Multiplier event E4: CLEAN-kWAT Evaluation Assembly in Serbia

Organizer: University of Belgrade

The Multiplier event was organized in Sava Centar in Belgrade on 7th of December. There were 93 participants in total, while not all of them were willing to fill in the whole questionnaire or all data required for participant list (especially ID number). The signed Participation List is provided in Annex. Here are listed in detail only some participants that filled in most of the required data in Participant list. The conclusion is that the amount of required data in this form is too big, and especially young people are not willing to fill all columns. I need to highlight that in Serbia, like in most of other countries, due to the Law of personal data protection, the request for ID number is not allowed in this way, however some people also provided this information. The suggestion for further work is to exclude this kind on enquiry from Participant List.

I) The participants of the event

1. Students of the Faculty of Technical Sciences University of Novi Sad – **37**

1.	Igor Gaković
2.	Boban Pejić
3.	Miloš Nestorović
4.	SobinDavid
5.	Milan Topalović
6.	Dejan Vurdelja
7.	Jovan Prole
8.	Nikša Rakočević
9.	Boris Bosnić
10.	Ivana Smiljanić
11.	Radica Mrkaljević
12.	Jovana Spasojević
13.	Nataša Janjić
14.	Draga Svorcan
15.	Ljubimir Maričić
16.	Sretko Tesla
17.	Srđan Arapović
18.	Božidar Stanković
19.	Miloš Lunić
20.	Sanja Dubljević
21.	Mladen Zurić
22.	Luka Šalaja

23.	Vladan Mitrović
24.	Marko Ničić
25.	Bojan Gagić
26.	Stefan Jovanović
27.	Stefan Simeunović
28.	Sandra Jeličić
29.	Nada Arsenov
30.	Draginja Ivanić
31.	Vanja Vukić
32.	Milica Raletić
33.	Dimitrije Alimpić
34.	Cvijetin Todorović
35.	Andrej Lučič
36.	Marko Todorović
37.	Ljubomir Đerić

2. Students of the Faculty of Mechanical Engineering University of Niš - **11**

1.	Danijela Đalić
2.	Branka Radovanović
3.	Mladžić Vukašin
4.	Marija Kostadinović
5.	Milica Ličina
6.	Petar Milanović
7.	Petrović Nikola
8.	Pavle Nikolić
9.	Dunja Milić
10.	Jovana Popović
11.	Miljana Banović

3. Students of the Faculty of Engineering – University of Kragujevac - **11**

1.	Stefan Golubović
2.	Suzana Radovanović
3.	Vladimir Nikolić
4.	Sofija Stefanović
5.	Petar Milenković
6.	Vladan Šiljanić
7.	Miloš Živković
8.	Dušan Đurđević

9.	Igor Tanasijević
10.	Miloš Brojčin
11.	Bojan Zeljković

3. Professors and Professional Engineers - **15**

1.	Jasmina Pekez	Professor at Technical Faculty “Mihajlo Pupin” Zrenjanin
2.	Slavica Prvulović	Professor at Technical Faculty “Mihajlo Pupin” Zrenjanin
3.	Dejan Mitrović	Professor at Faculty of Mechanical Engineering University of Niš
4.	Costas Balaras	Director and Regional Chair Region XIV ASHRAE
5.	Pavlović Nenad	Dean of the Faculty of Mechanical Engineering University of Niš
6.	Đorđe Stevanović	Director at LG Electronics, engineer
7.	Nenad Črnila	Project Manager LG Electronics, engineer
8.	Predrag Đurišić	LG Electronics, engineer
9.	Dejana Soldo	Sokoinženjering, mechanical engineer
10.	Marko Lošić	Aerprojekt, engineer
11.	Branislav Džinić	Director MPG-KGH, engineer
12.	Nemanja Džinić	Technical director MPG-KGH, engineer
13.	Vojislav Popović	Sokoinženjering, site manager, engineer
14.	Pavle Babić	ITN group, engineer
15.	Andres Sepulveda	ASHRAE engineer

There were more other participants, but they didn’t write the name of the Organization, so their names are not written in this list (the participant list is attached at the end of this Report)

II) Presentation and Discussion

During this event the draft results were presented. First the rationale and aim of the project was presented. It was highlighted what made us propose this project and how the aims of the project fit with sustainable development and environment protection in energy sector. The discussion was conducted in direct contact with students and engineers after the project presentation. In general, they are very interested in learning more about clean technologies, especially that the majority of students from Faculty of Technical Science University of Novi Sad are studying the module Clean Energy Technologies. The most important thing for them was the fact that the book about “Integrating Environmental Considerations into Energy System Development” will be available online and free of charge!

In total there were **22** questionnaires filled, and the results are discussed here in detail (Section III).

ERASMUS+ projekat CLEAN-kWAT

- Projekat je finansiran iz sredstava **Evropske Unije** uz podršku **Nacionalne Agencije Turske**
- Na mnogim katedrama vezanim za energetiku na univerzitetima nema obaveznih predmeta koji se odnose na uticaj energetskiih sistema na životnu sredinu.
- Evropski okvir kvalifikacija (EOK, engl. EQF), Nacionalni okvir kvalifikacija (NOK), Evropski sistem kreditnog vrednovanja (ECVET)
- Jedinstven sistem obrazovanja → mobilnost zaposlenih

Partneri na projektu CLEAN-kWAT

Promoter projekta: Univerzitet u Giresunu (Turska)

Koordinator projekta: ORKON (Turska)

Gazi Univerzitet (Turska)

Univerzitet u Beogradu (Srbija)

RENAC (Nemačka)

KALIENERGY (Turska)

AELV (Španija)

ENERGIAKLUB (Mađarska)

ERASMUS + CLEAN-kWAT Sava Centar 07. decembar 2017.

REZULTATI PROJEKTA

- Knjiga za obuku „Uključivanje pitanja zaštite životne sredine u razvoj energetskih sistema“
- Knjižica o Evropskom okviru kvalifikacija (EOK, engl. EQF) i Evropskom sistemu kreditnog vrednovanja stručnog obrazovanja (ECVET)

- Materijali za obuku
- Video materijal (zasnovan na poglavljima knjige za obuku)
- Website baza znanja
- Portal za e-učenje (moodle)

- Sastanci i seminari
- Strateško partnerstvo

Knjiga „Uključivanje pitanja zaštite životne sredine u razvoj energetskih sistema“

- Knjiga je predviđena za obuku inženjera i obuhvata tehnološke i ekološke aspekte konvencionalnih energetskih sistema, kao i sistema koji koriste obnovljive izvore energije:

1. **Uvod u pojmove i veze između energetike, ekosistema i životne sredine**
   - definicije nekih osnovnih termina iz oblasti ekologije, kao i opisi relacija između energije, životne sredine i održivosti
2. **Ekološki otisak energetskih sistema**
3. **Uticaj konvencionalnih energetskih sistema na životnu sredinu: termoelektrane**
4. **do 10. Tehnološki i ekološki aspekti energetskih sistema**

Knjiga „Uključivanje pitanja zaštite životne sredine u razvoj energetskih sistema“

4. Tehnološki i ekološki aspekti **nuklearnih elektrana**

5. Tehnološki i ekološki aspekti korišćenja **solarne energije**

6. Tehnološki i ekološki aspekti korišćenja **energije vetra**

7. Tehnološki i ekološki aspekti korišćenja energije **plime i oseke, vodonik**

8. Tehnološki i ekološki aspekti **geotermalne energije**

9. Tehnološki i ekološki aspekti **hidroelektrana**

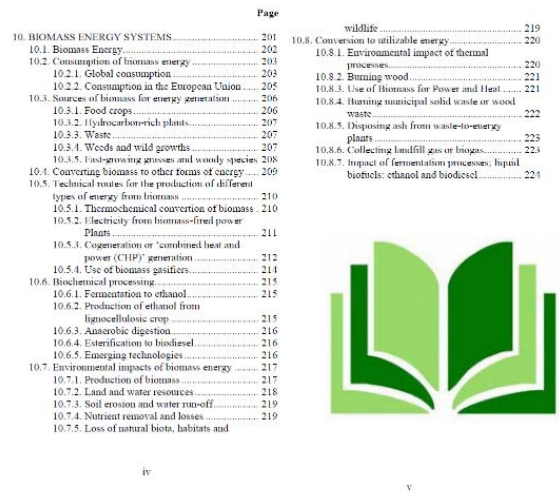
10. Tehnološki i ekološki aspekti **biomase**

Knjiga „Uključivanje pitanja zaštite životne sredine u razvoj energetskih sistema“

CONTENTS

ERASMUS + CLEAN-kWAT Sava Centar 07. decembar 2017.

Knjiga „Uključivanje pitanja zaštite životne sredine u razvoj energetskih sistema“



Page

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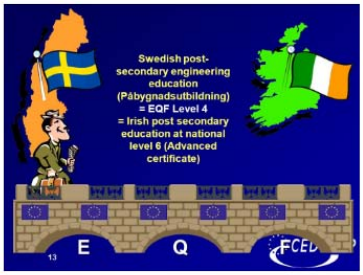
- Knjiga je u završnoj fazi izrade
- Nakon prevoda na jezike učesnika biće dostupna na sajtu projekta

Knjižica o EOK i ECVET

- Opisi kvalifikacija i ciljeva učenja koji su usklađeni sa potrebama odabranih zanimanja iz oblasti energetike
- Definisani su Evropski okviri kvalifikacija (EOK, engl. EQF), ishodi učenja, kao i neophodna znanja, veštine i kompetencije za bavljenje poslovima koji pripadaju nivou 6 i 7 prema sistemu kvalifikacija.
- Olakšana mobilnost zaposlenih – zajednički obrazovni sistem
- Izabrane profesije - ciljna grupa
  - Industrijski i proizvodni inženjeri
  - Inženjeri zaštite životne sredine
  - Mašinski inženjeri
  - Inženjeri elektrotehnike



Knjižica o EOK i ECVET

1 Learning Outcome levels in the European Qualifications Framework (EQF)

LO	Knowledge	Skills	Competence
EQF Level 6 (1st_ study cycle)	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	Manage complex technical or professional activities or projects, taking responsibility for decision making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups
EQF Level 7 (2nd_ study cycle)	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures ...	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice ....

Source:
ANNEX II, RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32008H0506(01),

2 International Standard Classification of Occupations (ISCO) – Selected Professions for CLEAN kWAt

2141 Industrial and Production Engineers

Industrial and production engineers conduct research and design, organize and oversee the construction, operation and maintenance of industrial production processes and installations. They establish programmes for the coordination of manufacturing activities and assess cost effectiveness and safety.

Tasks include –

(a) studying functional statements, organizational charts and project information to determine functions and responsibilities of workers and work units and to identify areas of duplication;

(b) establishing work measurement programmes and analysing work samples to develop standards for labour utilization;

(c) analysing workforce utilization, facility layout, operational data and production schedules and costs to determine optimum worker and equipment efficiencies;

(d) developing specifications for manufacture, and determining materials, equipment, piping, material flows, capacities and layout of plant and systems;

(e) organizing and managing project labour and the delivery of materials, plant and equipment;

(f) establishing standards and policies for installation, modification, quality control, testing, inspection and maintenance according to engineering principles and safety regulations;

(g) inspecting plant to improve and maintain performance;

(h) directing the maintenance of plant buildings and equipment, and coordinating the requirements for new designs, surveys and maintenance schedules;

(i) advising management on new production methods, techniques and equipment;

(j) liaising with materials buying, storing and controlling departments to ensure a steady flow of supplies.

Examples of the occupations classified here:

- Industrial efficiency engineer
- Industrial engineer
- Industrial plant engineer
- Production engineer

Some related occupations classified elsewhere:

- Manufacturing production manager – 1321

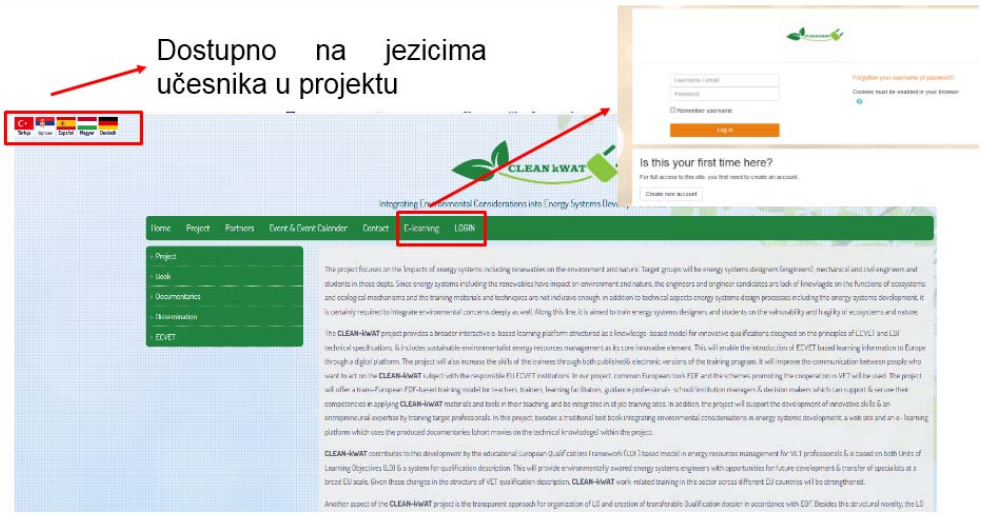
Materijal za obuku

- Video materijali
  - Zasnovani na poglavljima knjige
  - Korisni za započinjanje diskusije

- Portal za e-učenje

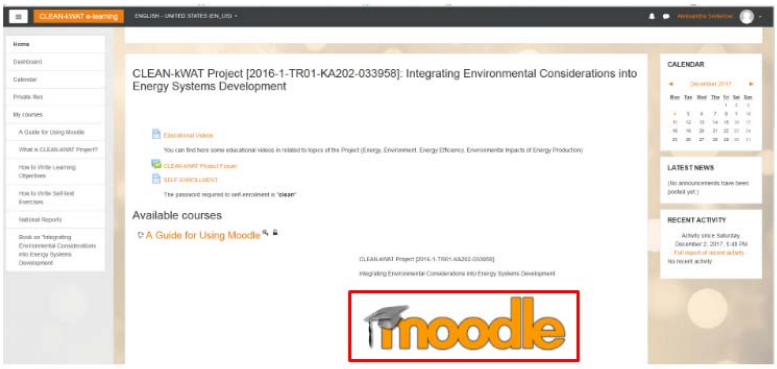
Portal za e-učenje

Dostupno na jezicima učesnika u projektu



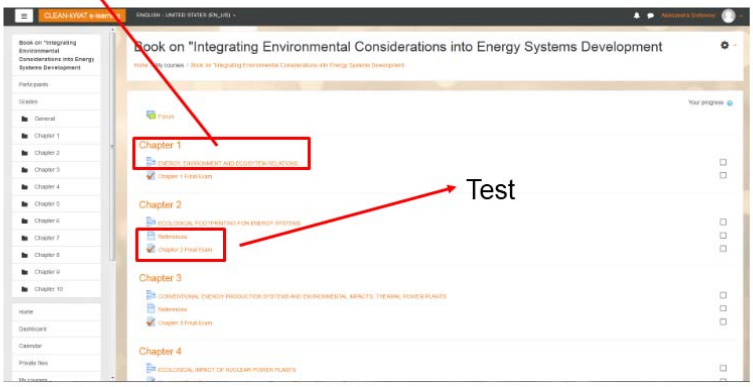
Portal za e-učenje

- Dostupni kursevi preko platforme moodle



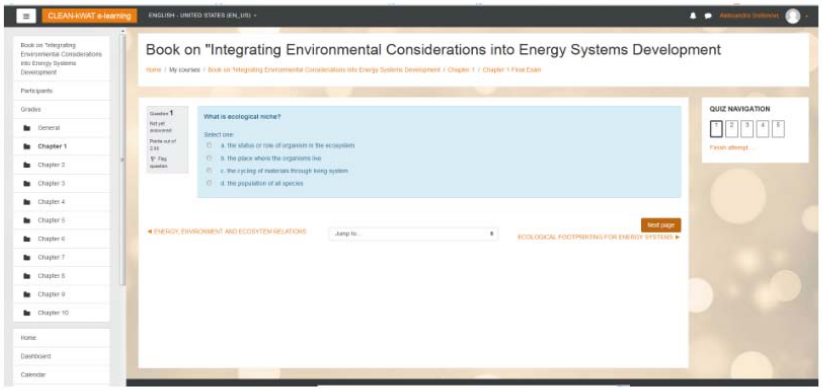
Portal za e-učenje

Poglavlja knjige



Portal za e-učenje

- Pitanja sa ponuđenim odgovorima



Portal za e-učenje

Pratite nas na

www.clean-kwat.com

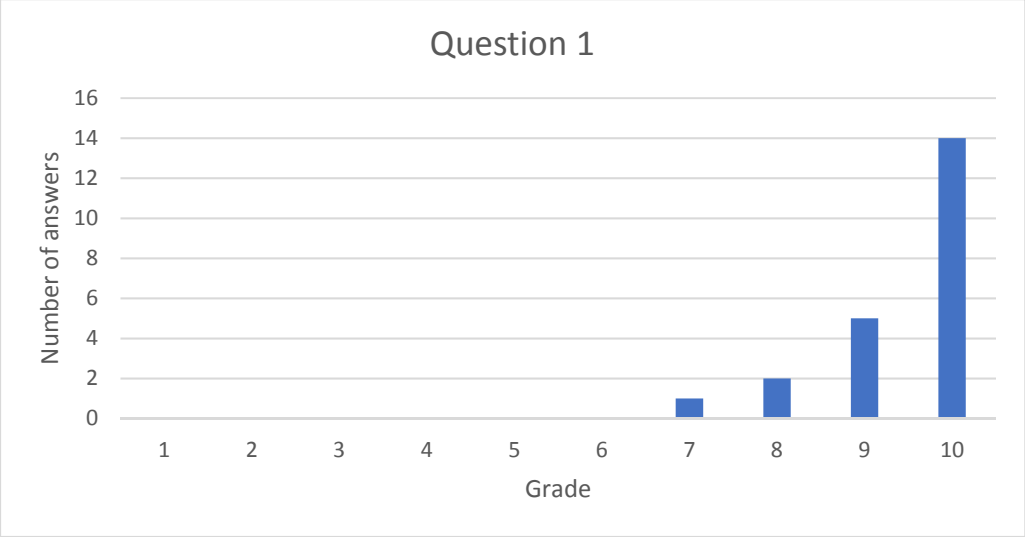
Facebook

www.facebook.com/cleankwat

III) Results of the questionnaire for the participants

(1= Not at all; 10 = Completely)

1. How clear are the objectives of CLEAN-kWAT project for you?

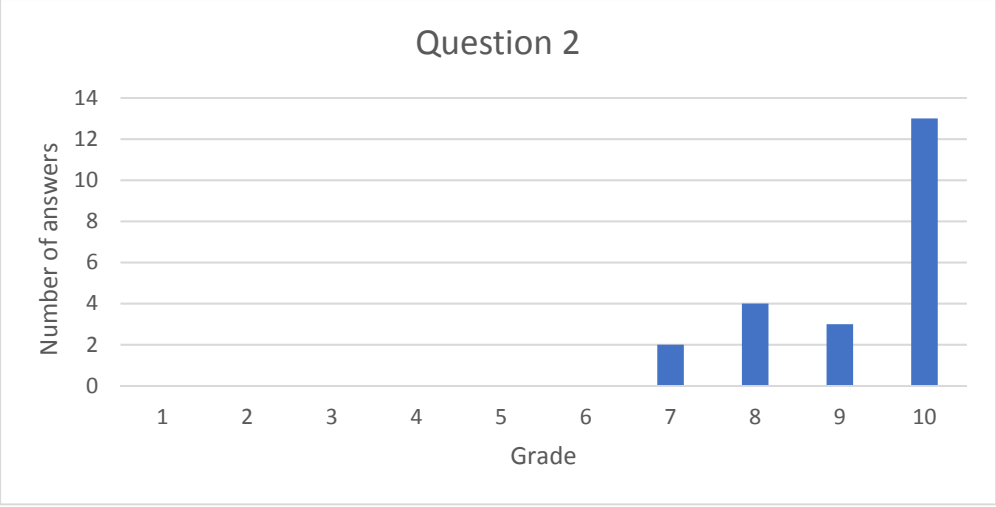


The average grade is: 9,45

Comments summarized:

- The scope of project is defined well enough
- After reading the provided material and attending presentation it is very clear to me

2. The material was well organized and presented on the event:

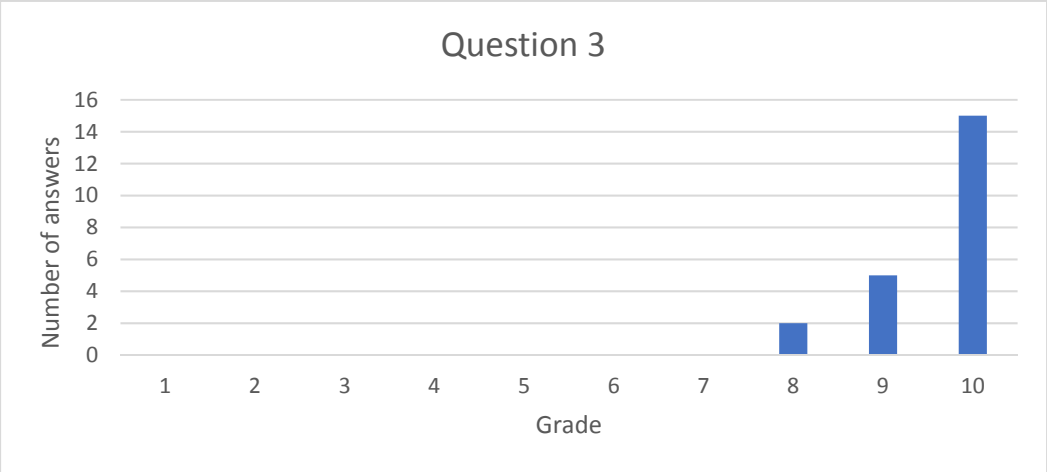


The average grade is: 9,23

Comments summarized:

- The lecturer was good
- The presentation was well received and organized

3. The target group is selected appropriately:

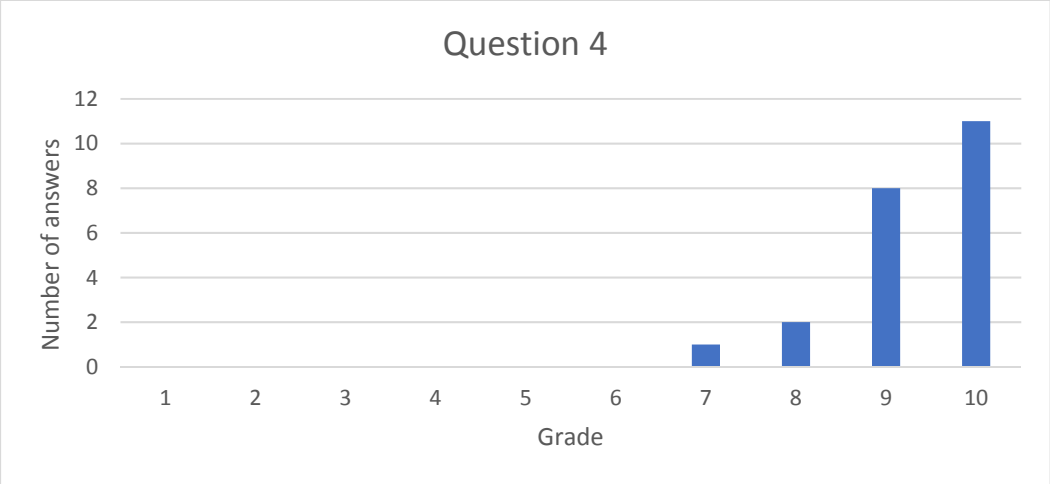


The average grade is: 9,59

Comments summarized:

- This is the right place and audience to elaborate this subject
- The right criteria was used for selecting target group, audience was reached

4. The products are appropriate for the target group:

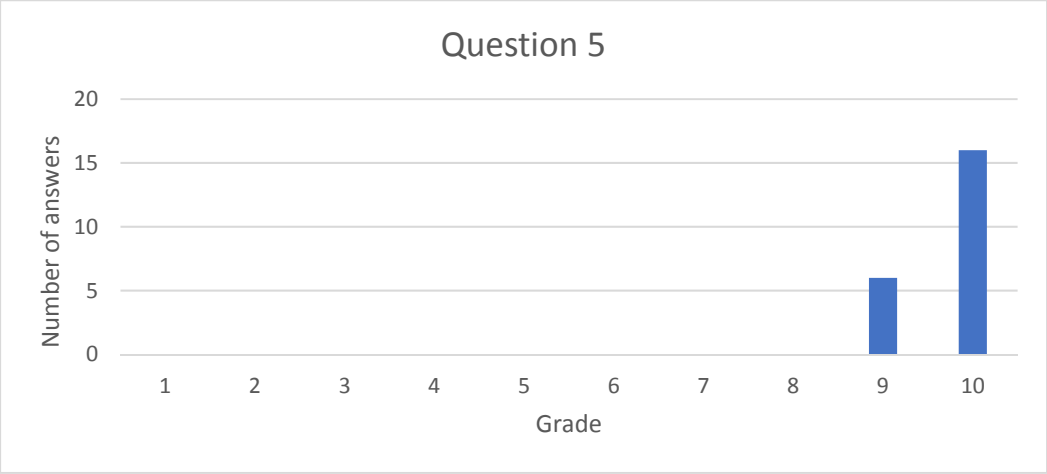


The average grade is: 9,32

Comments summarized:

- It will be especially useful for students and young engineers at the beginning of their carrier development
- I totally agree

5. How useful do you find the learning outcomes of CLEAN-kWAT project for your field of expertise and for the target group you represented?

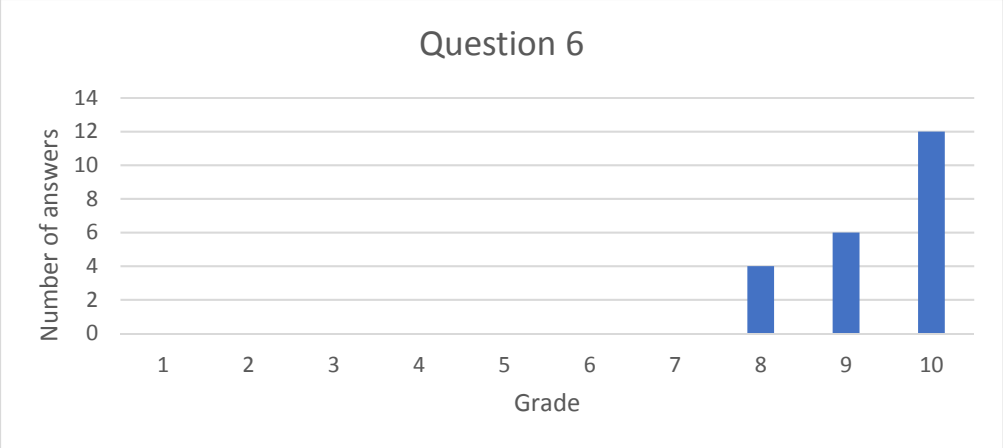


The average grade is: 9,73

Comments summarized:

- Young engineers show obvious lack of knowledge on basic environmental laws and it is very important to present them pros and cons of different energy systems, especially renewables (if possible in one place)

6. How useful do you find the book for your studies / field of expertise?

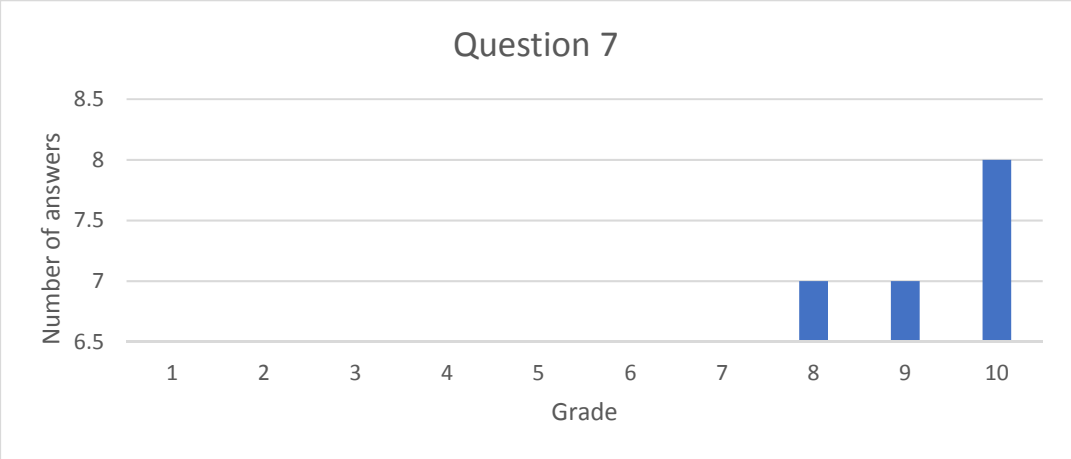


The average grade is: 9,36

Comments summarized:

- Also for modern architecture professionals, this topic is inevitable
- I find it informative. I would like to own this book
- If it is in subject curricula it will be obligatory, not only optional

7. How useful do you find the documentaries for your studies / field of expertise?

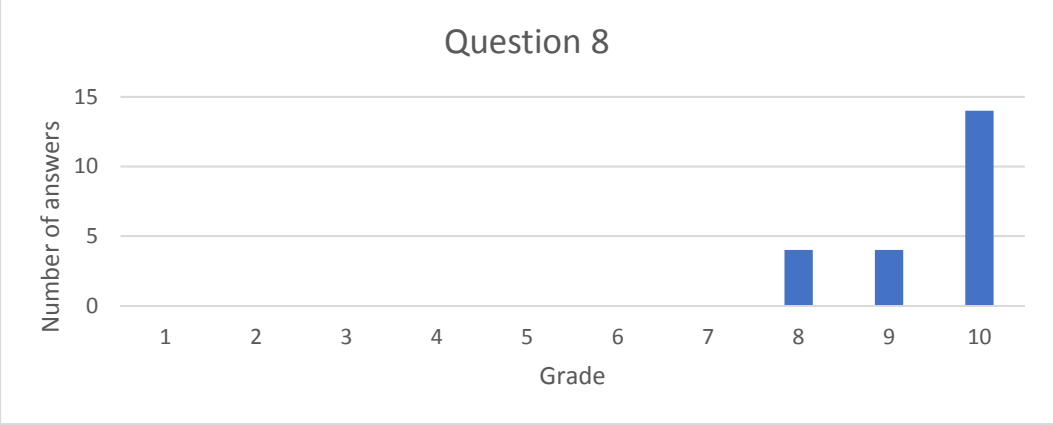


The average grade is: 9,05

Comments summarized:

- I find them useful
- Visual materials are more appropriate for young engineers

8. How useful do you find the e-learning materials for your studies / field of expertise?

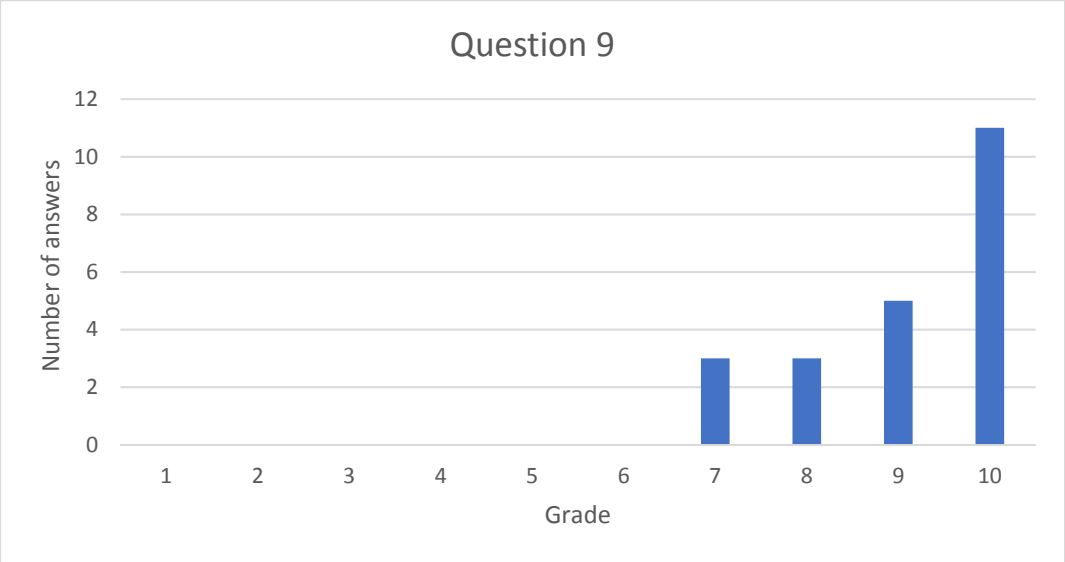


The average grade is: 9,45

Comments summarized:

- I find them useful as well
- It enables reaching useful information even for people that are no longer in contact with educational institutions

9. Do you think that CLEAN-kWAT project will be sustainable in terms of its results and outcomes?

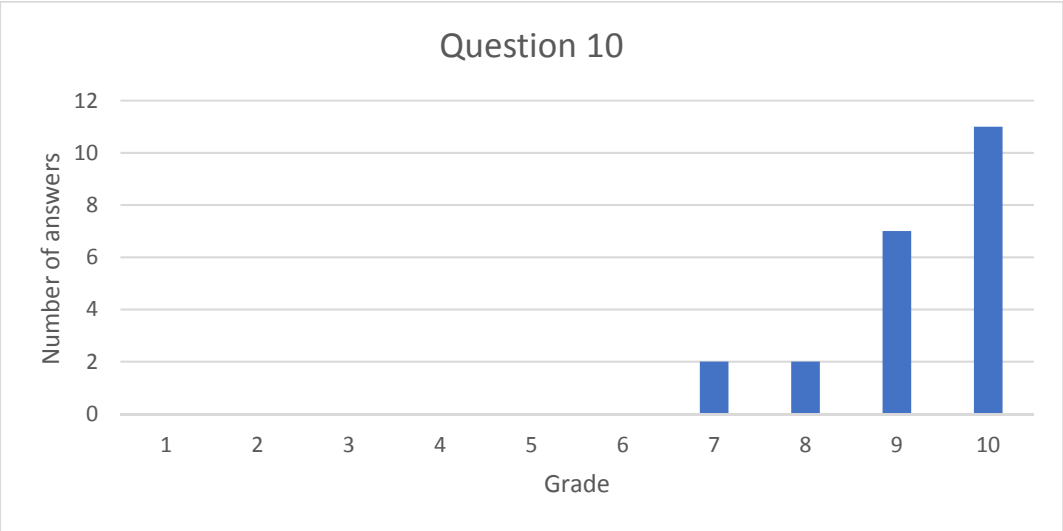


The average grade is: 9,09

Comments summarized:

- Yes, it should be continued to insist on further education on this topic, so the sustainability is inevitable
- This material should be included in subject curricula in energy related faculties, it is most certain way to reach young people at the beginning of their career

10. Do you think that the products of the project exhibit a level of flexibility and adjustment to changing conditions and needs with regards to the target groups identified?

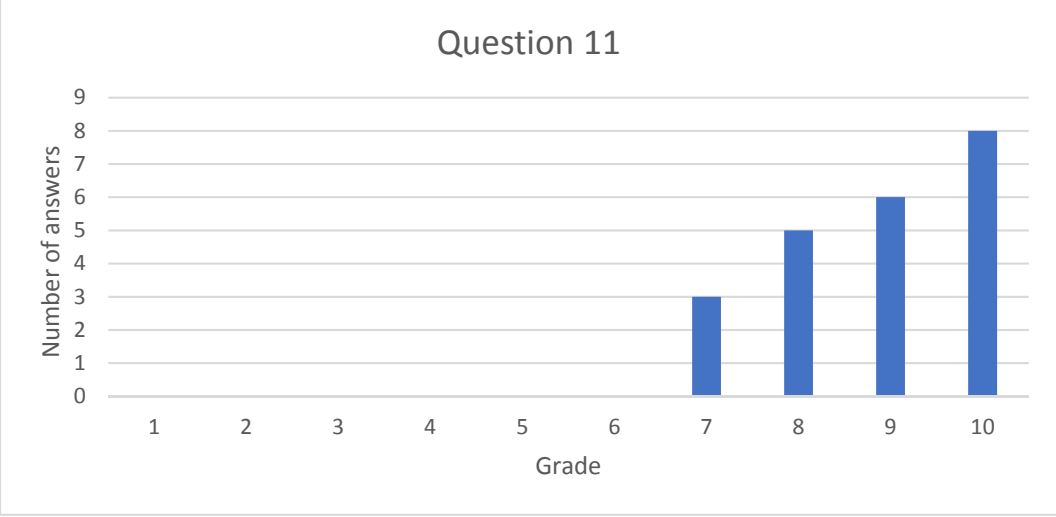


The average grade is: 9,23

Comments summarized:

- I think that project can be applied to other conditions as well.
- The research on this topic should be continued and constantly updated with new emerging technologies

11. To what extent do you believe that the training materials offer professional advice for the target groups reached?

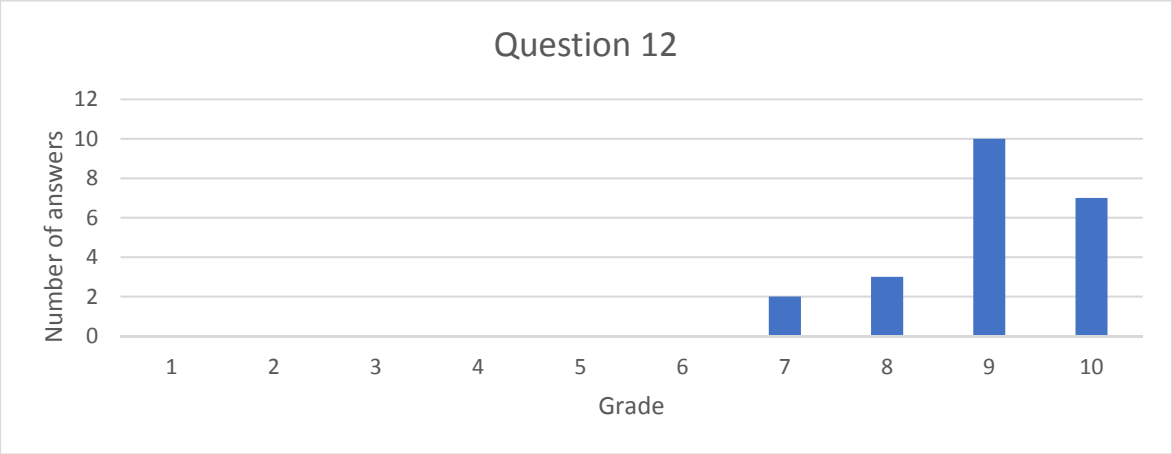


The average grade is: 8,86

Comments summarized:

- Maybe it is too early to judge if concrete professional advice could be received from this material, but it is great to have overview of different energy systems solutions and their environmental impact

12. What can you say about the innovative aspect of the materials that are produced in the project?



The average grade is: 9,00

Comments summarized:

- It is interesting
- It is contemporary and modern
- These kind of projects and material produced can help young engineers in better understanding and mastering the subject. While we were studying there were only printed books available.

WRITTEN ANSWERS

13. What was the most important / most interesting thing for you to learn on this event?

Comments summarized:

- The importance of environmental protection
- We have to pay attention to environmental protection through the development of the innovative educational material that are used within energy systems planning and design
- I understand now the importance of using renewable energy sources
- I see clearly the importance of this topic
- I see how important it is to use renewable energy sources as much as possible

14. Which is the weakest point of learning outcomes of CLEAN-kWAT project?

Comments summarized:

- The project is not widespread enough (more people and countries should get involved)
- There are no weak points of the project
- The weak points are new engineers that are still not informed about environmental protection

15. What should be improved in the Project in connection with the learning outcomes? What do you miss?

Comments summarized:

- So far, I would not change anything in project results
- There should be new subjects in our studies that are related to environmental protection so the results of the project can be promoted and used

16. If you could redesign a part of a product / learning outcome, what would you change?

Comments summarized:

- I need to study more so I can be able to answer if the results should be changed in any way. Right now, I still cannot answer that.

17. What is the most important information, knowledge or attitude the project and its outcomes offer you, that can be used in your studies / daily work?

Comments summarized:

- We have to include protection of our planet in everyday work and reduce the pollution
- It is important to include environmental questions and highlight the importance of ecology into everyday projects, so the investors can turn more to more environmentally benign energy systems

18. Please share any other comments, proposals you have, in order to strengthen or improve the products and learning outcomes of the project:

Comments summarized:

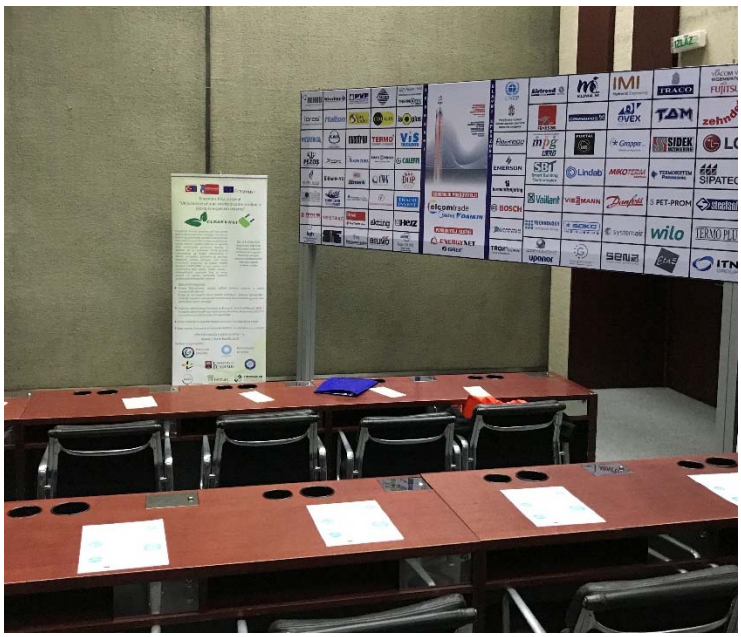
- You should be more promoted on Internet, so more people could hear about this project
- For this project to be improved, you should consult smaller group of relevant engineers
- Project is organized in an excellent manner
- It is necessary to include even more engineers with different professional background, to adjust to material to wider range of professionals, so people could be better informed and the final results will be even better
- We would like to see even more information so everybody can understand the importance of environmental protection from pollution

Comments and general conclusion

The average grades on our questions are in range from 8,86 to 9,73. It can be seen that the audience is very satisfied (best result 9,73) with the question „How useful do you find the learning outcomes of CLEAN-kWAT project for your field of expertise and for the target group you represented?". It is really encouraging, since it shows that the representatives of the aimed group find the results of CLEAN-kWAT project to be very useful. The aim and object of the project was very clear to the audience and they were satisfied with the selected target group and the information that were provided during this Multiplier event. They are still not so sure (average grade 8,86) if the project results could offer them professional advice during their career. Of course, it is still early to evaluate and be aware of the real impact of this project to energy sector. All participants during the discussion stated that they are very interested in learning more about the environmental impact of energy systems. Students also agree that, like it was stated in National Report, there is lack of environment related subjects in energy related engineering studies also in our country, so they are aware that this should be included in their education. Innovative aspects, such as e-learning portal, available book and visual training material is very appealing, especially for students and young engineers. The students are interested in receiving our book and other results, and they are informed that it will soon be available online free of charge. They also want to be informed about further news about our project via e-mail that they provided in Participant list.

IV) Photos of the event E4

Prepared questionnaires and dissemination material



Presentation



REZULTATI PROJEKTA






Audience


Discussion

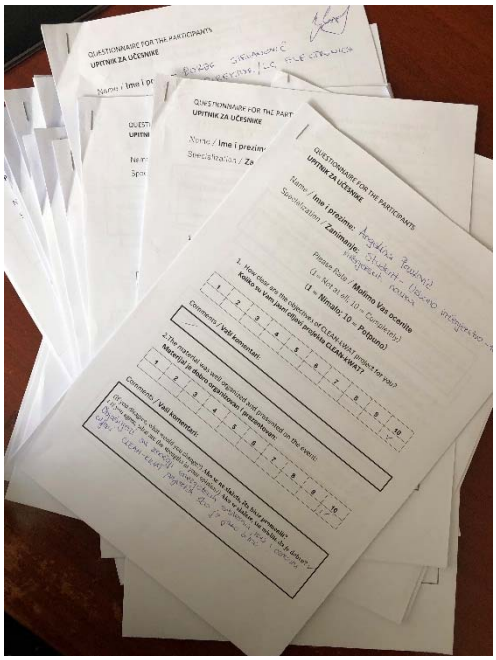





Students and professors reading material

Guest lecture on Renewable energy systems

Filled questionnaires



CLEAN-kWAT Multiplier Event E4 in Serbia 07.12.2017.

Programme

Presentation of Project Partners and Project aim

Presentation of Project Results (Book, Visual material, Booklet on EQF and ECVET)

Book on „Integrating Environmental Consideration into Energy System Development" – chapters overview

Presentation of CLEAN-kWAT website (how to subscribe, useful information)

Presentation of E-learning Portal (how to attend the course)

Discussion with participants and filling the questionnaire

Guest Lecture on Renewable Energy Systems