

DELIVERABLE D.T2.2.3

Functionality testing and validation of the
3D city models with energy audit
functions

Version 1
04/2019





D.T2.2.3: Deliverable

A.T2.2 Development of an advance 3D Energy Management System (EMS)

Feedback on 3D EMS

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Table of contents

1. Introduction	3
2. Questionnaire	5
3. Questionnaire results.....	8
4. Conclusions and recommendations.....	10
5. Annexes	10
5.1. Annex 1: Online questionnaire	10
5.2. Annex 2: List of participants.....	15



1. Introduction

The 3D Energy Management System (EMS) is one of the four modules of the BOOSTEE-CE OnePlace platform. 3DEMS is probably the most important and technological tool developed by the project consortium. It is a simple yet powerful GIS-based tool that provides a 3D representation of a selected set of buildings and is able to display energy-related information (i.e. consumptions, energy audits, building attributes, solar power potential, etc.) available for a building.

Why create such an online system?

The main advantage of the 3DEMS over more traditional applications is its simpleness and intuitive online solution that building operators, energy planners and municipality staff can use everywhere and every time without the need of special expertise. It is accessible without having to install any program, as it is a web-based tool requiring only a web browser to function.

What is it useful for?

The main function of the 3DEMS is to help building operators, energy & urban planners, municipality staff to better understand energy use and flows within a building in a much more graphical way, having a view also to the surrounding of a building and its location in the city. 3DEMS allows to share, visualize and query energy-related information to citizens and public authorities. It can be combined with smart metering live energy data and, being customizable, a wide range of data can be stored, displayed and managed within the platform. 3DEMS combines the most important functionalities of a GIS/CAD application into an easy-to-use web application which can be easily replicated and adapted to any municipality.




Velenje X

Building type: **Educational**

Electricity consumption [kWh/year]:
201629.1

Energy audit: **NO**

Energy consumption (heating) [GJ/year]:
785970

Energy efficiency measures already implemented in the building : **reducing heating demand: limiting the exposed surface area**

Energy source type (heat): **District heating**

Estimation of the amount of heating losses in the building: **no data**

Official name: **Glasbena šola Fran Korun Koželjski**

Recommended energy efficiency measures for the building: **Reducing heating demand: selecting efficient heating system**

Technology used to harvest a renewable energy source: **heat pumps**

The total CO2 emissions: **no data**

Typology (number of floors): **2**

Year of construction: **Built in 1987, a newer part in 1998**

Extended attributes (1)

▾ Building ID: 28



2. Questionnaire

Please select your country

- Austria
- Croatia
- Czech Republic
- Hungary
- Italy
- Poland
- Slovenia

1. Do you find the display of attributes of pilot buildings

	1	2	3	4	5	
not understandable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	easy to understand

Do you have any suggestion for improvement?

2. Would you prefer the attributes in local language?

- Yes
- No



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Where the numerical attributes or attributes with coded or text values are available for more than just one building, the analysis / comparison can be performed.

Two different analyses are available:

- **Filter analysis:**

On numerical attributes the following operations are possible:

- Equal
- Not equal
- Less than
- Less or equal
- Greater than
- Greater or equal

On attributes with coded values the following operations are possible:

- Equal
- Not equal

On attributes with text values the following operations are possible:

- Equal
- Not equal
- Regex*

*regular expression – matching a pattern in text

- **Colour coding** of attribute classes: Visualisation based on colour coding of attribute values segmented into classes.

Possibility to choose number of classes or class values and visualisation of single class.

On numerical attributes and attributes with coded values filtering according to the classes is possible.

3. Do you find the analysis of the attributes easy to perform?

	1	2	3	4	5	
Not easy at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very easy

4. Do you find these two analysis (filtering, colour coding) useful?

	1	2	3	4	5	
Not useful at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very useful

Do you have any suggestion for improvement?



BOOSTEE-CE

5. Would you prefer having additional documents attached to the building like thermal acquisition photo or energy audit document, if available?

- Yes
- No

6. If more energy data would be available, do you find the 3D EMS useful for estimating energy performances in public buildings and producing visualizations?

	1	2	3	4	5	
Not useful at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very useful.

7. If more energy data would be available, do you find the 3D EMS useful for delineating and prioritizing intervention areas/districts for large-scale, concerted and cost-effective investments aimed at building refurbishment?

	1	2	3	4	5	
Not useful at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very useful.

8. Do you see an opportunity for using 3DEMS in your daily work?

- Yes
- No

9. Would you attend a training seminar on using the 3DEMS tool, if it was organized in your country?

- Yes
- No

3. Questionnaire results

CZECH REPUBLIC

The survey was conducted in April 2019; altogether 26 responses were collected, partly from the participants of the Focus group meeting held in Zlín on 15.4, partly by other external relevant respondents.

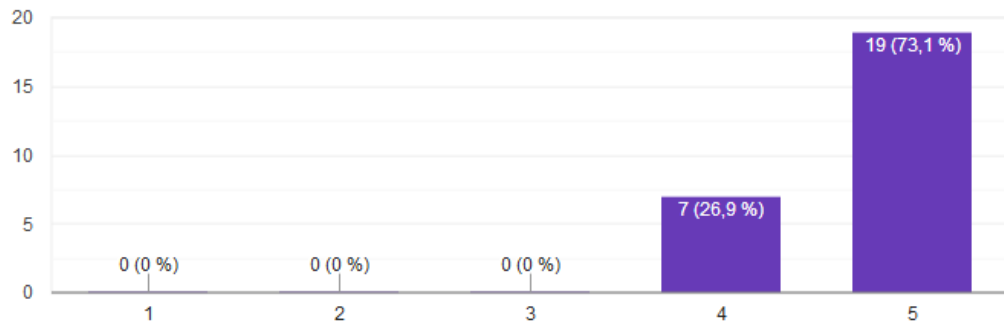


Picture 1 – Focus group meeting in Zlín 15.4.2019

Due to the complexity of the 3D Energy Management System (EMS) which is one of the four modules of the BOOSTEE-CE OnePlace platform, the survey was necessary for needs of the users and for further development of the portal.

Users mostly think that the portal is easy to use. Respondents prefer Czech language, because of the probably effectiveness and comfortable of the work in the 3DEMS.

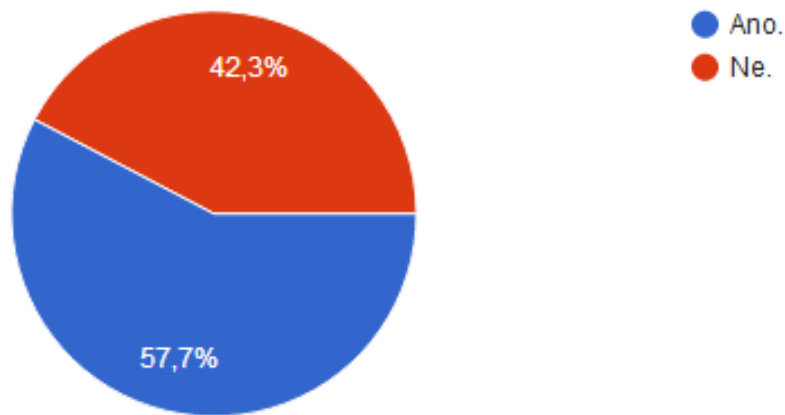
A key question addressing users was if analysis of the attributes is easy to perform. Most than 95 % think that is quite easy to actively use 3DEMS.



Picture 2 – usefulness of filtering and colour coding (5 = very useful, 1 = not useful at all)

All survey correspondents prefer having additional documents attached to the building like thermal acquisition photo or energy audit document.

The most disputative question was 3DEMS training. However, still 57,7 % respondents think that the additional training is necessary.



Picture 3 – willingness to attend a training seminar on using 3 DEMS tool (57,7% yes)



4. Conclusions and recommendations

CZECH REPUBLIC

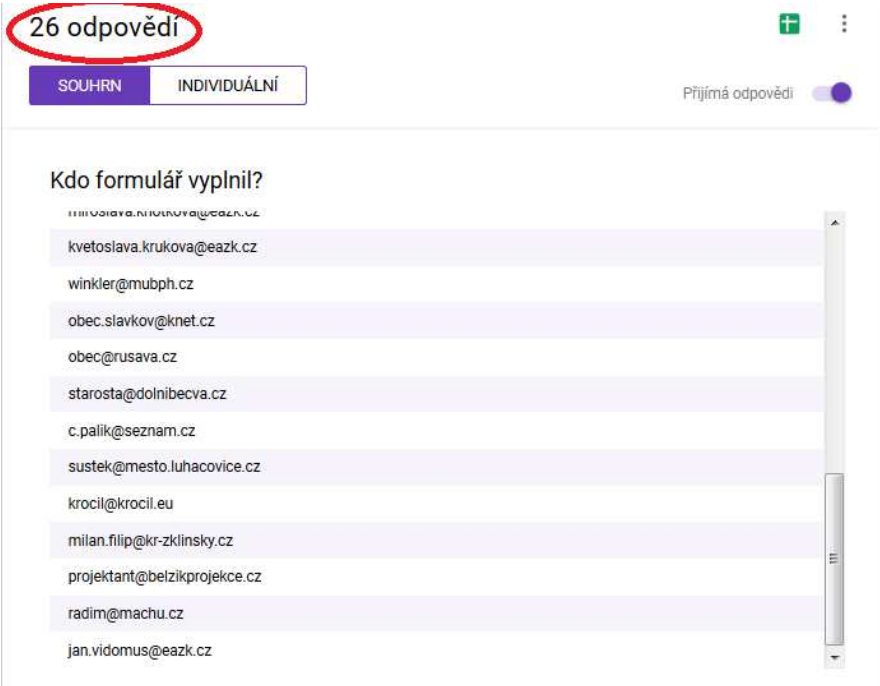
The recommendations for attributes of the pilot actions was to extend the attributes with the attribute "building energy performance" indicating the energy performance of the building both before and after the renovation, eventually indicating the possible future energy performance of the building suggested in the energy audit

Next recommendations for the filtering were to include the option of filtering the buildings according to the energy performance of buildings. Second opinion was that user will be able to increase to size of the letters for older audience.

5. Annexes

5.1. Annex 1: Online questionnaire

The questionnaire was introduced to participants in the Czech language, summary of particular questions follow as they were recorded by the system:



26 odpovědí

SOUHRN INDIVIDUÁLNÍ

Přijímá odpovědi

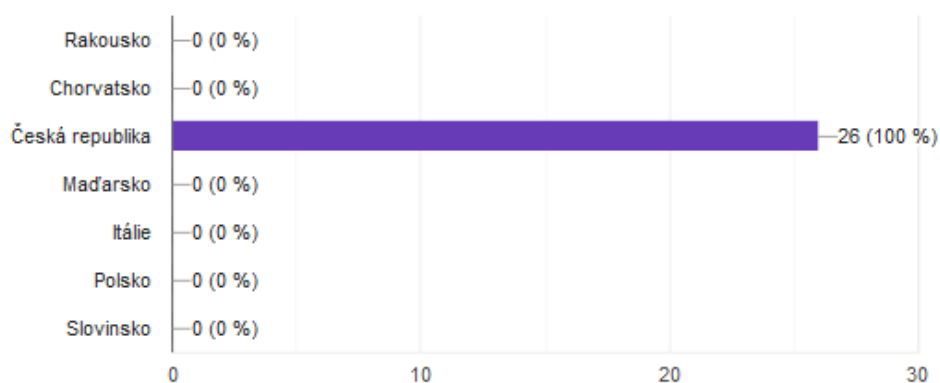
Kdo formulář vyplnil?

- kvetoslava.krukova@eazk.cz
- winkler@mubph.cz
- obec.slavkov@knet.cz
- obec@rusava.cz
- starosta@dolnibecva.cz
- c.palik@seznam.cz
- sustek@mesto.luhacovice.cz
- krocil@krocil.eu
- milan.filip@kr-zkilnsky.cz
- projektant@belzikprojekce.cz
- radim@machu.cz
- jan.vidomus@eazk.cz



Vyberte zemi

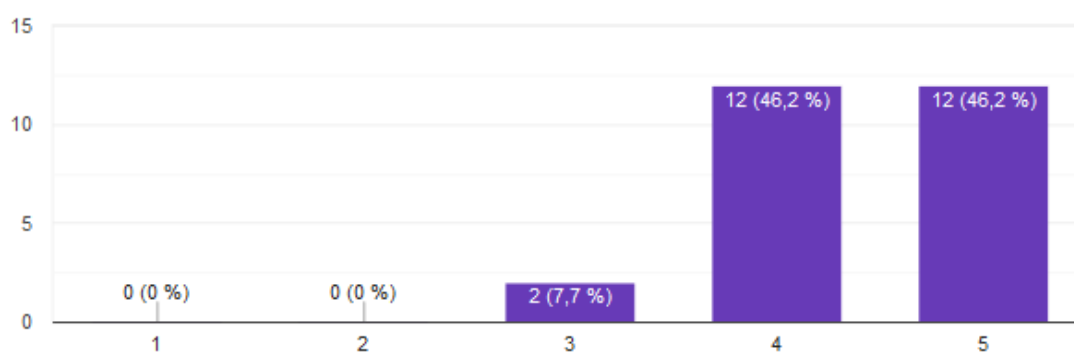
26 odpovědí



1. Zobrazení atributů pilotních budov je:



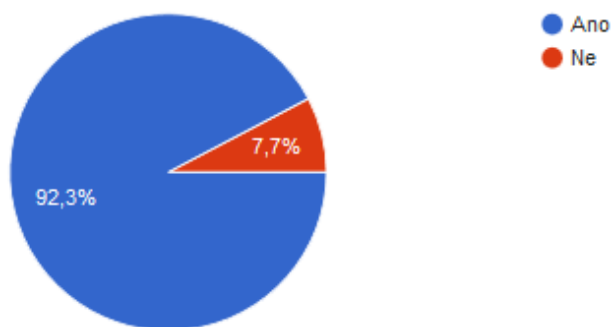
26 odpovědí





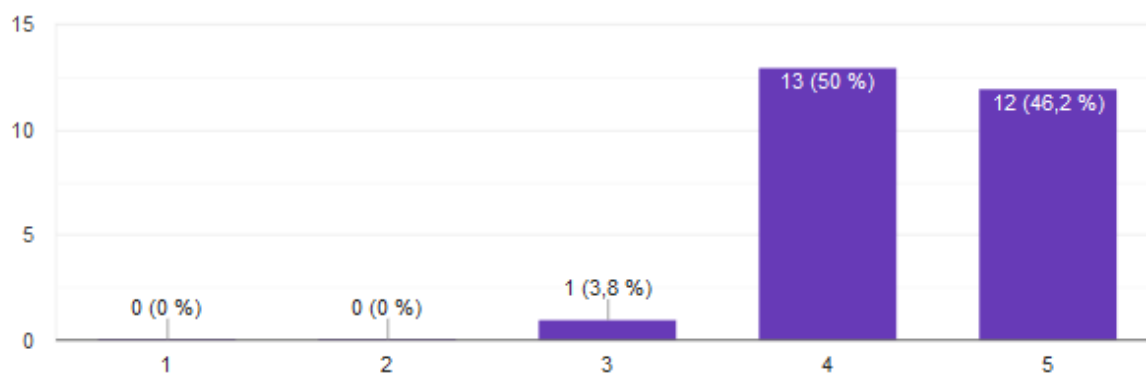
2. Dáváte přednost názvům atributů v češtině?

26 odpovědí



3. Považujete analýzu atributů uživatelsky přívětivou

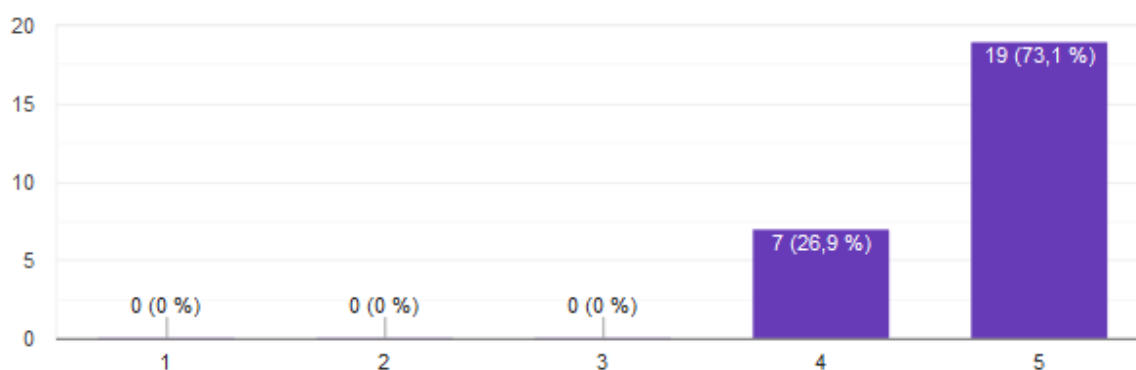
26 odpovědí





4. Považujete tyto dvě analýzy (filtrování, barevné programování) za užitečné?

26 odpovědí



Máte nějaké návrhy na zlepšení?

2 odpovědi

To include the option of filtering the buildings according to the energy performance of buildings

větší písmo pro starší osoby



5. Preferovali byste další dokumenty připojené k budovám jako např. snímky z termokamer, energetické audity atd.?

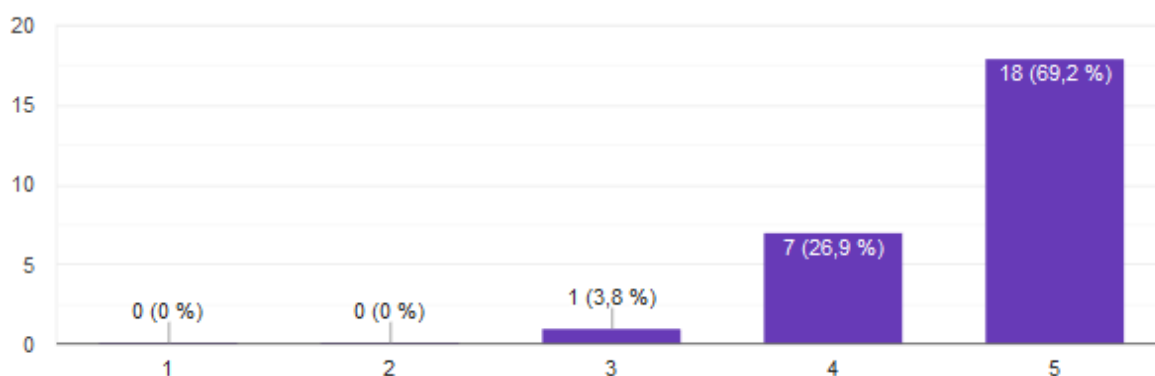
26 odpovědí



6. Pokud je k dispozici více energetických dat, považujete 3D energetický management za užitečný nástroj pro hodnocení energetické náročnosti budov a tvorbu vizualizací?



26 odpovědí

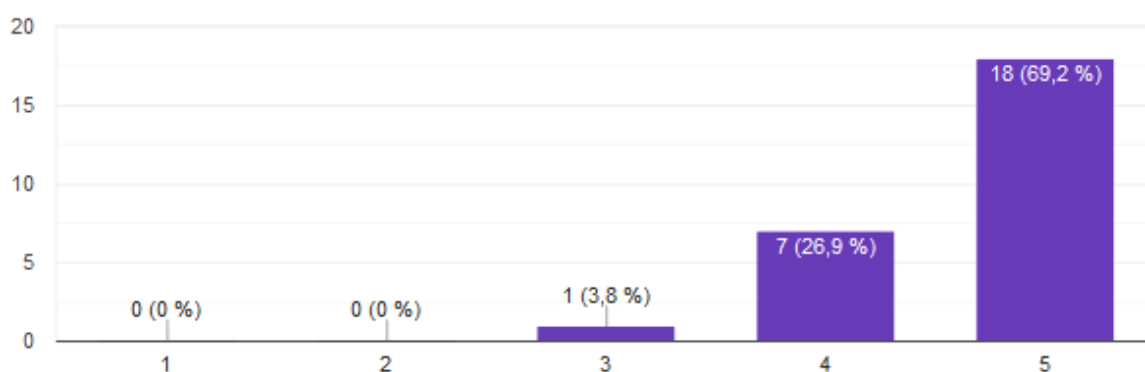




7. Pokud je k dispozici více energetických dat, považujete 3D energetický management za užitečný nástroj pro znázorňování a prioritizaci oblastí s nutností zavedení opatření na nákladově efektivní investice do renovací budov?

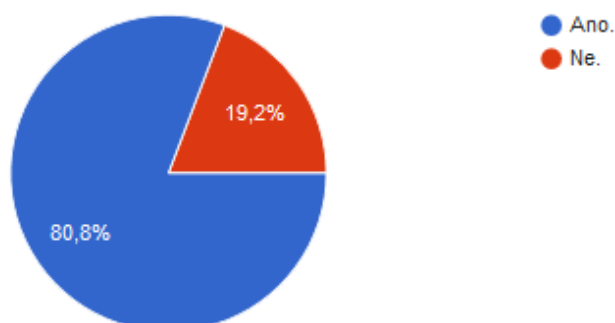


26 odpovědí



8. Vidíte příležitost v používání 3D energetického management ve Vaší každodenní práci?

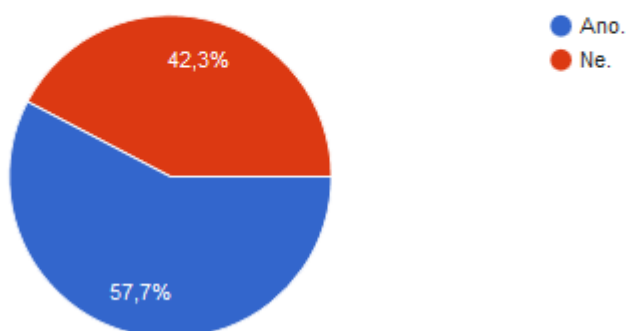
26 odpovědí





9. Navštívil(a) byste školící seminář na využití 3D energetického management ve vaší zemi?

26 odpovědí



5.2. Annex 2: List of participants

Focus Group meeting

Datum konání : 15. 4. 2019
Čas konání : 9:00
Místo konání : Budova č. 22 areálu Svitu Zlín,



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Focus Group meeting



Datum konání : 15. 4. 2019
Čas konání : 9:00
Místo konání : Budova č. 22 areálu Svitu Zlín,

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9	Kudr Vladimír	Uherskohradištská nemocnice a.s.	kudr@nemuh.cz	
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12	Petřek Jiří	Vsetínská nemocnice, a.s.	petrek@nemocnice-vs.cz	
13	Prášilová Eva, Ing.	Kroměřížská nemocnice a.s.	Eva.prasilova@nem-km.cz	
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Focus Group meeting



Datum konání : 15. 4. 2019
Čas konání : 9:00
Místo konání : Budova č. 22 areálu Svitu Zlín,

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