

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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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



BOOSTEE-CE

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
- Regexp*

*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?



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

Nine questions were directed towards potential users. Four participants had responded to the survey. The largest group of respondents were energy experts.

A first question addressing users was: How do you find the display of attributes of pilot buildings ? The users largely claim that it is easy to understand. The respondents see attributes of buildings as offering important potential.

Interesting comment includes:

- “In my opinion, the tool should describe building area, building volume, CO₂ emissions, electricity and heat consumption (it is in some buildings) but over what fuel is used and what power devices (boilers) are installed. In addition, a good aspect would be to show the gas and district heating in a given area. It would be possible to analyze the possibilities of connecting the installation to these networks and centralize heat generation, but also switch to low-emission fuel - gas.”

Would you prefer the attributes in local language ? “Yes” replied 50%. Indeed, the use of a local language may be easier to communicate.

25% of respondents consider attribute analysis as very easy to perform, and in most (50%) they consider it moderately easy.

The two analysis (filtering, colour coding) are considered useful and are seen as significant.

Another question was Would you prefer having additional documents attached to the building like thermal acquisition photo or energy audit document, if available ? “Yes” replied 100%. Indeed, the inclusion of technical documentation will provide additional support for energy experts.

The survey also focused on estimating energy performance of buildings. 50% of respondents say that it is sufficiently useful to have more energy data available. Probably, the formulation of specific energy data would be helpful.

Next question was about delineating and prioritizing intervention areas/districts for large-scale, concerted and cost-effective investments aimed at building refurbishment. 75% answer that more energy data availability would be useful. The comments show that there is a need to further develop the 3D EMS module to make it even more functional.

75% answer yes to the following questions: “Do you see an opportunity for using 3D EMS in your daily work ?” and “Would you attend a training seminar on using the 3D EMS tool, if it was organized in your country ?”.

Overall, the comments show that there is a lot of interest in the 3D EMS tool and its practical use. However, some say that this module does not provide the results expected.



4. Conclusions and recommendations

Exploration of the potential of the OnePlace platform is an activity of the BOOSTEE-CE project Partners. Another activity is a benchmark on platform aimed at examining and analyzing functionality and usability.



5. Annexes

5.1. Annex 1: Online questionnaire



5.2. Annex 2: List of participants

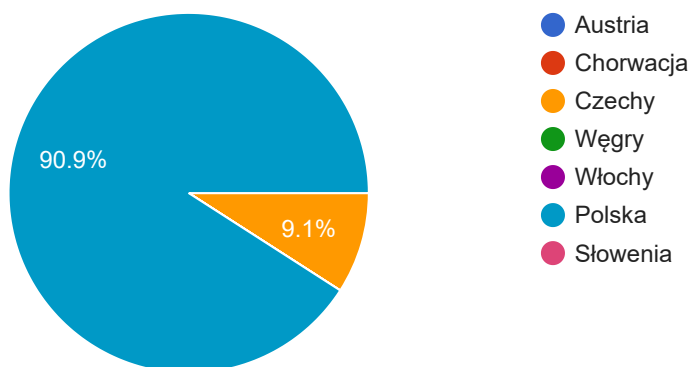
1. EKAR Ltd.
2. Mazovia Energy Agency Ltd.
3. University of Ecology and Management
4. Neoenergetyka Ltd.
5. Municipality of Lubawka
6. Municipality of Zacler
7. Municipality of Jelenia Góra
8. Karkonoska Regional Development Agency - KAAR
9. Municipality of Płońsk

Opinie użytkowników BOOSTEE-CE na temat 3D EMS

11 responses

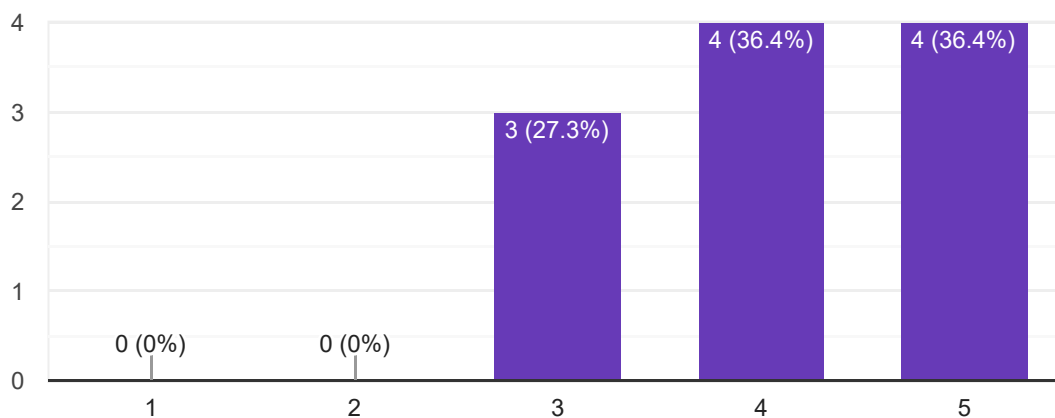
Proszę wybrać kraj, z którego Pan/i pochodzi:

11 responses



1. Czy uważa Pan/i, że wyświetlane atrybuty przy budynkach pilotażowych są

11 responses



Czy ma Pan/i jakieś sugestie dotyczące ich poprawy?

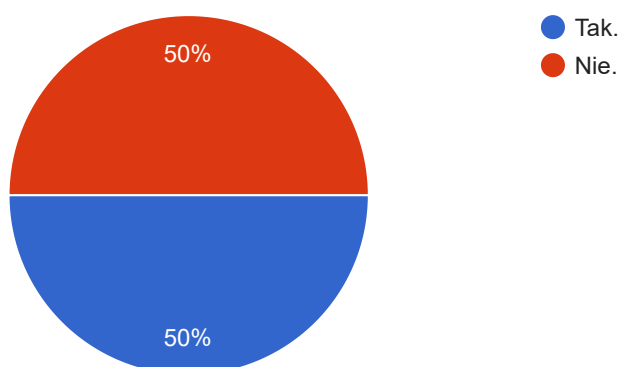
1 response

W mojej opinii narzędzie powinno mówić o powierzchni, kubaturze, emisji CO2, zużyciu energii elektrycznej i ciepłej (to w niektórych budynkach jest) ale ponad to jakim paliwem jest opalane i jakiej mocy urządzenia (kotły) są zainstalowane w kotłowni.

Dodatkowo dobrym aspektem byłoby pokazanie sieci gazowej i ciepłowniczej w danym terenie. Można by było analizować możliwości przyłączenia instalacji do tych sieci przez co i centralizować wytwarzanie ciepła (ciepłownie i elektrociepłownie) ale również przechodzić na paliwo niskoemisyjne – gaz.

2. Czy wolałby/ałaby Pan/i, żeby atrybuty były w języku ojczystym?

10 responses

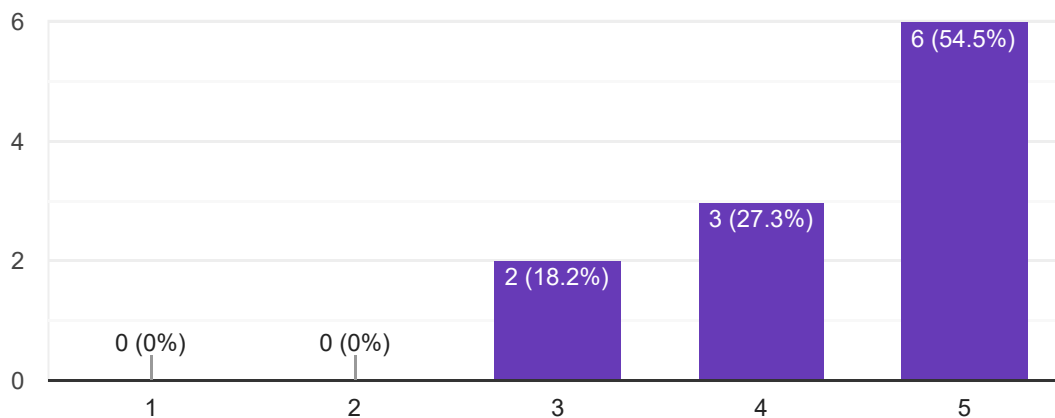


3. Czy analiza atrybutów jest łatwa do wykonania?

11 responses

4. Czy uważa Pan/i, że dwie analizy (filtrowanie, kodowanie kolorów) są przydatne?

11 responses



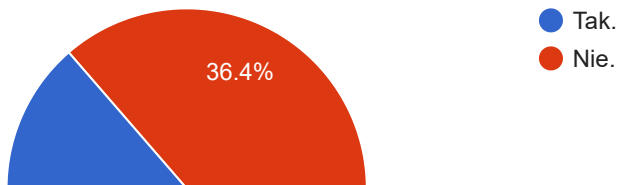
Czy ma Pan/i jakieś sugestie dotyczące poprawy?

0 responses

No responses yet for this question.

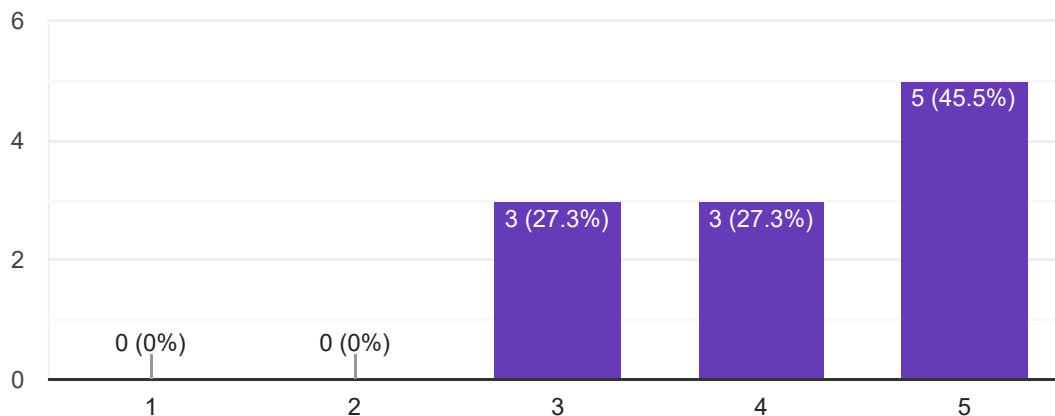
5. Czy wolałby/ałaby Pan/i, aby do budynku dołączone były dodatkowe dokumenty takie jak zdjęcie termowizyjne lub dokument audytu energetycznego, jeśli są dostępne?

11 responses



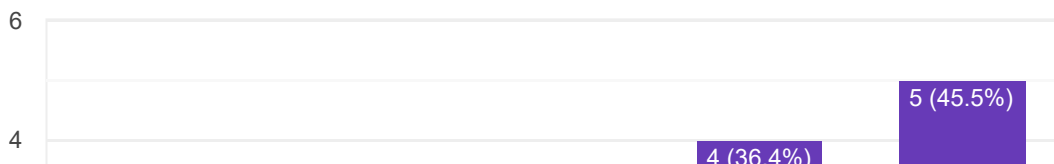
6. Jeśli dostępnych będzie więcej danych energetycznych, czy uważa Pan/i, że 3D EMS będzie przydatny do szacowania wydajności energetycznej w budynkach publicznych i tworzenia wizualizacji?

11 responses



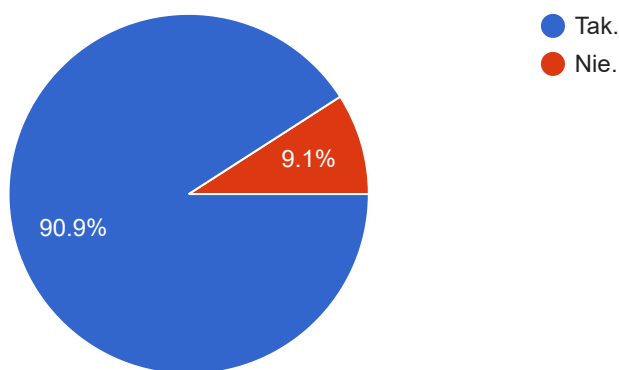
7. Jeśli dostępnych będzie więcej danych dotyczących energii, czy uważa Pan/i, że 3D EMS będzie przydatny do wyznaczania i ustalania priorytetów obszarów/okręgów interwencyjnych w celu realizacji dużych, zgodnych i opłacalnych inwestycji mających na celu modernizację budynków?

11 responses



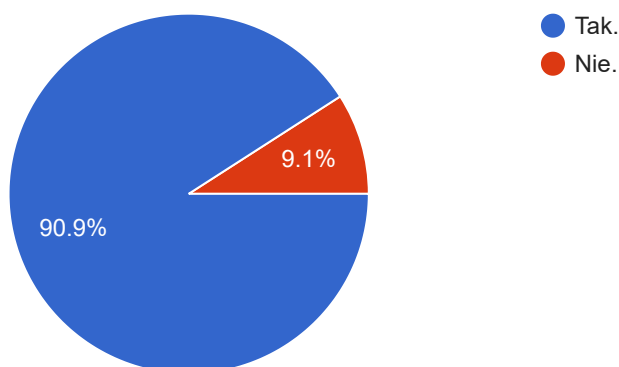
8. Czy widzi Pan/i możliwość wykorzystania 3DEMS w swojej codziennej pracy?

11 responses



9. Czy uczestniczyłby/łaby Pan/i w seminarium szkoleniowym dotyczącym korzystania z narzędzia 3DEMS, jeśli zostałoby ono zorganizowane w Pana/i kraju?

11 responses



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