEI Soonwook Kwon, Sungkyunkwan University, South Korea Opportunities of Digital Transformation for Better Project Management
	16:30	
	16:50	
	20:00	Welcome reception Opera Hall / 17th floor Dress code: business/smart casual * full registration or by invitation only

DATE	TIME	PANORAMA - 17th floor	OUVERTURE - 17th floor	OPERA - 17th floor	MAKSIMIR - Ground floor
Wednesday, September 04		Organization, Technology and Management in Construction	Organization, Technology and Management in Construction	IPMA Research Conference	IPMA Megaproject SIG
	09:00 - 09:40	KEYNOTE PRESENTATION Facilitator: Anita Ceric, Program Chair Baabak Ashuri, Georgia Institute of Technology, USA Project Finance and Public Private Partnership (P3) for Transportation Infrastructure Mega Projects			
	STREAM	Construction and Project Management Issues	Construction Technology and Design	Trust and Project Performance	IPMA Megaproject SIG
	FACILITATOR	Ivica Završki	Miklos Hajdu	Martina Huemann	Sandra Matuhina, Mladen Vukomanović, Mladen Radujković
	10:00 - 10:15	Contribution to Increasing the cost Efficiency in the Exploitation Phase of Public Education Facilities Tijanić, Ksenija; Car-Pušić, Diana; Marenjak, Saša	Framework for Automatic Calculation of Life-Cycle Costs of Tunnel Cracks Remediation Meho Saša Kovačević, Mario Bačić, Mladen Vukomanović, Anita Ceric	Invited lecture: The Future of PM in Rurality and TRUST in Sustainable Food Production in 2050 Martinez Almela, Jesus	Michael Ellis People Perspective on Megaproject: Montenegro Case
	10:15 - 10:30	Risk and Opportunities of Taking Different Procurement Routes in Construction Projects in Croatia Šopić, Martina; Vukomanović, Mladen; Car-Pušić, Diana	Effective Connection of Terrestrial Laser Scanner and Unmanned Aerial Vehicle for as-Built Measurement of Buildings Mesároš, Peter; Tkáč, Matúš; Mandičák, Tomáš	A Multi-Level Competencies Framework for the Successful Delivery of Major Infrastructure Projects Foster, Sue; Ahmad, Saima; Sohal, Amrik; Prajogo, Daniel; Algeo, Chivonne; Moehler, Robert	
	10:30 - 10:45	Time Analysis of Networks with Bi-directional Precedence Relationships: A Case Study M. Hajdu, I. Malyusz, Z.A. Vattai	Application of Smart Systems for Real Time Monitoring of Ready Mixed Concrete Delivery Sarkar, Debasis; Dave, Matangi	Operational Excellence Versus Breakthrough Innovation Fink, Laura	Harry Dimitriou Social and Environmental Perspectives of Megaproject Decision-making
	10:45 - 11:00	Managing Construction Stakeholders in South Africa– The Construction Professionals' perspective Aghimien, Douglas; Aigbavboa, Clinton; Thwala, Wellington	Microtunnelling of Wastewater Collector System – Experiences from the City of Mostar Zujo, Vahida; Šopgo, Suad; Žlenka-Pantovina, Valentina	A Trust Model for Analyzing Team's Relationship in Product Development Project Fang, Na; Yang, Qing; Yu, Jielu	
	11:00 - 11:30	COFFEE BREAK			
	STREAM	Construction and Project Management Issues	Sustainability in the Built Environment	Trust and Project Performance	IPMA Megaproject SIG
	FACILITATOR	Mauro Mancini	Jana Korytarova	Qing Yang	Sandra Matuhina, Mladen Vukomanović, Mladen Radujković
	11:30 - 11:45	Efficiency of Insurance as a Risk Management Tool in South African Construction Projects Akinradewo, Opeoluwa; Aigbavboa, Clinton; Ngwenya, Lerato; Thwala, Wellington; Ncube, Thabo	Infrastructure Projects' Impact on Sustainable Development– Case Study of a Water-Utility Company Mannell, Paul; Phillips, Simon; Broyd, Tim	Stakeholders' Trust and Power Dynamic in Tourism Resort Projects in a Developing Country Almasmari, Ghasan; Williams, Nigel; Atkinson, Roger	Martin Sedlmayer Challenges to Setup Rolling Stock for the Largest Cross Country Commuter Railway System (Geneva) Go far beyond Technology
	11:45 - 12:00	Re-Visiting the Impediments of Cost Contingency Plans for Construction Projects in South Africa Akinradewo, Opeoluwa; Ngwenya, Lerato; Aigbavboa, Clinton; Thwala, Wellington	Local Economic Development through Infrastructure Procurement: Exploring the Social Sustainability Nexus Diba, Nthabiseng Joy; Awuzie, Bankole	"The Last Area Of Freedom" Theories for Explaining the Lack of Trust in Major and Mega Projects Schoper, Yvonne	
	12:00 - 12:15	EPC 4.0 - The Quest of Reducing CAPEX in EPC-Projects by 50% Wagner, Reinhard Friedrich	A Sustainability Model of 217 Agents for Commercial Buildings Pesämaa, Ossi; Dahlin, Peter; Ekman, Peter; Rondell, Jimmy	Interrelationships of the Critical Success Factors of BOT Projects in Iran: A Grey-DEMATEL Approach Mazaheri Asad, Mohsen; Mahoud, Mohammad	Peter Jedelhauser and Sandra Matuhina Creating and Maintaining Trust in Mega Projects: Experiences made in Léman 2030
	12:15 - 12:30	Determining Measures to Increase the Productivity of Contractors in Construction Projects Vidaković, Dražiaec; Marenjak, Saša	Health and Safety Practices in the Zimbabwean Construction Industry Chipato, Estina; Chigara, Benisolomi; Smallwood, John	Four Stages of Making Project Management Flexible: Insight, Importance, Implementation and Improvement Jalali Sohi, Afshin; Bosch-Rekveldt, Marian; Hertogh, Marcel	

DATE	TIME	PANORAMA - 17th floor	OUVERTURE - 17th floor	OPERA - 17th floor	MAKSIMIR - Ground floor
Thursday, September 05	12:30 - 12:45	Strategic Engagement of Local Communities on Large-scale Infrastructure Projects Teo, Melissa	Designing for Sustainability Governance Implementation in Infrastructure Delivery Systems: Success Factors Awuzie, Bankole Osita; Monyane, Thabiso Godfrey; Diba, Nthabiseng M.J	Ex-Post Evaluation of Norwegian Public Buildings Agnar Johansen, Christian Bakke, Kozhen M. Mahmood, Andreas Landmark	Nikica Pancirov & Bojan Lončar Challenges and Lessons Learned from Turnaround of INA Rijeka Refinery 2019
	12:45 - 13:00	Method for Early Base Estimation of Construction Time for Linear Projects Đurrigi, Pavao; Prebanic, Kristijan Robert; Burcar Dunović, Ivana	Exploring Organizational Suitability of Construction Companies for Developing Project Management Organizational Competence Serpell, Alfredo Federico; Rubio, Herbert	A Cause and Effect Analysis on Critical Risk Factors of Iranian BOT Projects Using a Grey-DEMATEL Method Mazaheri Asad, Mohsen; Mahoud, Mohammad	
	13:00 - 14:00	LUNCH / HOTEL RESTAURANT, Ground floor		LUNCH / HOTEL RESTAURANT, Ground floor	
	STREAM	Construction and Project Management Issues	Sustainability in the Built Environment	Trust and Project Performance	IPMA Megaproject SIG
	FACILITATOR	Baabak Ashuri & Mario Galić	Zlata Dolaček-Alduk & Vladimir Obradović	Schoper Yvonne	Sandra Matuhina, Mladen Vukomanović, Mladen Radujković
	14:00 - 14:15	Workgroup Characteristics as Determinant of Project Team Effectiveness in Construction Primorac, Ivana; Dolaček-Alduk, Zlata; Šandrk Nukić, Ivana	Technical Opinion Leaders in Facility Companies' Renewable Energy Projects Pesämaa, Ossi; Dahlin, Peter; Ekman, Peter; Rondell, Jimmy	Explicit and Implicit Relationship between Stakeholder Management and Trust Concepts: Construction Project Management Perspective Prebanic, Kristijan Robert; Burcar Dunović, Ivana	Rodney Turner Post-Modernism on Megaprojects
	14:15 - 14:30	Determination of KPIs For Small and Medium Sized Construction Companies Okudan, Ozan; Budayan, Cenk	Low-energy Building Feasibility Analysis - a Business Case Bafić, Helena; Butković, Lana Lovrenčić; Sigmund, Zvonko; Mihić, Matej	Stakeholder Management Influence on Trust Student Competences in the Field of Project Management Ramopala, Joanna; Soroka-Potrzebna, Hanna	
	14:30 - 14:45	Corruption in the Egyptian Construction Industry Ibrahim, Ahmed N.; Erdogan, Bilge; Nielsen, Yasemin	Research and Education in Construction The Learning Competencies of Project Managers through the Use of BIM – Comparison Study Mandičák, Tomáš; Mesároš, Peter; Tkáč, Matúš	Trust factors in Mega projects in High Inflation Countries in Middle East: Case Study Azadmanesh, Vahid; Safakish, Gholamreza	Gholamreza Safakish People and Social Considerations in FEED Endorsement Phase in Upstream Oil & Gas Projects in Iran *FEED - Front-End Engineering and Design
	14:45 - 15:00	Managing Health and Safety Hazards and Risks in Construction Twaibu, Phillip; Smallwood, John Julian	Influence of Innovative Orientation on Small and Medium Construction Enterprises in Nigeria Ahmadu, Shehu Bustani; Kabir, Bala; Usman, Nuruddeen; Abdullahi, Umar; Alhassan, Dahiru	Enhancing Stakeholders' Trust in Megaproject Supply Chain through Blockchain: An Exploratory Study Yang, Rebecca Jing; Wakefield, Ron; Yi, Xun; Lyu, Sairan; Yang, Xuechao; Zhang, Ewaz; Zhang, Ivan	
	15:00 - 15:15	Project Management with Modified Gaussian S-Curve Knežević, Vladimir; Hrenj, Dražen	Improving Competences of Engineers and Workers in the AEC Industry for Delivering NZEBs Gumbarević, Sanjin; Milovanović, Bojan; Bagarić, Marina; Galić, Mengim; Burcar Dunović, Ivana	History, Trust and Mistrust: Lessons from Radioactive Waste Disposal Megaprojects Lehtonen, Markku	Mauro Mancini Organizational Legitimacy in Megaproject
	15:15 - 15:30	Contractor-Collaborators Logistics System Prototype For Construction Projects Serrada, Ximena; Reyes, Pablo	CROSP FRAMEWORK project 2015 – 2019 Lončar-Vicković, Sanja; Dolaček-Alduk, Zlata; Petrinšak, Slavko; Bošnjak-Klečina, Mirjana	The Paradoxical Profession: Project Management & Sustainability Contradictions Sabini, Luca; Alderman, Neil	
	15:30 - 16:00	COFFEE BREAK			
	STREAM	Construction and Project Management Issues	Research and Education in Construction	Stakeholder Management Influence on Trust	IPMA Megaproject SIG
	FACILITATOR	Soonwook Kwon and Ivan Marović	Ivo Kovačić and Zvonko Sigmund	Rebecca Jing Yang	Sandra Matuhina, Mladen Vukomanović, Mladen Radujković
	15:00 - 16:15	The Influence of Trust and Culture upon Western Consultants Executing GCC Megaprojects Walsh, Alan; Walker, Peter	Development of the Individual Competences in Construction Project Management: The Educational Approach Ramopala, Joanna; Wiaskiewicz, Małgorzata	Symbolism, Trust and Governance in Major Projects Floriot, Serghei; Brunet, Maude	Goran Legac Megaproject Governance Perspective: Pelješac Link Megaproject Project Governance
	16:15 - 16:30	Determinants of Cost Overrun and Schedule Delay in Tunnel Megaprojects De Marco, Alberto; Narbaev, Timur	Integrating BIM into Construction Project Management Education at the Faculty of Civil Engineering in Belgrade Simic, Nevena; Petronijevic, Marija; Mikic, Miljan; Petrovic, Marija; Ivanisevic, Nenad	European Megaprojects: Managing Contextual Uncertainty through the Stakeholder Management Mancini, Mauro	
	16:30 - 16:45	Impact of Project Complexity Factors on Profitability Using System Dynamics Modeling Jahan, Shah; Thaheem, Dr. Muhammad Jamaluddin; Ullah, Zeeshan; Maqsoom, Dr. Ahsen	Technological Innovation in Architecture and Engineering Education - An Investigation on X, Y and Z Generations in Turkey Bayhan, Hasan Gökberk; Karaca, Ece	WORKSHOP: How to Get your Excellent Papers Published in Project Management Journals Martina Huemann and Giorgio Locatelli	Brian Field Funding Megaprojects: Reconciling Financial Imperatives with Public Engagement
	16:45 - 17:00	Key Success Factors for Better Quality at Delivery in Construction Projects Ljevo, Zanesa; Vukomanović, Mladen; Dževo, Suada	The Triangle of Trust in Emotional Intelligence: The Irreducible Imperative for Project Team Success Sohmen, Victor S.		
	20:00	Casual dinner Pub Zlatni Medo / Sveska cesta 56 Dress code: Casual * full registration or by invitation only			

DATE	TIME	PANORAMA - 17th floor	OUVERTURE - 17th floor	OPERA - 17th floor	MAKSIMIR - Ground floor
Friday, September 06		Organization, Technology and Management in Construction	Organization, Technology and Management in Construction	IPMA Research Conference	IPMA Megaproject SIG
	09:00 - 09:45	KEYNOTE PRESENTATION Facilitator: Mladen Vukomanović, Scientific Chair Miklos Hajdu, Budapest University of Technology Planning and Scheduling Mega Projects: A Case Study of a Nuclear Power Plant			
	STREAM	Construction and Project Management Issues	General Management and Economics in Construction	Stakeholder Management Influence on Trust	IPMA Megaproject SIG
	FACILITATOR	Ivana Burcar Dunović	Martina Huemann and Lana Lovrenčić Butković	Marie-Pierre Leroux	Sandra Matuhina, Mladen Vukomanović, Mladen Radujković

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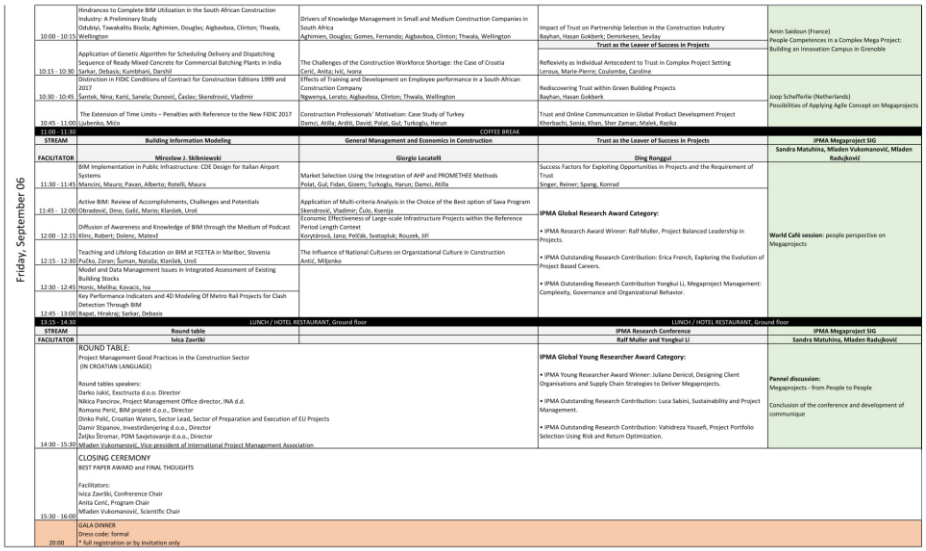

Friday, September 06					
	10:00 - 10:15	Hindrances to Complete BIM Utilization in the South African Construction Industry: A Preliminary Study Odubiyi, Tawakalitu Bisola; Aghimien, Douglas; Aigbavboa, Clinton; Thwala, Wellington	Drivers of Knowledge Management in Small and Medium Construction Companies in South Africa Aghimien, Douglas; Gomes, Fernando; Aigbavboa, Clinton; Thwala, Wellington	Impact of Trust on Partnership Selection in the Construction Industry Bayhan, Hasan Gokberk; Demirkesen, Sevilay	Amin Saidoun (France) People Competences in a Complex Mega Project: Building an Innovation Campus in Grenoble
	10:15 - 10:30	Application of Genetic Algorithm for Scheduling Delivery and Dispatching Sequence of Ready Mixed Concrete for Commercial Batching Plants in India Sarkar, Debasis; Kumbhani, Darshil	The Challenges of the Construction Workforce Shortage: the Case of Croatia Cerić, Anita; Ivić, Ivona	**Trust as the Leaver of Success in Projects** Reflexivity as Individual Antecedent to Trust in Complex Project Setting Leroux, Marie-Pierre; Coulombe, Caroline	
	10:30 - 10:45	Distinction in FIDIC Conditions of Contract for Construction Editions 1999 and 2017 Šantek, Nina; Karić, Sanela; Dunović, Časlav; Skendrović, Vladimir	Effects of Training and Development on Employee performance in a South African Construction Company Ngwenya, Lerato; Aigbavboa, Clinton; Thwala, Wellington	Rediscovering Trust within Green Building Projects Bayhan, Hasan Gokberk	Joop Schefferlie (Netherlands) Possibilities of Applying Agile Concept on Megaprojects
	10:45 - 11:00	The Extension of Time Limits – Penalties with Reference to the New FIDIC 2017 Jukenko, Mićo	Construction Professionals' Motivation: Case Study of Turkey Damci, Atilla; Arditi, David; Polat, Gul; Turkoglu, Harun	Trust and Online Communication in Global Product Development Project Kherbachi, Sonia; Khan, Sher Zaman; Malek, Rasika	
	11:00 - 11:30	COFFEE BREAK			
	STREAM	**Building Information Modeling**	**General Management and Economics in Construction**	**Trust as the Leaver of Success in Projects**	**IPMA Megaproject SIG**
	FACILITATOR	**Miroslaw J. Skibniewski**	**Giorgio Locatelli**	**Ding Ronggui**	**Sandra Matuhina, Mladen Vukomanović, Mladen Radujković**
	11:30 - 11:45	BIM Implementation in Public Infrastructure: CDE Design for Italian Airport Systems Mancini, Mauro; Pavan, Alberto; Rotelli, Maura	Market Selection Using the Integration of AHP and PROMETHEE Methods Polat, Gul; Fidan, Gizem; Turkoglu, Harun; Damci, Atilla	Success Factors for Exploiting Opportunities in Projects and the Requirement of Trust Singer, Reiner; Spang, Konrad	
	11:45 - 12:00	Active BIM: Review of Accomplishments, Challenges and Potentials Obradović, Dino; Gašić, Mario; Klanšek, Uroš	Application of Multi-criteria Analysis in the Choice of the Best option of Sava Program Skendrović, Vladimir; Čulo, Ksenija	**IPMA Global Research Award Category:** • IPMA Research Award Winner: Ralf Muller, Project Balanced Leadership in Projects. • IPMA Outstanding Research Contribution: Erica French, Exploring the Evolution of Project Based Careers. • IPMA Outstanding Research Contribution Yongkui Li, Megaproject Management: Complexity, Governance and Organizational Behavior.	**World Café session**: people perspective on Megaprojects
	12:00 - 12:15	Diffusion of Awareness and Knowledge of BIM through the Medium of Podcast Klinc, Robert; Dolenc, Matevž	Economic Effectiveness of Large-scale Infrastructure Projects within the Reference Period Length Context Korytárová, Jana; Pelčák, Svatopluk; Rouzek, Jiří		
	12:15 - 12:30	Teaching and Lifelong Education on BIM at FCETEA in Maribor, Slovenia Pučko, Zoran; Šuman, Nataša; Klanšek, Uroš	The Influence of National Cultures on Organizational Culture in Construction Antić, Miljanko		
	12:30 - 12:45	Model and Data Management Issues in Integrated Assessment of Existing Building Stocks Hynio, Melitha; Kovacic, Iva			
	12:45 - 13:00	Key Performance Indicators and 4D Modeling Of Metro Rail Projects for Clash Detection Through BIM Rajput, Hiratraj; Sarkar, Debasis			
	13:15 - 14:30	LUNCH / HOTEL RESTAURANT, Ground floor		LUNCH / HOTEL RESTAURANT, Ground floor	
	STREAM	**Round table**		**IPMA Research Conference**	**IPMA Megaproject SIG**
	FACILITATOR	**Ivica Završki**		**Ralf Muller and Yongkui Li**	**Sandra Matuhina, Mladen Radujković**
	14:30 - 15:30	ROUND TABLE: Project Management Good Practices in the Construction Sector (IN CROATIAN LANGUAGE) Round tables speakers: Darko Jukić, Exactnucta d.o.o. Director Nikica Pancirov, Project Management Office director, INA d.d. Romano Perić, BIM projekt d.o.o., Director Dinko Polić, Croatian Waters, Sector Lead, Sector of Preparation and Execution of EU Projects Damir Stipanov, Investinženjering d.o.o., Director Željko Štromar, PDM Savjetovanje d.o.o., Director Mladen Vukomanović, Vice-president of International Project Management Association		**IPMA Global Young Researcher Award Category:** • IPMA Young Researcher Award Winner: Juliana Denicol, Designing Client Organisations and Supply Chain Strategies to Deliver Megaprojects. • IPMA Outstanding Research Contribution: Luca Sabini, Sustainability and Project Management. • IPMA Outstanding Research Contribution: Vahidreza Yousefi, Project Portfolio Selection Using Risk and Return Optimization.	**Pannel discussion:** Megaprojects - from People to People Conclusion of the conference and development of communique
	15:30 - 16:00	CLOSING CEREMONY BEST PAPER AWARD and FINAL THOUGHTS Facilitators: Ivica Završki, Confrerence Chair Anita Ceric, Program Chair Mladen Vukomanović, Scientific Chair			
	20:00	GALA DINNER Dress code: formal * full registration or by invitation only			

	WORKSHOPS:		SOCIAL EVENTS:	
	Wednesday	WORKSHOP 1 Publishing in High Impact Factor Journals Miroslaw J. Skibniewski, Ph.D. Date: Wednesday, Sep 4, 2019 Time: 09:00 – 13:00h Meeting room Zrinjevac / Ground floor	Wednesday	WELCOME DRINK Date: Wednesday, Sep 4, 2019 Time: 20:00 - 22:00h Meeting room Zrinjevac / 17th floor * full registration or by invitation only
	Thursday	WORKSHOP 2 How to Get your Excellent Papers Published in Project Management Journals Professor Martina Hueman and Professor Giorgio Locatelli Date: Thursday, Sep 5, 2019 Time: 16:30 – 17:30h Meeting room Opera / 17th floor	Thursday	CASUAL DINNER Date: Thursday Sep 5, 2019 Time: 20:00 - 22:00h Pub Zlatni Medo / Savska cesta 56 * full registration or by invitation only
	Friday	WORKSHOP 3 Project Management Simulation Date: Friday, Sep 6, 2019 Time: 09:00 – 17:00h Meeting room Zrinjevac / Ground floor	Friday	GALA DINNER Date: Friday Sep 6, 2019 Time: 20:00 - 00:00h Crystal Ballroom / Hotel Westin, ground floor * full registration or by invitation only
		WORKSHOP 5 Alma Mater Europaea Doctor of Science in Project Management - Ph.D. students' presentations Facilitator: Mladen Radujković Date: Friday Sep 6, 2019 Time: 10:00 - 17:00h Meeting room Zrinjevac / Ground floor		
		WORKSHOP 4 Project Leaders (you) Can Measure their UN Global Goal Impacts – Why & How? Paul Mamelí Date: Friday Sep 6, 2019 Time: 14:00 – 16:30h Meeting room Terra Croatica / Ground floor		
			Saturday	CITY TOUR Date: Saturday Sep 7, 2019 Time: 10:00 - 12:00h Meeting point: Entrance of the Westin hotel *please confirm your participation at the registration desk

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12.2 Paper

Improving Competences of Engineers and Workers in the AEC Industry for Delivering NZEBs

Sanjin Gumbarević[1]; Bojan Milovanović[1]; Marina Bagarić[1]; Mergim Gaši[1]; Ivana Burcar Dunović[1]

[1]*Faculty of Civil Engineering, University of Zagreb, Croatia*

Abstract:

The Energy Performance of Buildings Directive requires from the European Union Member States to ensure that by 31st of December 2020 all new buildings are Nearly Zero-Energy Buildings (NZEB) and after 31st of December 2018, new buildings occupied and owned by the public authorities should also have the NZEB performance. The large-scale deployment of NZEBs represents a challenge for all the stakeholders involved in the construction sector, where the lack of adequate competences is identified as one of the main obstacles. This paper analyses the current situation in the construction industry in Croatia and provides a possible solution for the abovementioned problem. Fit-to-NZEB and Net-UBIEP (Horizon 2020 projects) are dealing with the lack of education and competences in Architecture, Engineering and Construction (AEC) industry for delivering NZEBs. Fit-to-NZEB aims to increase knowledge of AEC engineers and workers in deep energy retrofit through the education in EQF levels 3-7, while Net-UBIEP seeks to develop the schemes for using Building Information Modelling (BIM) throughout the whole building lifecycle to increase building's energy performance. The integrated design process and strengthen control on the construction site, supported by BIM, should be carried out as they are the most critical parts in delivering NZEBs. Therefore, Fit-to-NZEB and Net-UBIEP projects can contribute to upgrading professional competences of all the stakeholders involved in the design and realisation of NZEBs.

Keywords: *education in construction; nearly zero-energy buildings; net-UBIEP; fit-to-NZEB; BIMzeED; building information modelling;*

1. Introduction

To achieve 2020, 2030 and 2050 goals set by the European Union through the Energy Performance of Buildings Directive (EPBD) and Energy Efficiency Directive (EED), a large scale of Deep Energy Retrofit (DER) should be carried out. EPBD prescribes that by 31st of December 2020 all new buildings and all the buildings under major renovation should perform as NZEBs. The same applies to the buildings occupied and owned by the public authorities after 31st of December 2018, because buildings owned and occupied by the public authorities should be a good-practice example as they are representing the state and therefore should adopt energy efficiency demands first to encourage others to follow their example. The EED also set strict energy-efficiency targets on European building stock with demand for every EU Member to develop a program for deep energy renovation of the building stock up to 2050. As a result of the deadlines mentioned above, it can be concluded that the large number of NZEBs will be built from now, up to 2050. A question which arises is, are the engineers and workers in the

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement *No.754016*

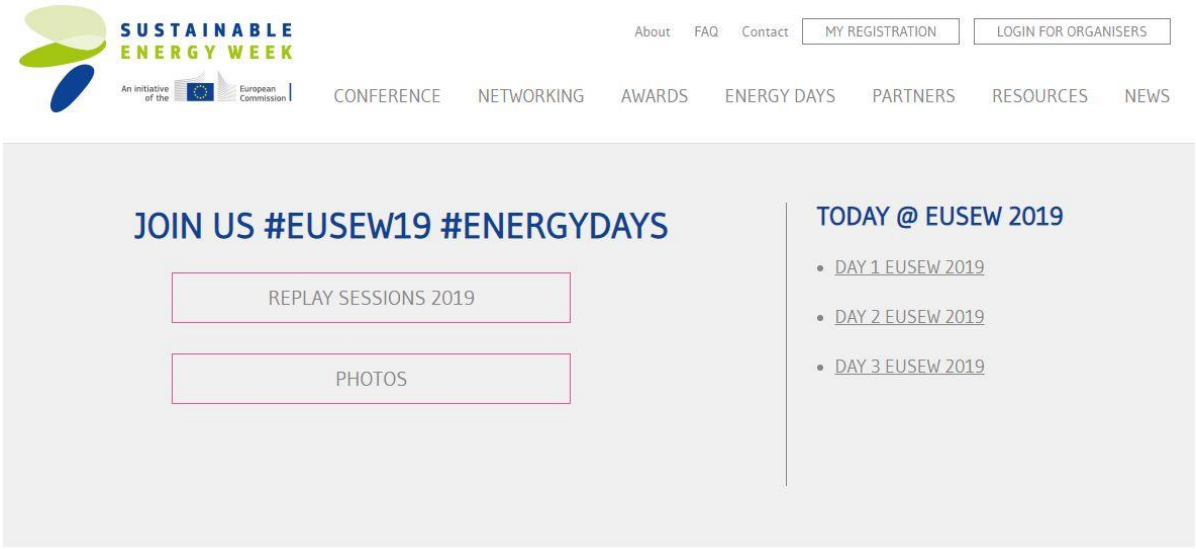
12.3 Photos

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

13. EU Sustainable Energy Week - Bruxelles 18-20 june 2019

13.1 Description event

EU Sustainable Energy Week (EUSEW), the annual flagship event organised by the European Commission, brings together public authorities, private companies, NGOs and consumers to promote initiatives to save energy and move towards renewables for clean, secure and efficient power. In 2019, activities are focused around the theme 'Shaping Europe's Energy Future'. Now in its 14th year, EUSEW is bigger and livelier than ever with over 90 policy sessions, more than 4,000 registered participants, 380 speakers and 100+ unique networking opportunities.



[Link to the event in Bruxelles]

13.2 Presentation by BIM Alliance

BIM alliance prepared a proposal for a workshop during the sustainable energy week event and was accepted. The speakers were from both BIMCERT and Net-UBIEP. The workshop saw the participation of around 80 people with many Q&A.
The slides presented are the following:

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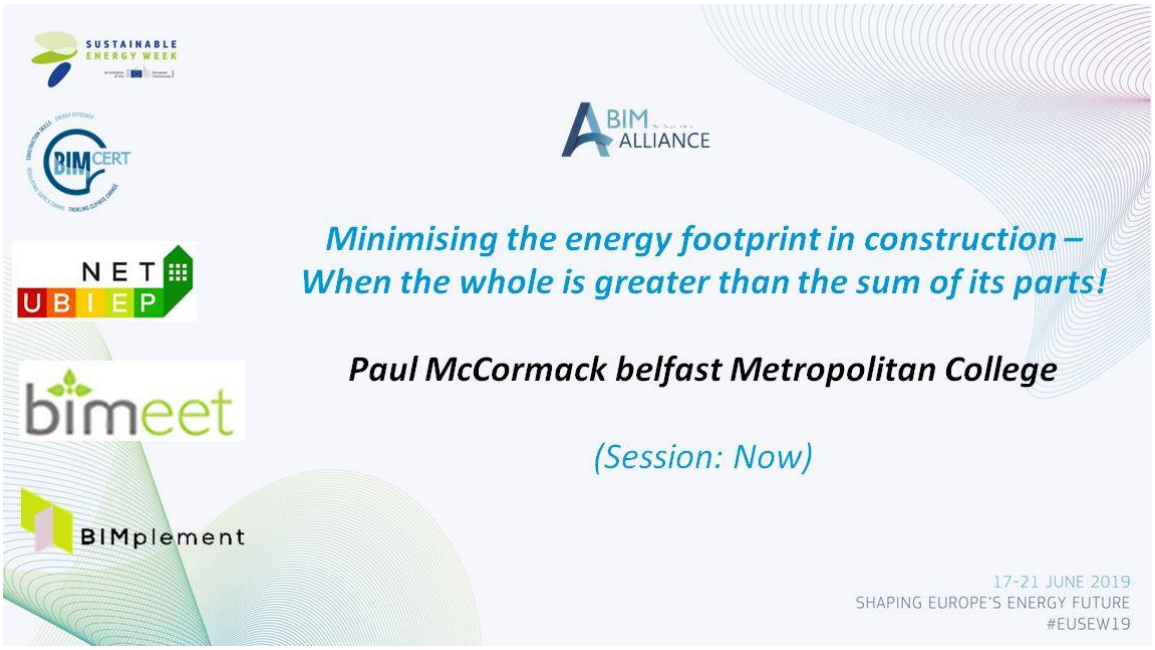

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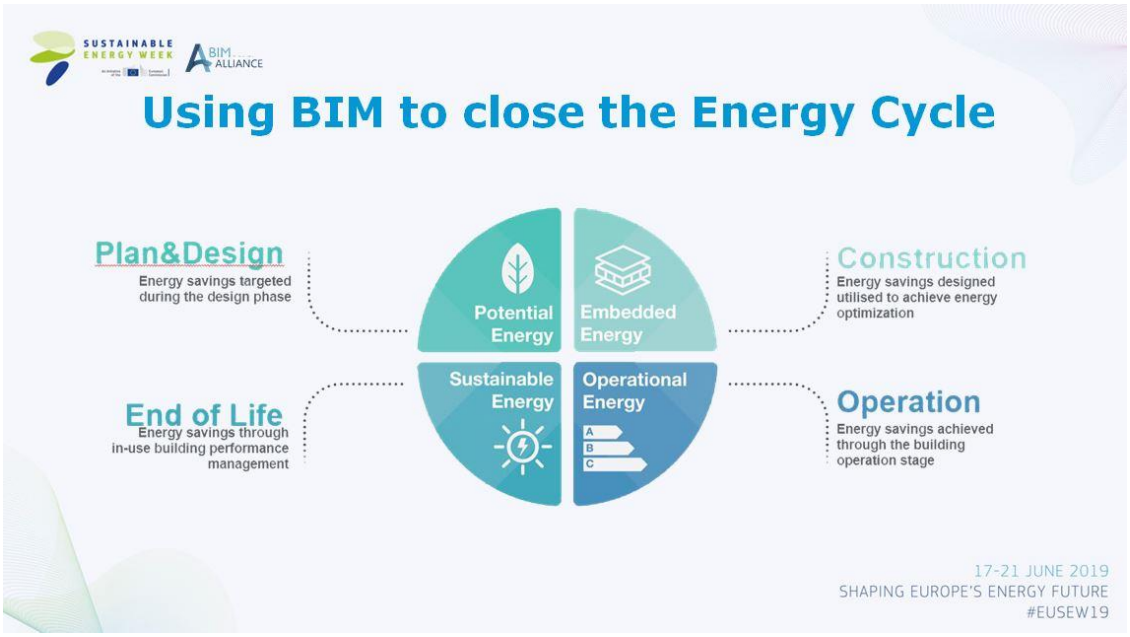

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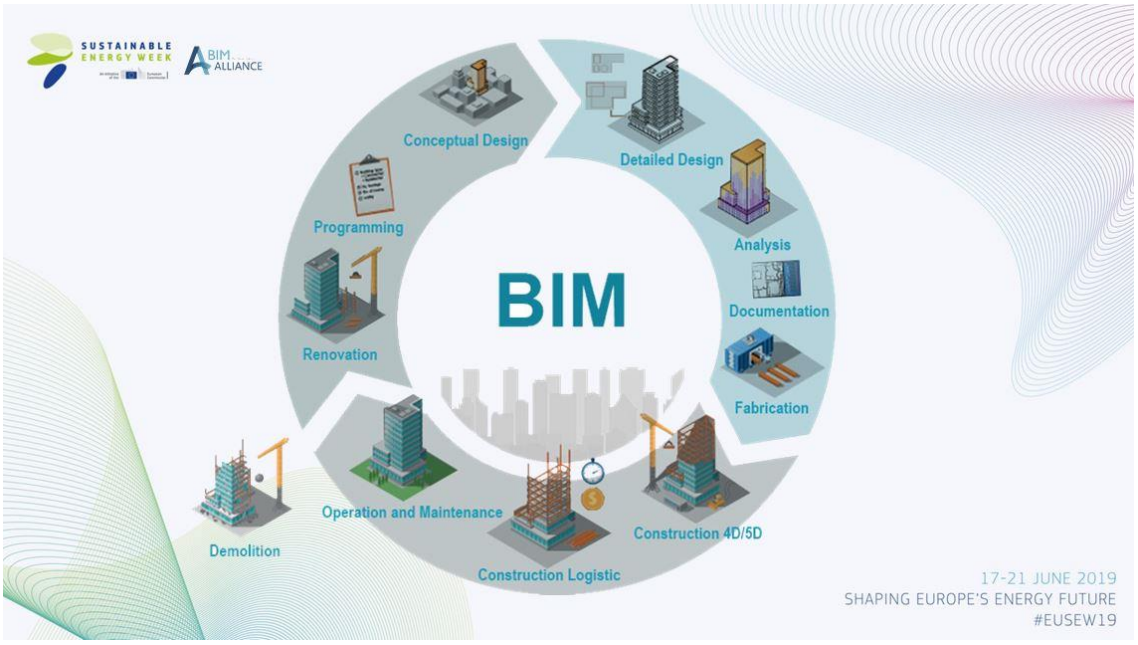
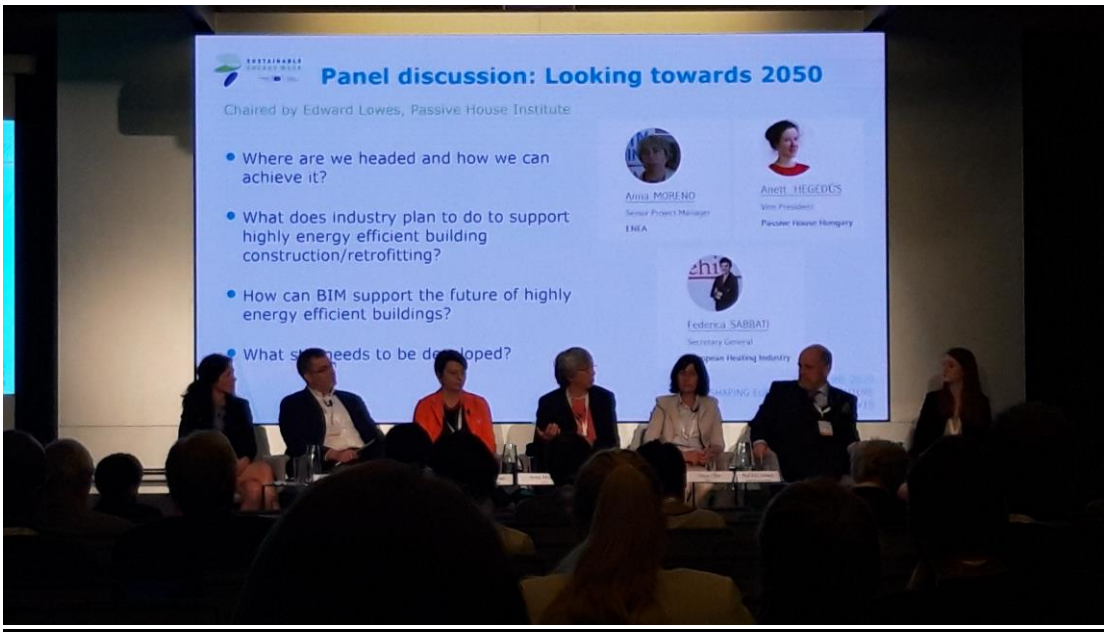


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

13.3 Photos

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.754016

14. IMSC CONFERENCE - Bruxelles 8th July 2019

14.1 Agenda

en Jóvenes con Dificultades de Aprendizaje''

MONDAY, JULY 08, 2019
3:45 PM - 6:30 PM

Aplicaciones de Informática y Cibernética en Ciencia e Ingeniería (CISCI)
Co-Chair: Brayan D. Gutierrez (Peru); Alejandro Hossian (Argentina)

Cevallos-Torres, Lorenzo J.; Guijarro-Rodríguez, Alfonso A.; Núñez-gaibor, Jefferson E.; Arrese-Vilche, Alfredo E.; Villagómez-Bajaña, Luis E. (Ecuador): ''El Uso de las TIC's como Herramienta para Medir Daños Estructurales Post-Sísmicos''

Correa Espinal, Alexander A.; Gutiérrez Roa, D. Faviana; Londoño Atehortúa, Luis C. (Colombia): ''Revisión de Literatura de Cadenas de Suministro Resilientes Usando Herramientas de Teoría de Grafos''

Guijarro-Rodríguez, Alfonso A.; Molina-Calderón, Miguel A.; Preciado-Maila, Debora K.; Arrese-Vilche, Alfredo E.; Ortiz-Zambrano, Mirella C.; Galarza-Soledispa, María I. (Ecuador): ''Métodos de Ayuda a la Toma de Decisiones Multicriterio: Caso Práctico de Adquisición de Computadoras''

Gutierrez, Brayan D. *; Soto, Jackeline C. *; Chavez, Pedro A. *; Raymundo, Carlos A. *; Dominguez, Francisco ** (* Peru, ** Spain): ''Modelo Lean para Mejorar el Cumplimiento de Pedidos en Pymes del Sector Metalmecánico''

Hossian, Alejandro; Carabajal, Roberto; Alveal, Maximiliano; Bustamante, Patricio; Merlino, Hernán (Argentina): ''Una Propuesta de Sistema de Control Borroso en el Marco de una Aplicación Industrial - Una Visión desde los Requerimientos de Usuario''

Luna Pérez, Miguel A.; Vázquez Álvarez, Graciela (Mexico): ''Metodología de Mantenimiento Predictivo 4.0 para Asegurar Procesos de Producción''

Madrid-Alvarez, Harold Manuel *; García-Diaz, J. Carlos **; Pulido-Rojano, Alexander D. * (* Colombia, ** Spain): ''Enfoques de Cartas de Control para el Monitoreo de Procesos con Distribución Asimétrica: Una Revisión Bibliográfica ''

Ramos Valle, Milagritos del R.; Oré Mayorga, Elia V.; Carvallo Munar, Edgardo; Raymundo Ibañez, Carlos (Peru): ''Modelo de Gestión de Compras para Reducir los Tiempos de Entrega de las Pymes Exportadoras del Sector Textil''

MONDAY, JULY 08, 2019
3:45 PM - 6:30 PM

Communication and Control Systems, Technologies and Applications (WMSCI)
Co-Chair: Julio C. Tafur (Peru)

Calderón, Jesús A.; Tafur, Julio C.; Barriga, Eliseo B.; Lozano, John H. (Peru): ''Active Noise Control Proposal for Rotating Machines''

Calderón, Jesús A.; Tafur, Julio C.; Barriga, Eliseo B.; Lozano, John H. (Peru): ''Event Reconstruction Algorithm Proposal to Study Sensors Elaboration Based on Nanostructures''

Hu, Wen-Chen (United States): ''Location Privacy Protection Using Dummy Locations and Routes''

Lozano, John H.; Tafur, Julio C.; Calderón, Jesús A. (Peru): ''Control Algorithm Proposal for a Hybrid Active Magnetic Bearing System with Variable Load''

Rodas, Jorge; Gregor, Raúl; Renault, Alfredo (Paraguay): ''Modulated Predictive Current Control for H-Bridge Active Power Filters''

Šustr, Martin *; Főző, Ladislav **; Soušek, Radovan *; Němec, Vladimír *; Řeha, David *; Novák, Martin *; Endrizalová, Eva *; Mrázek, Petr *; Zharkova, Viktoria *; Strrádal, Oktavián * (* Czech Republic, ** Slovakia): ''Assessment of Critical Infrastructure for Air Transport in the Czech Republic''

MONDAY, JULY 08, 2019
3:45 PM - 6:30 PM

Education and Information Systems, Technologies and Applications II (EISTA)
Co-Chair: Meni Koslowsky (Israel); Wessam Al Chibani (Lebanon)

Al Chibani, Wessam (Lebanon): ''Investigating the Efficiency of Implementing Active Learning Strategies in Higher Education Courses in Lebanon: A Multiple Case Study''

Danoch, Shiran; Koslowsky, Meni (Israel): ''Social Networks and Organizational Effectiveness ''

Ilunga, Masengo (South Africa): ''Using Osmosis Pressure Merlot Multimedia to Enhance On-Line Learning in Wastewater Treatment

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Technology IV Module Offered by the University of South Africa''

Ilunga, Masengo (South Africa): ''Using an Online Learning Object for pH Determination in Wastewater Treatment Technology IV Module Taught by the University of South Africa''

Kiaulakis, Arvydas; Vilutienė, Tatjana; Šarka, Vaidotas (Lithuania): ''Public Authorities' Attitude and Perception Regarding Use of BIM for Information Management''

Redkin, Oleg; Bernikova, Olga (Russian Federation): ''Learning Foreign Language Through Cultural Context in the Case of Arabic''

Rios Navarro, Dario; Acon Matamoros, Ariana (Costa Rica): ''Proposal for the Implementation of a Massive Open Online Course (MOOC) with the Open eDX Platform for the Computer Engineering Career of the UNED, Costa Rica''

MONDAY, JULY 08, 2019
3:45 PM - 6:30 PM

Interdisciplinary Research, Education, and Communication (IDREC 2019) I (WMSCI)
Co-Chair: Alfonso López-Lira Arjona (Mexico); Caroline Olsson (Sweden)

Estrada-Domínguez, Jesús Eduardo; López-Lira Arjona, Alfonso; Hinojosa-Rivera, Moisés; Torres-Castro, Alejandro (Mexico): ''Developing Innovation Technology Capacities in Large Manufacturing Firms from Mexico''

Khan, Rahatullah Muhammad (Saudi Arabia): ''Microfinance Landscape in Saudi Arabian Entrepreneurship Ecosystem'' (Virtual Presentation)

Jancart, Sylvie; Stals, Adeline (Belgium): ''A Pedagogical Introduction to Parametric Modeling as a Formal Research Tool ''

Laracy, Fr. Joseph R.; Marlowe, Thomas; Valdez, Edgar; Liddy, Msgr. Richard (United States): ''Was Bernard Lonergan a Second-Order Cyberneticist?''

Luchian, Eric *; Sas, Corina ** (* United States, ** United Kingdom): ''Erroneous Features in Freehand Sketching: Opportunities to Generate Visual Analogies''

Olsson, Caroline; Lindberg, Jesper; Holmstrom, Paul; Hallberg, Stefan; Bjork-Eriksson, Thomas (Sweden): ''An Analytical Approach to Aggregate Patient Workflows for System Dynamics Modelling of Radiation Therapy''

Placencia Medina, Maritza; Silva Valencia, Javier; Mechan Mendez, Víctor; Pando Álvarez, Rosa; Quintana Salinas, Margot Rosario; Carreño Escobedo, Jorge Raúl; Ascacivar Placencia, Yanelli Karen (Peru): ''ALM Program: Ten Years of Educational Technology Interventions at the Faculty of Medicine at the Oldest National University in Perú''

Rosenko, Svetlana I. *; Rezaev, Andrey A. ** (* Russian Federation, ** United States): ''CommunicationS and Political Communication Today: New World, New Concepts, and Schemes ''

TUESDAY, JULY 09, 2019

TUESDAY, JULY 09, 2019
10:10 AM - 12:10 PM

Artificial Intelligence and Knowledge/Cognitive Sciences and Technologies (KCST)
Co-Chair: Erick Giovani Sperandio Nascimento (Brazil); Abhijit Kumar Nag (United States

Aguezzoul, Aicha *; Pires, Silvio ** (* France, ** Brazil): ''Use of Artificial Intelligence in Supply Chain Management Practices and 3PL Selection''

Campos, Luan Rios; Nogueira, Peterson; Moreira, Davidson; Nascimento, Erick Giovani Sperandio (Brazil): ''An Empirical Analysis of the Influence of Seismic Data Modeling for Estimating Velocity Models with Fully Convolutional Networks''

Das, Kausik S.; Gonick, Larry; Mitchell, Monica; Baldwin, Charles G.; Kairo, Moses (United States): ''Holistic Development of Undergraduate Students – Concept Cartoons to Authentic Discovery''

Nag, Abhijit Kumar; Dasgupta, Dipankar (United States): ''A Survey on Computational Intelligence Techniques in User Identity Management''

Park, Seongchul; Kim, Juntae (South Korea): ''Design for Network Intrusion Detection Using Deep Reinforcement Learning''

Zucatelli, Pedro Junior *; Nascimento, Erick Giovani Sperandio *; Arce, Alejandro Mauricio Gutiérrez **; Moreira, Davidson Martins * (* Brazil, ** Uruguay): ''Short-Range Wind Speed Predictions in Subtropical

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15. Events Exploitation

In the preparation of this second event a document was produced with the contribution of the coordinators of the 4 projects.
The following document is the output of the BIM Alliance constituted by the four projects:

15.1 BIM EASME Projects

The Alliance of BIMcert, BIMplement, Net-UBIEP and BIMEET

BIMalliance

Minimising the carbon footprint of energy use in construction –
When the whole is greater than the sum of its parts!

15.2 Focus of Collaboration work

15.2.1 Focus of work

1. Energy targets, energy savings – Energy week presentation
2. Dissemination and communication
3. Accreditation and certification - utilise databases
4. Exploitation
5. Future Collaborative opportunities

1. Energy targets, energy savings : To determine position of BIM in European Energy and Climate Roadmaps beyond 2020; to explore fields of coordination and support actions, research and innovation, as well as potential funding sources for the activities,

2. Dissemination and communication: - Establishing a common communication and collaboration platform of the 4 projects (e.g., linking their web pages; sharing information about the Alliance common work, organization of joint events, etc.), in order to provide better informing and multiple use of individual projects' stakeholders and followers.

3. Accreditation and certification - To initiate a common pan-European recognized certification scheme of BIM and EE skills in AEC industry (buildingSMART option to be considered)

4. Exploitation of results - to prepare and distribute a survey via the common platform / united web pages / for assessment of the progress on BIM maturity and acceptance, as a result of the activities of the 4 projects; to develop a common report with guidelines for future actions.

5.Future Collaborative opportunities

- Developing additional modules for skills delivery.
- Developing BIM expertise in countries where deployment is low – working with public authorities to develop national BIM development plans
- Developing an EU BIM Centre of Excellence – virtual centre?

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15.2.2 Future collaborative opportunities

Opportunity and need to develop competencies to existing profiles, in public administration in particular; for instance, Energy Auditors and Construction Inspectors, should be upskilled in using BIM models to issue construction and commissioning permissions for buildings.

1. Energy targets, energy savings : To determine position of BIM in European Energy and Climate Roadmaps beyond 2020; to explore fields of coordination and support actions, research and innovation, as well as potential funding sources for the activities,

2. Dissemination and communication: - Establishing a common communication and collaboration platform of the 4 projects (e.g., linking their web pages; sharing information about the Alliance common work, organization of joint events, etc.), in order to provide better informing and multiple use of individual projects' stakeholders and followers.

3. Accreditation and certification - To initiate a common pan-European recognized certification scheme of BIM and EE skills in AEC industry

4. Exploitation of results - to prepare and distribute a survey via the common platform / united web pages / for assessment of the progress on BIM maturity and acceptance, as a result of the activities of the 4 projects; to develop a common report with guidelines for future actions.

15.3 Project Summaries

15.3.1 BIMcert

Development of BIM training and qualification scheme for all levels of the construction sector, specifically "blue collar." BIMcert is a European wide project, funded by Horizon 2020, aimed at providing a training and qualification scheme for the skills required to support the implementation of BIM across the construction supply chain.
The Construction Industry, including its supply chain, is a significant contributor to the European economy. However, the Built environment is recognised as one of the largest consumers of natural resources, producers of carbon emissions and source of energy wastage. To improve the sustainability of the Built Environment and energy efficiency, a more coordinated approach to enhance collaboration is required across the industry. Building Information Modelling (BIM) provides a collaborative design, build and manage processes that offers the opportunity for improved efficiencies for the Construction Industry in energy, materials and time. BIM can reduce waste, inefficiencies in the supply chain, improve coordination and management, while incorporating better, more suitable and more sustainable design choices and decision making.

This project will:

- Enable collaborative working to improve design, development and delivery of both new build and renovation construction projections, whilst supporting energy efficient near zero buildings (embedded energy)
- Achieve efficient and effective ongoing management of the building in terms of energy and fabric (operational energy).

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- Utilise Building Information Modelling (BIM), and virtual construction as the enabling methodology and tool to achieve sustainable energy efficient construction

BIMCert approach

BIMcert *is a project based upon 3 steps, aimed at providing a large scale training & qualification scheme providing the requisite skills for the entire construction supply chain to:*

1. **Enable** collaborative working to improve access to and the transition from design to development and delivery of both new build and renovation to achieve energy efficient near zero buildings **(embedded energy)**
2. **Achieve** efficient and effective ongoing management of the building in terms of energy and fabric **(operational energy)**
3. **Utilise** Building Information Modelling (virtual construction) as the enabling methodology and tool **(sustainable energy)**

Opportunities for collaboration

The deliverables BIMcert is ready to share are:

- Pilot testing materials, learning units:
- Reports on surveyed industry needs (WP2 Reports Stage 1,2, and 3)
- BIMcert Strategy Compass

15.3.2 BIMplement

BIMplement offers the trainers and the learners a range of tools that fit the objective of developing a fully qualified and equipped workforce, capable to implement, execute and perform all the necessary labour actions. Main aim is to achieve an improved quality for NZEB construction and renovation by setting up a large scale, training, CPD and qualification schemes, addressing the entire process phases in a cross-crafts and cross level multidisciplinary approach, strengthened with hands-on and BIM-enhanced workplace learning tools by following objectives:

1. To improve the overall quality of renovations and new constructions, based on a BIM-enabled workplace learning, addressing the entire process phases in a cross-crafts multidisciplinary approach
2. To create a new generation of professionals and craftsmen, equipped and enabled by BIM skills, to enhance the overall quality of construction and renovation across the entire process
3. To foster interactions between different trades and professions enabled by a flexible qualification, certification and accreditation methodology for implementing BIM as a workplace learning environment
4. To sustain the qualification and training schemes a replication and exploitation strategy will be developed and validated

Opportunities for collaboration
The deliverables BIMplement is ready to share are:
D2.1: Methodology for a BIM enhanced Qualification Framework FINAL
D2.2: Five national results of usability testing
D2.3: Adjusted methodology for a BIM-enhanced Qualification Framework and instruction guide

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D3.4: Selected tool and learning methods implemented in the five national frameworks
D3.5: Overview of possibilities to connect tools and learning methods to the BIM
D4.1: List of criteria of the selected territories
D4.2: Training content and list of tools for BIMplement coach
D4.3: Methodology guide and tools for awareness campaign
D4.5: Tools and learning methods and qualification schemes for BIM work place trainers
D6.1: Dissemination and Communication Plan
D6.2: BIMplement corporate identity
D6.3: Production and maintenance of website and subsites
D6.4: Brochure

15.3.3 Net-UBIEP

Net-UBIEP aims at increasing energy performance of buildings by wide spreading and strengthening the use of BIM, during the life cycle of the building. The use of BIM from the design phase through the construction, management, maintenance, demolish is investigated to identify the competences needed, in each phase, in order to decrease the environmental impact of the building during its life cycle.
To achieve this objective it is important that all the professionals and technicians who work in the building supply chain are aware of their role into collecting, managing and storing all the information required during construction, management, maintenance and decommissioning of a building.
Each technician, public officer, designer, constructor, facility manager, supplier, etc, will have to understand which information they manage could be used by any other individual during the life time of a building that goes far behind the duration of the computer who has generated the information. Therefore it is important that all the different targets use the same language, the same dictionary and the same data structure. Net-UBIEP promote the use of “openBIM”.
BIM Qualification Models proposed by the net-UBIEP partners tackle the problem of energy competences gap in the existing buildings sector as a whole.
The information materials produced for the four targets may be used for developing the module for the training necessary to have a qualification. At the same time the learning outcome, may be used as base for the qualification schema to be agreed among all the partners
Net-UBIEP Project aims at increasing energy performance of buildings by wide spreading and strengthening the use of BIM, during the life cycle of the building. The use of BIM will allow simulation of building energy performance using different materials and components, both to be used in the building design and/or in building design refurbishment.

To reach this aim Net-UBIEP Project has:
1. Identify professional profiles involved in NZEB building sector with specific BIM related competences . Four target groups have been selected according to the role they play in building processes, namely Public Administrations, Professionals (Engineers / Architects), Technicians (Installers / Maintainers), Tenants/Owners/Building Administrator.
2. Elaborated a three dimensional matrix for the identification of competences required to each of above target group while working in buildings applying BIM to ensure the highest energy performance. The matrix indicates competences needed in each construction phase: strategic definition, preparation and brief, concept design, development design, technical design, handover and close out, in use refurbishment and eventual demolish.
3. Develop BIM Qualification Models composed by a BIM Training Scheme and a BIM Qualification and Certification Scheme

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4. Standardize at European level the schemes for BIM Qualification Models

Opportunities for collaboration

The deliverables net-UBIEP is ready to share are:

- Report on existing BIM professional profiles
- Report on Roles of Target Groups in the Building Life Cycle and their role in NZEB implementation
- Maps on NZEB and BIM competences for target groups
- First report on CEN existing standards
- Report on CEN existing standards and standardization landscape
- Draft for the standardization of training scheme
- Information Materials for Public Administration
- Information materials for technicians
- Information materials for owners
- Information materials for professionals

15.3.4 BIMEET

The European Construction sector is facing unprecedented challenges to achieve ambitious energy efficiency objectives, in a context dominated by reduced investments, search for cost effectiveness and high productivity. Moreover the industry is experiencing its digital revolution, with Building Information Modeling (BIM) approach gaining significant interest across Europe. Member states implement very different approaches through regulations and maturity targets, which always face the traditional low-tech and informal practices of construction businesses (a sector dominated by SMEs).

BIMEET project aims to leverage the take-up of ICT and BIM through a significant upgrade of the skills and capacities of the EU construction workforce. This project is built around a strong consortium relying on educational and research & technology expertise, robust experience of accrediting bodies, training supply chain and a wide engagement of industry led best practice.

Through its actions the project will (a) pave the way to a fundamental step change in delivering systematic, measurable and effective energy efficient buildings through BIM training; (b) promote a well-trained world leading generation of decision makers, practitioners, and blue collars; (c) establish a world-leading platform for training. Its principal outputs are 1) a skills matrix related to BIM and energy efficiency, harmonized thanks to EQF standard, and 2) a training platform contributing to disseminate the results.

Opportunities for collaboration
The deliverables BIMEET is ready to share are:

- BIM for energy efficiency requirements capture
- BIM for Energy Efficiency required roles and skills
- Definition of responsibilities and roles for BIM & Energy Efficiency
- Definition of learning outcomes in the European level
- BIMEET Training Repository platform
- BIMEET training platform for the design and recommendation of BIM/EE courses

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BIMEET platform aims to comprise a representative (if not exhaustive) set of training modules across EU which focus on BIM integrated with EE topics. Therefore, we would be very happy to liaise with databases implemented in the other projects in order to integrate such initiatives in BIMEET's repository thus demonstrating the EU-wide potential in terms of training available.

BIMEET strongly focus on the calculation of Energy Performance Certificates from BIM, and will implement it for our 5 partners countries LU, FR, UK, GR, FI. The team is very open to share the methodology with other interested countries. Specific training (including online) is expected.

15.4 General comments

The use of BIM to establish minimum environmental criteria for new buildings and deep renovation of existing building could be also investigated. Green procurement foresees the use of green products. The use of BIM to investigate new environmentally friendly materials or to use materials produced locally (Km 0) for the future built environment could be investigated as BIM is more and more integrated with GIS and IoT.
We could prepare a survey with google drive to start sharing the net-UBIEP matrix of competences among the partners of all the four projects to agree on the main competences for each target. We should do that before the Dusseldorf meeting in order to be ready to propose a solution that suites all.
I also have a personal view that I would like to share: in many cases we are dealing with new competences and not with new profiles. This means that, for instance, the officers in the public administrations need to learn how to manage digital projects and to establish what this means when evaluating a refurbishment project in BIM. Therefore the market more than requiring new professional profiles requires new competences for existing profiles.
The competences could be certified in different way depending if the person is in charge of the development of the BIM model or in checking the BIM model against predetermined rules/values.

The use of bSI qualification system would imply the agreement on the followings items:

a) Develop transversal learning outcomes valid for any target starting with the 3D matrix developed by net-UBIEP and others (BIMEET)
b) Develop, if required, specific learning outcome for the different targets
c) Develop the training materials for each target and for each phase of the building lifecycle starting with the information material produced by net-UBIEP and/or others
d) Develop the qualification schemes based on the learning outcomes identified in the points a and b.
e) Ask bSI the procedures to add this additional module to the existing bSI individual qualification

15.5 Future Collaborative Plan and Timescale

Work in progress.

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